SWEET'S ARCHITECTURAL CATALOGUE

(REG. U. S. PAT. OFF.)

TWENTY-THIRD ANNUAL EDITION
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A

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SECTION A

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(REG. U. S. PAT. OFF.)

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Manufacturers of Drafting Room Furniture

MAIN OFFICE AND FACTORY

TWO RIVERS, WIS.

EASTERN BRANCH AND WAREHOUSE, RAHWAY, N. J.

Products

OAK and STEEL BLUE PRINT SECTIONAL CABINETS; ADJUSTABLE DRAWING TABLES; DRAWING BOARDS.

Also manufacturers of Collapsible Drawing Tables and Easels, Parallel Rule Attachments, Artists' Tables, Typewriter Tables, School Tables, etc.

Blue Print Sectional Cabinets in Wood

Built on the unit plan—add as requirements demand.

Thoroughly well made of seasoned oak and well finished. Each drawer is fitted with label holder, substantial pulls, and hood at back of the drawer.

Oak Blue Print Cabinet Units
Combination 29

Sizes—Carried in stock in two sizes. Units lettered from A to P and numbered 32 and 37.

No. 32 Units—Have drawers with inside dimensions 32x42½ in., outside dimensions 34½x45½ in.

No. 37 Units—Have drawers with inside dimensions 25x37½ in., outside dimensions 27¼x40½ in. Special sizes to order.

Bases—Bases for the above units are supplied in four different styles flush to the floor; or on legs, sanitary style.

Blue Print Sectional Cabinets in Steel

Built on the unit plan—add as requirements demand.

Substantially constructed of cold rolled furniture steel with joints electrically welded. Finished in olive green enamel, baked on. A beautiful and lasting finish that will harmonize with any surroundings.

Each drawer fitted with label holder, substantial pulls, patented paper weights, and hood at back of drawer.

Sizes—Carried in stock in two sizes. Units numbered from 1825 to 1839 have drawers with inside dimensions 25x37 in., outside dimensions of cabinet 28½x40⅛ in. Units numbered from 1843 to 1857 are 6 in. wider and 7 in. deeper.

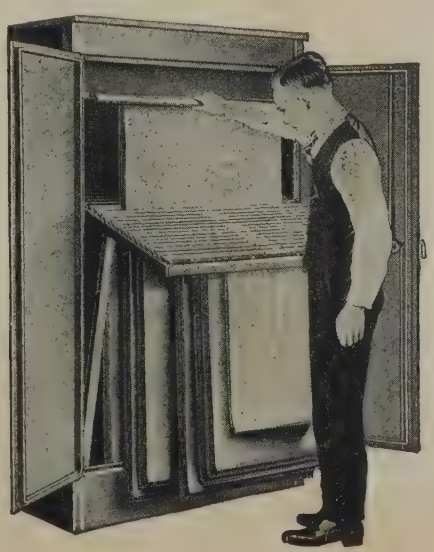
Hamilton-Calumet Vertical Planfile

For filing large records and sets of plans. Made in sizes from 24x70 in. to 48x70 in. Each cabinet has a capacity of 3000 prints, drawings or tracings.

Hundreds of these cabinets are in use in architects' and engineers' offices.

Made of steel and finished in olive green baked enamel.

Ask for booklet A Dr. B-5.



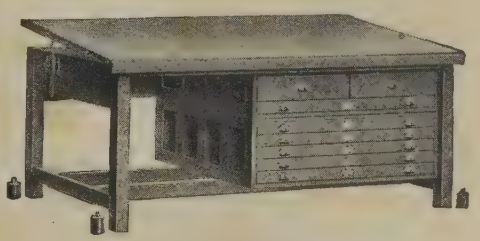
Drawing Tables

Perfection-Monroe Adjustable Drawing Tables—Adjustable in height from 31 to 41 in. Top tilting to any angle. White pine tops 23x31 to 36x60 in. with end cleats which allow for expansion and contraction of top.

A very practical, rigid drawing table at a moderate price. The diagonal braces insure rigidity.

Perfection-Monroe Adjustable Drawing Table

Tables Nos. 220 to 247—These tables are made in two different sizes, 36x72 and 42x84 in. The tops are made of selected white pine with end cleats screwed to board with oblong washers and heavy screws which allow for expansion and contraction of board. These tables will take any of our regular No. 32 or No. 37 units for filing purposes.



Drawing Table No. 234

Hamilton Steel Base Adjustable Drawing Tables—A new and unique drawing table. Base of steel—absolutely no breakage in shipment or while in use. Top of best white pine in sizes 36x48, 36x60, and 42x72 in. Adjusting device wonderfully simple, efficient, and positive.

Hamilton Steel Base Adjustable Drawing Table

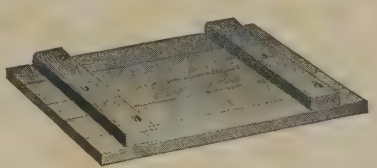
Top cannot possibly drop down accidentally. Top tilts to any angle and vertically.

Finished in olive green baked enamel, attractively striped.

Drawing Boards

We manufacture six different styles of drawing boards. Made in pine and basswood in any size.

Style D—1 1/16-in. board with 3x1¼-in. maple cleats and oblong washers staggered.



Style D, Drawing Board

Facilities and Experience

This company has had over 45 years' experience in making business furniture. It has a warehouse at Rahway, N. J. so as to insure prompt delivery in the East, as well as in the West.

Send for catalogue, H-S-E.

THE C. F. PEASE COMPANY

Blue Printing Machines and Accessories, Drafting Room and Architects' Supplies

EASTERN SALES OFFICE AND DISPLAY ROOM
12 East 44th Street
NEW YORK, N. Y.

837 North Franklin Street, corner Institute Place
CHICAGO, ILL.

PACIFIC COAST SALES OFFICE
541 South Spring Street
LOS ANGELES, CALIF.

Products

BLUE PRINTING EQUIPMENT and ACCESSORIES, which include: Blue Printing Machines; Washing and Drying Machines, single sheet and continuous type; Blue and Brown Print Paper and Cloth, sensitized and unsensitized; Blue Print Room Supplies.

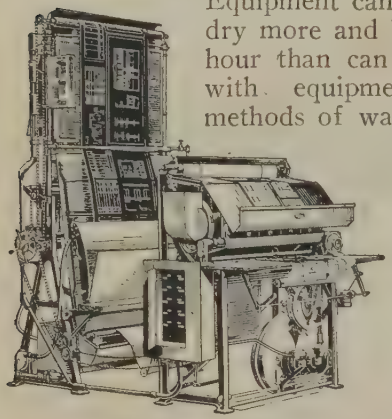
DRAFTING ROOM FURNITURE and SUPPLIES of all kinds: DRAWING INSTRUMENTS and MATERIALS of every sort; all leading brands of TRACING PAPERS and CLOTHS.

Also Engineers' and Surveyors' Instruments and Supplies.

Pease "Peerless" Continuous Electrical Blue Printing Equipment

Saves Labor, Time and Dollars—

One operator and a Pease "Peerless" Blue Printing Equipment can print, wash, potash and dry more and better blue prints in one hour than can be done in four hours with equipment using independent methods of washing and drying.



Pease "Peerless" Continuous Electrical Blue Printing Machine

Prints, Washes, Potashes and Dries—

Every operation is automatic and continuous and the Pease "Peerless" will handle up to 120 linear yards of perfect blue prints per hour at lowest possible per sq. ft. cost.

Economical for Short Runs—

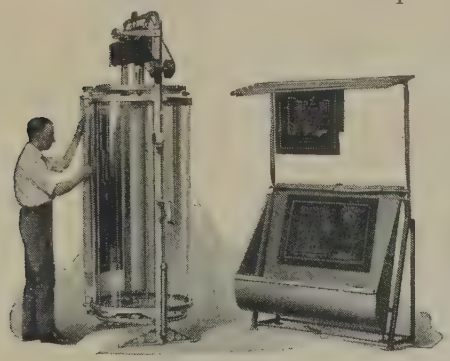
Short runs of 5 or 10 yards can be handled just as economically when required, by an operator who has other duties to perform.

Ask for Catalog MP-37.

Pease "Vertical" Blue Printing Machine and Sheet Washer

A Fast Vertical Blue Printing Machine—

Where the demand for blue printing does not warrant the purchase of a Pease "Peerless" Continuous Equipment, the Pease "Vertical" Blue Printing Machine and Sheet Washer meets every blue printing requirement, except continuous production.



Pease "Vertical" Electrical Blue Printing Machine and Pease Sheet Washer

Machine is made in ten sizes and is equipped with a Pease UV Universal High Power Arc Lamp which gives absolutely uniform results, with fastest printing speed. The Pease Sheet Washer is made in three sizes and completely eliminates open bath trays, dripping prints and wet floors.

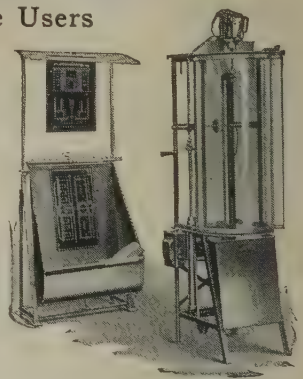
Ask for Catalog MV-37

Pease "Junior" Vertical Blue Printing Machine and Sheet Washer

For Moderate Users of Blue Prints—

Completely eliminates old unreliable makeshift or sun frame methods and will furnish clear and distinct blue prints in any size up to 24x36 inches in from one to one and one-half minutes. Similar in design to the larger Pease Vertical Machine, can be stood in a corner of the drafting room, and can be connected directly into the lighting circuit. Initial investment is small and maintenance expense is reduced to a minimum.

Ask for Catalog MJ-37.



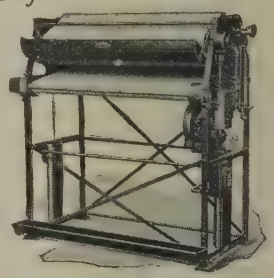
The Pease "Junior"
Machine operates on either 110 or 220 volts A-C. or D-C. and requires a floor space of 25x26 in. The sheet washer requires a floor space of 24x34 in. and is equipped with spray pipe and drain pipe

Pease Sheet Dryer

No Waiting for Prints to Dry—

Dries dripping wet prints perfectly at the rate of 8 linear feet per minute. Either electric or gas heating element can be furnished and Pease Dryers are equipped with copper cylinder to which prints will not adhere. An inclined feeding apron eliminates steam pockets and resultant creased prints while the automatic band control constantly regulates traveling of the band. Made in 22, 45 and 57-inch widths.

Ask for Catalog SD-37.



Pease Sheet Dryer
With gas heater, thermostatic heat control and automatic band control. Electric heating element can be furnished if desired

Pease Blue Print Paper

Guaranteed Rag Stock—

Pease Blue Print Paper is coated in four printing speeds and all rolls are guaranteed to contain exact rag stock specified and be of full measure and in one piece. Pease Paper has a high folding test, excellent permanency and is the nearest non-fading blue print paper in existence.

Ask for Catalog BP-37.

Pease Drafting Room Furniture and Drafting Room Supplies

Includes both steel and wooden, sectional, horizontal and vertical filing cabinets; drawing tables; drawing boards; draftsmen's stools and drawing materials, briefly—"Everything for the Drafting Room."

Ask for Catalog F-37.

Pease Filing Cabinet

Catalog G-37

Ask for your copy.

Contains complete illustrations and descriptions of the full line of Pease Blue Printing Machinery, Blue Print Paper, Drafting Room Furniture and Supplies and Architects' and Engineers' Equipment.

WICKES BROTHERS

ESTABLISHED 1856

SAGINAW, MICH.

SALES OFFICES

NEW YORK, N. Y., 501 Fifth Avenue

SEATTLE, WASH., 736 White-Henry Building

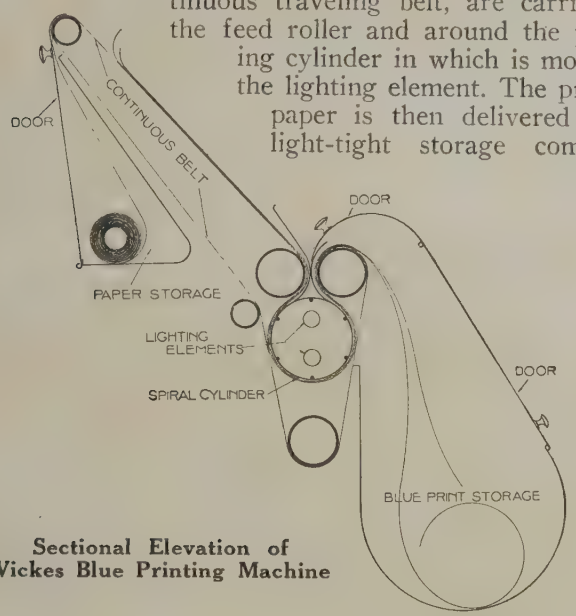
Products

Wickes Continuous Electric Blue Printing Machines.

Also builders of Standard Heavy Duty Engine Lathes, Crankshaft Lathes, Production Lathes, Heavy Duty Punches (vertical and horizontal), Shears (plate, bar, structural), Bending Rolls (horizontal, vertical, and angle), Radial Wall Drills, Flanging Clamps.

Wickes Blue Printing Machines

Operation—The Wickes continuous electric blue printing machine will print separately cut sheets or continuous rolls in any length and in widths varying from 2 to 48 in. The paper and tracing, placed on a continuous traveling belt, are carried to the feed roller and around the printing cylinder in which is mounted the lighting element. The printed paper is then delivered to a light-tight storage compartment and the tracing is returned to the operator or carried to the storage compartment, as desired.



Sectional Elevation of Wickes Blue Printing Machine

The machine is entirely automatic, the only work required of the operator being the placing of the tracing and blue print paper on the traveling belt. The entire operating mechanism is controlled by three toggle switches conveniently located for the operator, one being for the motor and one for each auxiliary, thus controlling each light on a separate starting apparatus. The operator, without changing position, can start, stop, reverse or vary speed of drive.

All wiring is in metallic conduit, the entire electrical mechanism being approved by the National Board of Fire Underwriters.

Lighting Elements—The light is obtained from two mercury vapor lamps of standard pattern. These lamps operate at a very low temperature and require absolutely no attention from the operator at any time.

Printing Cylinder—The printing cylinder which surrounds the lighting element is composed of longitudinal and spirally disposed wires, woven right-handed on one side of the center of the machine and left-handed on the other side. The cylinder is stationary and the tracing and blue print paper are carried around it by the traveling belt. The light is projected directly in a radial line through the tracing without having to pass through any intervening glass, the spirally disposed wires offering much less actual obstruction to the light than any glass cylinder would. The right and left-handed spirally woven wires impart a very desirable ironing and spreading effect to the entire surface of the tracing. The tracing and paper pass over 92% of the circumference of the cylinder.

Continuous Traveling Belt—The contact between the tracing and the paper is secured by means of a single, wide, continuous belt which passes around the feed rolls and the metallic printing cylinder. The tension of this belt is regulated automatically. Its life is guaranteed for three years' service.

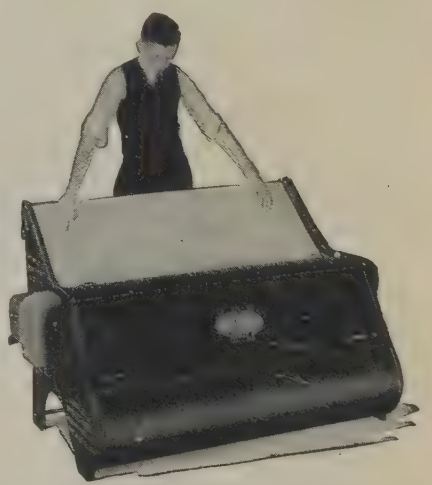
Advantages of the Wickes Blue Printing Machine—Blue prints are made with an absolutely uniform tone throughout.

The operator is not required to work in a darkened room, the light-tight compartments making this unnecessary.

The operation of the machine is so simple that any person, however inexperienced, can make perfect prints with it.

There is no glass cylinder to clean, break or replace, our metallic cylinder being self-cleaning and unbreakable.

The power required is exceptionally low; the consumption when running at maximum capacity being but .015 kw. per sq. yd.



Wickes Continuous Electric Blue Printing Machine

Model 20 Blue Printing Machine

The Model 20 machine carrying two lighting elements on separate starting apparatus has a capacity of 400 sq. yd. per 8-hour day. With the improved variable speed, 4-step, quick change gear box and adjustment of motor on iron driving disc, the printing speed can be adjusted to suit any grade of paper, including Van Dyck's. The machine is entirely self-contained; is 30 in. high and requires a floor space of 2 ft. 6 in. x 5 ft.

Model 15 Blue Printing Machine

The Model 15 machine is constructed exactly like the Model 20 except that it carries only one lighting element, decreasing the printing speed about one-half. It is so constructed that another lighting element can be added at any time as required, thus changing it to a Model 20 machine.

Catalogues

Catalogues fully describing the Wickes blue printing machines will be sent on request.

ROBERT W. HUNT COMPANY

Engineers

Inspection and Tests of Materials for Buildings and Structures

GENERAL OFFICES
2200 Insurance Exchange
CHICAGO, ILL.

NEW YORK, N. Y. | DENVER, COLO. | KANSAS CITY, MO. | BIRMINGHAM, ALA. | DALLAS, TEX.
SAN FRANCISCO, CAL. | RICHMOND, VA. | CINCINNATI, OHIO | BUFFINGTON, IND. | DETROIT, MICH.
NEW ORLEANS, LA. | MILWAUKEE, WIS. | CLEVELAND, OHIO | PITTSBURGH, PA. | JACKSONVILLE, FLA.
HOUSTON, TEX. | ST. LOUIS, MO. | PHILADELPHIA, PA. | SEATTLE, WASH. | MINNEAPOLIS, MINN.
VANCOUVER, B. C. | MONTREAL, QUE. | TORONTO, ONT. | LONDON, ENGLAND

General Engineering Service

CONSULTATION SERVICES in all ENGINEERING FIELDS: MECHANICAL, CIVIL, HYDRAULIC, ELECTRICAL and CHEMICAL.

The SUPERVISION and DETAIL INSPECTION of CONCRETE CONSTRUCTION, including EXAMINATIONS and REPORTS upon the SUITABILITY of AGGREGATES.

SOIL TESTS, TEST BORINGS and REPORTS upon the SAME in CONNECTION with FOUNDATIONS.

Also, Reports on Permissible Floor Loads and on Existing Conditions of Buildings and other structures.

Testing, Physical, Chemical and Machinery

Strength tests of materials and systems of construction—steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

Chemical tests of all building materials, including steel, iron, cement, paint, oils, slags, limestones, marls and clays.

Duty and efficiency tests of entire plants—engines, boilers, pumps, compressors and other machinery.

Structural Steel Inspection

The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

Estimation of weights from detail drawings, and checking shipped weights of finished work.

The supervision and detail inspection of the structure during erection.

Cement Inspection

The testing of cement, including the sampling in car load or bin lots, at the mills or warehouses or when delivered on the work, and the identifying of each lot with serially numbered blue tags.

Complete cement and chemical laboratories in connection with cement testing at Chicago, New York, Pittsburgh, St. Louis, Kansas City, San Francisco, Birmingham, Montreal, Toronto, Vancouver and London.

Soil Tests, Test Borings and Reports

The scientific method of determining areas of foundations, permissible loads per square foot and the probable ultimate settlement under load, based on an analysis of direct soil loading tests and borings, as compared with our records of the results of similar investigations.

Specification Forms

The following is a form for incorporation in specifications for buildings and other structures, covering the necessary arrangements for inspection and relationship between inspector and contractor:

Materials of Construction—Shall be inspected and tested by ROBERT W. HUNT COMPANY, who will act under instructions of the architect or engineer, and report to him the results of inspection and progress of the work, and otherwise facilitate prompt and early delivery of satisfactory materials. The inspectors shall also place marks of identification on accepted materials. Such inspection shall not relieve contractor from responsibility to furnish satisfactory material, but is a measure of precaution against oversights and errors. The cost of this inspection is to be borne by the contractor unless otherwise stipulated.

Structural Steel—Shall be inspected and tested at the rolling mills and also inspected at the shops during fabrication, in proper manner, to determine whether the material conforms with the plans and specifications. Contractor shall furnish inspector necessary facilities for inspecting, testing and labor for handling material.

Reinforcing Steel—Shall be inspected and tested at the mill or warehouse in proper manner, contractor furnishing, free of charge, testing apparatus and facilities for inspection.

Cement—Shall be sampled and tested before delivery to the work, in accordance with American Society for Testing Materials, or the special specifications attached.

Standard Specifications

For complete information write our nearest office and request a copy of our recent publication on "Inspection and Tests of Materials for Buildings and Structures."

Please address our Company on your own letterhead, giving title and position.

THE FOUNDATION COMPANY

120 Liberty Street
NEW YORK, N. Y.

CABLE ADDRESS
"UNDERFOUND"

BRANCH OFFICES

ATLANTA, GA., 101 Marietta Street
CHICAGO, ILL., 27 E. Jackson Boulevard
PITTSBURGH, PA., Fulton Building
SAN FRANCISCO, CAL., Kohl Building

FOREIGN OFFICES

MONTREAL, QUEBEC
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TOKYO, JAPAN
CARTAGENA, COLOMBIA
BRUSSELS, BELGIUM
ATHENS, GREECE
LONDON, ENGLAND
PARIS, FRANCE
MEXICO CITY, MEXICO, D. F.

Services

THE FOUNDATION COMPANY is an organization of Construction Engineers widely experienced in BUILDING DIFFICULT SUPERSTRUCTURES and SUBSTRUCTURES in all parts of the world. The enviable reputation gained in its early history for trustworthy underground construction has followed it into the field of GENERAL CONTRACTING.

THE FOUNDATION COMPANY has built buildings of nearly every known type such as offices, banks, stores, hotels, club houses, dwellings, and also the whole range of industrial buildings, power plants, etc. This company is successfully building warehouses, railroad terminals, filtration and sewage plants, hydro-electric developments, highways, bridges and bridge piers, mine shafts and tunnels, river and harbor developments and complete industrial projects.

As its name would indicate, THE FOUNDATION COMPANY also specializes in underpinning and foundations. Most of the skyscrapers in lower New York City rest on foundations built by this Company.

Courtaulds, Ltd., Montreal, Can.

Forrest Hills-Ricker Hotel, Augusta, Ga.

T. Eaton Co. Ltd., Montreal, Can.

Manatee River Hotel, Bradentown, Fla.

The Foundation Company, General Contractor

RAMP BUILDINGS CORPORATION

Consulting Garage Engineers

21 East 40th Street, NEW YORK, N. Y.

Product

D'HUMY MOTORAMPS, a patented System of Garage Design, involving a combination of ramps with staggered floor levels, the building being divided into two or more units.

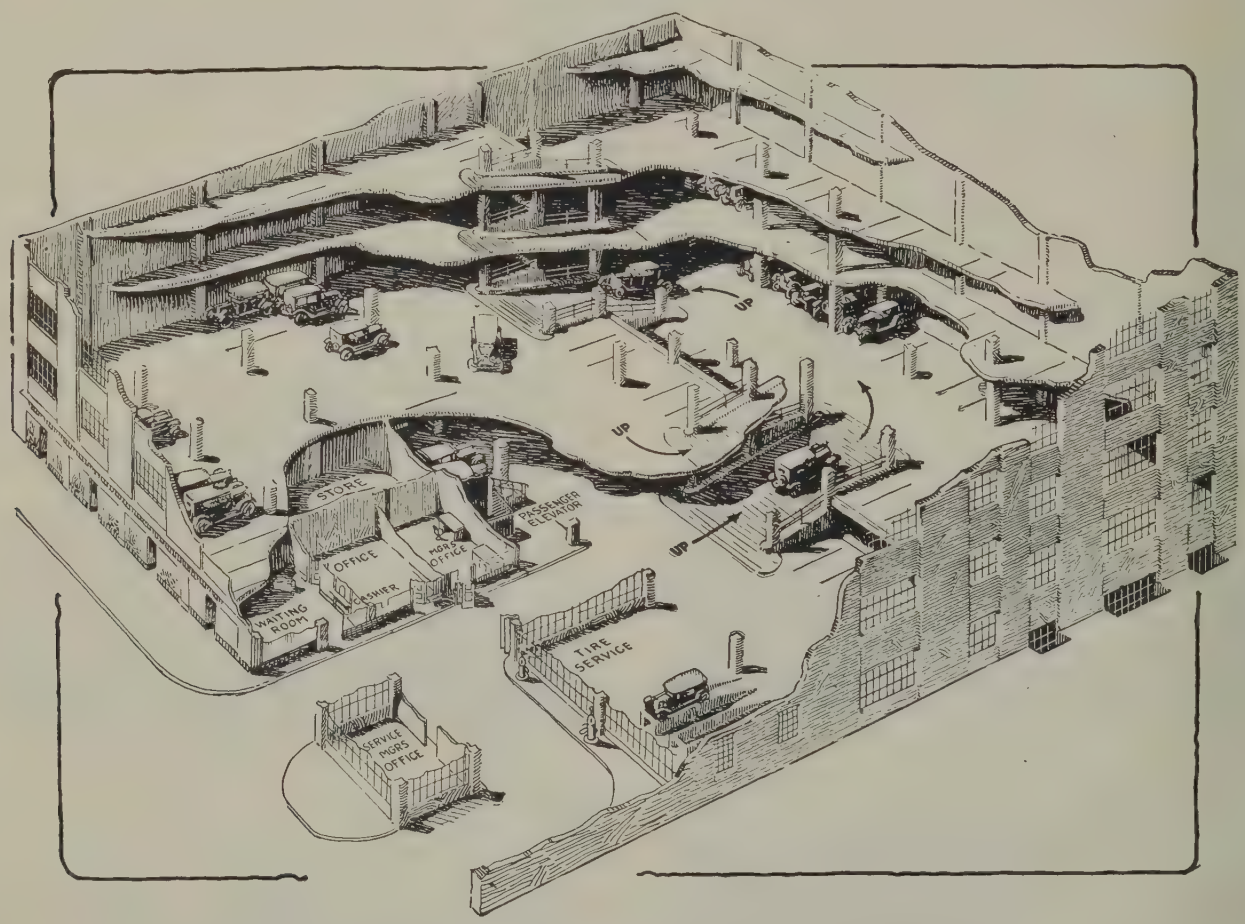
Building Design as It Affects the Commercial Success of a Multi-floor Garage

(1) Because garage revenue is directly proportioned to the number of cars stored, maximum car capacity for any given floor area is an absolute essential.

(2) Operating economy demands a building in which each car pays for its own vertical transportation—via ramps.

d'Humy Motoramps are adaptable for plots of any dimension greater than 50-ft. frontage and can be readily adapted to plots of irregular contour. The ramp location is as flexible as that of elevators. d'Humy Motoramps have been used in 2-story buildings and in garages as high as 10 stories—and higher buildings are contemplated.

Single roadway d'Humy Motoramps (with passing points at every floor-level aisle) are ordinarily used in garages up to 4 or 6 stories high where the storage floors house 50 to 60 cars each. Generally for larger garages, or where the peak traffic load makes greater ramp capacity desirable, double roadway motoramps are advisable. The latter arrangement provides separate paths for up and for down traffic. The type of Motoramp and the ramp arrangement should in all cases be chosen in consideration of the particular conditions which obtain. This company will be glad to discuss such matters, entirely without obligation.



Cut-away Perspective Drawing of a Typical d'Humy Motoramp Garage
(Single Ramp System—up and down traffic on same ramps)

(3) The building must be designed to give the patron a measure of convenience, safety and service which will attract and hold business.

d'Humy Motoramps

This patented system of building design is based on the staggering of floor levels in at least two portions of a building and connecting each half-story difference in floor level with short ramp inclines.

The division line between two of the units of the structure may extend across one dimension of the building or may be arranged in a rear corner so that the building will not show the staggered effect in its fenestration on either of two facades.

Advantages of d'Humy Motoramps

Storage efficiency in any building at least equal to elevators and 10% to 25% better than ordinary ramp floor layouts. Maximum possible income.

Traffic capacity beyond any elevator equipment, and in excess of oldstyle floor-to-floor ramps because of better visibility and minimum possible interference in short travel through storage aisles.

Continued on next page

A Typical Interior Showing the Short Ramp Length, Easy Grade and Complete Visibility

Simple construction, easy formwork and no structural complications.

Building convertible into two standard type structures.

Safety for patrons. Open side ramps afford complete visibility for the turn ahead.

Specifications

The term d'Humy Motoramp in these specifications shall be understood to describe the short ramp between floor levels in one portion of the building which are mid-way between the floor levels in another part—a special and patented type of building design known as the d'Humy Motoramp System and licensed for use in this structure by RAMP BUILDINGS CORPORATION, New York, N. Y.

Essential Design Data

Car Spaces—6 ft. 8 in. to 7 ft. in width, 12 to 15 ft. in depth.

Aisles—20-ft. width in the clear.

Car Bays—Three car bays are usually most efficient.

Columns—Outside face of column set back 1 ft. from line of car spaces.

Ramp Grade—From 13% to 15%.

Story Heights—10 ft. 6 in. to 11 ft., floor to floor. A minimum clear headroom of 8 ft. 6 in. should be maintained.

Note: For complete data ask us for Garage Design Data Sheets. The above data is necessarily approximate. Exact dimensions must be determined by local conditions and requirements. The specialized experience of this company's engineers is available to architects, as noted in a following paragraph. Consult us before your plans are laid out; we can save your time.

Ramp Buildings Corporation Services

Working with and through the architect in all matters, the company places its specialized knowledge at his disposal in furthering any project in which d'Humy Motoramps can be used.

Where desired, sketch plans (in miniature) will be prepared, without obligation, to demonstrate the relative superiority in storage efficiency of the d'Humy Motoramp design.

Complete consulting advice is available, without cost to the architect, on the establishment of critical dimensions, planning of entrance, service and control facilities, etc., upon the arrangement of a contract between the owner and RAMP BUILDINGS CORPORATION for the use of the d'Humy Motoramp System.

License Fees for Use of d'Humy Motoramp Design

The company licenses the use of its design patents after a standard scale of fees proportionate to the total floor area devoted to garage purposes. This fee is a charge made to the owner and is payable, if, when and as the building is erected.

References

d'Humy Motoramps have been specified as a profitable investment in the building of over 90 recent garages in 96 cities in three countries. Among these are:

ALBANY, N. Y.—Albany Garage, 5 and 7 stories, 1600 cars
Double Ramp System (tandem); Fuller & Robinson, Architects
ATLANTA, GA.—Cone Street Garage, 6 stories, 300 cars
Wide Single Ramp System, Pringle & Smith, Architects
BALTIMORE, MD.—Downtown Garage, 5½ stories, basement and roof, 400 cars
Wide Single Ramp System, Frank S. Parker, Architect
BOSTON, MASS.—Shoppers Garage (Jordan Marsh Co.), 8 stories, 450 cars
Double Ramp System (tandem), H. M. Haven & A. T. Hopkins, Inc., Architects
BUFFALO, N. Y.—Statler Hotel Garage, 5 stories and basement, 600 cars
Double Ramp System (tandem), George B. Post & Sons, Architects
CHICAGO, ILL.—South Loop Motoramp Garage, 10 stories and basement, 500 cars
Double Ramp System, Alfred S. Alschuler, Architect
CINCINNATI, OHIO—Ninth Street Garage, 7 stories and basement, 600 cars
Wide Single Ramp System, Garber & Woodward, Architects
CLEVELAND, OHIO—Medical Arts Garage, 9½ stories, 1250 cars
Double Ramp System (tandem), Graham, Anderson, Probst & White, Architects
DETROIT, MICH.—First National Garage, 11 stories, 700 cars
Double Ramp System, Albert Ralm & Robert C. Derrick, Architects
DETROIT, MICH.—Book Tower Garage, 11 stories, 930 cars
Double Ramp System, Louis Kambler, Architect, and N. R. Huffman, Construction Manager
KANSAS CITY, MO.—Congress Garage, 4½ stories and basement, 400 cars
Wide Single Ramp System, Robert Gornall, Architect
LOS ANGELES, CAL.—Jonathan Club Garage, 7 stories, 500 cars
Double Ramp System (Concentric), Schultze & Weaver, Architects
MINNEAPOLIS, MINN.—Baker Office Building. Garage, 3 stories and 1½ basement and roof, 300 cars
Wide Single Ramp System, Larson & McLaren, Architects
NEW YORK, N. Y.—Brisbane's Fifth Avenue and 102nd Street Garage, 6 stories, 600 cars
Double Ramp System (Concentric), Emery Roth, Architect
PITTSBURGH, PA.—William Penn Garage, 9 stories, 550 cars
Double Ramp System (Concentric), Rubin & Ve Shancey, Architects
SAN FRANCISCO, CAL.—North Central Garage, 6 stories, 200 cars
Wide Ramp Single System, Powers and Almden, Architects
SEATTLE, WASH.—Four Stores Garage, 3 and 4 stories, basement and roof, 500 cars
Double Ramp System (Concentric), Harlan Thomas & Clyde Grainger, Architects
TORONTO, CANADA—Bay Adelaide Garage, 6 stories and basement, 550 cars
Double Ramp System, C. B. Dolplim, Architect
WASHINGTON, D. C.—Capital Garage, 10 stories, basement and roof, 1000 cars
Double Ramp System (Tandem), Arthur B. Heaton, Architect

THE IRVIN RAMP COMPANY

Engineers and Consultants for Modern Garage Construction

99 Vandergrift Building

PITTSBURGH, PA.

The "Irvin Ramp"

The "Irvin Ramp" is a patented system of garage building construction providing a continuous smooth driving surface—banked at all points—from basement to roof, resulting in the easiest and smoothest driving of automobiles and trucks in and out, up and down throughout the building, and also permitting the maximum storage.

It provides an easy, quick and safe method for storing 800 to 1000 cars in a single unit, and for building garages up to 10 stories in height. It is particularly adaptable for parking garages, service garages, truck garages, storage buildings and bus terminals.

The "Irvin Ramp" is an elliptical spiral runway, and the parking floors are eased off from the ramp so that the entire floor area is available for parking and aisles.

This solution to the garage construction problem is the result of building many garages, many years of thought, study and development by an experienced architect.

Consulting Architectural and Engineering Service

Our architectural and engineering service is available without obligation to architects and engineers having clients interested in this type of structure. We assist in making sketches embodying the principle of our patents and in evolving the very best possible structure and solving structural and plan problems. We place at the designer's call a vast experience in design, finance and operation.

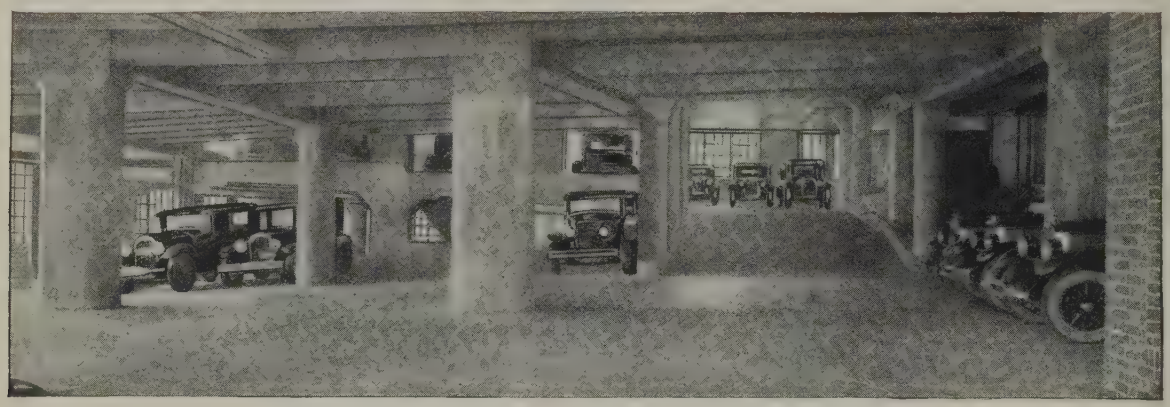
Our royalty fee is per square foot of floor area, from building line to building line, of any structure built upon this principle. This fee is paid on contract between the owner of the structure and ourselves.

Three Typical "Irvin Ramp" Structures

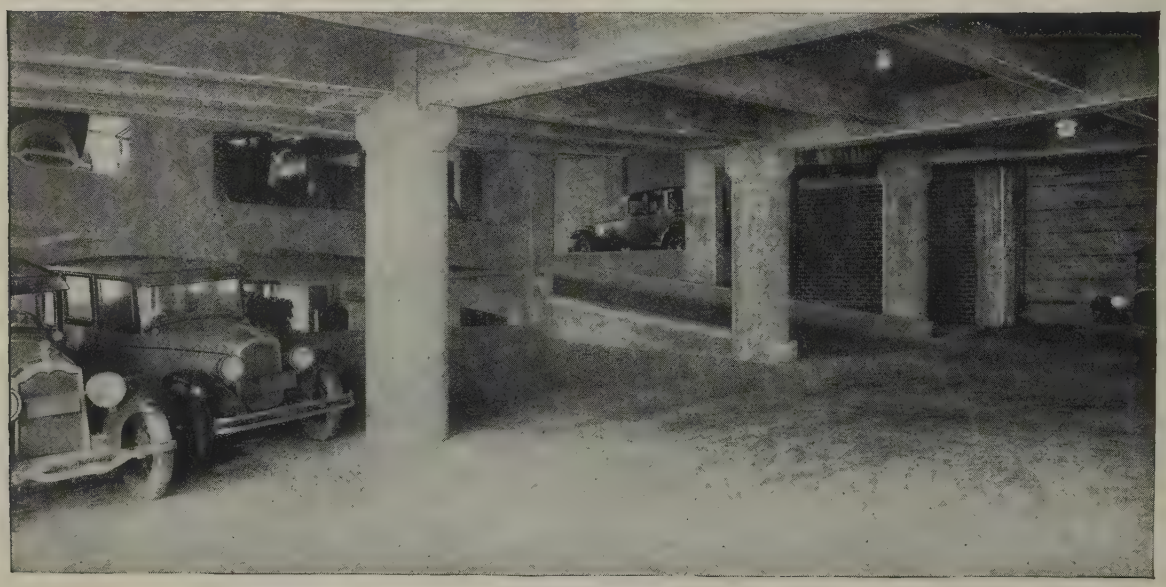
Fourth Avenue Garage, Pittsburgh, Pa.
For parking 450 cars and truck storage.

Monument Street Garage, Baltimore, Md.
Capacity—300 trucks; operated by the Consolidated Gas, Electric Light and Power Co. of Baltimore.

Service and Sales Garage, Washington, D. C.
For the Semmes Motor Company, Dodge Distributors.



Main Entrance, Fourth Avenue Garage, Pittsburgh, Pa.



Note Easy Turns and Low Grades on This Third Floor Ramp

THE BELL TELEPHONE SYSTEM

AMERICAN TELEPHONE AND TELEGRAPH COMPANY AND ASSOCIATED COMPANIES

A Service for Architects, Builders, Engineers and Owners

Comfort and convenience are basic requirements of modern telephone service. Their complete realization in large buildings or in residences involves the planning of suitable facilities for telephones in advance of construction.

To help in the attainment of adequate telephone comfort and convenience our telephone engineers have prepared two illustrated booklets, mentioned below, which will be furnished gladly to those interested in building projects.

Write or call the nearest Bell Telephone business office.

Residential Telephone Installations

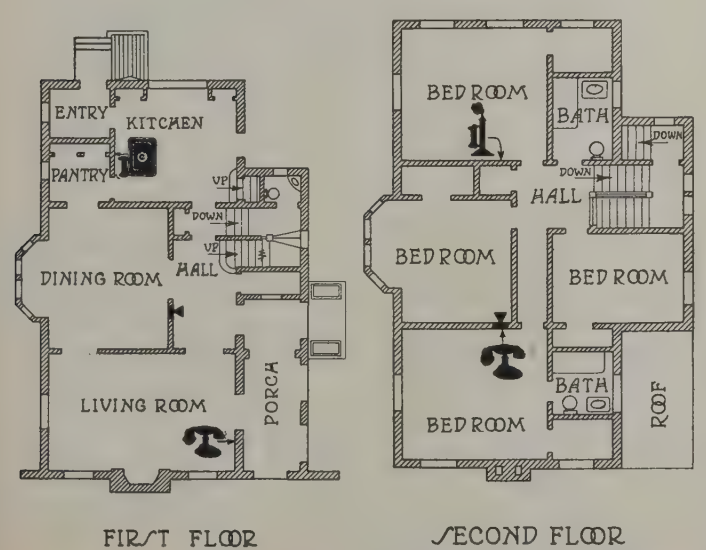
The growing appreciation on the part of telephone subscribers of the comforts and conveniences to be obtained from adequate telephone service requires the provision of more complete home telephone equipment. The placing of adequate facilities for the telephone wires and apparatus during construction results in general improvement of residences, in that better appearance is secured by concealing the wires and some of the equipment. Also the provision of these facilities provides flexibility in the arrangement of the telephone equipment. One of the illustrated booklets, "Planning for Home Telephone Conveniences," presents information which will be helpful to those engaged in the design and construction of residences.

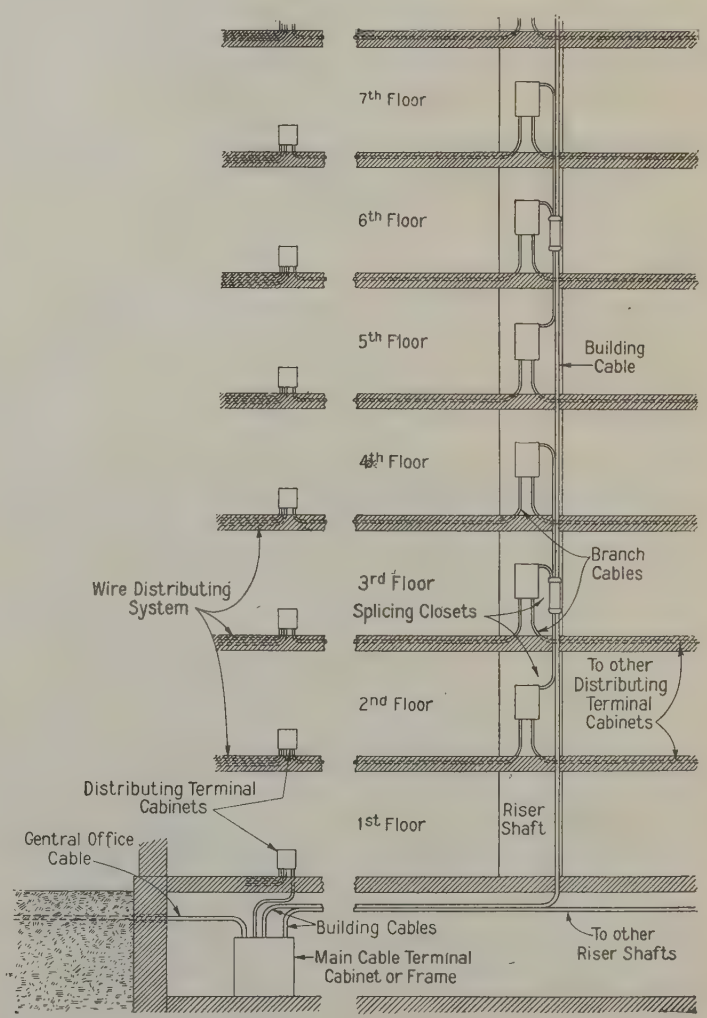
Large Building Telephone Installations

The modern large building contains a great many telephones which require for their operation numerous cables, terminals, wires and, in some cases, large switchboards with associated equipment. Facilities adequate for housing all of this telephone equipment are, like the facilities for water, electric light and power, essential features in the design of such buildings. The other illustrated booklet, "Planning for Telephones in Buildings," presents information which will be helpful to those engaged in the design, construction or alteration of office, loft, public buildings, hotels, apartment houses and hospitals.

Service

The services of the Associated Companies' engineers for consultation and advice on all matters pertaining to telephone facilities are also available without charge. A conference with telephone engineers can easily be arranged by a telephone call to any Bell Telephone business office.





Typical Plans Shown and Described in the Booklets Mentioned Above

GAS SERVICE AND EQUIPMENT

Recommended by Architects' and Builders' Service Committee

AMERICAN GAS ASSOCIATION
420 Lexington Avenue
NEW YORK, N. Y.

Gas in the Service of the Home

Due to recent development in the manufacture of gas appliances, gas has entered into a new era of usefulness in the home. Gas is now the most modern agent for cooking and refrigerating food, incineration of household waste, providing hot water for household cleanliness and for personal toilet, insuring comfortable house temperature at all seasons of the year, and for permitting clothes to be washed, dried and ironed in the home under conditions of known cleanliness. These services make gas the world's greatest caterer to the fundamental needs of the home.

Original Installation

The increasing uses of gas make it more necessary than ever for the builder to provide the comforts and conveniences of modern gas service for the home owner at the lowest cost, by installing the proper piping and flues at the time the house is erected, which will permit the use of the various appliances thereafter.

Cost of Piping

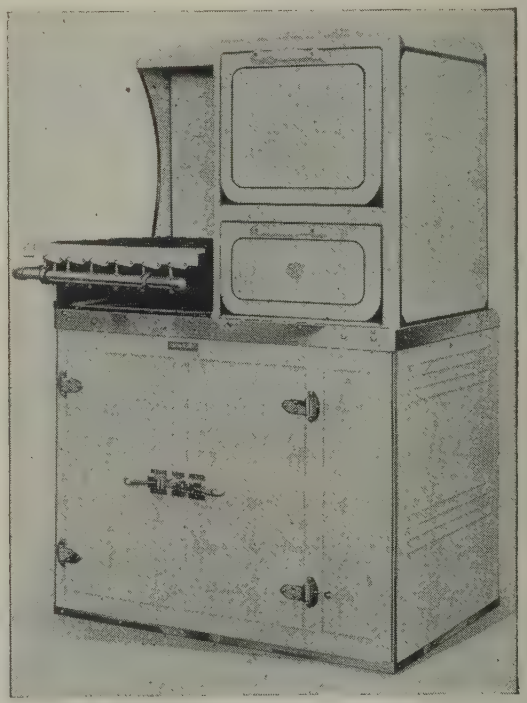
The cost of gas piping and flues, *if put in at the time of erection,* is relatively small when compared to the total cost of the building and compared to the increased rental value of the premises so equipped. This cost varies from 0.10 to 1.0% of the total cost of the building, the latter figure covering the most elaborate piping lay-out required to cover every possible contingency.

Selection of Appliances

No gas appliances should be installed which are not susceptible of such adjustment as will enable the user to bring about the complete combustion of the gas supplied under all reasonable service conditions. Because it is somewhat difficult for those not experienced in the utilization of gas to judge whether or not a given appliance is designed to comply with this requirement the AMERICAN GAS ASSOCIATION operates an elaborate Testing Laboratory, which tests all types of gas appliances. The Laboratory Approval Seal shown below is a guarantee of compliance with basic national standards of safety, established by experts from the AMERICAN GAS ASSOCIATION, U. S. Bureau of Mines, U. S. Bureau of Standards, U. S. Public Health Service, Heating and Piping Contractors National Association and the Master Plumbers Association, which every appliance should meet. Architects and builders are urged to specify and install only appliances which have been tested and approved by the American Gas Association Appliance Testing Laboratory. A list of the trade names and model numbers, as well as the names of the manufacturers of approved appliances, may be secured gratis from your local gas company, or from the AMERICAN GAS ASSOCIATION, 420 Lexington Avenue, New York, N. Y.

Kitchen Range

The range is the most important piece of kitchen equipment. It is the most used housekeeping device. The modern gas range with oven heat control has changed cooking from drudgery to a real pleasure. No modern home is complete without one of these new heat controlled ranges, which eliminate guesswork in cooking and permit the housewife to go about her other duties, secure in the knowledge that the food will be cooked to a turn. New color finishes for gas ranges can be had to match any kitchen color scheme.



A Special Type Combination Gas Refrigerator and Range
Particularly appropriate for apartment kitchens. Many other types of ranges and refrigerators are available as separate units

The following are the essential qualities of a range which will give real satisfaction to the home owner:

(1) *Convenience:* as to size, arrangement of parts, ease of control, and simplicity in cleaning.

(2) *Efficiency:* in the use of fuel without waste.

(3) *Safety:* correct construction to avoid hazards, such as incomplete combustion.

(4) *Attractiveness:* an important point in the opinion of the user.

(5) The Laboratory Approval Seal of the AMERICAN GAS ASSOCIATION, which is a guarantee of compliance with basic national standards of safety.

Continued on next page

The Gas Refrigerator

Scientific research has now produced a gas refrigerator with no belts, moving parts or other machinery to produce noise, wear and tear or trouble.

This means unbelievably silent operation, assuring freedom from monotonous and objectionable noises—superior refrigeration with low operating costs which compare favorably even with old-fashioned methods.

Be sure to specify this new marvel of science.

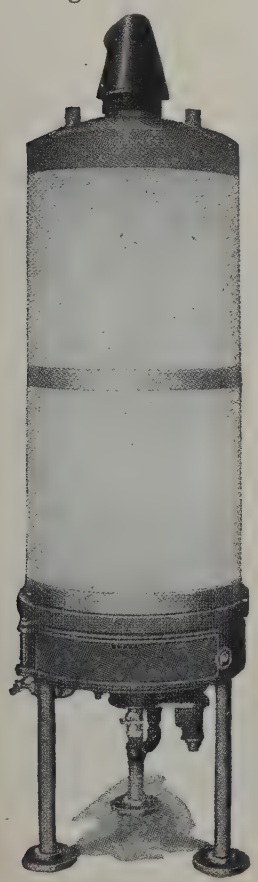
Hot Water Service

A plentiful and ever-ready supply of hot water is a most vital and sanitary need of any household and is essential to the comfort and cleanliness of the home and the family. Gas-fired water heaters of high efficiency and reliability are available in two main types.

One of these is the automatic instantaneous water heater which is suitable for water supply under a pressure of 10 lbs. or more at the highest faucet. On this type of heater the gas burners operate only while the water flows from the faucet (the burner being ignited by a pilot light and controlled by a valve operated by the water pressure). These heaters are both economical and efficient, but because of their large temporary demand of gas, require a larger supply pipe and meter.

The other type of water heater is the automatic storage heater which consists of an insulated water tank, a pilot light, thermostat and gas burner, so connected that the tank is always kept full of hot water ready for use. This type can be used on low pressure water supply and requires only a ¾-in. gas pipe and meter of corresponding size.

Where an installation is required at minimum cost, a non-automatic hot water service can be secured through the use of the circulating or tank type of gas water heater, manually controlled. Accessories can be had for this type of heater, whereby the gas can be automatically turned off after a given time. It is also possible to convert this type of heater to the automatic type later if desired.



Left:

Automatic Storage Type Water Heater

In this type water is always hot ready for use. Equipped with down-draft diverter and installed with a flue connection

Location of Water Heater—Water heaters should not be installed in bathrooms or other closely confined spaces, and the length of the hot water lines should not be excessive.

All automatic water heaters should be provided with flue connections.

Auxiliary Room Heating

Individual gas room heaters provide a welcome service during many days of Fall and Spring in removing chill and dampness from the room without necessitating the operation of the main furnace, which is not designed for efficiency when operated at low temperature and for short periods.

Room heaters are available in several types as follows:

(1) The radiant heater, often called a fireplace heater. Also coal basket type heaters.

(2) Individual gas-fired radiators, steam or hot air type.

(3) Portable heaters, not radiant type but flame type.

(4) Wall heaters, flame type.

For general attractiveness the radiant heater is a superior form of room heating equipment, particularly when installed as fireplace unit.

Portable heaters are available in many styles and sizes, including even a small radiant type. They are lower in cost than other auxiliary heaters and are frequently connected by means of flexible tubing, although this is not a recommended practice.

Gas outlets provided in several rooms will facilitate off-season comfort when the furnace is shut down.

Where flexible hose connections are necessary, a safe installation can be made by providing the gas outlet nipple, heater inlet nipple and the flexible tubing utilized is of the type that has been tested and approved by the American Gas Association Testing Laboratory. The shut-off cock for portable heaters should be located in the gas pipe outlet and not on the appliance. Safety hose cocks installed on all gas pipe outlets will prevent accidental opening of gas cocks.

Right:

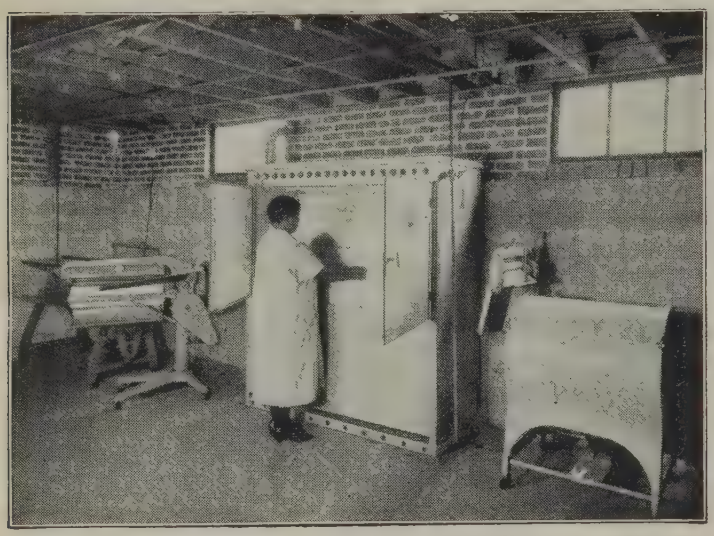
Radiant Fireplace Installation

Adds beauty and charm to any room. More efficient, cleaner and safer than a wood fire, and as attractive

Continued on next page

Laundry Equipment

Weather statistics show that less than one-half of the days of the year are suitable for drying clothes outdoors. The modern housewife appreciates nothing more than a laundry dryer, which permits her to dry the laundry quicker and better in her own basement, independent of the vagaries of the weather. Gas-heated dryers produce the same freshness, whiteness and freedom from mildew as outdoor drying and eliminate the labor of carrying the laundry in and out of the house.



Ironer, Dryer and Washer Installation

With these gas-heated appliances, washday ceases to be a burden and ignores weather conditions

Several makes of electric washing machines are equipped with gas burners to raise the temperature of the wash water economically and quickly. Where the washing machine is not so equipped, it is advisable to install a laundry stove for boiling the wash or reheating water for the washing machine.

Ironing machines, utilizing gas for heating the rolls, operate more economically than those employing other heating methods. The home laundry provided with complete gas-heated laundry equipment carries the assurance that clothes, linens, blankets, and all household laundry can be washed, dried and ironed under sanitary home conditions with less effort than ever before possible.

Heating the Whole House by Gas

The house equipped with a gas furnace gives positive assurance the home will always be kept warm and comfortable at a uniform temperature automatically, without any of the customary labor and attention. Gas furnaces are manufactured to meet all heating requirements—that is, for steam heat, vapor heat, hot water heat, or warm air systems. Each of these types has its special advantages and, as with solid fuels, the hot water heating system is slightly more efficient, sometimes running as high as 90%.

Amount of Gas Required for House Heating—The uniformity of the heating value of gas as a fuel makes it possible to predict with great accuracy the amount required to heat a home of any given size; once the climatic conditions in the particular section of the country are taken into account. The local gas company has a complete file of this information, and with data on the size of the house, construction of the walls and roof can easily provide an accurate estimate of the cost of house heating by gas.

Insulation Cuts Fuel Costs

The wall and roof heat losses can be cut to one-third of their normal value by the use of insulation with corresponding reduction in the amount of radiation and furnace size, as well as the operating expenses of heating the house. Oftentimes the savings in installation and cost of operation cover the added cost of insulating the house and make it possible to utilize gas for heating the home at little or no extra cost over solid fuel.

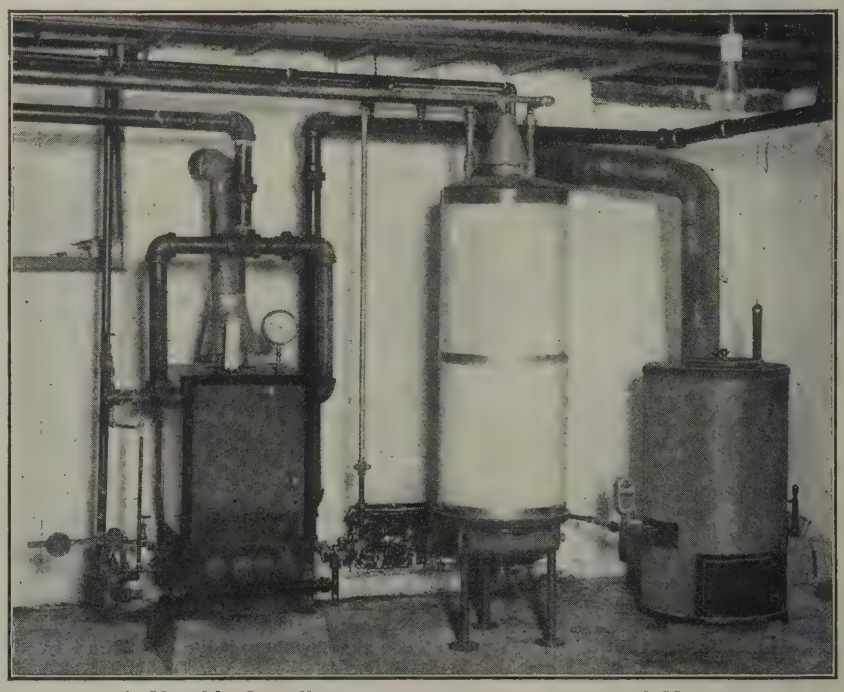
All gas-fired heating systems should be thermostatically controlled, inasmuch as the saving in fuel under these conditions and the uniform temperature made possible, more than pay for the added cost of the heat controlled equipment.

The development of automatic heating with gas as a fuel, for the first time recovers the space ordinarily required for coal bins and ash bins, and makes it available as a clean and useful part of the house.

Incineration

The gas-fired incinerator makes possible the complete disposal of household garbage, safeguards health, and saves labor and eliminates the unpleasant odors and opportunity for the spread of disease resulting from accumulation of garbage between collections by the municipality. In addition to this, the use of the incinerator avoids the fire hazard caused by the accumulation of old boxes, paper, etc., about the house.

The installation of an incinerator requires a flue, and therefore this appliance should be located as near to the chimney as possible. Oftentimes it is possible to install a chute from the kitchen, which will save all the labor of carrying the refuse downstairs to the incinerator.



A Notable Installation in a Six-room Insulated House

The heating system is hot water, using the small boiler at the left (which type is also used for water heating in other instances). Here the hot water supply is taken from the automatic storage heater (center); and the incinerator (right) disposes of all garbage and waste. This basement is used as a playroom, workshop and living room

Continued on next page

Installation of Appliances

No less important than the quality of the appliance itself is the provision of adequate supply piping, in order to insure the safe and satisfactory performance of gas appliances. Piping of the proper size insures constant and sufficient gas pressure and results in uniform operation of the burners, giving complete combustion and insuring reliable performance.

The following table gives the gas consumption of various domestic appliances and indicates the size of outlet ordinarily necessary for each appliance:

Appliances	Size of outlet ordinarily necessary, in.	Usual maximum gas consumption per hour, cu. ft.*
For the Kitchen:		
Gas range	¾	110
Gas refrigerator	¾	2 for continuous type 30 for intermittent type
For the Basement:		
Gas water heaters:		
Manual	¾	40 to 80
Instantaneous	1¼ to 1½	60 per gallon rating
Automatic storage	¾ to 1	60 to 80
Gas incinerators	¾	40 to 60
Gas boilers	1½ to 2½	300 to 1600 About 85 per hour per 100 sq. ft. installed cast iron steam radiation
Gas warm air furnaces	1½ to 2½	250 to 1000 About 35 per hour per 10,000 B.t.u. hourly heat loss from the building
For the Laundry:		
Gas heated laundry dryer	¾	60
Gas laundry stove	¾	30
Gas ironing machines	¾	20
Gas washing machines	¾	20
For Space Heating:		
Gas radiant heaters (for fireplaces)	¾	30 (or 3 per radiant)
Gas room heaters (flame type)	¾	15 to 30
Gas radiators (warm air)	¾	15 to 30
Gas radiators (steam)	¾	3 per section
Gas floor furnaces	¾ to 1	100
Gas garage heaters	1	50
Gas ignitors for fireplaces	¾	5
Gas wall heaters	¾	15

**Note:* For natural gas installation these figures should be divided by two.

General Principles of Installation

As local conditions govern to a great extent the practice and installation of gas piping it is urged that before the contract is let for this important part of your building, your local gas company be consulted. The following general conditions, however, apply in practically every community throughout the country.

Appliances shall be installed so that their continued operation will not in any way create a fire hazard because of adjacent flammable material. Vent pipes should not be run closer than 6 in. to unprotected ceilings and wooden joists.

Any appliance which consumes large quantities of gas, or which is automatically controlled and which depends upon a pilot light for ignition, shall be connected to an adequate flue or flue pipe.

This rule is particularly significant with regard to the very large appliances such as central heating systems. These burn such large quantities of gas that every precaution should be taken. As further protection, it is advisable to insist on thermostatic or other forms of safety pilot which shall cut off the main gas supply in event that the pilot is extinguished.

No water heating appliance shall be installed in a closed system of water piping unless a water relief valve is provided.

The presence of a water meter will serve to make it a closed system, as water meters permit the flow in only one direction. It is to be recommended, then, that all water heating systems be operated with a pressure relief valve at some point.

Proper Piping for Domestic Gas Service

Four factors determine the size of pipe needed; length of pipe, maximum gas consumption to be provided for, the allowable loss in pressure from the meter to the appliance and the specific gravity of the gas.

Your gas company will be glad to furnish the proper pipe sizes to insure good service to your installation of gas appliances, upon request and without charge.

Miscellaneous Recommendations

Piping should not be laid under tile, parquet or mosaic floors, where it is possible to avoid it. Piping should not be run along the bottom of beams that are to be covered with lath and plaster, but should be run along the top of beams or joists, where it is possible, so that it will be accessible by raising the floor boards, which, when covering such piping, should be fastened with brass screws.

All parts of piping should be securely and permanently fastened to or supported from the building itself. If this is not done, sags or undue strains may later develop and the piping may leak or condensation may accumulate in the low points of the sags and interfere with the free flow of gas.

All piping should be graded toward the meter or outlet—condensation can then be removed if necessary. Meters should be set in a clean, dry, safe place, not subject to wide variations in temperature.

Your gas company has complete information on the size, price and instruction for installing all of the equipment mentioned herein, and will be glad to supply this information upon request without obligation or cost to you.

The annual research bulletins of the Producers' Council on building materials and appliances, indexed in accordance with the standardized filing system of the American Institute of Architects, contain valuable data on the proper selection and installation of all types of gas appliances.

In addition, the Architects' and Builders' Service Committee of the American Gas Association will be glad to furnish specific answers to any questions relating to the design, construction and installation of gas service in the home. This data will be furnished without charge.

Of necessity, the appliances shown here are of particular makes. However, the showing of a particular manufacturer's product here expresses no preference of the A.G.A. for that particular brand.

BOSTON ACOUSTICAL ENGINEERING COMPANY

Manufacturers of Acoustex, an Ideal Sound Absorbing Material

46 Cornhill

BOSTON, MASS.

ACOUSTEX

Products

MATERIALS for ACOUSTICAL CORRECTION and SOUND INSULATION.

ACOUSTEX—a sound absorbing slab for acoustical correction.

For Trimount Sound Proof Doors and Folding Partitions, see page B1437.

Acoustical Treatments for Modern Buildings

The diminution of noise is taking an increasingly prominent place in the design of modern buildings. Banks, offices, schools, churches, hospitals, courtrooms, etc., are all benefited by quiet conditions.

The large areas of hard non-sound absorbing materials used in the construction of present day buildings make it necessary that a highly sound absorbing material be introduced to compensate for the use of hard sound reflecting materials. Acoustex, the result of many years of research and experimentation, is such a material; besides being a practical, efficient and scientifically correct sound absorbent, it has a beautiful and interesting but unobtrusive texture.

Properties That Make Acoustex an Ideal Sound Absorbing Material

Acoustex is fire resisting and is not affected by extremes of temperature.

Absorption—Tests made by Clifford Melville Swan in the Jefferson Physical Laboratory at Harvard University, and by Professor W. R. Barss at the Massachusetts Institute of Technology, show Acoustex to be a highly efficient sound absorbing material.

Decoration—Acoustex can be sized, and spray painted with a light cream color oil paint, or with any other color desired.

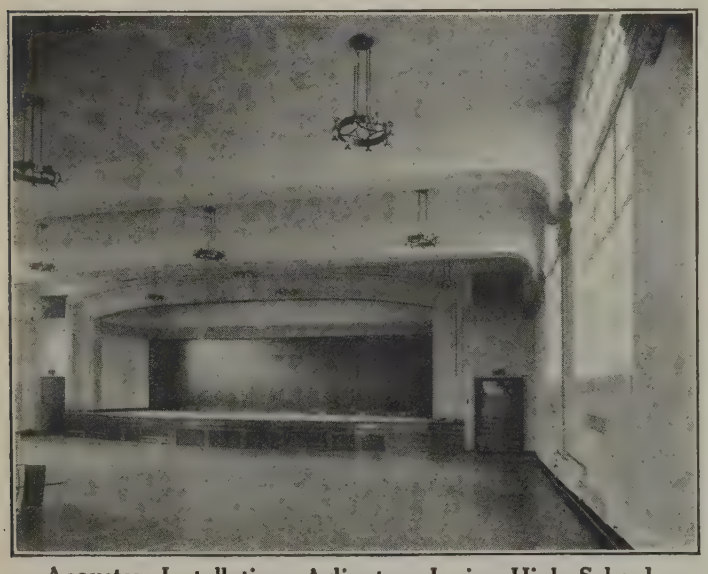
It may be vacuum cleaned and redecorated by spray-painting the surface. This can be done a number of times without causing the pores to fill with paint, or without greatly impairing its acoustic efficiency.

Sizes—Acoustex is furnished in slab or tile form, 12x12, 12x24, 24x60 in. Special sizes cut to order. Standard thickness 1 in.

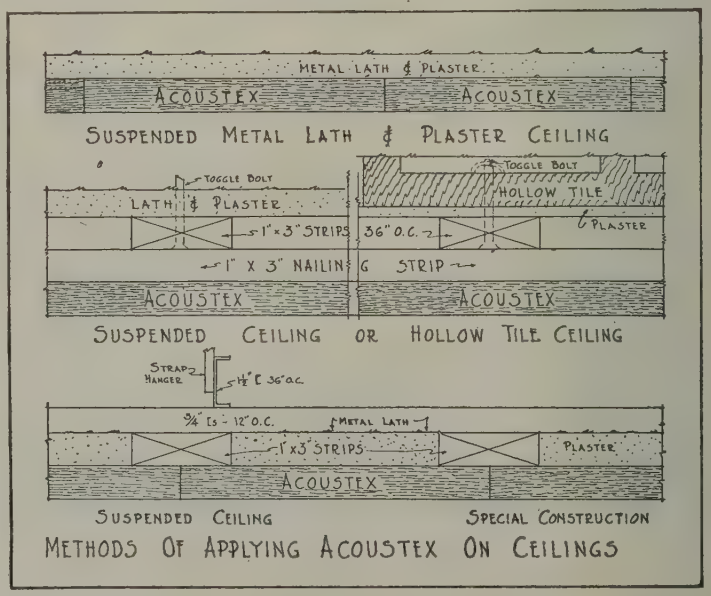
Joints—Regular type Acoustex is furnished with rough sawn square edges, which, when laid together, produce close fitting joints so desirable for ceiling treatment. It may also be furnished with beveled edges when required.

Representative Installations

North Station Arena, Boston, Mass. (75,000 sq. ft.)
St. Mary's Church, Lewiston, Me.
Arlington Junior High School, Arlington, Mass.
Women's Club, New Rochelle, N. Y.



Acoustex Installation, Arlington Junior High School, Arlington, Mass.
FRANK IRVING COOPER CORP., Architects



JOHNS-MANVILLE CORPORATION

EXECUTIVE OFFICES

292 Madison Avenue, NEW YORK, N. Y.

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Products

ACOUSTICAL TREATMENT.

For other Johns-Manville Products, see pages in this edition, as follows:

Transite Corrugated Asbestos.....page A175
Waterproofing and Dampproofing.....page A79
Rigid Asbestos Shingles.....page A478
Specification (Built-up) Roofing.....page A452
Pipe Coverings and Insulations.....page B1672
Asbestos Ebony and Electrical Products.....page C3413

Also Packings for all purposes; Floorings; Refractory Cements and Furnace Linings; Asbestos Wood; Insulating Lumber; Asbestos Products of all kinds.

Acoustical Treatment

The subject of sound as it is related to building interiors was reduced to an exact and practical science through the researches of the late Wallace Clement Sabine of Harvard University. Retaining Professor Sabine as consultant, JOHNS-MANVILLE CORPORATION established, in 1911, a Department of Architectural Acoustics, to provide a means for the practical application of his work to new and existing buildings.

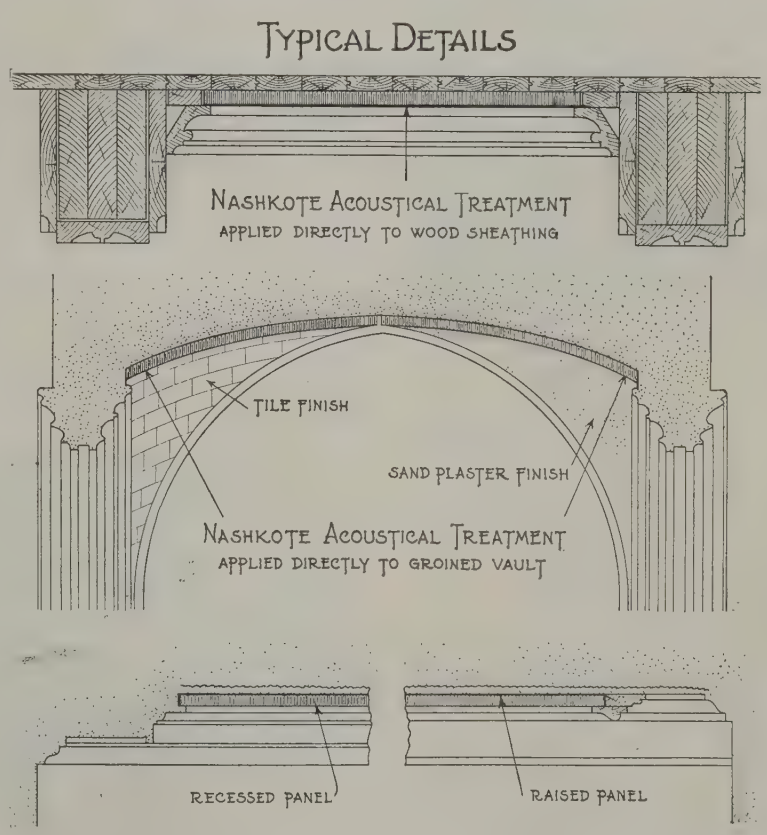
Literally thousands of acoustical problems of every conceivable nature have been successfully and practically solved during the past 17 years. A formidable background of knowledge and practical achievement has been built up, and the soundness of Professor Sabine's theories—the completeness with which they meet the combined requirements of public opinion and exacting taste—has been definitely established.

Consulting and Contracting Services—JOHNS-MANVILLE CORPORATION offers to architects a free consulting service for acoustical problems in building in advance of construction, and to correct the acoustic properties of existing buildings.

Contract departments are maintained in all large cities for the installation of acoustical materials when corrective measures are found necessary. Our construction work is done by competent men, skilled in the application of acoustical interior finishes, and the work is performed under our own supervision. Thus the entire responsibility of recommendations and their fulfillment rests in competent hands.

Materials—The principal acoustical product of JOHNS-MANVILLE CORPORATION is known as Asbestos Akoustikos Sound Absorbing Felt, which possesses to a unique degree the qualities which absorb sound—porosity of the mass and the flexibility of the mass as a whole. Akoustikos Felt is as practical an interior finish as any of the materials it covers or replaces. It is fire resistant, and in its manufacturing process is treated in a manner to make it, in effect, a germicide. It possesses great tensile strength. It may be cemented, with a waterproof and heat resisting cement, to any kind of a foundation or any character of warped or groined surfaces, and finished in a tremendous number of texture and decorative effects.

The Johns-Manville Nashkote type of acoustical finish, using Akoustikos Felt, is capable of manipulation in thickness, density and finish, so that practically any reasonable percentage of sound absorption may be obtained in any part of the musical scale. The surface may be finished to give the effect of a smooth or sand finished plaster, burlap or brocades; or it may be decorated to an unlimited degree and with as much permanence of color as any plaster or wood surface. Special finishes are available to provide maximum sound absorbing efficiency in quieting business offices, restaurants, banks, hospitals, etc.



NASHKOTE ACOUSTICAL TREATMENT

Specifications

The amount and location of sound absorbing finishes to assure proper acoustical properties for any room are so intimately and individually linked with the design and interior finish of the room in question, that it is not practical to write a specification for the work which will be applicable in all cases. Competent acoustical engineers are available in all branches of the Company for consultation without fee or obligation.

Literature

Special Bulletins covering the following fields of acoustical work will be sent at your request:

Hospitals and Sanitariums
Auditoriums and Theatres
Schools and Universities
Courthouses
Radio Broadcasting Studios
Insurance Companies
Banks and Offices
Churches and Religious Institutions
Restaurants and Cafeterias
Newspaper Plants
Fraternal Buildings

C. F. BURGESS LABORATORIES, INC.

Consulting Acoustical Engineers and Contractors

Manufacturers of Burgess Sanacoustic Tile

FACTORY
FREEPORT, ILL.

GENERAL OFFICES
205 West Wacker Drive
CHICAGO, ILL.

LABORATORIES
MADISON, WIS.

Products

BURGESS SANACOUSTIC TILE.
BURGESS SANACOUSTIC FABRIC.
BURGESS MEMBRANE TREATMENTS.
BURGESS BOARD INSTALLATIONS.

The Company

The C. F. BURGESS LABORATORIES, INC., have long been known for their reliable, impartial and scientific handling of technical problems. The organization is built up of efficient, technically trained engineers for the study and development of scientific methods relating to physics and chemistry.

An important branch of its business relates to acoustics, the manufacture and installation of acoustic materials and in addition, the furnishing of independent engineering service in the study of acoustic problems.

An Involved Acoustical Problem

Experience

The excellent acoustic properties in many theaters, university and high school auditoriums, churches and lodge buildings are the results of special study by Burgess engineers. Years of acoustical research in the laboratories have resulted in special equipment for making acoustical analysis to assist in these studies.

Consulting Acoustical Engineers

Architects as well as the general public appreciate the necessity for good acoustical conditions wherever people gather together in groups for worship, education, business or entertainment.

Structural requirements for a building must be studied and specified by technically trained engineers. Acoustical requirements must likewise be handled by those skilled in the art. The Burgess Laboratories offers an impartial service to architects. In analyzing an auditorium many problems may be encountered. The two most important factors to be controlled are the period of reverberation and the effect of echo-producing surfaces.

Special Equipment

Special methods and equipment have been worked out to make the study of acoustics scientific and accurate. The Burgess photo-echo method of analysis definitely and quickly locates sources of sound focii, and Burgess specifications will define any and all changes necessary to obviate difficulties found.

The Burgess Acoustimeter accurately registers the sound level or intensity of sound built up in a room due to noises transmitted through walls, floors and windows or produced by sources in the room.

Reports from Plans in Advance of Construction

Sketches or blue prints of proposed buildings showing details of construction and the materials to be used, sent to the Engineering Department, will enable us to report fully on conditions which will prevail in the finished structure, and to recommend any corrective measures which may be necessary. The same method is used for existing buildings.

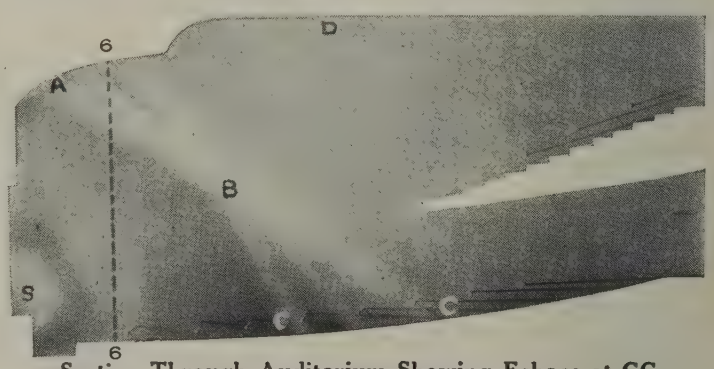
Services and Charges

Sketches or blue prints of proposed or existing buildings will receive prompt attention and will be returned quickly with a report or recommendations. This method of analysis permits the submission of guaranteed specifications.

These engineering analyses are impartial and on a fee basis, the fee charge depending upon the cubical contents of the portions of the structure studied. By submitting plans or sketches of proposed or existing buildings an estimate can be made on the charges for a complete acoustical survey.

Example of Analysis

The engineering analysis covers all types of problems found in the control of sound in churches, school auditoriums, hospitals, banks, hotels, restaurants and general offices. The Laboratories are, furthermore, prepared with instruments to report on the sound transmission through partitions, floors, ventilating ducts, etc.



Section Through Auditorium Showing Echoes at CC

The longitudinal section through an auditorium, as above shown, will give a fair idea of one method of photo-echo analysis.

"S" is a source of sound and "A" is a proscenium arch over the stage. It will be noted that sound waves reflecting from surface "A" focus at "B" and cause echo conditions at "CC," as is shown by the double shadows in that area. To correct such a condition, the proscenium arch "A" could be changed in its curvature so as to reflect into the balcony sound waves striking it, thus reinforcing the sound and eliminating the serious condition at "CC." If this curvature could not be changed because of architectural unity or because the building has been erected, then surface "A" would have to be covered with a sound absorptive material of high efficiency to absorb the distorting sound. In addition to the longitudinal sections, plan as well as transverse sections through the auditorium must be studied as is suggested by line 6-6.

In addition to the echo analysis, the period of reverberation must, of course, be determined for each is a distinct problem.

Continued on next page

BURGESS ACOUSTICAL PRODUCTS

Integrity

The C. F. Burgess Laboratories, Inc., was founded in 1910 and has an established financial standing and reputation throughout the country. The Burgess name assures efficient and dependable products and its rating will bear out this statement. Performance bonds will be furnished wherever desired.

The Laboratories have successfully developed many well-known articles and products in the electrochemical, paper specialty and building fields. Their reputation as manufacturers of Burgess Batteries is unquestioned, and certain of their developments in the building field are well known. With their scientific background they realized the need of acoustic materials which would have characteristics not found in those then present on the market, and in their usual thorough manner have developed outstanding acoustical treatments.

Burgess Sanacoustic Tile (Metal)

Burgess Sanacoustic Tile consists of perforated metal forms, back of which is placed a highly sound absorbent material such as Mineral Wool, Balsam-Wool, Flaxlinum or Hairfelt. These forms in turn are locked definitely into light structural T-sections which have been bolted or screwed to wall or ceiling surfaces. When using Sanacoustic Tile, lath and plaster may be eliminated on many types of construction. This installation is highly fire resistant as well as permanent and has no upkeep expense. The surface of Sanacoustic Tile can be readily washed, or if redecoration should be desired after some years, it can be repainted with ordinary paint without harming its acoustic efficiency. Sanacoustic Tile is made in size 16x16 in. with either square turned or beveled edge. The surface is finished in baked enamel of standard color, thereby having high light reflective properties. Special color will be provided if desired.

Burgess Sanacoustic Tile offers the most real value for the money expended, and assures the architect of a high co-efficient of absorption, high light reflection, permanent construction, high fire resistant properties, redecoration as desired, sanitary construction and no upkeep expense.

The two following pages contain details of Burgess Sanacoustic Tile with specifications and descriptive features.

Burgess Sanacoustic Fabric

For certain special conditions Burgess Sanacoustic Fabric offers the architect an interesting and efficient acoustic treatment. This consists of blocks of hairfelt to which is secured with a moisture and heat resisting cement, Burgess 19-LF Membrane (resembling burlap), the whole in turn being cemented to the surfaces to be treated. This type of treatment was developed especially for double curved surfaces and can be decorated effectively to represent blocks of stone. Due to the varying thicknesses of punched hairfelt which may be used, this treatment also offers co-efficients of absorption commensurate with the work which it must do.

Burgess Membrane Treatments

The Burgess Laboratories are equipped to install panels or concealed edge membrane treatment where this method of installation is demanded. Burgess Acoustic Paint enables decorating such membranes effectively without decreasing appreciably the absorption of the treatment.

Burgess Board Installations

Where low co-efficients of absorption can produce satisfactorily the correct acoustical properties Burgess Board Installation can be made. This board is installed in sizes ranging from 12x18 in. with beveled edges to sheets 4x10 feet. The small blocks can be laid up in broken Ashlar design thus giving the effect of tile. This board is manufactured in a standard cream white color although special acoustical paints can be used for tinting if desired.

Installations

Burgess installations can be made in any part of the country by crews under Burgess superintendence, thus assuring swift and efficient workmanship. Stocks of Burgess acoustic materials on hand for immediate delivery.

Guarantee

The Burgess Laboratories will guarantee in specific terms that, if its recommendations are followed, the acoustic properties of the room or rooms analyzed will be correct for the uses to which these rooms will be put. The Burgess guarantee is back of all specifications written.

Assembling Sanacoustic Tile

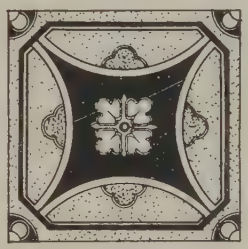
Locking Tile in Metal Tees

Continued on next page

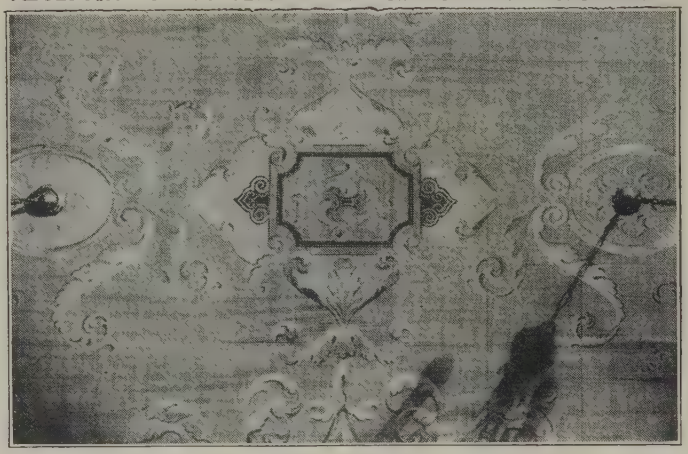
BURGESS SANACOUSTIC TILE

STANDARD COLOR U. S. POST CARD CREAM

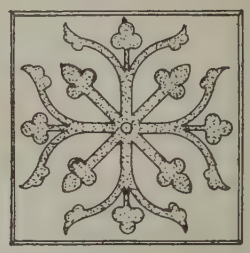
STENCILED TILE



RECEPTION ROOM CEILING BERLIN & SWERN ARCHITECTS



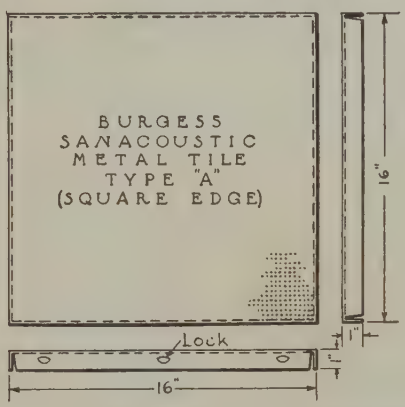
TAPESTRY DESIGN ON BURGESS TILE
DECORATIVE BRILLIANCE OF COLOR CAN BE EFFECTED ON BAKED ENAMEL SURFACE OF SANACOUSTIC TILE

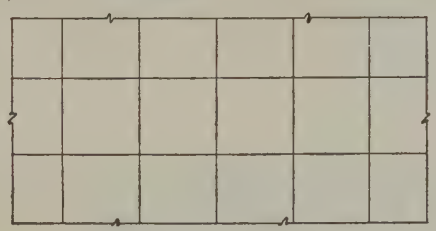


STENCILED TILE

SANACOUSTIC TILE DETAILS

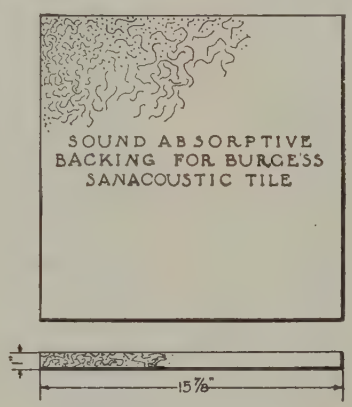
BURGESS SANACOUSTIC METAL TILE TYPE "A" (SQUARE EDGE)





JOINTS UNBROKEN

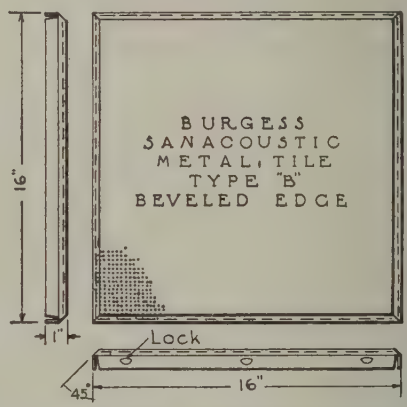
SOUND ABSORPTIVE BACKING FOR BURGESS SANACOUSTIC TILE

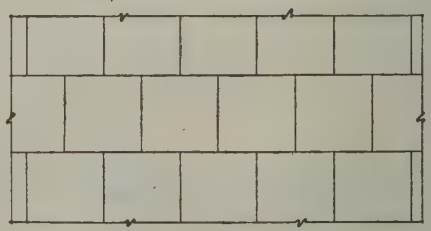


ARRANGEMENT FOR BURGESS SANACOUSTIC TILE

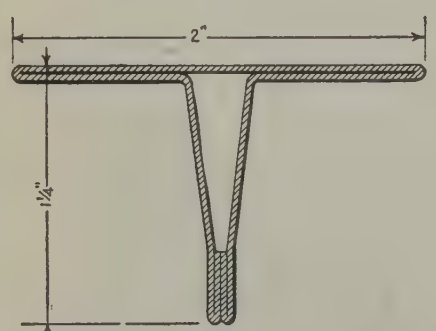
Either arrangement can be made with Type A or Type B Tile.

BURGESS SANACOUSTIC METAL TILE TYPE "B" BEVELED EDGE



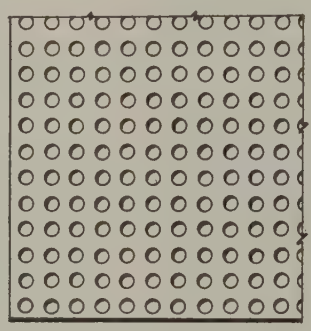


JOINTS BROKEN



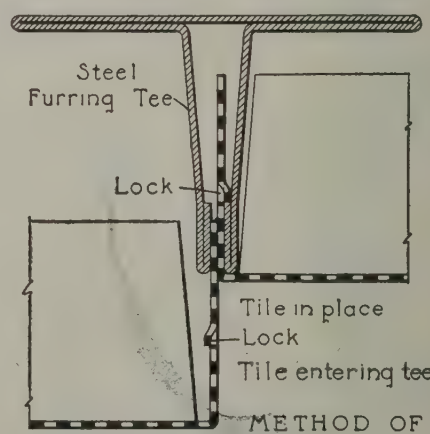
STEEL FURRING TILE
End Section
Standard length — 8 ft.

NOTE: Burgess Sanacoustic Tile can be used on both walls and ceilings



DETAIL OF METAL TILE SURFACE

Showing actual spacing and size of perforations Holes 1/16" in diam. Centers 1/8"



METHOD OF FASTENING SANACOUSTIC METAL TILE TO FURRING TEE

Continued on next page

SANACOUSTIC TILE DISTINCTIVE FEATURES

1. High coefficient of sound absorption.
2. Low cost per unit of sound absorption.
3. Permanent baked enamel surface.
4. Redecorates-acoustical properties unchanged.
5. Sanitary surface easily cleaned.
6. Does not detract from architectural design.
7. High coefficient of light reflection.
8. No expensive upkeep involved.
9. Fireproof-with excellent heat insulation.
10. Exposed parts and fittings made of metal.
11. Easily and quickly installed.
12. Standard size-square turned or beveled edge.
13. Substitute for lath and plaster.
14. Finished in any colors desired.
15. Perforation unnoticeable at ordinary ceiling height.
16. Excellent background for stencil or mural designs.

SPECIFICATIONS

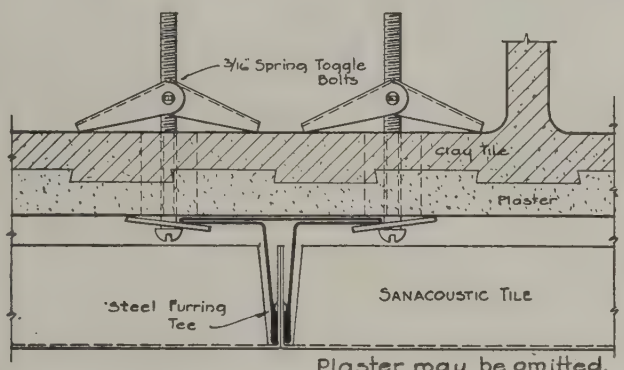
GENERAL SPECIFICATION

Where acoustical treatment is shown on the plans it shall consist of Burgess Sanacoustic Metal Tile backed by one inch (*). The tile shall be secured to the surfaces to be treated by means of Burgess Metal Tee Runners firmly secured to the (Metal Lath),(Hollow Tile),(Concrete) (Brick), ceilings or walls. The Sanacoustic Tile shall be furnished with standard post card cream baked enamel finish (or color to be selected by the architect). Where treatment terminates a suitable wood moulding shall be installed and given two coats of interior flat paint of an approved color.

SUBSTITUTE FOR LATH AND PLASTER

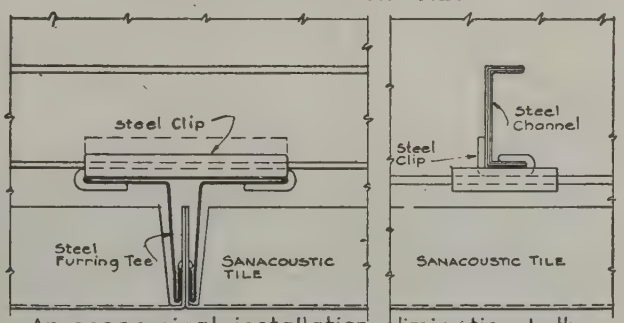
Where acoustical treatment is shown on plans all metal lath and plaster, furring channels, and carrying bars shall be omitted. This contractor shall install the necessary carrying bars to properly support the acoustical material. The treatment shall consist of Burgess Sanacoustic Metal Tile backed by one inch (*), The tile shall be secured to the surfaces to be treated by means of Burgess Sanacoustic Metal Tee Runners firmly secured to the carrying bars. Where treatment terminates a suitable wood moulding shall be installed and given two coats of interior flat paint of an approved color.

* 1. Mineral Wool
2 Balsam Wool
3. Flaxlinum
4. Hairfelt



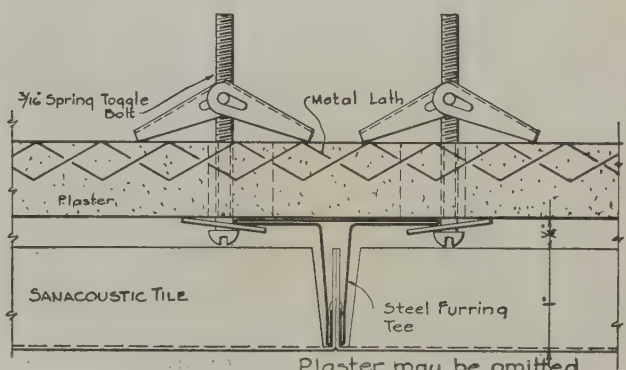
Plaster may be omitted.

INSTALLATION ON CLAY TILE



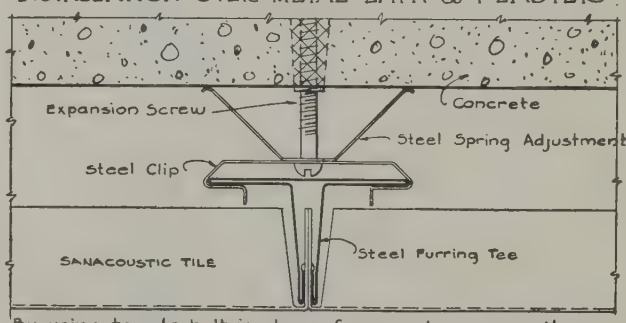
An economical installation eliminating both lath and plaster.

INSTALLATION ON STEEL CHANNELS-NO PLASTER



Plaster may be omitted

INSTALLATION OVER METAL LATH & PLASTER



By using toggle bolt in place of expansion screw, this furring clip may be used on constructions above.

INSTALLATION ON CONCRETE

TYPICAL SANACOUSTIC TILE INSTALLATIONS

1. BALL ROOM	COMMODORE PERRY HOTEL	TOLEDO, OHIO.	7. BANKING DEPARTMENT	PEOPLES WAYNE COUNTY BANK	DETROIT, MICH.
2. AUDITORIUM	SHORTRIDGE HIGH SCHOOL	INDIANAPOLIS, IND.	8. OFFICES	SEARS-ROEBUCK & COMPANY	BOSTON, MASS.
3. CATHEDRAL	IMACULATE CONCEPTION	SPRINGFIELD, ILL.	9. OFFICES	RICHARDS, WILCOX MFG. CO	AURORA, ILL.
4. AUDITORIUM	UNIVERSITY OF MINNESOTA	MINNEOPOLIS, MINN.	10 BOARD ROOM & OFFICES	EASTMAN-DILLON CO.	CHICAGO ILL.
5 NATATORIUMS	OAK PARK HIGH SCHOOL	OAK PARK, ILL.	11. HOSPITAL	ST. MICHAELS HOSPITAL	STEVENS POINT, WIS.
6. LODGE ROOMS	FREEPORT MASONIC TEMPLE	FREEPORT, ILL.	12. COURT ROOM	LAKE COUNTY COURT HOUSE	GARY, IND.

R. GUASTAVINO COMPANY

INCORPORATED

Timbrel Arch Construction and Masonry Acoustical Installations

BOSTON, MASS.
40 COURT STREET

225 West 34th Street
NEW YORK, N. Y.

FACTORY
WOBURN, MASS.

Products and Services

The business of this company is that of DESIGNING and INSTALLING the SYSTEM of TIMBREL ARCH CONSTRUCTION, and the installation of fireproof acoustic material known as AKOUSTOLITH.

Also Rumford Ceramic Acoustic Tile.

Note: It is important to record that Professor Sabine and Mr. Guastavino were the first in the acoustical field to develop along correct technical lines and to bring to a point of commerciability, a masonry fireproof material having a sound absorbing or acoustical value many times greater than that of ordinary plaster, and, in view of that fact, the United States Patent Office has awarded to these inventors patents which are basic to a sound absorbing material of the character of our Akoustolith and which covers the use of that material in any form it may be prepared or used.

Co-operation

Owing to the varied uses of our construction, involving engineering and architectural features, the more satisfactory method is to send us, before the plans are fully drawn, a sketch outline of the requirements, which will enable us to indicate the most approved method of treatment and the approximate cost.

The service of our acoustical engineer is at the architect's disposal in order to determine the correct location and amounts of AKOUSTOLITH TILE or PLASTER.

Facilities

This company owns and operates for its sole use, as contractors, a factory for the manufacture of the better grades of glazed and unglazed tile and acoustic tile required as a soffit course in vaulted construction. It has, therefore, unexcelled facilities for prompt installation and the making of special pieces in connection with its contracting business.

Akoustolith Tile

Description—AKOUSTOLITH TILE is an all-masonry material having a sound absorbing or acoustical value higher than any other masonry material on the market. Its value has been demonstrated by laboratory tests made by the late Prof. Wallace C. Sabine, of Harvard University, and by many important installations.

Adaptability—Owing to its light weight (about 4 lb. per board foot) and facility of manufacture, AKOUSTOLITH is easily adapted to plain or elaborate architectural forms.

Texture—AKOUSTOLITH is made in a variety of textures, usually of a fine granular appearance, and can be made to closely resemble the usual building stone employed for interiors.

Permanency—The permanency of AKOUSTOLITH, owing to its composition of masonry, is assured. It will not disintegrate nor warp; moisture has no effect on its structure. It is genuine masonry, and noncombustible.

Color—AKOUSTOLITH is manufactured in a wide range of colors, ranging from gray white through various shades of buff, brown, or any colors resembling those of building stones.

Stock Sizes—AKOUSTOLITH is manufactured in any size from the smaller tile dimensions—4x8, 5x10, 6x12, 8x16 and 10x20 in., all about 1 in. thick—to the larger ashlar sizes for wall work.

How It Is Installed—AKOUSTOLITH used on ceilings has primarily been installed in connection with our regular Guastavino arch construction, using it as a soffit course of tile and backing up the same with two or more layers of rough tile. It is, however, being largely used by applying it directly on the soffit of the concrete floor slabs, or wire lath and cement plaster ceilings.

For inside walls the installation can be made directly on any of the many masonry surfaces without scratch coat, if surface is reasonably true. In this case the material can be purchased f.o.b. factory and set by either the general contractor or his tile layer.

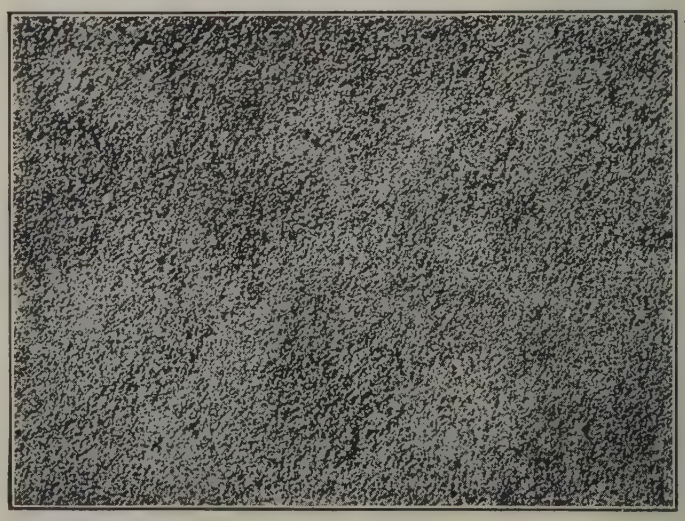
Akoustolith Plaster

AKOUSTOLITH PLASTER is a light weight masonry material used as a finish coat ½ in. thick possessing a sound absorption of from .31 to .59 between the frequencies of 297 to 2890 vibrations per second—these values being many times greater than ordinary plaster.

Uses—AKOUSTOLITH PLASTER is used for the purpose of insuring correct acoustics in auditoriums and churches, also in hospitals, banks and offices, etc., where excessive reverberation would occur.

Color—AKOUSTOLITH PLASTER is a light gray color, almost white. If other colors are desired the usual mortar stains of any shade that the architect may select can be added by the plasterer. For tinting AKOUSTOLITH PLASTER after installation special instructions will be sent on request.

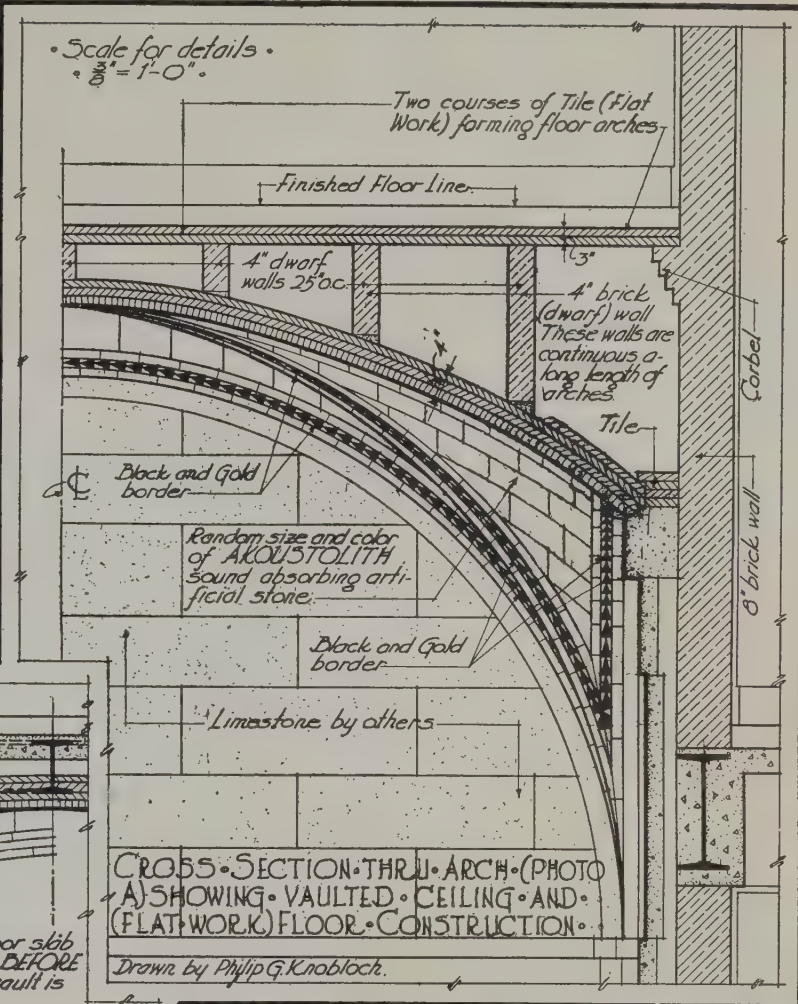
How Purchased—AKOUSTOLITH PLASTER is sold f.o.b. factory, packed in bags and ready for use with the addition of water only, and can be applied by any intelligent plasterer following the specifications and instructions furnished by the manufacturer.



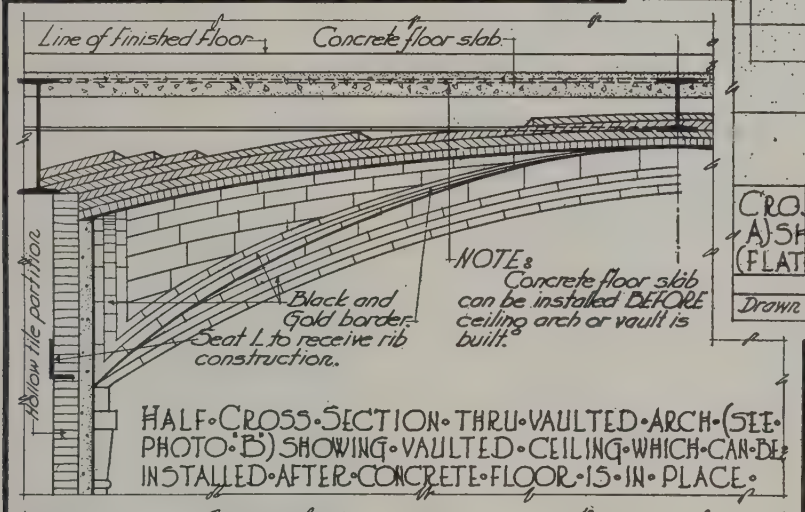
Photograph Showing Interesting Texture Obtainable with Akoustolith Plaster
Stone & Webster Investment Offices, Boston, Mass.

Continued on next page

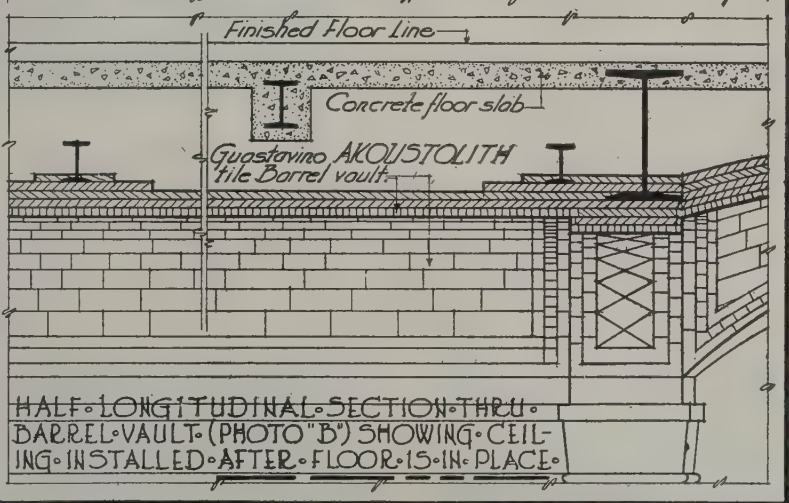
VESTIBULE ENTRANCE TO SALMON TOWER
YORK & SAWYER ARCH'TS. WEST 42ND STREET N.Y.C.



CROSS SECTION THRU ARCH (PHOTO A) SHOWING VAULTED CEILING AND (FLAT WORK) FLOOR CONSTRUCTION.
Drawn by Philip G. Knobloch.



HALF CROSS SECTION THRU VAULTED ARCH (SEE PHOTO "B") SHOWING VAULTED CEILING WHICH CAN BE INSTALLED AFTER CONCRETE FLOOR IS IN PLACE.



HALF LONGITUDINAL SECTION THRU BARREL VAULT (PHOTO "B") SHOWING CEILING INSTALLED AFTER FLOOR IS IN PLACE.

CORRIDOR ENTRANCE TO SALMON TOWER
YORK & SAWYER ARCH'TS. WEST 42ND STREET N.Y.C.

R. Guastavino Company

MACOUSTIC ENGINEERING COMPANY, INC.

Acoustical Engineers and Manufacturers of Macoustic Material

Union Trust Building, CLEVELAND, OHIO

DISTRICT SALES ENGINEERS IN ALL PRINCIPAL CITIES

Organization

An organization devoting its energies *exclusively* to the problems of sound control.

Macoustic Material

Macoustic is a plastic material which *goes on like plaster.* Used in accordance with Macoustic engineering recommendations, based on definite established principles of sound direction and control, Macoustic controls sound reflection and provides a uniform degree of good hearing under all conditions. Macoustic is low in cost, as well as simple and inexpensive to apply. It is permanent and becomes an integral fireproof part of the structure.

MACOUSTIC
REG. U. S. PATENT OFFICE
Patents Pending

John Hancock Insurance Building
Every office quieted with Macoustic

cost as ordinary plaster. Coverage, 100 yd. per ton.

Permanence—Becomes an integral, permanent part of the interior.

Decorative Appearance—Unlimited range of surface texture finishes in combination with harmonious color. Macoustic may be marked off in any desired pattern.

Fire Resistance—Macoustic is fireproof and verminproof—not an added hazard.

Acoustical Effectiveness—Evidenced in actual practice by universally successful achievement.

Low Cost—The reasonable cost of Macoustic treatment places it within the reach of the smallest jobs, permitting a specification for Macoustic where otherwise this important consideration of good hearing would necessarily be eliminated.

Absorptive Value—Macoustic absorbs as much as 36% of the sound waves striking its surface, as determined by tests. This exceptional acoustical value is the direct result of properly coordinated triple acting mechanical-aero-chemical processes.

Engineering Service

To assure a desirable accoustical factor of safety and protect the clients' interest, an engineering service is rendered. From the architect's drawings, an analysis is made by competent engineers which determines whether treatment is necessary, and so, where Macoustic should be applied to obtain the best results, for the least cost and for decorative effects in harmony with the architect's design. *There is no charge whatever for this advisory service, nor any obligation.*

One of the Many Textures Possible with Macoustic

Additional Data

Write for the "Macoustic Data Book" which includes illustrations in color of textures and list of typical installations. For prompt analysis send drawings to us direct, or through our nearest representative. They will be returned with our acoustical engineering report with cost data covering each of your interiors.

Almost Unlimited Texture and Color Range

Specification

Use the following:

Macoustic, manufactured by the MACOUSTIC ENGINEERING COMPANY, INC., Union Trust Building, Cleveland, Ohio, to be applied on all surfaces specified and recommended by the Manufacturer's Engineering Department, and in accordance with their standard specifications.

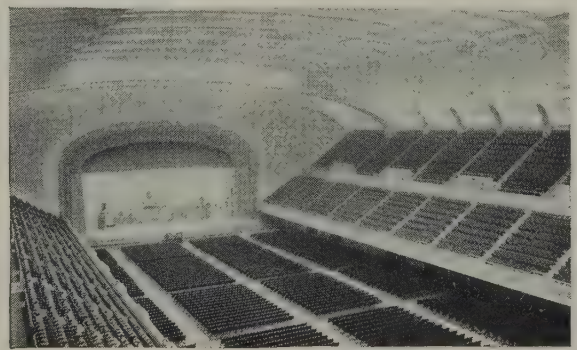
How Applied—Macoustic is mixed with clean water and applied in the same manner as ordinary plaster, over the usual brown coat, and laid on to a depth of ½ in. Produce specified surface texture finish.

Distinctive Macoustic Features

Practicability—Mixed and applied in exactly the same manner as ordinary plaster without special solutions or formulas or special skill.

Economy of Application—Applied for the same labor

National Broadcasting Company Building, New York
Studios in Washington and Chicago also treated with Macoustic



Macoustic Design—Macoustic Treatment
Cleveland Public Auditorium, seating capacity, 15,000. The largest and most successful acoustically designed and treated interior in the world

Interior of St. Louis Cathedral, St. Louis, Mo.
Murals applied directly to Macoustic

UNITED STATES GYPSUM COMPANY

Sabinite Acoustical Plaster

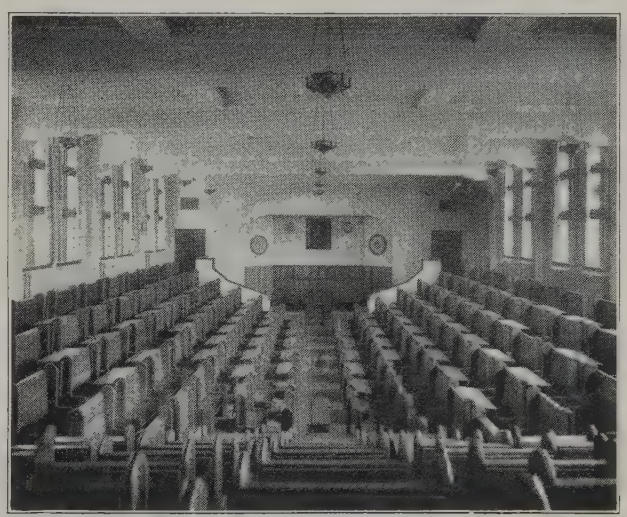
300 West Adams Street
CHICAGO, ILL.

For Sales Offices, see page A182

Product

SABINITE ACOUSTICAL PLASTER. (Licensed under Sabine Patent No. 1,458,631, June 12, 1923.)

For Sound Insulation, see pages A24-25.
For Reinforced Roof Tile; Monolithic Roof and Floor Construction, see pages A182-187.
For Pyrobar Partition and Furring Tile; Beam and Column Covering, see pages A430-431.
For Structolite Tile; Structolite Cement, see page A432.
For Fireproof Wallboard, see page B1621.
For Fireproof Sheathing, see page B1624.
For Dry Fill Insulation, see page B1668.
For Fireproof Lath, see page B1731.
For Gypsum Plasters and Finishes, see pages B1763-1765.
For Colored Finish Plaster, see page B1770.
For Exterior Stucco, see page B1780.
For Plastic Paint, see page B2135.



Lincoln Hall, Levy Mayer Building, Northwestern University School of Law, Chicago, Ill.
JAMES GAMBLE ROGERS, New York, N. Y., CHILDS & SMITH, Chicago, Ill., Associate Architects
Walls and ceiling of Sabinite

Advantages

Sound absorbing materials previous to the invention of Sabinite were in general fabrics or similar soft fibrous substances—inherently combustible, catch-alls for dirt, vermin, and pathogenic bacteria. Some have conspicuous patterns which do not always fit into the plans for decoration. Sabinite is a hard plastic material which combines ample sound absorption with a permanent finish plaster that will not burn, rot or mould. It is completely sanitary, cleanable and does not provide nesting material nor hiding places for vermin.

Sabinite walls do not cause comment. They look like other walls and may be painted or integrally tinted to unobtrusively fit into any scheme of decoration, or may be stenciled to form a major note in the beautification of any structure. They are applied by the plastering contractor under direct supervision of a service man furnished without cost by the manufacturer. The absorption of Sabinite is guaranteed by the manufacturer and is secured at usually lower costs per unit of absorption.

Description

Sabinite Acoustical Plaster is designed to combine definite absorption of sound with all of the properties of a finishing plaster. It is the invention of Dr. Paul E. Sabine, director of the most complete acoustical laboratory in the world—the Riverbank Laboratories at Geneva, Illinois.

Use

Sabinite Acoustical Plaster is applied to ceilings or sidewalls in lieu of the usual plaster finish. The area to be covered should be determined after a careful acoustical analysis of the room. It is applied in two successive coats each ¼ in. thick, with the regular plasterer's tools.

Purpose

Sabinite Acoustical Plaster is designed to correct the acoustics of auditoriums, churches, lodge halls, gymnasia, courtrooms, ballrooms, theaters, etc. It is also indicated as a quieting agent in hospitals, office buildings, hotels, and similar structures.

Why Sabinite Absorbs Sound

Sabinite Acoustical Plaster absorbs sound because of myriads of minute tortuous passages which proceed from the surface to the interior of the ½-in. coat. Sound is repeatedly reflected in these passages, losing its energy to heat and friction. The passages are inherent in the material. No skill or art unknown to the commonest plasterer is needed to obtain them.

Absorption

Tests of Sabinite Plaster at Riverbank Laboratories yield a sound absorption coefficient at C4 (512 vibrations) of 30%; at C6 (2048 vibrations, the pitch of office noises) 39% of the sound is absorbed.

Acoustical Analyses

The company maintains a competent corps of acoustical engineers for the convenience of architects. They will analyze any auditorium from the plans before construction, predict the acoustical results and determine proper areas of Sabinite where necessary for the correction of the reverberation time under full performance guarantees. This service is without charge or obligation.

Users of Sabinite

Sabinite Acoustical Plaster has been used on over 200 prominent structures without a single failure to meet all demands made on it. Among these buildings are structures designed by Graham, Anderson, Probst & White; James Gamble Rogers; Bertram Grosvenor Goodhue Associates; Schmidt, Garden & Erikson; U. S. Treasury Department, and many others of similar prominence.

Specification Data

Complete specification data is found in the book "Sabinite—Controlled Sound" obtainable from any representative or office of the company.

UNITED STATES GYPSUM COMPANY

U.S.G. System of Sound Insulation

300 West Adams Street, CHICAGO, ILL.

Product

U.S.G. System of Sound Insulation.

A supplemental construction adapted for use on new or existing buildings to eliminate objectionable sound travel from the room of its origin to other parts of the structure. Furnished and installed by the Contracting Division of the Company, on a guarantee basis.

Details of Construction

The U.S.G. System of Sound Insulation comprises the following constructions or treatments:

U.S.G. Sound Insulative Partition Furring—Adapted to any standard type of partition construction, but preferably to tile (either gypsum or clay). Applied usually to one face only of the partition before plastering. This sound insulative furring measures approximately 2 in. from the face of the partition to the outer face of the lath, which is included as an integral part of the furring. Our construction when installed is ready for plastering by the plastering contractor.

U.S.G. Sound Insulative Floor—Adapted to any standard type of floor construction. Applied to the rough masonry slab or to the rough wood flooring. This sound insulative floor measures approximately 3 in. from the rough floor slab to the top of wood sleepers (usually 2x2's 16 in. center to center) which the construction includes and provides. This height allows approximately 1¼ in. clearance under the sleepers for passage of conduits, etc., without cutting the sleepers. The construction when installed is left ready for the furnishing and placing of wood flooring by the carpenter contractor. Finish flooring may be used directly over the sleepers, but for the best type of work we recommend that both rough and finish flooring be used. If desired, the furnishing and placing of the rough flooring may be included as part of the sound insulation work.

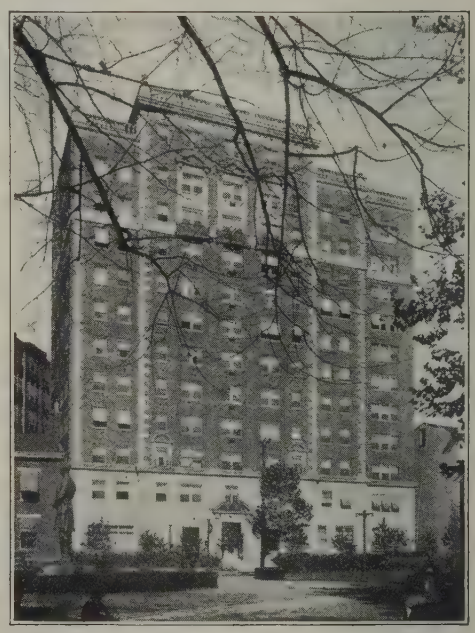
Note: Provision in our construction can be readily made for special floor heights, sleeper sizes, concentrated loads, etc.

U.S.G. Sound Insulative Suspended Ceiling—Adapted to any standard type of construction. Hung with hangers of No. 7 wire (or of size to meet local building requirements) spaced 2 ft. on centers in one direction and 4 ft. in the other direction. For masonry ceiling slabs these hangers should be installed under the general contract, when the slab is being poured, by the proper trade. This sound insulative suspended ceiling requires a minimum space of 5 in. from the structural ceiling to the underside of the lath, which is included as an integral part of the ceiling. Our construction when installed is ready for plastering by the plastering contractor. Where beams occur, our construction may either furr around the beam, allowing a minimum of 2 in. on sides and bottom of beam for such furring, or the entire ceiling may come below the beams.

Note: For certain types of construction a sound insulative ceiling furring occupying approximately 2 in. of space, and similar in detail to our sound insulative partition furring, may be used. This construction is recommended only for ceilings where space will not permit a suspended ceiling.

Raulf Hotel, Oshkosh, Wis.
Raulf Co., Milwaukee, Wis., Builders and Operators
Sound insulation of bowling alley in basement under theater

Medinah Athletic Club, Chicago, Ill.
Walter W. Ahlschlager, Architect
Sound insulation of bowling alleys, rifle range, plunge, rest room, telephone booths and elevator machinery



Phelps Apartments, Cincinnati, Ohio
Sinton Realty Co., Operators
Sound insulation between apartments including treatment of vent ducts

Miscellaneous Treatments

In addition to the treatment of walls, floors and ceilings as outline above, the U.S.G. System includes machinery bases and treatment of mechanical equipment, ventilating systems, piping, etc. In most jobs the treatment of these items is essential for proper results.

Advantages of U.S.G. System

Sound is commonly defined as consisting of alternate compressions and rarefactions of the atmosphere. Sound, however, is carried as a vibratory force by the molecular structure of *any* medium.

Continued on next page

In general, the denser the materials the higher the rate of speed that sound is carried. In building construction most sounds are not of sufficient intensity to be transmitted by the molecular structure of the materials, except those of direct physical impact. For example, a steel column will not carry to any appreciable extent the sound forces generated in the atmosphere by a voice, but will carry the direct impact of a hammer blow through the entire structure. Sound, however, is transmitted to a greater extent in a building due to the fact that the structural partitions, floors and ceilings form diaphragms which are relatively easily vibrated by sound forces. This vibration of the structural units as diaphragms actually recreates the compressions and rarefactions of the atmosphere on their opposite sides, thus reproducing the sound.

The greater the weight (and rigidity) of the structure unit the less the sound will be transmitted, or rather reproduced, by its diaphragm action.

To provide effective sound insulation in building construction is therefore a problem (1) of providing the most effective means of preventing the sound forces in the atmosphere (sometimes called "air-borne" sound) from acting upon the easily vibrated diaphragm construction, and (2) of preventing direct contact sound forces from being carried by the materials of the structure. The entire problem in its simplest form is the prevention of the transmission of vibratory force. The U.S.G. System of Sound Insulation was developed after a number of years of study and research to meet this requirement with the greatest efficiency. This is accomplished by interposing a shock-absorbing construction between the interior finished surfaces and the structural items of the building. Such shock-absorbing construction is obtained by attaching the finishing surfaces of partitions, ceilings and floors, etc., to their component parts of the structure by properly designed resilient means supplemented by vibration dampening material.

The U.S.G. Resilient Slips and Hangers are carefully designed devices formed of a special grade of steel and provide the essential non-rigid contact with a definite and permanent resiliency. The U.S.G. Insulative Fill is a dry, fluffy, flocculent, specially processed, mineral material of extremely light weight. It will noted, therefore, that the distinctive advantages of the U.S.G. System are the use of materials that are fireproof, vermin-proof and permanent in their effect.

Uses

The U.S.G. System should be used where a high degree of sound insulation is needed.

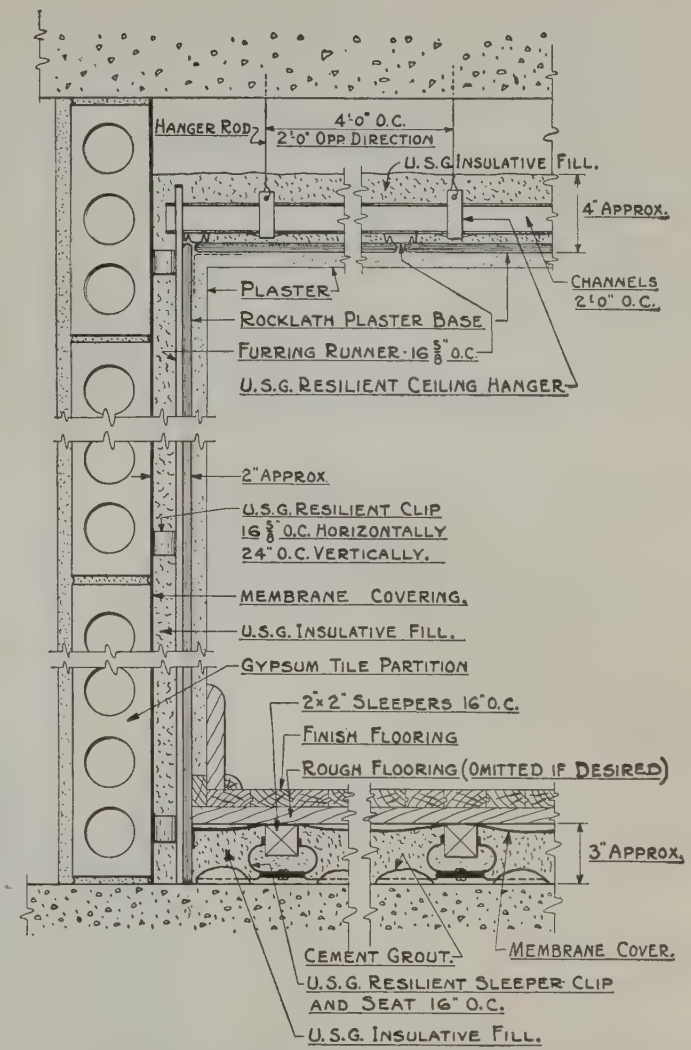
Apartments, hotels, hospitals, schools, club buildings, theaters and buildings housing bowling alleys and music studios, etc., all require effective sound insulation to a varying extent.

The U.S.G. Sound Insulation Floor provides a quiet resilient construction that is often used in dance halls, drill halls, gymnasia, etc., solely because of its non-reverberant and non-fatiguing qualities.

Engineering and Contracting Service

We offer a consulting service on problems of sound and vibration control and will give without charge or obligation detailed recommendations and cost estimates. When possible, this information should be obtained before plans and specifications are completed to allow proper incorporation.

The U.S.G. System of Sound Insulation is installed only by the Contracting Division of the United States Gypsum Company, which assures *definite results* and an *undivided responsibility*. Our work is not handled by agents.



Detail Section of U.S.G. Sound Insulative Floor, Wall and Suspended Ceiling Constructions

Guarantee

Our system installed in new buildings in accordance with our recommendations carries a written guarantee to eliminate objectionable sound travel.

Specification

Where sound insulation is indicated or specified, the U.S.G. System of Sound Insulation shall be used and shall be furnished and installed by the United States Gypsum Company, Contracting Division, 300 West Adams Street, Chicago, Ill.

Note: Detailed specifications furnished on request.

Acoustical Treatment

Sound insulation should not be confused with acoustical treatment. Acoustical treatment by use of exposed absorbent materials reduces reverberation *within a room,* by cutting down the reflection of the sound waves. It does not prevent to any appreciable degree the vibratory force of the sound from acting upon the walls, etc., and the sound being transmitted by diaphragm action as previously discussed. We also manufacture Sabinite Acoustical Plaster for acoustical correction and our recommendations therefore are unbiased on the proper use of sound insulation and acoustical treatment. For information on Sabinite, see page A23.

STEVENS SOUND-PROOFING CO.

Sound-proofing Engineers

Room 1190, 407 South Dearborn Street, CHICAGO, ILL.

REPRESENTATIVES

ATLANTA, GA., Ryan Sales Co., 252 Spring Street, N. W.
BOSTON, MASS., F. E. Berry Jr. & Co., Inc., 837 Little Building
BUFFALO, N. Y., Niagara Asbestos Corp., 11 Terrace
CHICAGO, ILL., G. F. Becker Co., 407 So. Dearborn Street
CINCINNATI, OHIO, Cincinnati Builders Supply Co., 534 Main Street
DALLAS, TEX., R. V. Aycock Co., 2114-16 Griffin Street
DETROIT, MICH., William Foster Shaw, Majestic Building
DULUTH, MINN., Walker-Jamar Co., 365 So. First Avenue, E.
HARTFORD, CONN., F. E. Berry Jr. & Co. Inc., R. 314 Essex Building
HOUSTON, TEX., R. V. Aycock Co., 1308 Conti Street
INDIANAPOLIS, IND., Charles E. Wehr, Hume-Mansur Building
KNOXVILLE, TENN., Ryan Sales Co., 426 W. Depot Street
KANSAS CITY, MO., R. V. Aycock Co., 1526 Grand Avenue
LOUISVILLE, KY., Building Equipment Co., 912 So. 8th Street
MILWAUKEE, WIS., Federal Asbestos & Cork Insulation Co., 931 30th Street
MEMPHIS, TENN., Ryan Sales Co., 770 So. Cooper Street
MINNEAPOLIS, MINN., H. O. Johnson, Builders Exchange
NASHVILLE, TENN., Ryan Sales Co., 1122 Stahlman Building
NEW ORLEANS, LA., Nachary Builders Supply Co., 802 Perdido Street
NEW YORK, N. Y., Ferro Building Products Co., Graybar Building
PHILADELPHIA, PA., Albert Zellfelder, 1324 Walnut Street
PITTSBURGH, PA., Pittsburgh Building Specialties Co., Jones Law Building
SAN FRANCISCO, CAL., Albert B. Mann, 417 Crocker Building
ST. LOUIS, MO., R. V. Aycock Co., 3900 Chouteau Avenue
SEATTLE, WASH., Asbestos Covering & Supply Co., 1037 Sixth Avenue, So.
TAMPA, FLA., Ryan Sales Co., 811 First National Bank
TULSA, OKLA., R. V. Aycock Co., 119 W. First Street
WASHINGTON, D. C., W. Lester Baker, Peoples Life Insurance Building

Engineering Service

We offer, in addition to a sound-proofing system of wide scope, an engineering service to the architect and engineer. We are prepared to present suggestions and make recommendations on any sound-proofing problem that may arise in connection with any class of construction, and the architect and engineer are invited to call upon us at any time in order to avail themselves of this service. It is good policy to go into such matters at the time preliminary plans are being drawn, so that recommendations can be made before full details of construction are arranged.

This service is offered without charge and the recommendations being based on years of experience in this field, to which our entire time has been devoted, eliminates the necessity of working out experimentally such problems on a purely theoretical basis.

Twelve years of successful installations in all parts of the United States form the basis on which all recommendations and specifications are offered.

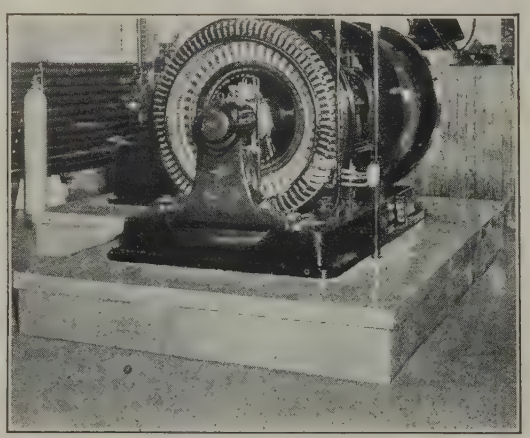
Advantages of Stevens System

Sound is an expansion and contraction of air, and travels in all directions in waves from the source of the sound. Where sound is disturbing within a room due to reverberation or echo, it is a simple matter to place absorbing materials in such a way that the sound will be partially absorbed and a large percentage of the echo eliminated. Sound being a phenomena of the air, the problem becomes more complex when sound is transmitted from one closed room to another, as it is evident there is no passage of air.

It has been fairly well established that the transmission of sound from one room to another is caused by the movement or vibration of the structural parts of the building, which are set in motion by the sound and reproduces that sound wherever it comes in contact with air. Thus, a sound may carry indefinitely through a building, depending on the intensity of the sound and the resistance offered by the materials used in the building. It is, therefore, evident that where absorbing materials are placed under floors or behind partitions or ceilings, that no matter how efficient they may be, that they can not function if the building is all tied together, as the sound will be transmitted by the steel, concrete or other materials.

The Stevens System provides a practical method of breaking the solid connection between the finished surfaces of room and substructures, so that surfaces exposed to sound may vibrate or move without disturbing the substructure, and by using proper absorbing materials in connection with installation absorbs sounds produced by the diaphragmatic action of the finished surface.

Aeolian Hall, New York, N. Y.
Warren & Wetmore, Architects
Organ rooms treated throughout with Stevens System



Ford Administration Building, Ford Motor Co., Fordson, Mich.
Albert Kahn, Architect
Stevens Anti-vibration platform under Brunswick-Kroschell ice machine

Special Uses

In addition to using the system under floors, in partitions, in ceilings and under machinery to prevent passage of sound or vibration, it is also used under ballroom and gymnasium floors to provide resiliency and eliminate fatigue and shock of impact.

Some Installations

Adelphi Theater, Clark and Estes Avenue, Chicago, Ill., J. E. O. Pridmore, architect, Stevens System installed in 1917 in connection with six bowling alleys. Alleys placed on second floor over lobby of theatre and stores, and adjoining theatre auditorium.

Roxy Theatre, Seventh Avenue and 50th Street, New York, N. Y., Walter Ahlschlager, architect. Ventilating fan and motor weighing 6 tons placed directly above the auditorium on Stevens anti-vibration platform.

Elks Club, Milwaukee, Wis., R. A. Messmer & Bro., architects. Ten bowling alleys placed on fourth floor directly above restaurant and directly under main lodge hall.

Stevens Hotel, Seventh Street and Michigan Avenue, Chicago, Ill., Holabird & Roche, architects. All ballroom and banquet room floors treated with Stevens System.

Edsel Ford Residence, Grosse Pointe, Mich., Albert Kahn, architect. All floors above first floor soundproofed under the Stevens System.

Fifth Avenue Theater, Seattle, Wash., R. C. Reamer, architect. Theater was built in connection with an office building, and each lease contained a clause stating that if sounds of theater organs are disturbing the lease may be broken. The two organ chambers were treated on ceilings, floors and partitions with entire satisfaction.

Grosse Pointe Country Club, Grosse Pointe, Mich., Smith, Hinchman and Gryls, architects. All floors treated with Stevens System.

New York Central Office Building, 45th Street and Park Avenue, New York, N. Y., Warren & Wetmore, architects. Walls and ceilings of all elevator machine rooms treated with Stevens System to prevent passage of sound to adjoining offices.

155 East 72nd Street Apartments, 155 East 72nd Street, New York, N. Y., Bing and Bing, owners, Cross and Cross, architects. All floors soundproofed with Stevens System.

Specifications

Furnish and install Stevens System of Sound-proofing as designed and manufactured by the Stevens Sound-Proofing Co., Room 1190, 407 South Dearborn St., Chicago, Ill.

This system to be installed under the specifications and direction of the manufacturer.

Further Information

If further information is desired, a representative will call at your request. Write for new catalogue.

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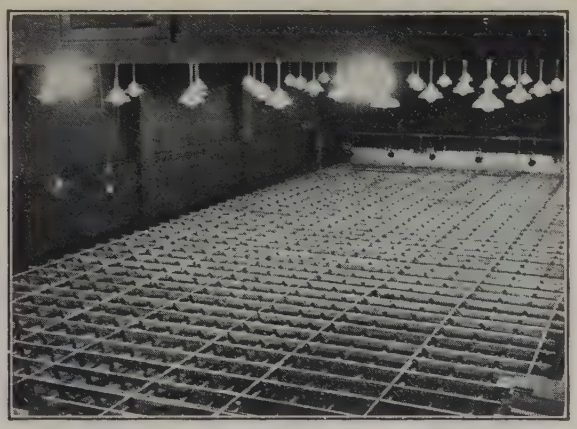
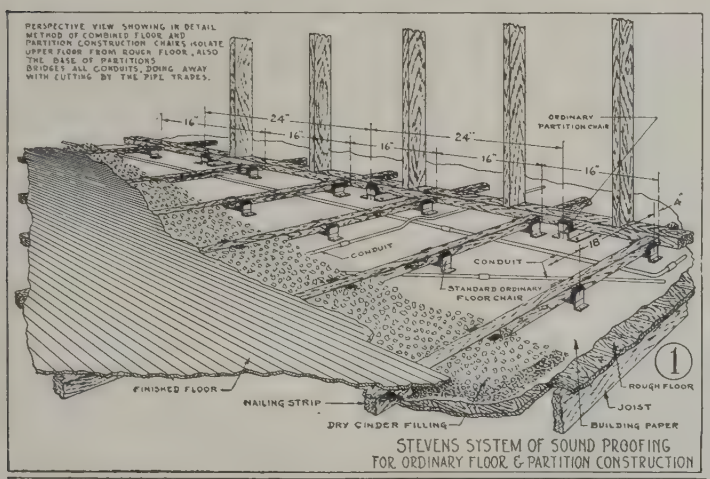
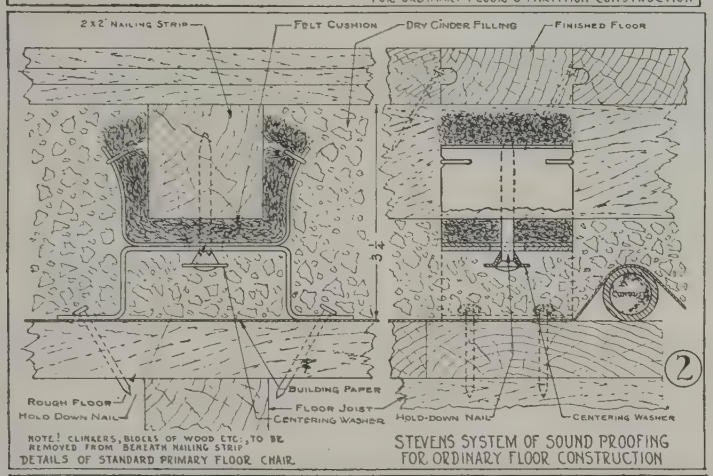


Orpheum Theatre, Pontiac, Mich.
Showing Stevens System of Sound-proofing under 10 bowling alleys above theatre used for drama

Drake Field House, Des Moines, Iowa
BURDETTE HIGGINS, Architect
PROUDFOOT, RAWSON & SOUERS, Associate Architect
Stevens System under gymnasium floor

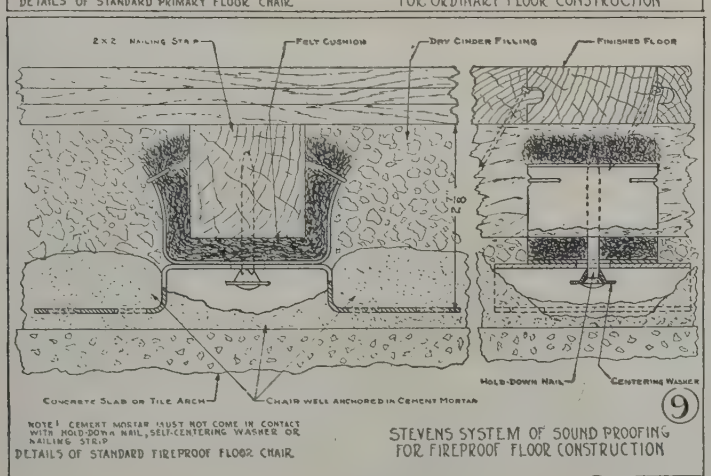


STEVENS SYSTEM OF SOUND PROOFING
FOR ORDINARY FLOOR & PARTITION CONSTRUCTION



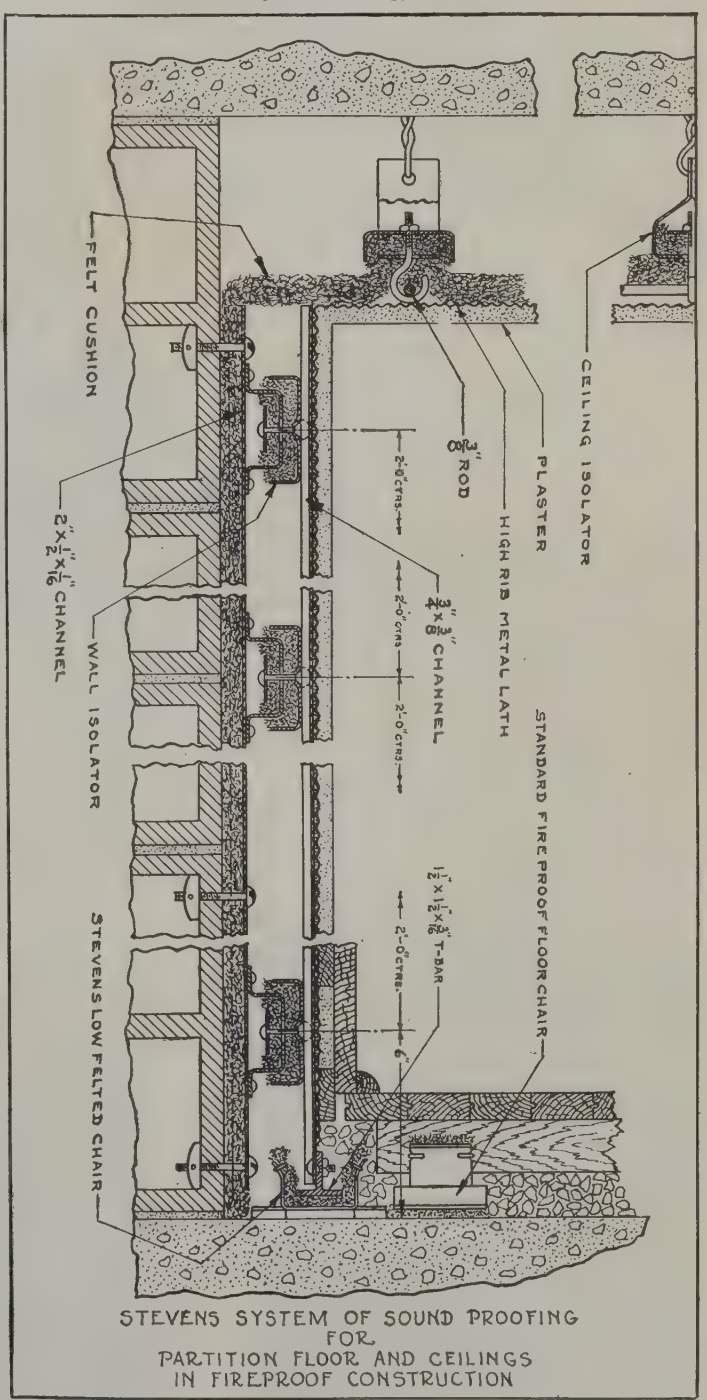
NOTE! CLINKERS, BLOCKS OF WOOD ETC., TO BE REMOVED FROM BENEATH NAILING STRIP.
DETAILS OF STANDARD PRIMARY FLOOR CHAIR

STEVENS SYSTEM OF SOUND PROOFING
FOR ORDINARY FLOOR CONSTRUCTION



NOTE! CEMENT MORTAR MUST NOT COME IN CONTACT WITH HOLD-DOWN NAIL, SELF-CENTERING WASHER OR NAILING STRIP.
DETAILS OF STANDARD FIREPROOF FLOOR CHAIR

STEVENS SYSTEM OF SOUND PROOFING
FOR FIREPROOF FLOOR CONSTRUCTION



STEVENS SYSTEM OF SOUND PROOFING
FOR
PARTITION FLOOR AND CEILINGS
IN FIREPROOF CONSTRUCTION

Detailed Drawings, Stevens System of Floor Deadening

Ordinary Construction: (1) Isolates upper floor from rough floor. Does away with all cutting by pipe trades. Eliminates all cutting of the floor plate; bridges all conduits. (2) Hold-down chairs for use where floors have a tendency to buckle, in center of rooms, etc.

Fireproof Construction: (1) Eliminates buckling of finished floors. Saves all cinder concrete fill. Conduits easily changed. Saves time. No waiting for the cinder concrete to dry. Hold-down chairs to prevent buckling floors.

MacARTHUR CONCRETE PILE CORPORATION

19 West 44th Street, NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 134 North La Salle Street
PITTSBURGH, PA., Union Trust Building
BUFFALO, N. Y., 70 Ohio Street
NEW ORLEANS, LA., 325 North Cortez Street
BOSTON, MASS., 108 Massachusetts Avenue

CANADIAN MacARTHUR CONCRETE PILE CO., LTD., NEW BIRKS BUILDING, MONTREAL

"A Special Pile for Every Condition—Not One Pile for All Conditions"

The MacArthur Method employs *"A Special Pile for Every Condition—Not One Pile for All Conditions"* but the method of forming each type is such that all can be placed with our standard equipment. Therefore, when unexpected subsoil conditions are encountered and a change in plans becomes suddenly necessary, there is no delay incidental to bringing in equipment for special piles, as the equipment is already on the site and all material used is available locally.

MacArthur Concrete Piles are all cast-in-place piles and are all of the straight shaft type. They include:

Straight Shaft and Pedestal Piles—These are our standard compressed concrete piles. Used for all ordinary soil conditions where piles up to 40 ft. in length are required.

Composite Piles of Concrete and Timber—For use where bottom (timber) section of pile is below permanent water level. More economical than all concrete. Placed in lengths up to 100 ft.

Composite Piles of Concrete and Pipe—Uncased upper section of compressed concrete and lower section of closed end pipe—any length. For use in very soft soils where piles have to be driven to great depths.

Pipe Piles with Cast Steel Point—Filled with concrete to any length. Economical for driving where headroom is limited, such as for underpinning foundations or making new foundations inside existing buildings.

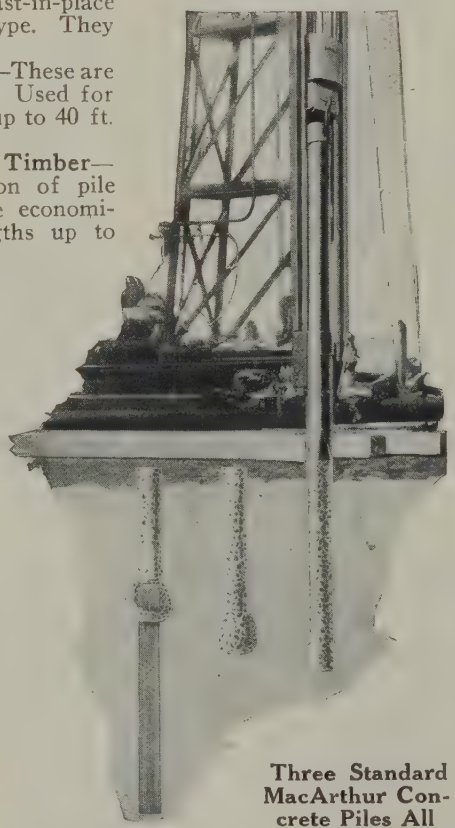
Concrete Slabs for Gas Holders—We have built hundreds of complete foundations (piling and slabs) for gas holders and oil storage tanks. Our experience in this work is a very valuable asset.

Straight Shaft Uncased Compressed Concrete Piles for All Ordinary Soil Conditions

Maximum of Skin Friction—The MacArthur uncased pile calls for a workable dry mix concrete compressed under a weight of 7 tons per pile—after the concrete is poured. This forces a dense, homogeneous concrete into intimate contact with the surrounding soil and gives the maximum of skin friction without any disturbing factor.

The compressed concrete is so much denser than the surrounding soil that it cannot be disturbed, distorted or forced out of place by the driving of adjacent piles as might be the case with a wet uncompacted concrete even though enclosed by a thin metallic casing.

Perfect piles are formed on 2 ft. 6 in. centers in the toughest and most rubbery of clays by this method. Large numbers of excavated piles have proven the certainty of this method.



Three Standard MacArthur Concrete Piles All Formed by the Same Standard Driving Apparatus

Uniform Diameter—The MacArthur Method for uncased compressed concrete piles employs a steel driving shell with walls ½-in. thick and of uniform diameter throughout its entire length. There is no question, when this is driven to penetration, about the shell being intact and absolutely true in diameter throughout while the concrete is being placed. It also makes a pile as strong at the base as it is at the top—a pile with twice the diameter at the base as the ordinary tapered form of pile and with more concrete in each pile.

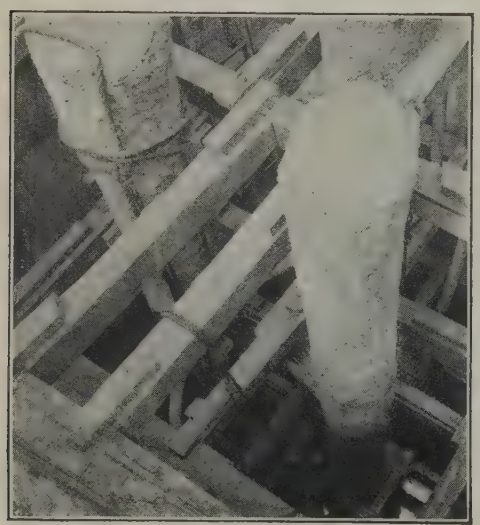
Concrete Easily Rammed or Compressed—It is a known fact that has been demonstrated by years of practice that concrete should be rammed or compressed after being placed in the forms, so as to secure perfect cohesion and to remove voids caused during pouring.

The MacArthur Method calls for a concrete compressed under a weight of 7 tons in each pile, after the concrete is placed.

"Dry Mix" Concrete Recommended for Cast-in-place Piles—In a cast-in-place pile it is necessary to dump the concrete down a steel shell a considerable distance. Therefore when a wet sloppy mix is used, the sand, cement, water and stone undoubtedly will separate and the chance of the aggregates again arranging themselves in correct proportion when they arrive at their destination is very remote indeed.

The MacArthur Method calls for a water ratio of 6 gal. of water per bag of cement with sufficient coarse aggregates to make what is termed a "dry mix."

Note: See recommendations of Portland Cement Association in their booklet "Design and Control of Concrete Mixtures."



MacArthur Piles Excavated for Inspection
Made under supervision of Supt. of Building Dept., Borough of Brooklyn, N. Y.

Nine MacArthur Pile Drivers Quickly Finished This Foundation
We have the equipment, organization and resources to satisfactorily complete the most difficult pile foundation work in any part of the United States or Canada

Continued on next page

Open Specifications for Cast-in-place Concrete Piles

(For Incorporation in Architect's and Engineer's General Specifications)

Concrete Pile Construction—Concrete piles shall be provided where shown and called for on plans. The price shall be calculated on the basis of .... lineal feet each. Contractors shall state plus and minus price per pile and per lineal foot for actual length driven.

Concrete piles shall be driven to a bearing value as determined by the Engineering-News Formula and if necessary, in the judgment of the architect or engineer, load tests shall be made on (one or more) piles, at the expense of the owner. The total settlement of pile shall not exceed one one-hundredth of an inch per ton of test load applied.

Concrete piles cast-in-place may be straight shaft or tapered. The working load on each pile shall be .... pounds. Piles shall be cast in strong removable steel shells, or light gauge steel reinforced, or corrugated, or plain shells to remain in place.

After the shell has been driven and the driving mandrel withdrawn, the shell shall be tested against collapse or squeezing of the shell out of true shape by again dropping the full sized mandrel to the bottom of the shell. Any shell which is improperly driven, is broken, shows partial collapse, is out of round or otherwise defective shall not be accepted.

Note: In the removable shell type the concrete shall be constantly compressed while the shell is being withdrawn.

Concrete—Concrete shall be mixed in the proportion of 1 part of cement, 3 parts of sand and 5 parts of stone or gravel, all as approved. A water ratio of 6 gal. per bag of cement shall be used as closely as possible so as to obtain a dry enough mix to keep the component parts of the concrete from separating while being poured into the shell. A wet, sloppy mix of concrete shall not be allowed. The concrete shall be tamped as it is being deposited or compressed after it is deposited.

Borings—(State hereafter information on and instructions regarding soil samples and boring diagrams).

Special Notes and Engineering Information on Cast-in-place Concrete Piles

Engineering News Formula—

$$L = \frac{2\,W\,H}{S + 0.1}$$

L = Load in pounds
W = Weight of falling parts in pounds
H = Drop in feet of falling parts
S = Final penetration per blow in inches

A No. 1 steam hammer has a weight of 5000 lb. falling 36 inches.

Pile Length—It is necessary to adopt in the specification a length of pile so as to secure uniformity in the bids. This length can be determined approximately from examination of the borings. (We will be glad to make recommendations covering correct bid length upon receipt of boring data.)

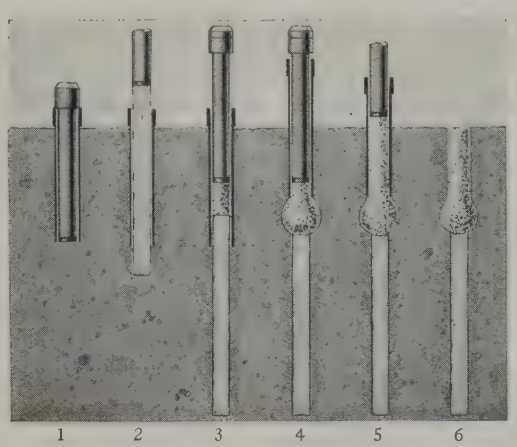
Driving Piles on Standard Centers—A condition is seldom met where the driving of cast-in-place concrete piles on 2 ft. 6-in. centers injures the pile previously driven. If unusual soil conditions are found it should be treated as a special case, rather than needlessly adding to the cost of the operation by arbitrarily specifying piles to be driven in scattered formation, which makes necessary considerable increased cost to the owner. The following is suggested for taking care of this case:

"If it is found that driving adjacent pile disturbs the pile which has just been completed, the engineers (or architects) may require the contractor to deviate from the regular driving method, so as to avoid injury to piles already in place."

Pedestal Piles—It is sometimes found that there is a firm strata of soil lying between layers of poor soil which would sustain the superimposed load if it could be properly distributed by a larger base than is possible with standard diameter piles, thereby making a desirable saving in pile length. Also, in some cases the foot of the concrete pile rests on an inclined rock, which tends to cause a side slip of the pile. The addition of a pedestal overcomes this danger by giving a larger end bearing and more intimate bond.

Reinforced Piles—Piles may be reinforced with single central rod or with a hooped cage without delay in driving operations.

Metal Shoe—In wet or semifluid soils pile forming casing is sealed before driving with a suitable metal shoe.

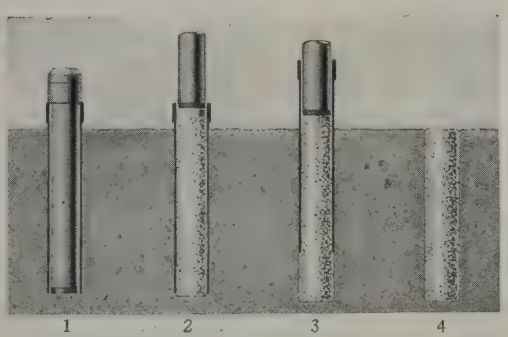


MacArthur Composite Type (Concrete and Wood Pile)

(1) Core and casing driven into ground.
(2) Core withdrawn and square timber placed in casing.
(3) Timber guided by casing, driven down to give necessary bearing. Butt of timber below ground water level. Core withdrawn, batch of concrete deposited in casing on top of timber and core replaced.
(4) Casing raised necessary distance, pedestal joint formed around top of timber insuring perfect juncture between timber and concrete.
(5) Core withdrawn, sufficient concrete deposited to provide for voids and space occupied by casing. Casing then steadily withdrawn with 7-ton pressure remaining constantly on the concrete.
(6) Finished shaft well knitted and bonded to soil

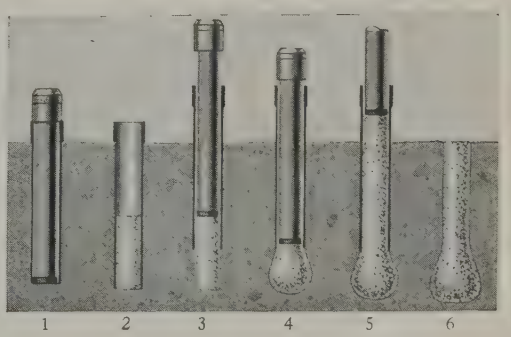
References

Bartlett-Hayward Co., Baltimore, Md.
Wilputte Coke Oven Corp., New York, N. Y.
William Higginson, New York, N. Y.
D. X. Murphy & Bro., Louisville, Ky.
B. H. Davis & Co., New York, N. Y.
A. Burton Cohen, New York, N. Y.
Ford, Bacon & Davis, New York, N. Y.
Westcott & Mapes, New Haven, Conn.
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio
Bernard H. Prack, Pittsburgh, Pa.
Brooklyn Union Gas Co., Brooklyn, N. Y.
Stevens & Wood, New York, N. Y.
Electric Management & Engineering Corp., New York, N. Y.



MacArthur Compressed Concrete Straight Shaft Type

(1) Core and casing driven into ground.
(2) Core removed and casing filled with concrete a sufficient amount above grade to take care of compression. The 7-ton weight of the core and hammer is then placed on the concrete.
(3) The casing is steadily withdrawn from the ground—the 7-ton weight of the core and steam hammer remaining constantly on the concrete and forcing it into the space occupied by the casing and any voids in the ground.
(4) The finished cylindrical shaft—a solid homogeneous mass of compressed concrete



MacArthur Compressed Concrete Pedestal Type

(1) Core and casing driven into ground.
(2) Core removed, charge of concrete dropped to bottom of casing.
(3) Casing pulled up 18 in. to 3 ft. with 7-ton pressure of core and steam hammer remaining on concrete.
(4) Charge of concrete rammed out.
(5) Core is removed, casing filled with concrete. Core replaced and casing steadily withdrawn while concrete is under 7-ton pressure.
(6) Finished shaft with enlarged base

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RAYMOND PRE-CAST PILES: Bearing and Sheet.
CONCRETE WORK of a Special Nature.

Slogan

A form for every pile—
A pile for every purpose.

Concrete Piles vs. Wood Piles

There are certain fundamental advantages that concrete piles have over the use of wood piles. Wood piles must be driven so that the cut-off is below permanent water line, whereas concrete piles may be cut off at any level, irrespective of the permanent water line. Wood piles are often broomed or broken while being driven, thus reducing, if not eliminating their supporting power, whereas the Raymond type of concrete pile is not subject to distortion in driving.

In marine work, wood piles most frequently are creosoted for protection against marine borers, whereas concrete piles are not subject to such destruction. Wood piles very often require considerable shoring, underpinning, sheeting, pumping and deep excavation, whereas this can usually be eliminated partially, if not entirely, by the use of concrete piles. Furthermore, there is an important saving in time by the use of concrete piles, as the footings can be placed immediately after the concrete pile has been driven.

Classification of Concrete Piles

Concrete Piles are of two distinct types:
(1) Concrete piles, which are made in place, commonly referred to as "cast-in-place" concrete piles.
(2) Concrete piles which are cast in moulds and then driven like wooden piles and are referred to as "pre-cast" concrete piles.

Cast-in-place piles are divided into two classes:

(a) Those in which a form is left in the ground to preserve the integrity of the finished pile.

(b) Those in which the concrete is placed by means of a temporary driving form which is removed before the concrete hardens and leaves the pile confined only by the loose earth. The green concrete is then, obviously, subject to the admixture of foreign materials, excess of water and distortion due to strains set up by soil pressures and the driving of adjacent piles.

Pre-cast concrete piles are those which are cast in a mould and then driven like a wooden pile and are referred to frequently as "pre-cast concrete piles."

The Raymond Method

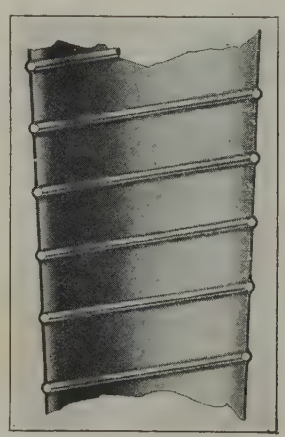
A collapsible steel core, usually 8-in. diam. at the point and increasing in diameter at the rate of 0.4 in. per lin. ft. of length, is incased by a spirally reinforced steel metal shell. The core, thus incased, is driven to a proper penetration in accordance with the *Engineering News* formula. It is then collapsed and withdrawn from the shell, the shell remaining in the ground and maintaining the resistance encountered in the driving. The shell is then inspected and if found perfect from tip to top is filled with concrete, making a perfect concrete pile.

Under certain conditions we use a core with a larger diameter at the point.

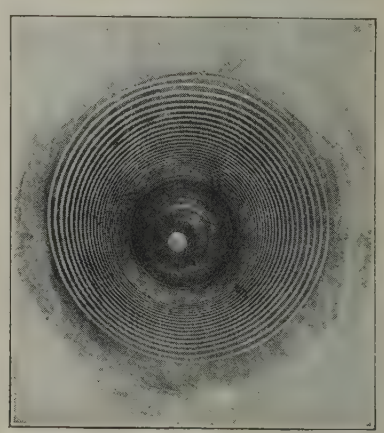
Loads and Spacing—Usually Raymond concrete piles are driven to carry a working load of 30 tons each, but in some cases, loads of from 35 to 40 tons are safely carried.

A working load of 30 tons per pile is accepted by all building departments. The usual spacing of Raymond concrete piles is 2 ft. 6-in. centers for piles less than 30 ft. in length, and for piles in excess of 30 ft. in length, a spacing of 3-ft. centers is more desirable. In view of the very wide variation in soil conditions and other difficulties surrounding a job, it is suggested that the nearest Raymond office be conferred with, so that the site can be investigated and recommendations made.

Sizes and Weight of Material—The standard Raymond concrete pile is installed by the use of a pile core 8-in. diam. at the point and increasing in diameter 0.4 in. per lin. ft. of length. For instance, a pile 20 ft. in length would be 16-in. diam. at the top, while one 37 ft. long would have a top diameter of 22.8 in.



Section of Spiral Shell



Looking Down Into a Driven Shell—30-ft. Long

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The present limit in length of a standard Raymond concrete pile is 37 ft. 6 in. Where conditions are such as to require piles of greater length, we call attention particularly to the Raymond composite pile, a description of which will be found on the next page.

Working Loads—In calculating the resistance to penetration, the *Engineering News* formula, based on using a steam hammer, has been found most satisfactory. This formula follows:

$$L = \frac{2\,W\,H}{S + 0.1}$$

L=Load in pounds
W=Weight of falling parts in pounds
H=Drop in feet of falling parts
S=Final penetration per blow in inches

A No. 1 steam hammer has a weight of 5000 lb. falling 36 inches.

A No. 2 steam hammer has a weight of 3000 lb. falling 30 inches

Thus the carrying capacity of the Raymond concrete pile is not a matter of guesswork or speculation, but is susceptible of computation and demonstration.

Advantages of Taper—The Raymond concrete pile possesses an extreme taper and offers a maximum resistance for a given length. This has been proved by a comprehensive record of resistance encountered in driving plus an extensive series of loading tests, during which the real carrying power of the pile has been checked with the driving resistance.

Prices—The Raymond concrete pile is "made-in place" and not sold by the foot, f. o. b. cars, consequently it is impossible to quote prices without knowing the conditions under which the work is to be done. For even approximate prices, it is necessary to have some knowledge of the number of piles, probable length, the approximate spacing, soil conditions, accessibility of the site, etc.

Points of Superiority of Raymond Concrete Piles—

(1) Absolute permanency: immunity from decay or from the attacks of wood borers and destroyers.

(2) Economy, because of greater carrying capacity—meaning a less number of piles for a given load. The greater carrying capacity rests upon several points—to wit:

(a) Greater size, therefore greater displacement and frictional area.

(b) Greater taper, therefore greater frictional value per square foot.

(c) Perfect shape, therefore perfect contact with the ground at every point.

(d) Possibility of inspection after driving, hence the ability to load to full capacity, instead of making a large allowance for inefficiency as in the case of wood piles subject to injury by overdriving, telescoping, departing from the vertical, and like defects, none of which are discernible at the moment when correction is possible.

(e) Decreased length of pile as a natural consequence of greater size and taper.

(3) Smaller and lighter footings, because of decreased number of piles.

(4) Decrease in total load to be carried, because of decreased weight of footings.

(5) Practical elimination of shoring, underpinning, sheeting, pumping and deep excavation and the reduction of masonry.

(6) Due to decreased number of piles and consequent reduction in width of wall footings, the center line of columns can be brought nearer to the building line.

(7) Important saving in time caused by:

(a) The smaller number of piles required.

(b) The reduction in the amount of excavation, shoring, sheeting and pumping.

(c) The reduction in quantities of footing or masonry.

(d) Manufacture of the pile in place, from materials readily procurable in all localities, and limit of manufacture to the actual number and exact length of piles required. There is no delay for cutting and trimming trees, hauling to shipping point, transporting for great distances by rail or water and delivery to the job, perhaps only to find that the piles are too long or too short.

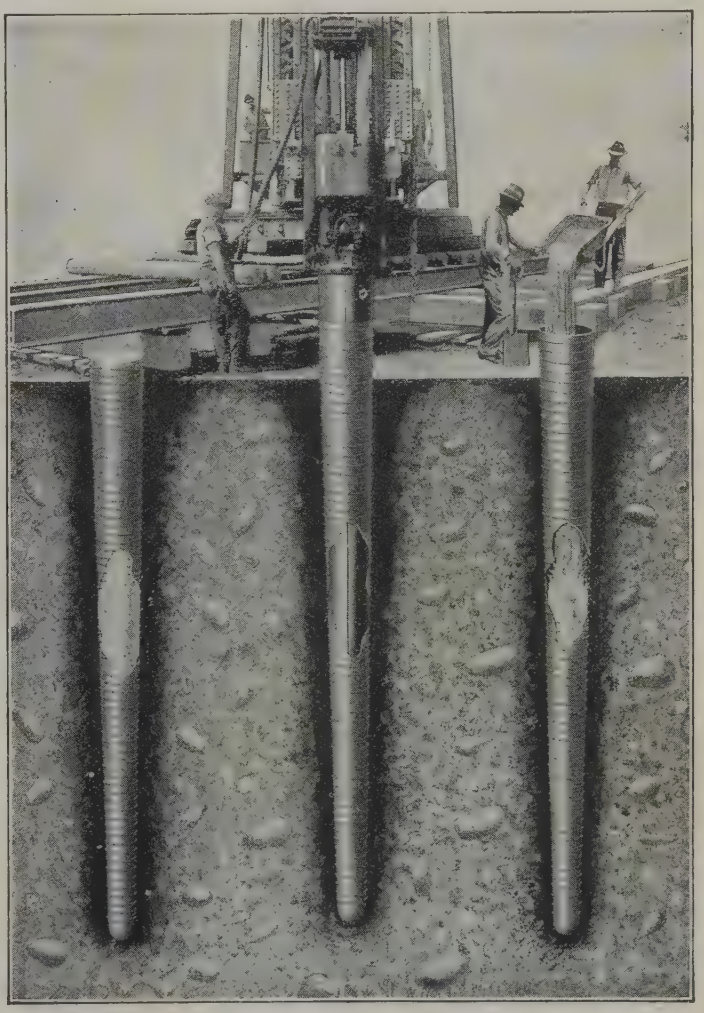
Specification—If "Raymond concrete piles" are called for, this is of course sufficient. On the other hand, if it is for any reason inadvisable to name them specifically the following specifications will cover:

"Concrete piles shall be of a type specifically approved by the architect or engineer, and shall be placed in the following manner:

"A collapsible steel mandrel or pile core 8 in. in diameter at the small end and 20 in. in diameter 30 ft. from that point shall be incased in a spirally reinforced steel shell and driven to a proper penetration. The pile core shall then be collapsed and withdrawn from the shell. Before placing the concrete, each shell shall be inspected and, being found perfect, shall thereupon be filled with concrete placed in accordance with the best practice."

or

"Moulded-in-place piles shall be of a type suitable for the conditions and subject to the approval of the architect or engineer. They shall be formed in casings left in place, which shall be of sufficient strength to prevent distortion or bulging after mandrel has been withdrawn and while the cavity is being filled with concrete or during the driving of adjacent casings."



Essential Steps in the Making of a Raymond Concrete Pile

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More About the Raymond "Cast-in-place" Pile

The Raymond pile is the only concrete pile employing the spirally reinforced driven casing as a permanent form to remain in the ground. This feature is essential for perfect dependable results. The province of the form or shell is manifold:

(1) To serve as a form for the piles.
(2) To prevent the admixture of foreign substances.
(3) To retain the original moisture in the mixture until the concrete is thoroughly hardened.
(4) To prevent distortion by external pressure, due to the driving of adjacent piles or accumulated pressures from displacement by the pile itself.
(5) To perfectly retain the displaced earth forming the walls of the cavity, so that there may be no relaxation of the ground and therefore no loss of resistance when the displacing force (the core) is removed.
(6) To act as reinforcement of the pile until the concrete shall have attained its maximum strength.

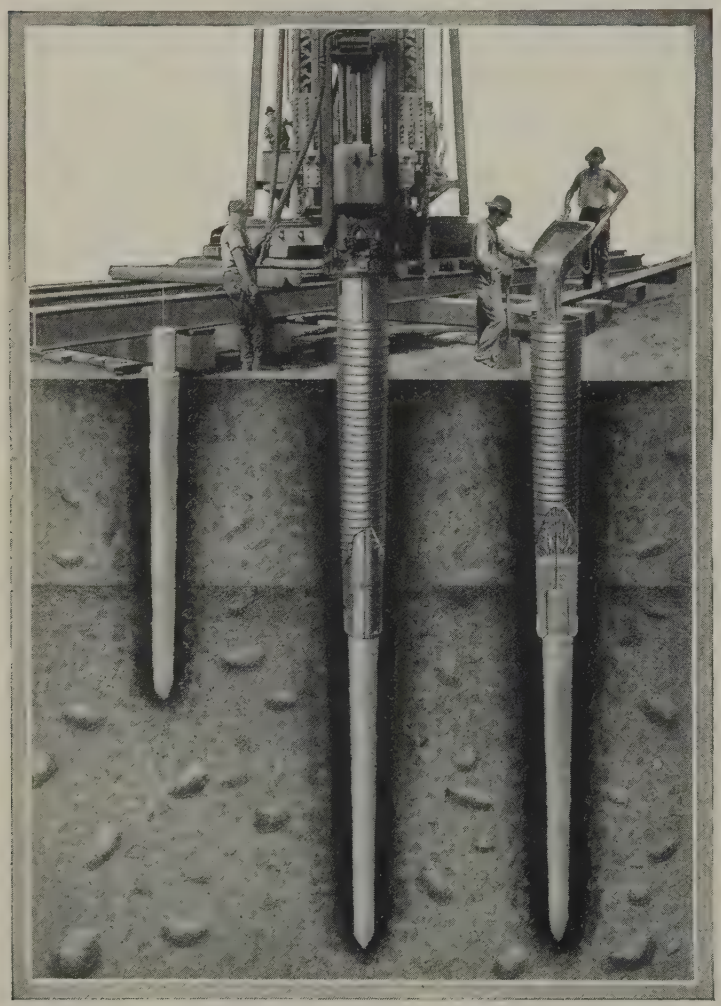
Raymond Composite Piles

For use where depths greater than 37 ft. 6 in. are encountered, we have developed a composite pile made up by superimposing a Raymond concrete section on a previously driven wooden pile.

The wood pile is ultimately driven so that its top is below the permanent water level and from that point to the bottom of the footing is a standard Raymond concrete pile, as fully illustrated below.

Pre-cast Piles

Pre-cast piles have a large and useful field, particularly in marine structures, such as docks, bulkheads, etc.



Raymond Composite Pile

The Raymond Concrete Pile Company is prepared, through its experience, to give good advice upon the use of "pre-cast piles," and also to design and construct work in which a pre-cast pile can be used economically and advantageously.

Special Concrete Construction

In addition to the placing of standard Raymond concrete piles for foundation of structures on land, we construct and design permanent docks, piers, bulkheads, trestles, storage bins, retaining walls, bridges, heavy foundation, shipways, drydocks, etc.

Each problem requires special study for solution and our experienced organization is yours to command.

Services and Facilities

Our staff of experts is at your service, to assist in the designing and installation of concrete piles for all purposes and to meet all conditions.

Engineering—Our engineering department is available to architects and engineers at all times for investigation work and consultation, and we will gladly submit recommendations, designs and estimates covering any problem within the scope of our business.

Equipment—Every Raymond driver is built of structural steel, scientifically designed for the most rapid and economical construction, and the major portion of our equipment is built in our own machineshops.

References

Since 1901 when the first Raymond concrete pile was placed, we have placed up to December, 1927, more than 25,000,000 ft. of Raymond concrete piles throughout the United States, covered by over 2400 separate and individual contracts. We shall be pleased to have you refer to any of the many engineers, architects, owners, and general contractors with whom we have been associated.

A partial list follows:

Voorhees, Gmelin & Walker, New York, N. Y.
James Gamble Rogers, New York, N. Y.
York & Sawyer, New York, N. Y.
William Higginson, New York, N. Y.
Trowbridge & Livingston, New York, N. Y.
Warren & Wetmore, New York, N. Y.
Cass Gilbert, New York, N. Y.
Buchman & Kahn, New York, N. Y.
Gilbert & Boutelle, Newark, N. J.
Holabird & Root, Chicago, Ill.
Nimmons, Carr & Wright, Chicago, Ill.
Rapp & Rapp, Chicago, Ill.
S. Scott Joy, Chicago, Ill.
H. L. Stevens & Co., Chicago, Ill.
Rankin & Kellogg, Philadelphia, Pa.
Zantzinger, Borie & Medary, Philadelphia, Pa.
Horace Trumbauer, Philadelphia, Pa.
Paul P. Cret, Philadelphia, Pa.
Monks & Johnson, Boston, Mass.
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Simplex Concrete Piles: Cast-in-place, Pre-cast and Composite.

Engineers and Contractors for Concrete Construction; Engineers and Contractors for Foundations for Chimneys, Tanks, Buildings, etc.; Caissons for Concrete Construction.

Also Steel Incased Concrete Piles.

We will submit recommendations, designs and estimates on receipt of necessary data, or will visit the site of prospective work at any time for purposes of investigation and consultation, and without obligation.

Specific Types of Piles for Specific Conditions

No one type of concrete pile has as yet been designed that will economically and successfully meet all conditions of soils and loadings. We have developed several methods of installing concrete piles enabling us to meet successfully every condition.

Simplex piles are of proved worth. They have been used extensively in the United States and Europe since 1903 for supporting buildings and other structures.

Advantages of Simplex Concrete Piles

Simplicity; easily and quickly installed.

Certainty of results.

Durability equal to that of natural rock; renewals never required.

Greatest frictional surface. Unsurpassed carrying power.

Economy in time and cost over other types of foundations.

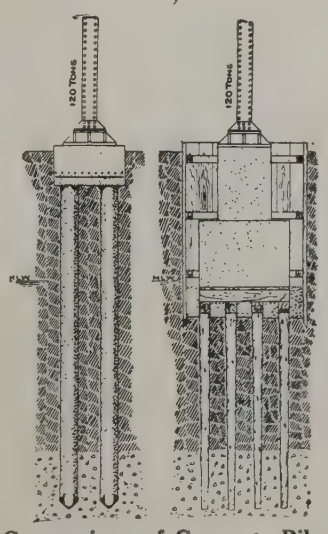
Load transferred to firm bearing strata without reference to or dependence on poor soil above, although taking full advantage of it in addition to the end bearing value.

16 in. in diameter at top, 16 in. in diameter at the bottom; this pile with the big cast iron base gives 1½ sq. ft. in the hard pan on which you depend for carrying the loads.

Standard Simplex Cast-in-place Concrete Piles

Are suitable for nearly all conditions met with in unreliable ground. A cylindrical steel form, fitted with a cast iron point (joint is watertight) is driven to proper depth and filled with wet concrete. Form is withdrawn and the concrete is molded against the rough, compacted walls of the hole, resulting in tremendous skin friction in addition to its end bearing. *The concrete is placed before removal of form.*

In no case of Simplex pile construction has it been found that the back pressure of the earth was as great as the weight of the column of concrete in the pile. Reinforcement may be used, if desirable.



Comparison of Concrete Pile and Wood Pile Foundations

Standard Simplex concrete piles are 16-in. diam. their entire length; they have been driven to depths of 75 ft. Working load is usually 30 tons per pile, fully justified by long experience and many tests. Load may be varied in special cases.

Under average soil conditions, a spacing of 3 ft. on centers produces the best results.

Specification—Concrete piles shall be made-in-place by driving to proper penetration a 16-in. diameter steel pipe fitted at its lower end with a detachable cast iron point. This pipe shall be filled with concrete to the proper height and then it shall be pulled out of the ground, leaving the cast iron point in the ground and a shaft of concrete completely filling the hole to its compacted walls.

Greatest Compression of Soil Immediately About the Pile

Disturbance ceases about one diameter from pile

Simplex Pre-Cast Concrete Piles

Are used for foundations for docks, wharves, sea walls and other water work, and for foundations where the ground is unusually unsatisfactory. A form is driven to proper depth as in the standard system. A small amount of wet concrete is poured into the form. A pre-cast reinforced concrete pile is lowered through the form; the projecting ends of the reinforcement extend into the wet concrete. The form is then withdrawn, leaving the pre-cast pile in position. Thin grout poured into the form as it is withdrawn materially increases skin friction in some cases. This method admits of positive results as to penetration without striking a blow on the pre-cast pile and entirely avoids the questionable consequences of jetting.

Standard size is 13 in. octagonal section and 40 ft. in length, but can be installed in larger diameters and to greater depths.

Simplex Composite Piles

Economically meet soil conditions requiring great depth of penetration, where the permanent water line is considerably below the surface. A wood pile of required length and diameter is driven to proper depth, upon which is constructed a standard Simplex concrete pile. This method lends itself to the modifications of the standard system and readily admits the use of a pre-cast concrete pile on top of the wood pile.

WESTERN FOUNDATION COMPANY

Engineers and Contractors

308 West Washington Street
CHICAGO, ILL.

Products

FOUNDATIONS of all types.
PILES.
CAISSONS.

Foundations of All Types

Where the soil conditions are such as to require special foundations the WESTERN FOUNDATION COMPANY finds its field of activity. We are prepared to discuss with architects and engineers any standard type of foundations, i.e., concrete piles, composite piles, caissons, steel pipe piles, wood piles and steel and wood sheeting.

Our Service

Being prepared to execute any type of foundation work, we are enabled to install not one particular type of foundation on a given job but the most economical type for the soil conditions. It sometimes happens that on a single job several types of foundations are desirable. In one recent job, there were piers, open caissons, blown-out steel pipes, compressed concrete piles, composite piles and wood piles, all of these being carried to rock, which in one part of the building was above the water line and in another part below the water line.

Being prepared to execute various types of foundations, we are also in a position to discuss with architects and engineers the cost of various types. Our engineers have had many years of experience in foundation work. We are very glad to have them call upon architects and discuss with them their foundation problems when they are studying a job and making preliminary cost estimates, so that the most economical type of foundation can be determined and the plans prepared accordingly.

Our Concrete Piles

Experience has shown that satisfactory results with concrete piles cannot be obtained by using the same type of pile for all soil conditions. In some cases the compressed type of pile is the most satisfactory. In other cases the soil is such that it is desirable to protect the concrete with a metal casing. In some other soils it is desirable to make a pile with an enlarged base so that the load may be carried through a soft stratum on to a firm stratum. Again the load conditions may be such that a pile of small diameter will be entirely satisfactory, or the load may be so great that it is necessary to have a pile of large diameter in order to keep the stresses in the concrete within safe limits.

All of these varying conditions can be and have been taken care of by us in an economical and satisfactory manner.

Who Is The Western Foundation Company and What Do They Do?

The WESTERN FOUNDATION COMPANY is a new company, having been incorporated in 1924. It is made up of men who have had many years of experience in foundation and structural work—consequently the plant and equipment is thoroughly modern and has many new features. Our first job was started in October, 1924. We have had work for the following to whom we would refer any one that may be interested:

Architects

Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, Ill.
John Archibald Armstrong, 127 No. Dearborn Street, Chicago, Ill.
Bennett, Parsons & Frost, 80 E. Jackson Boulevard, Chicago, Ill.
Condron & Post, 53 W. Jackson Boulevard, Chicago, Ill.—2 jobs
Folz & Brand, 510 No. Dearborn Street, Chicago, Ill.
Graham, Anderson, Probst & White, 80 E. Jackson Boulevard, Chicago, Ill.—3 jobs
Harry Hake, 2400 Gilbert Avenue, Cincinnati, Ohio—3 jobs
Holabird & Roche, 333 No. Michigan Avenue, Chicago, Ill.
Albert Kahn, Marquette Building, Detroit, Mich.
Kirchoff & Rose, 210 Sycamore Street, Milwaukee, Wis.
M. J. Morehouse, 343 So. Dearborn Street, Chicago, Ill.
Schmidt, Garden & Erickson, 104 So. Michigan Avenue, Chicago, Ill.
Smith, Hinchman & Grylls, Marquette Building, Detroit, Mich.
Thielbar & Fugard, 219 E. Superior Street, Chicago, Ill.

Contractors

Austin Company, Cleveland, Ohio—2 jobs
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John Griffiths, Builders Building, Chicago, Ill.—2 jobs
Hegeman-Harris Co., Tribune Building, Chicago, Ill.
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Kelly-Atkinson Construction Co., 189 W. Madison Street, Chicago, Ill.—2 jobs
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Owners

Alpha Portland Cement Co., Easton, Pa.—2 jobs
Battle Creek Gas Co., Battle Creek, Mich.—2 jobs
Battle Creek Sanitarium, Battle Creek, Mich.
Sanitary District of Chicago, 910 So. Michigan Avenue, Chicago, Ill.—3 jobs
Eckhart Milling Co., 1320 Carroll Avenue, Chicago, Ill.
Evansville Portland Cement Co., Catasaqua, Pa.
Ford Motor Co., Detroit, Mich.—2 jobs
W. H. Holliday Co., Indianapolis, Ind.—2 jobs
International Portland Cement Co., New York, N. Y.
May Company Department Store, Akron, Ohio
Michigan Bell Telephone Co., Flint, Mich.
National Biscuit Co., 110 No. Morgan Avenue, Chicago, Ill.
North American Cement Co., Albany, N. Y.
North Shore Coke & Chemical Co., Waukegan, Ill.
Pittsburgh Plate Glass Co., Oregon and Barclay Streets, Milwaukee, Wis.
Union Stock Yards Co., Cincinnati, Ohio—2 jobs

We would call particular attention to the fact that, although we have been operating less than five years, we have had many repeat orders. Notice the number of jobs we have had with the same owners, architects and contractors.

In many cases, after we have had one job, we have been given the second and succeeding jobs without competition. This can mean but one thing—satisfaction.

LAWRENCE PORTLAND CEMENT COMPANY

SALES OFFICE

302 Broadway

NEW YORK, N. Y.

DISTRICT OFFICES

PHILADELPHIA, PA., 4 South 15th Street

BOSTON, MASS., 31 Milk Street

Products

DRAGON PORTLAND CEMENT.
DRAGON SUPER CEMENT.
DRAGON STRONGFAST CEMENT.
DRAGON MAINROK LIME.

Dragon Portland Cement

Quality—Dragon Portland Cement, increasingly used since 1889, surpasses the specifications for portland cement of the American Society for Testing Materials, as well as standard specifications of the Government, railroads and technical societies such as the A.I.A., A.S.C.E., A.R.E.A. and A.E. Standards Committee. Because of its excess strength above standard requirements, Dragon Portland Cement has become known as the cement that is "Forty per cent above standard."

Dragon Super Cement

A tanno catalyzed portland cement made under the direction of The Super Cement Company. Used in accordance with approved standard practice for portland cement, Dragon Super Cement produces concrete that is inherently impermeable to liquids. This obviates all need for membranes, surface treatment or admixtures for waterproofing or surface hardening. Without any supplementary treatment whatever, Dragon Super Cement produces concrete of maximum plasticity and density, waterproof, wearproof and oilproof. It is highly resistant to frost, seawater, acids, alkalis and other destructive agencies.

Literature Available—A book titled "How, Why, Where" gives complete data and describes important structures in which Super Cement has been applied during the past decade.

Dragon Strongfast Cement

A high early strength special portland cement for use where time is an important element and early use of concrete work is essential.

Dragon Mainrok Lime

Analyzes 98% available lime and yields 12 to 13 cu. ft. of putty per 280 lb. barrel. Dragon Mainrok Lime is rigidly graded, inspected and tested to insure that every barrel meets these standards of quality.

Shipping Territory

Dragon Cement is manufactured at Siegfried, Pa., in the heart of the Lehigh Valley and at Thomaston, Maine in "New England's Own and Only Cement Mill." The location of these mills permits economic and expeditious distribution throughout New England, the Middle Atlantic States, Delaware, District of Columbia, Maryland and Virginia. In this territory it is possible to secure the excess value of Dragon at no excess cost. Dragon Mainrok Lime, produced at Thomaston, Maine, is available throughout New England.

Output

The combined capacity of the mills producing Dragon Cement is approximately four million barrels per year. Unusually ample storage facilities at the mills are utilized to the end that all rush orders, no matter how large, may always be shipped on the same day that the order is received.

THE ATLAS PORTLAND CEMENT COMPANY

25 Broadway, NEW YORK, N. Y.

UPTOWN SALES OFFICE: 41 East 42nd Street, NEW YORK, N. Y.

CHICAGO, ILL. BIRMINGHAM, ALA. ST. LOUIS, MO. LOS ANGELES, CALIF.
PHILADELPHIA, PA. BOSTON, MASS. DES MOINES, IOWA OKLAHOMA CITY, OKLA.
OMAHA, NEB. ALBANY, N. Y. KANSAS CITY, MO.

Products

ATLAS PORTLAND CEMENT.
ATLAS-WHITE PORTLAND CEMENT.
Sales Agent for ATLAS LUMNITE CEMENT.

TRADE-MARKS

Quality

Atlas Portland Cement—Over a period of more than 37 years, Atlas Portland Cement has merited the distinction of being "the Standard by which all other makes are measured."

It is guaranteed to pass the Standard Specifications for portland cement which have been adopted by:

The United States Government
The American Engineering Standards Committee
The American Society for Testing Materials
The American Society of Civil Engineers
The American Institute of Architects
The American Railway Engineering Association

"Atlas-White Portland Cement"—Atlas-White Portland Cement (white) has been manufactured for more than 18 years and is identical in strength and durability with Atlas Portland Cement (gray).

Atlas-White Portland Cement is guaranteed to pass the Standard Specifications for portland cement as noted above.

Atlas Lumnite Cement

Gives full strength 28-day concrete within 24 hours.

A slow setting, quick hardening hydraulic alumina cement for concrete and mortar.

Permits pouring concrete one day, putting it in use with safety the next day.

For any concrete work where speed is desirable or necessary.

Packages

Atlas Portland Cement is packed in duck or paper bags of 94 lbs. net weight, 4 bags to the barrel. For export, it is shipped in especially constructed and lined barrels of 400 lbs. gross or 376 lbs. net weight.

Atlas-White Portland Cement is packed in paper and duck bags, and for export, in barrels. Same weights as above.

Publications

"Stucco—Interior Plastering—Graffito"
"Atlas-White Portland Cement for Remodeling with Stucco"
"Atlas-White Portland Cement for Swimming Pools"
"Atlas-White Portland Cement for Mortar"
"Atlas-White Portland Cement for Terrazzo"
"Atlas-White Portland Cement for Ornamental Cast Work"
"Atlas-White Portland Cement for Railroad, Highway and Municipal Uses"
"Houses of Stucco"

Technical and Research Department

A technical and research department is at the disposal of architects for assistance in any problems pertaining to concrete or stucco. This service is, of course, offered without obligation to them and it is hoped that architects will freely avail themselves of this department.

Uses of Atlas-White Portland Cement

(1) Wherever a pure color or white is desired.
(2) For non-staining mortar.

Specific Uses—

Stucco—Makes possible a wide range of color effects. As Atlas-White is neutral in color toward pigments, it gives clear and unmuddied shades. Also produces excellent results when used in connection with exposed aggregates, or when mixed with naturally colored sands.

Brick Joints—Makes possible a pure white or correctly colored joint. Can be colored by mixing directly with a colored sand or by pigments.

Cast Stone, Trim and Garden Furniture—Gives white or colored effects as desired.

Terrazzo—White cement when used for this purpose doubles the number of color combinations. It will not discolor.

Swimming Pools—Used with white sand and applied as a plaster or throughout the concrete gives an inexpensive, durable and attractive finish. Particularly adapted to outdoor pools.

Interior Plastering—Interior plastering of white cement mortar makes possible interesting color and textural effects. As it is unaffected by moisture, it is also used for dairies, cold storage rooms and lavatories.

For Its Non-staining Qualities—

Pointing, Setting and Backing Fine Stone—Widely used for setting Indiana limestone and marble. Gives the strongest possible mortar and is absolutely non-staining to any stone which in itself contains no staining elements.

Setting Tile—Will not stain the tile and is unaffected by moisture.

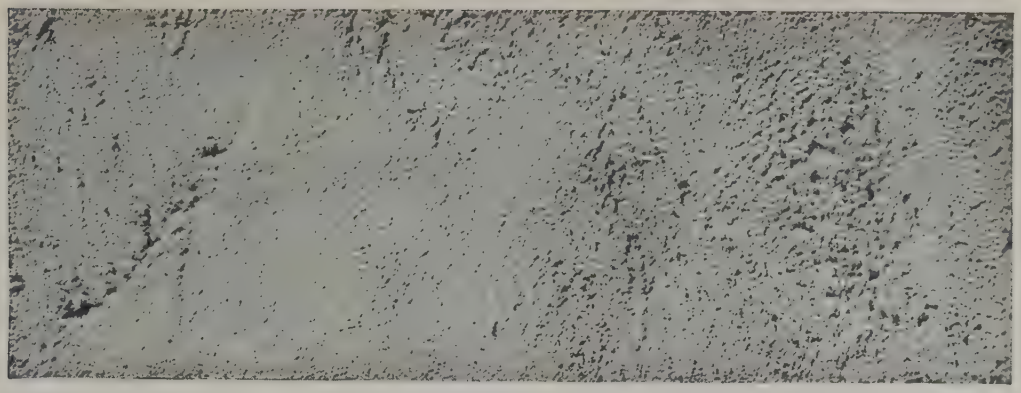
Stucco Finishes

The illustrations show only four of the endless variety of stucco finishes which are possible with the use of a portland cement stucco using Atlas-White.

The endless number of textures possible are produced by various methods of manipulation of the plastic material. While it is difficult to describe in detail the exact method by which they are obtained, an examination by the architect of the photographs in "Stucco—Interior Plastering—Graffito," the book referred to above, will make the manner of finishing evident.

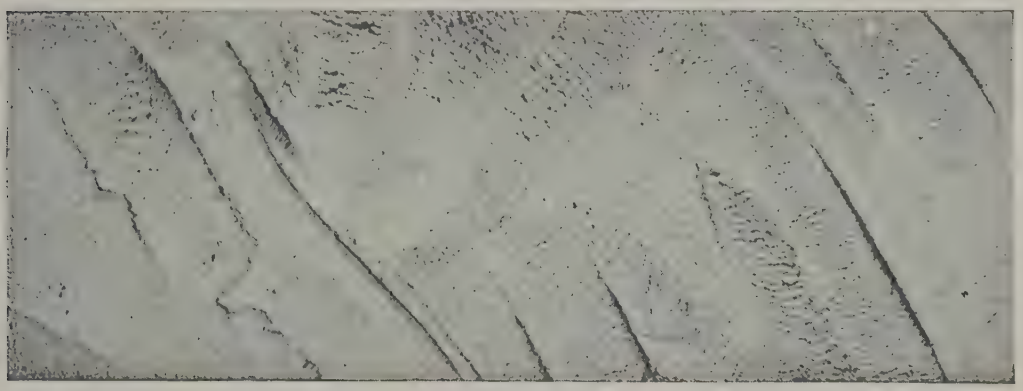
Stucco finishes in portland cement are unlimited as to texture and color. To secure permanently successful results in color and durability, Atlas-White Portland Cement is the ideal material.

Continued on next page



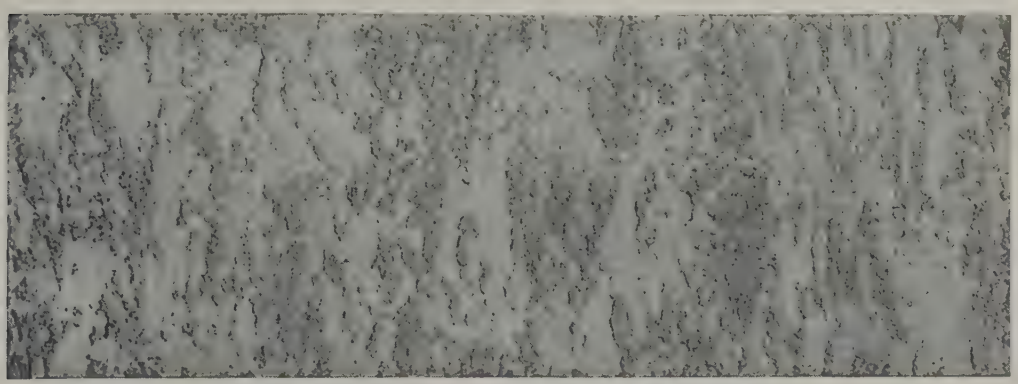
Stucco Finish Used on House at Forest Hills, L. I.

The house, portion of which is shown, was designed by W. L. Bottomley, New York City. The finish is from an actual wall and shows a rather dry mix applied with irregular pressure and motion of the trowel



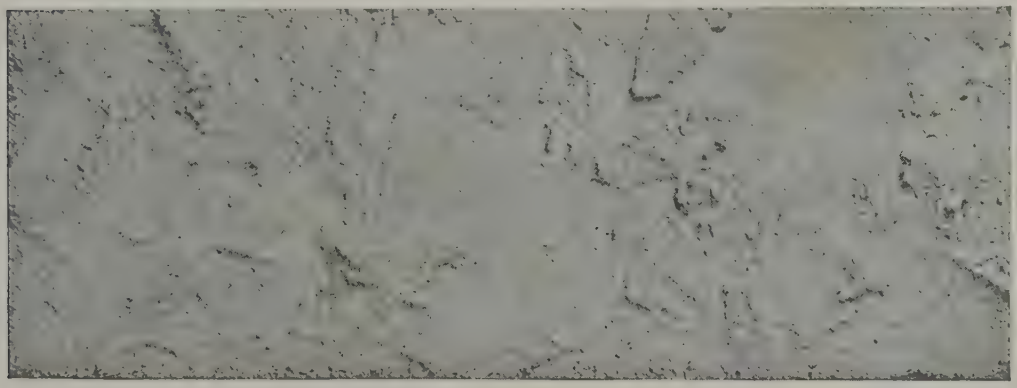
Stucco Finish Used on House at Pelham, N. Y.

This house, for which Bloodgood Tuttle of New York was the architect, is particularly pleasing in its use of stucco. The panel shows a finish placed with a sweep of the trowel, using more pressure on one end than the other



Stucco Finish Used on House at Jamestown, N. Y.

A. J. Bodker of New York was the architect for this residence. The finish was obtained by throwing on a spatter dash and smoothing the high parts with a steel trowel



Stucco Finish Used on House at Riverdale, N. Y.

The adaptability of stucco to harmonize with architectural design is evident in this house for which Julius Gregory was the architect. The panel shows a finish obtained with a rather dry mix applied with an irregular motion of the trowel

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

33 West Grand Avenue
CHICAGO, ILL.

DISTRICT OFFICES

ATLANTA, GA.	DENVER, COLO.	KANSAS CITY, MO.	NEW ORLEANS, LA.	PORTLAND, ORE.
BIRMINGHAM, ALA.	DES MOINES, IOWA	LINCOLN, NEB.	NEW YORK, N. Y.	RICHMOND, VA.
BOSTON, MASS.	DETROIT, MICH.	LOS ANGELES, CAL.	OKLAHOMA CITY, OKLA.	ST. LOUIS, MO.
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DALLAS, TEX.	JACKSONVILLE, FLA.	NASHVILLE, TENN.	PITTSBURGH, PA.	SEATTLE, WASH.

VANCOUVER, B. C. WASHINGTON, D. C.

Purpose

The Portland Cement Association is a national organization to improve and extend the uses of concrete.

This phrase states in formal language the purpose of the Portland Cement Association. It is a service organization, supported by the manufacturers of portland cement, for the benefit of users and prospective users of concrete.

In November, 1928, the Association completes twenty-six years of existence. Since 1915, its service has been available on a truly national scale.

Concrete is a basic material in nearly every form of construction. Research has developed the laws which control the strength of concrete, as well as other important characteristics. Inventive craftsmanship has developed applications of concrete for artistic decoration which were unknown a few years ago. An attempt has been made to convey brief and somewhat general information about these fundamental laws and new applications in the four pages following.

It is impossible in this limited space to present all of the information that may be desired. Inquiries for more complete data are invited, and may be addressed to the nearest district office in the list given on this page.

Continued on next page

STANDARD SPECIFICATIONS FOR PORTLAND CEMENT

A.S.T.M. Serial Designation: C 9-26

Definition

(1) Portland cement is the product obtained by finely pulverizing clinker produced by calcining to incipient fusion an intimate and properly proportioned mixture of argillaceous and calcareous materials, with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

I. Chemical Properties

(2) The following limits shall not be exceeded:

Loss on ignition, per cent	4.00
Insoluble residue, per cent	0.85
Sulphuric anhydride (SO_3), per cent	2.00
Magnesia (MgO), per cent	5.00

II. Physical Properties

(3) The residue on a standard No. 200 sieve shall not exceed 22 per cent by weight.

(4) A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking, or disintegration in the steam test for soundness.

(5) The cement shall not develop initial set in less than 45 minutes when the Vicat needle is used or 60 minutes when the Gillmore needle is used. Final set shall be attained within 10 hours.

(6) The average tensile strength in pounds per square inch of not less than three standard mortar briquets (see Section 47) composed of one part of cement and three parts of standard sand, by weight, shall be equal to or higher than the following:

Age at test, days	Storage of briquets	Tensile strength, lb. per sq. in.
7	1 day in moist air, 6 days in water	225
28	1 day in moist air, 27 days in water	325

(7) The average tensile strength of standard mortar at 28 days shall be higher than the strength at 7 days.

III. Packing, Marking and Storage

(8) The cement shall be delivered in packages as specified with the brand and name of the manufacturer plainly marked thereon, unless shipped in bulk. When shipped in bulk, this information shall be contained in the shipping advices accompanying the shipment. A bag shall contain 94 lb. net. A barrel shall contain 376 lb. net. All packages shall be in good condition at the time of inspection.

(9) The cement shall be stored in such a manner as to permit easy access for proper inspection and identification of each shipment, and in a suitable weather-tight building which will protect the cement from dampness.

IV. Inspection

(10) Every facility shall be provided the purchaser for careful sampling and inspection at either the mill or at the site of the work, as may be specified by the purchaser. At least 12 days from the time of sampling shall be allowed for the completion of the 7-day test, and at least 33 days shall be allowed for the completion of the 28-day test. The cement shall be tested in accordance with the methods hereinafter prescribed. The 28-day test need not be made if waived by the purchaser.

V. Rejection

(11) The cement may be rejected if it fails to meet any of the requirements of these specifications.

(12) Cement remaining in storage prior to shipment for a period greater than 6 months after test shall be retested and shall be rejected if it fails to meet any of the requirements of these specifications.

(13) Cement shall not be rejected on account of failure to meet the fineness requirements if upon retest after drying at 100° C. for one hour it meets this requirement.

(14) Cement failing to meet the test for soundness in steam may be accepted if it passes a retest using a new sample at any time within 28 days thereafter. The provisional acceptance of the cement at the mill shall not deprive the purchaser of the right of rejection on a retest of soundness and time of setting at the time of delivery of cement to the purchaser.

(15) Packages varying more than 5 per cent from the specified weight may be rejected; and if the average weight of packages in any shipment, as shown by weighing 50 packages taken at random, is less than that specified, the entire shipment may be rejected.

Note: The American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa., will furnish complete information on the standard tests and test methods for determining physical and chemical properties of Portland cement. Our booklet "Standard Specifications and Tests for Portland Cement" also gives this information and may be obtained by addressing our nearest district office.

PORTLAND CEMENT CONCRETE

Proportioning Concrete

Extensive research in the past 10 to 15 years has resulted in a new method of proportioning concrete mixtures by which it is possible to design mixes that will have definite strengths and other qualities. It has been found that for given materials and methods of manipulation, the strength, watertightness and ability to withstand weathering depend upon the amount of mixing water used. The less mixing water used the stronger will be the concrete and the more watertight and weather resistant. The mixtures must be workable, completely filling the forms and surrounding the reinforcement without excessive spading. With fixed quantities of cement and water the amount and proportions of aggregates may be adjusted to give the workability necessary for the particular job without affecting the strength so long as the mixture is plastic. This discovery has led to the water-cement ratio specification for concrete, given below in abbreviated form:

Specifications for Concrete

Water-Cement Ratio—Concrete shall be proportioned to give the necessary workability without exceeding the quantities of mixing water given in the following table:

Class of Concrete	Desired compressive strength at 28 days, lb. per sq. in.	Maximum quantity of mixing water, U. S. gal. per sack cement
A[1]	3000	6
B[2]	2500	6¾
C[3]	2000	7½
D[4]	1500	8¼

[1]Suitable for roadways, piles, pressure pipe, tanks, thin structural members and walls, dams, piers, etc., exposed to severe action of water and frost.

[2]Suitable for sewers, bridges, walls, dams, piers, etc., subject to moderate action of water and frost.

[3]Suitable for ordinary reinforced concrete buildings. Bridges and retaining walls of heavy section in moderate exposure.

[4]Suitable for mass concrete, basement walls, etc., protected from water or severe weather conditions.

These water-cement ratios are the maximum permissible. The mixes shall be proportioned for somewhat lower ratios so that with the normal fluctuations from batch-to-batch these ratios will not be exceeded. Moisture held by the aggregate must be included in computing the water-cement ratios. Water absorbed by the aggregate in a period of 30 minutes may be deducted in computing the water-cement ratio.

Change of Water-Cement Ratio—The water-cement ratios specified shall not be changed except by the Engineer. In the event that the Engineer finds it necessary to change the water-cement ratios from those specified, adjustment covering amount of cement and aggregates affected will be made as an extra or a credit under the provisions of the contract.

Measuring Moisture in the Aggregate—Moisture in the aggregate shall be measured by a method satisfactory to the

Continued on next page

Engineer, which will give results within 1 lb. for each 100 lb. of aggregate.

Concrete Consistency—The proportions of aggregate to cement for concrete of the water-cement ratios specified shall be such as to produce concrete that can be puddled readily into the corners and angles of the form and around the reinforcement without excessive spading and without segregation or undue accumulation of water or laitance on the surface. In no case shall concrete be placed which shows a slump outside of the following limits:

Part of structure	Slump, inches	
	Minimum	Maximum
Caissons	1	4
Heavy walls, slabs, beams	3	7
Thin walls and columns	4	8
Pavements	1	3

Proportions of Aggregate—The proportion of fine and coarse aggregate shall be such that the ratio of the coarse to the fine shall not be less than—*nor more than—*nor shall the amount of coarse material be such as to produce harshness in placing or honeycombing in the structure. When forms are removed, the surface and corners of the members shall be smooth and sound throughout.

Note: *The following limits in the proportion of coarse to fine aggregate are suggested:

Maximum size of coarse aggregate, inches	Ratio of coarse to fine aggregate on basis of dry and rodded volumes	
	Minimum	Maximum
⅜	0.4	0.8
¾	0.6	1.5
1 and over	1.0	2.0

Control of Proportions—The methods of measuring materials shall be such that the proportion of water to cement can be closely controlled during the progress of the work and easily checked at any time by the Engineer or his representative. To avoid unnecessary or haphazard changes in consistency, the aggregates shall be obtained from a source which will insure uniform quality and grading during any single day's operation, and they shall be delivered to the work and handled in such a manner that variations in moisture content will not interfere with the steady production of concrete of a reasonable degree of uniformity.

Tests of Concrete—Frequent tests may be made by the Engineer throughout the work to determine the quality of concrete. These tests will be made at the expense of the owner, and will, in general, be made on 6 by 12-in. concrete cylinders loaded in compression at 7 and 28 days, in accordance with the Standard Method of Making and Storing Specimens of Concrete in the Field (Serial Designation: C31-21) of the American Society for Testing Materials.

Co-operation of Contractor—The contractor shall co-operate in every way to the end that concrete of the desired quality be obtained. He shall provide, at cost, such housing as may be required for testing equipment and storage of test specimens; such cost to include only labor and materials actually used.

Mixing Concrete—The concrete shall be thoroughly mixed in a batch mixer of approved type. The mixer shall be equipped with suitable charging hopper. A water-storage and water-measuring device shall be provided. The mixing of each batch shall continue for at least one minute after all the materials are in the mixer during which time the mixer shall rotate at a peripheral speed of approximately 200 ft. per minute.

Depositing Concrete—Concrete shall be handled from the mixer to place as rapidly as practicable and in a manner that will prevent segregation of the ingredients. It shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling. Concrete as it is deposited shall be puddled with suitable tools until forms are completely filled and reinforcement and embedded fixtures thoroughly incorporated in the mass.

Concrete shall be deposited continuously and as rapidly as practicable until the unit of operation, approved by the Engineer, is completed.

Concrete when deposited shall have a temperature of not less than 40° F. and not more than 120° F. In freezing weather suitable means shall be provided for maintaining the concrete at a temperature of at least 50° F. for 72 hours or more after placing, or until the concrete has thoroughly hardened. The methods of heating the materials and protecting the concrete shall be approved by the Engineer. Salt, chemicals, or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing.

Protection of Concrete—Exposed surfaces of concrete shall be protected from drying for a period of at least 7 days after being deposited.

High Early Strength Concrete

The element of time is often important in concrete work. Certain operations such as repairing cuts in pavement slabs, made necessary by water or sewer construction, require high early strengths in the concrete. Portland cement meeting standard specifications will produce concrete of the desired strength by variation in the quantity and proportions of the materials, including the water, and by adjusting the methods of placing and curing to the needs of the work under consideration.

The table shows the increase in strength that results from reducing quantity of mixing water and corresponding increase in quantity of cement to maintain same consistency. With some cements the use of 2 lb. of flake calcium chloride with each sack will add further to early strength. This should not be depended upon unless proven by test that the given cement will react in this manner.

Increasing the mixing time to 2 minutes will add about 100 lb. per sq. in. to the strength of all mixes at 3 days and 5 minutes mixing will add 200 lb. per sq. in. The factors which will increase strength at early ages are:

(1) Decrease amount of mixing water,
(2) Increase mixing time up to 5 minutes,
(3) Increase amount of cement,
(4) Place and keep concrete at 70° F. or higher,
(5) Keep concrete damp,
(6) Use calcium chloride where tests show favorable results.

TABLE OF BASIC MIXTURES

Based on 70° F. minimum temperature of concrete when placed and during curing and a minimum time of mixing of 1 minute

Refer. No.	Typical mixes (illustrating range for aggregates used in this test)		Water-cement ratio, (gal. per sack)	Slump in.	Compressive strength (cured wet until test)			
	Mix	Cement, (bbl. per cu. yd.)			1 da.	3 da.	7 da.	28 da.
1	1:2:3½	1.40	7½	6-7	100	500	1100	2000
2	1:2:3½	1.40	6½	2-4	230	830	1530	2600
3	1:2:3½	1.40	6	½	300	1000	1800	3000
4	1:1½:3	1.65	6	6-7	300	1000	1800	3000
5	1:1½:3	1.65	5½	2-4	370	1230	2070	3400
6	1:1½:3	1.65	5	½	470	1500	2400	3900
7	1:1:2	2.25	5	6-7	470	1500	2400	3900
8	1:1:2	2.25	4½	2-4	600	1800	2800	4300
9	1:1:2	2.25	4	½	830	2130	3170	4900

Note: In calculating water-cement ratio, free water or moisture carried by aggregates must be included; water absorbed by dry aggregates may be deducted. Slumps, mixes and cement quantities given above are for illustration only and are accurate only for the particular aggregates used in these tests.

Concrete Floor Finish

The installation of concrete floor finishes should be entrusted only to the competent floor contractor where uniformly hard, dense and durable surfaces are desired. The variables that make up a job must be constantly controlled to get satisfactory results. Aggregates must be chosen with regard to gradation, cleanness and hardness. Mixing water must be reduced to a minimum to produce the strongest concrete. Curing with plenty of water is absolutely necessary. Faulty and excessive troweling must be eliminated. These are the fundamental principles of good floor finish. If they are ignored, soft, porous, short-lived floors will usually

Continued on next page

result. Sloppy, soupy concrete, fine grained aggregates, improper troweling and total omission of proper curing account for practically all floor troubles.

Specification for 1-inch Bonded (Two Course) Concrete Floor Finish for an Office Building

Slab Level—The structural slab surfaces shall be reasonably true and struck off at a level approximately 1 in. below the finished floor level.

Brooming—As soon as the concrete base permits, all laitance, scum, dirt and loose aggregate shall be removed from the surface by means of a steel broom. Smearing of concrete indicates that it is still too soft. Brooming shall leave the surface clean and rough to insure thorough bond of finish.

Chipping—When it is impossible to cut off laitance and roughen the slab prior to the final set of the cement, the surface shall be cleaned and prepared for bond by mechanical chipping.

Grouting—The slab shall be thoroughly wet, but free from pools of water. A thin coat of neat cement grout shall be thoroughly broomed into the surface of the slab just prior to the application of the wearing course.

Mix—The mix shall be 1 part of portland cement, 1 part of coarse, clean, torpedo sand, and 1½ parts of hard, clean pea gravel or crushed stone (¼ to ½ in.).

Consistency—The concrete shall be of the driest consistency possible to work with a sawing motion of the strike-off board.

Finishing—After striking off the wearing course to the established grade, it shall be compacted with a wood float. From time to time, the surface shall be tested with a straightedge to prevent high and low spots. The concrete shall be floated so as to yield a surface free from depressions or irregularities of any kind. This floating shall be followed by steel troweling to bring the finish to a smooth surface free from marks and blemishes. In no case shall dry cement or a mixture of dry cement and sand be sprinkled on the surface of the wearing course to absorb moisture or to hasten the hardening.

Curing—Within 24 to 36 hours after the final troweling, the finished surface shall be covered with a layer of sand or sawdust which shall be kept wet by sprinkling with water for at least 10 days.

SPECIFICATIONS FOR CONCRETE BUILDING BLOCK AND CONCRETE BUILDING TILE

I. General

(1) The purpose of these specifications is to define the requirements for concrete building block and concrete building tile to be used in construction.

(2) The word "concrete" shall be understood to mean Portland cement concrete.

II. Classification

(3) According to the strength in compression 28 days after being manufactured or when shipped, concrete block and concrete tile shall be classified as heavy load bearing, load bearing, and non-load bearing on the basis of the following requirements:

Name of classification	Compressive strength, lb. per sq. in. of gross cross-sectional area as laid in the wall	
	Aver. of 3 or more units	Min. for individual unit
Heavy load bearing block or tile...	1200	1000
Medium load bearing block or tile..	700	600
Non-load bearing block or tile.....	250	200

(4) The gross cross-sectional area of a one-piece concrete block or tile shall be considered as the product of the length times the width of the unit as laid in the wall. No allowance shall be made for air spaces in hollow units. The gross cross-sectional area of each unit of a two-piece block or tile shall be considered the product of the length of the unit times one-half the thickness of the wall for which the two-piece block or tile is intended.

III. Requirements

(5) The compressive strength of the concrete in units of all classifications except "non-load bearing block" shall be at least 1000 lb. per sq. in., when calculated on the minimum cross-sectional area in bearing.

(6) Concrete building block and tile to be exposed to soil or weather in the finished work (without stucco, plaster or other suitable protective covering) shall meet the requirements of the absorption test.

(7) All concrete building block and tile not covered by Paragraph 6 need not meet an absorption requirement.

(8) Concrete block and tile shall not absorb more than 10 per cent of the dry weight of the unit when tested as hereinafter specified, except when it is made of concrete weighing less than 140 lb. per cu. ft. For block or tile made with concrete weighing less than 140 lb. per cu. ft. the absorption in per cent by weight shall not be more than 10 multiplied by 140 and divided by the unit weight in pounds per cubic foot of the concrete under consideration.

(9) Specimens for tests shall be representative of the commercial product of the plant.

(10) Not less than three and preferably five specimens shall be required for each test.

(11) The specimens used in the absorption test may be used for the strength test provided they have been dried at approximately 70 degrees Fahrenheit for not less than three days.

CONDENSED SPECIFICATIONS FOR PORTLAND CEMENT STUCCO

General

Preparation of Backing Surface—The backing surface of whatever type, shall provide clean, rough surfaces and good mechanical bond for the stucco, and shall be thoroughly cleaned before the application of stucco; all hangers, fasteners, trim or other fixed supports, or projections of any kind, shall be in place before stucco is applied. Masonry walls shall be properly wetted before the application of the scratch coat. Flashing shall be applied at all points where it would prevent water from getting behind the stucco.

Materials

Cement—Portland cement shall conform to the requirements of the latest standard specifications of the American Society for Testing Materials.

Fine Aggregate—Fine aggregate shall consist of clean sand, or screenings from crushed stone or pebbles, graded from fine to coarse, passing when dry a No. 8 screen, free from dust or other deleterious materials.

Water—Water shall be clean, free from oil, acid, strong alkali or vegetable matter.

Coloring Materials—Only permanent mineral oxides that are fully guaranteed by the manufacturer to be unaffected by lime, cement or weather, and in amounts not to exceed 10 per cent of the weight of the cement shall be used as coloring matter.

Hydrated Lime—Hydrated lime shall meet the requirements of the standard specifications of the American Society for Testing Materials and shall be used in quantity not to exceed one-fifth the volume of cement.

Construction

Proportions—The proportions for all coats shall be 1 bag of cement to 3 cu. ft. of sand to which may be added hydrated lime in an amount not exceeding one-fifth the volume of cement. In these proportions 1 cu. ft. (1 bag) of cement weighs 94 lb. net and 1 cu. ft. of hydrated lime weighs 40 lb.

Mixing—The ingredients of the stucco shall be thoroughly mixed, preferably in a machine mixer of the rotating drum type, for at least five minutes after all materials are in the drum. The quantity of water shall be determined by trial and thereafter measured in proper proportion.

Masonry Walls—Concrete, concrete block, brick, hollow tile and similar walls shall be rigid and constructed upon solid footings, all units being set in portland cement mortar. The surface on which stucco is to be applied shall be clean, free from all dust, dirt or loose particles, preferably rough and of coarse texture. Wood lintels over wall openings shall not be used. Monolithic concrete walls shall be roughened by hacking, wire brushing or other effective means. Concrete block, tile or brick units shall have the joints cut back even with the surface.

Continued on next page

Framing—Spacing of studs shall not exceed 16 in. Studding shall run from foundation to rafters without intervening horizontal members, tied together below second floor joists with 1x4-in. boards let into the inner faces of the studs. In open construction without sheathing, the spacing of studs shall not exceed 12 in. The corners of all walls shall be braced diagonally to secure the necessary rigidity of the structure. Bridging of studding with 2x4-in. braces shall occur at least once in each story height.

Sheathing—Sheathing boards shall not be less than 6 in nor more than 8 in. wide, dressed to a uniform thickness, laid horizontally and fastened securely to each stud. Over the sheathing shall be laid, horizontally, beginning at the bottom, any standard asphalt saturated roofing felt weighing 15 lb. per square, the bottom layer lapping the baseboard and each strip lapping the strip below and all flashing at least 2 in.

Application of Reinforcement—Reinforcement shall be placed horizontally, fastened with approved furring devices not more than 8 in. apart over the surface. Vertical laps shall occur at supports, horizontal joints being lapped and tightly laced with 18 gauge annealed wire. The sheets shall be returned around corners at least 4 in. in sheathed construction and 16 in. in open construction. Corner beads shall not be used.

Furring—All reinforcement shall be furred out from the studs, sheathing or base ⅜ in. by any device which will not reduce the effective section of the scratch coat.

Half-timbering—Embedded trim or half-timbering shall be securely nailed directly upon sheathing or studs, and shall have the inside corners of vertical members grooved into which the mortar of the first coat shall be forced forming a watertight joint. All joints on horizontal members shall be flashed.

Application of Stucco Coats on Frame Construction—The application shall be carried on continuously in one general direction without allowing the stucco to dry at the edges. If it is impossible to work the full width of the wall at one time the joining shall be at some natural division of the surface, such as a window or door. The scratch coat shall be shoved thoroughly through the metal reinforcement forming a solid mass against the sheathing paper, thus completely encasing the metal. This coat shall be ½ in. thick fully covering the face of the reinforcement and shall have its surface heavily cross scratched to provide a strong mechanical key or bond. Allow this coat to become thoroughly dry. It shall be wet down but not saturated before applying the second coat. The second or browning coat shall be at least ½ in. thick over the face of the first coat and shall be rodded straight and true in every direction, or left untrue giving a wavy effect, as the desired finish would suggest. If the finish is to be a float type finish, the second coat shall be brought to a good even surface with wood floats. This coat shall be wet down for at least three days and allowed to become thoroughly dry before the finishing coat is applied. The finish coat shall be applied not less than one week after the application of the second coat and shall vary in thickness from ⅛ to ¼ in., depending upon the texture of the finish coat.

Scratch Coat on Masonry Walls—Mortar shall be troweled on to a thickness of approximately ½ in., heavily cross scratched and allowed to become thoroughly dry before the browning coat is applied.

(From this point on use specification covering "Application of Stucco Coats on Frame Construction.")

Freezing—Stucco shall not be applied when the temperature is below 32° F., unless protected with canvas and heat sufficient to prevent freezing for a period of at least 48 hours after application.

Curing—Each coat shall be protected from drying rapidly from effects of intense sunlight or wind until it has sufficiently hardened to permit sprinkling. Each coat shall be kept moist by sprinkling for at least three days following its application.

COLOR DECORATION ON CONCRETE

Concrete surfaces are eminently suited for expressing directly, motifs in any color combinations known to the artist. Oil stains give a wide range of color without affecting the characteristic texture of the concrete. Craftsmen have found that the roughness and board markings serve to enhance the decorative effect. Such concrete surfaces possess a tone and atmosphere both unique and pleasing.

Color decoration applied directly to the concrete surface is extensively used on ceilings and is a natural development for the beam and girder type of construction. Many examples have shown that once applied the design may be protected by suitable coatings over a long period of years, lending a desirable permanency so difficult to attain with other media.

Many wall surfaces of concrete have also been treated in this manner. Color decoration on monolithic walls combined with modeling in low relief, offers possibilities in wall embellishment expressive of the material. This type of decoration is well within the usual economic limits since it eliminates certain operations that add to the cost of other forms of ornamentation.

Specifications for Painting Concrete

Cleaning—All loose particles and dirt shall be removed. Grease or oil shall be wiped off with a rag saturated with gasoline or benzine. Surfaces previously coated shall be either sandblasted, or wire brushed.

Neutralization of Surface—The cleaned surface shall be brushed with a water solution containing 4 lb. of zinc sulphate to the gallon. At least 48 hours shall be allowed for the zinc sulphate to react and dry.

Staining—Staining shall be done by using any good linseed oil paint thinned to the proper consistency with turpentine. Stains only differ from paints by containing enough volatile solvent to make up about one-half by volume of the vehicle.

Painting—For one-coat work the paint shall be applied without thinning. For two-coat work the first coat shall be thinned with the proper solvent (turpentine or naphtha, 1 pt. to the gallon). The second coat shall be applied without thinning. At least 48 hours drying time shall be allowed between coats.

CAST STONE

Cast stone is one form of concrete used as an exterior facing material to give beauty and grace to buildings.

The ease with which it may be moulded so as to conform to architectural requirements gives cast stone an especially practical value as a building material. The demand for color in architecture can be fully satisfied through the use of colored aggregate or color pigments in cast stone, while the range of textures goes even beyond what is possible in natural stone.

The growing list of monumental buildings employing cast stone is evidence of its merit.

CONCRETE FLOORS AND FLOOR COVERINGS

Concrete floors in residences confine basement fires to their origin, add rigidity and stability to the structure, eliminate vibration and sagging, and minimize plaster cracking. Are serviceable, smooth and sanitary.

They provide a smooth, rigid and durable base upon which to place any selected floor covering. Linoleum, cork or rubber may be cemented directly to the concrete, and hardwood flooring may be nailed to sleepers embedded in the concrete or secured with metal clips. Parquet and design floors may be cemented directly by means of a mastic cement. Slate, art marble, concrete and ceramic tile may be laid in cement mortar over the concrete floor.

Types of concrete floors in general use are the solid slab, ribbed and tile and joist.

THE SANDUSKY CEMENT COMPANY

Manufacturer of Medusa Portland Cements

CLEVELAND, OHIO

PLANTS

CINCINNATI, OHIO, Builders Industries Building
CHICAGO, ILL., 1016 The Builders Building
NEW YORK, N. Y., 350 Madison Avenue
TOLEDO, OHIO, 1004 Second National Bank Building
YORK, PA., 60 Lehmayer Building

FACTORIES

BAY BRIDGE, OHIO | SILICA, OHIO | DIXON, ILL. | YORK, PA. (2)

Products

MEDUSA PORTLAND CEMENTS.

For Medusa Waterproofing, see page A101; for Medusa Portland Cement Paint, see page B2131.

Output

Annual production = over 4,000,000 bbls.

Quality

Medusa Portland Cements are guaranteed to pass all standard and U. S. Government specifications. Every carload is tested before being shipped. A record of laboratory tests furnished on request.

Literature

New Medusa literature, in standard size 8½x11 in., describing many of the uses for Medusa White Cement will be gladly sent at your request.

The Use and Some of the Many Applications of Medusa White Portland Cement — Waterproofed or Plain

Irrespective of type or kind of structure, Medusa White Portland Cement will fit in perfectly at several points in the construction. Any concrete work when the element of appearance is as vital and important as the permanence of the material itself, should be done in either Waterproofed or Plain Medusa White Portland Cement.

One handles and mixes Medusa White Portland Cement exactly the same as ordinary gray cement. Special attention must be given to the sand and aggregates used in the producing of different tints or shades. Various mineral oxides can be used with Medusa White Portland Cement to produce color effects.

Due to the whiteness of Medusa White Cement, it is especially desirable where light shades of color are required.

A Remarkable Illustration of the Possibilities in Architectural Embellishment of Precast Work Using Medusa White Cement, on the Estate of John Bindley, Cocoanut Grove, Fla.

KIEHNEL & ELLIOTT of Pittsburgh and Miami, Architects
All ornamentation shown was done under the able execution of JOHN B. ORR of Miami

There is no waterproofed white cement except Medusa Waterproofed White Cement. We are the exclusive manufacturers of this product.

The illustrations show some of the practical, unique and enduring effects that can be secured in exterior work, and the specifications show definitely how any given effects may be produced.

Partial List of Leading Applications for Medusa White Portland Cement—

Cast stone (plain or ornamental)
Cut cast stone (plain or ornamental)
Cement brick
Cement floor tile
Cement mantels
Concrete block facing
Concrete blocks
Concrete burial vaults
Concrete fence posts
Concrete roofing tile
Concrete stave silos
Hollow concrete tile
Lawn furniture
Lamp standards
Monuments
Mortar
Ornamental cement work
Shower baths
Stucco
Swimming pools
Table tops and counters
Terrazzo tile
Traffic markers

Description of Medusa Portland Cements

Medusa Portland Cements attain high strength rapidly; they are absolutely uniform, unsurpassed in fineness and strength.

Medusa White Portland Cement—Is perfectly white and non-staining; a product of unlimited artistic possibilities. It differs from ordinary gray cement in color and fineness only. Where ordinary portland cement is a varying shade of gray, Medusa White Cement is a uniformly clean white. This is true in the finished work as well as in the sack. It passes all the requirements of the American Society for Testing Materials. Furnished either plain or waterproofed.

Medusa Gray Portland Cement—Is uniform in color and passes all the requirements of the American Society for Testing Materials. Furnished either plain or waterproofed.

Medusa Waterproofed Cements are our regular gray and white brands, waterproofed with our celebrated Medusa Waterproofing (see our pages in Waterproofing Section), and ready for use.

Continued on next page

Vital Points to be Observed Carefully in Concrete Work

Use the proper proportions for the work intended.

Cement—The most important materials used in concrete work are cement and water.

The cement used in mass concrete or the facing of concrete work should be either Medusa White Portland Cement or Medusa Waterproofed White Portland Cement.

The gray portland cement should be either Medusa Gray Portland Cement or Medusa Waterproofed Gray Portland Cement. (In locations where it is impossible to obtain Medusa Waterproofed Gray Cement any standard gray portland cement passing the requirements of the U. S. Government may be used with the addition of the proper amount of Medusa Waterproofing.) *See our pages in Waterproofing Section.*

Storage of Cement—All cement should be stored in a weathertight, dry building to prevent caking.

Water—Water for concrete or cement work must be clean, free from oil, acid, strong alkali or vegetable matter and should be good enough to drink. Do not use an excess of water in mixing, as it will ruin the work by causing sand and stone pockets and wash away the cement, reducing the strength of concrete and causing cement work to dust and disintegrate.

Best results are obtained by making the mixture of a plastic or jellylike consistency, so as to flow readily into the forms with slight spading.

If applying cement plaster to a base which is in the least porous—such as tile, brick, old concrete walls, floors, etc.—the base must be thoroughly soaked with water before applying. Otherwise water will be drawn out of the fresh cement plaster before it has a chance to set properly and the results will be a failure.

Fine Aggregates—Sand that looks and feels good in the palm of the hand should not be accepted without further tests for quality, grading and voids.

Quality—There are numerous sands that are not wholly decomposed and will crush under pressure of the fingers. Under microscopic examination such sands will show a small crystal surrounded by a soft honeycombed wall; when used in concrete, it would break down the cementation value of the cement and result in weak, mealy concrete. Fine silica sands are often found to be matted together and should be broken up before using.

Grading—All sands should be frequently tested by thoroughly drying and running through at least three screens—⅛ in., 24 and 40.

Sand should be clean, free from clay, loam or vegetable matter. It should be graded so that all will pass a ⅛-in. mesh, one-third remaining on a No. 24 screen, one-third on a No. 40, and one-third on a No. 60. (It is rare to find a sand with such an exact grading—the above figures are given as a standard. The closer they are approached the better the final results.) The following actual sieve tests are examples of ideal sands for use in any concrete work:

3%	through ¼-in.	mesh, held on ⅛-in. mesh
20%	through ⅛-in.	mesh, held on $\frac{1}{16}$-in. mesh
35%—12%	through $\frac{1}{16}$-in.	mesh, held on No. 24 mesh
17%	through No. 24	mesh, held on No. 30 mesh
35%—18%	through No. 30	mesh, held on No. 40 mesh
22%	through No. 40	mesh, held on No. 60 mesh
5%	through No. 60	mesh, held on No. 80 mesh
2%	through No. 80	mesh, held on No. 100 mesh
30%— 1%	through No. 100	mesh

Damp sands are misleading; the coarse will attract the minute particles, appearing apparently perfect, when in reality they are excessive in fines and dangerous.

Coarse Aggregates—Equal care is necessary in the use of the larger aggregates. Bank run should never be used before ascertaining the percentage of coarse and fine material and proportioning accordingly.

Gravel and pebbles will produce more dense concrete; trap rock and silica sand the greatest strength.

Trap rock, gravel and silica sand produce strength and density. Crushed granite or hard trap rock requires more sand.

For soft trap rock, presenting rounded corners, use less sand. It is dangerous to use the crusher run of any aggregate before screening. Dust in excess of 15% through a 60-mesh screen should never be used.

Colorimetric Test—A simple, practical test to determine the presence of rotten vegetable or organic matter in sand, pebbles or broken stone, is made as follows:

Take a 12-oz. bottle. Fill to 4½-oz. mark with material to be tested. Then pour in a 3% solution of caustic soda until the volume of sand and solution after shaking amounts to 7 oz. Thoroughly shake the bottle and contents and allow to stand for 24 hours. If, at the end of this time, the liquid above the material is colorless, or only a light yellow, it is sufficiently free of organic matter to be used, provided its other qualities are suitable.

If the liquid is darker than a light yellow, approaching a brownish yellow. the material may be used for unimportant concrete work. It should not be used in first class concrete work. If the liquid is a dark brown the material should be washed or rejected.

Cause of Crazing, Hair Cracks, or Map Checks

The appearance of hair cracks or crazing in concrete or cement work results from greater shrinkage in the rich, wet surface than in the body of the work and can be prevented by keeping the work *covered, moist and protected from the sun and wind,* for a period from one to four weeks, according to weather and character of the work.

Hair cracks or crazing generally may be traced to any or all of the following conditions:

(1) Mixture too rich in cement.
(2) Too much water used in mixing.
(3) Too rapid drying out.
(4) Too fine sand or aggregate.

Mixture Too Rich in Cement—Neat cement when set and hardened in air contracts much more than when mixed with sand or other inert aggregate, this contraction increasing with age up to a certain period. When allowed to harden and set under water, contraction is very much less than in air, but is still present to a slight extent. With a fair proportion of sand, finely crushed stone or other suitable aggregate, the contraction is reduced to practically zero and there is no tendency for cracks to form, provided surface is protected and kept moist. As a rule, the ratio of cement to inert material should not be greater than 1 to 2.

Too Much Water Used in Mixing—When the right quantity of water is used in mixing concrete, a soft plastic mass is formed with just sufficient water to bind the cement, sand, etc., together and to remain in the mass itself with no tendency to escape or flow away.

Water also serves as a vehicle to carry the cement and finer particles of sand into the spaces between the larger pieces of gravel, stone, etc., and to distribute the component parts uniformly throughout the mass.

An excess of water will run off or rise to the surface of the concrete, carrying with it much of the cement in suspension and rob the interior of its cementing material. As the surface water evaporates, the fine cement is deposited as a layer of practically neat cement which, as stated above, has a greater tendency to contract than the poorer mixture beneath. This is the most fruitful cause of hair cracks.

Too Rapid Drying Out—Where ample precautions are taken to protect fresh concrete or cement work from drying out, by means of thick layers of wet sand, or wet cloths hung over vertical faces, and this protection is kept up for a week or more, very few if any hair cracks occur.

Neat cement or very rich mixtures which will craze when hardened in the air will show no such effect if kept under water. Therefore there is less chance for contraction when the concrete or cement is not allowed to dry out; and the prevention of contraction prevents also the tendency to crack or check on the surface.

Too Fine Sand or Aggregate—Insufficient coarse material in concrete, stucco, etc., to hold the cement and fine sand, will increase the danger of the sand and cement being washed to the surface. The same result will be obtained as where an excess of water is used.

Few contractors and users of cement realize the importance of a properly graded mixture and the practical necessity of having sufficient coarse particles, whether pebbles or fragments of crushed rock, present for the greatest strength and best results.

One of the most successful manufacturers of cast stone in Ohio attributes his freedom from hair crack trouble to care in selecting and grading his aggregates.

With attention to the above four points, we are confident that any careful user of cement can reduce hair crack and crazing trouble to a minimum, or prevent it altogether.

Continued on next page

Specifications for Waterproofed Portland Cement Stucco

Materials—***Cement***—The cement for the first coat (base or scratch coat) shall be standard gray portland cement conforming to the Specifications of the American Society for Testing Materials, with the addition of Medusa Waterproofing Powder or Paste, to the amount of 2% by weight of the cement used (2 lbs. to the sack of cement).

The cement for the second or brown coat, and the third or finish coat, shall be Medusa Waterproofed White Portland Cement.

Fine Aggregate—Fine aggregate shall consist of sand, screenings from crushed stone, or crushed pebbles, evenly graded from fine to coarse, passing when dry a No. 8 screen. Fine aggregates should preferably be of silicious materials, clean, coarse and free from loam, vegetable or other deleterious matter.

Hydrated Lime—Hydrated lime shall meet the requirements of the standard specifications for hydrated lime of the American Society for Testing Materials, being used to add plasticity to the mixture.

Coloring Matter—Only permanent, mineral oxides and limeproof colors shall be used. Finish coat containing colors shall be applied as dry as possible to prevent separation of the colors. (The use of Medusa Waterproofed Cement will prevent the gradual washing out of a color surface).

Water—Water shall be clean, free from oil, acid, strong alkali or vegetable matter.

Preparation of Mortar—***Mixing***—The ingredients of the mortar shall be mixed until thoroughly distributed and the mass is uniform in color and homogeneous. The quantity of water necessary for the desired consistency should be determined by trial, and thereafter measured in proper proportion. The water shall be added slowly to the dry mix so as to allow the aggregates to absorb as much as possible in the course of mixing.

Machine Mixing—The mortar shall preferably be mixed in a suitable mortar-mixing machine of the rotating drum type. The period of machine mixing shall be not less than 5 minutes after all the ingredients are introduced into the mixer.

Hand Mixing—The mixing shall be done in a watertight mortar box, and the ingredients shall be mixed dry until the mass is uniform in color and homogeneous. The proper amount of water shall then be added and the mixing continued until the consistency is uniform.

Measuring Proportions—Methods of measurement of the proportions of water shall be used which will secure separate uniform measurements at all times. All proportions stated shall be by volume. A bag of cement (94 lbs. net) may be assumed to contain 1 cu. ft.; 40 lbs. may be assumed as the weight of 1 cu. ft. of hydrated lime. Hydrated lime shall be measured dry, and shall *not* be measured nor added to the mortar in the form of putty.

Retempering—Mortar which has begun to stiffen or take its initial set shall not be used.

Consistency—Only sufficient water shall be used to produce a good workable consistency. The less water in the mix, the better the quality of the mortar, within working limits.

Mortar Coats—***Mortar***—All coats shall contain not less than 3 cu. ft. of fine aggregate to 1 sack of portland cement.

Application—The plastering shall be applied with a steel trowel and carried on continually in one general direction without allowing the plaster to dry at the edge. If it is impossible to work the full width of the wall at one time, the joining shall be at some natural division of the surface, such as a window or door. The first coat shall thoroughly cover the base on which it is applied and shall be troweled enough to insure the best obtainable bond. Before the coat has set it shall be heavily cross-scratched with a saw-toothed metal paddle or other suitable device to provide a strong mechanical key.

The first coat shall be thoroughly wet down before the second coat is applied The second coat shall be applied, whenever possible, on the day following the application of the scratch coat, and shall be brought to a true and even surface by screeding at intervals not exceeding 5′ 0″, and by constant use of a straight-edge. When the second coat has stiffened sufficiently, it shall be floated with a wood float and lightly and evenly cross-scratched to form a good mechanical bond for the finish coat. The day following the application of the second coat, and for not less than 3 days thereafter, the stucco must be thoroughly sprayed at frequent intervals and kept from drying out. The finish coat shall be applied not less than a week after the application of the second coat. Methods of application will hereinafter be described under "Finish."

Drying Out—*The finish coat must not be permitted to dry out rapidly and adequate precaution must be taken to make this certain by sprinkling frequently after the mortar is set hard enough to permit it, or by hanging wet burlap or similar material over the surface, during hot weather.*

Freezing—Stucco should not be applied when the temperature is below 32° Fahr., nor under any conditions such that ice or frost may form on the surface of the wall.

Stains—Dirt may be readily washed off Medusa Waterproofed White Portland Cement stucco by using a brush and Sapolio, or other cleaning compound.

Mortar Colors—Should not be used to color Portland cement stucco, use only mineral oxides.

Residence of J. L. Carmen, Gravelly Lake, Near Tacoma, Wash.

Kirtland Cutter, Spokane, Architect
Stucco applied by Fred Stabbert, Tacoma
Medusa White Cement Stucco on hollow tile

Halliday Residence, Santa Monica, Cal.

Mr. Pierpont, Architect
Exterior finish of California Stucco Products Company Cement Stucco in which Medusa White Cement was used

Continued on next page

Use of Medusa White Waterproofed Portland Cement for Non-staining Mortar

Setting and backing up marble and stone work, and laying face brickwork requires a mortar that will not discolor the face of the marble, stone or face brick.

Medusa Stainless White Cement contains only a trace of iron. Due to this purity of composition it will not streak or stain the finest of building materials. It is used extensively from coast to coast, on the finest of buildings for this purpose.

Specifications

Mortar for Marble or Stone Work

For setting, backing and pointing marble and stone work.

Non-staining Waterproofed Cement—Cement shall be Medusa Waterproofed White (Non-staining) Portland Cement, manufactured by The Sandusky Cement Company, Cleveland; or other approved white (non-staining) portland cement conforming with the requirements of the American Society for Testing Materials, and guaranteed by the manufacturer to contain 20% or more of water-repellents, ground in with the cement during process of manufacture at the mill.

Waterproofing mixed with a non-staining cement by hand or machine, at the job or elsewhere, will not be permitted to be used.

Sand—Sand shall be clean river, lake or bank sand, light in color and evenly graded from fine to coarse, all passing through a ⅛"-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Crushed Marble for Pointing—Crushed white marble for pointing mortar shall be equal to Conlin Marble Company's, Tuckahoe, N. Y., size 20 to 30.

Measuring—Assuming that 1 bag of portland cement measures 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring of sand or other material with a shovel will not be permitted.*

Water—Water in all cases shall be added slowly and only sufficient water used to reach a stiff, workable consistency.

Setting Mortar—Mortar for the setting and backing of marble and stone work shall consist of:

1 part Medusa Waterproofed White Portland Cement.
⅛ part hydrated lime, by volume.
3 to 4 parts sand.

Pointing Mortar—Mortar for pointing of marble shall consist of:

1 part Medusa Waterproofed White Portland Cement.
⅛ part hydrated lime, by volume.
2 to 3 parts white crushed marble or sand.

Setting of Marble or Stone—All marble or stone work shall be sufficiently embedded and backplastered in the mortar to form one continuous coating. Special attention must be given to all belt courses, copings and other exposed surfaces.

Mortar for Laying Face Brick

Note: The object of using Medusa Waterproofed Cement is to overcome discoloration, dampness and efflorescence.

Non-staining Waterproofed Cement—Cement shall be Medusa Waterproofed White (Non-staining) Portland Cement, manufactured by The Sandusky Cement Company, Cleveland; or other approved white (non-staining) portland cement conforming with the requirements of the American Society for Testing Materials, and guaranteed by the manufacturers to contain 20% or more of water-repellents, ground in with the cement during process of manufacture at the mill.

Waterproofing mixed with a non-staining cement by hand or machine at the job or elsewhere, will not be permitted to be used.

Sand—Sand shall be clean river, lake or bank sand, light in color and evenly graded from fine to coarse, all passing through a ⅛"-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Water—Water in all cases shall be added slowly and only sufficient water used to reach a stiff, workable consistency.

Measuring—Assuming that 1 bag of portland cement contains 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring of sand or other material with a shovel or other implement that has no positive dimensions will not be allowed.*

Setting Mortar—Mortar for laying face brick shall consist of:

1 part Medusa Waterproofed White Portland Cement.
⅛ part hydrated lime, by volume.
3 parts sand.

Joints—Should a joint exceeding ⅝" be desired, the necessary amount of coarse grit may be added to the above mortar.

Mixing—When mortar is hand mixed, dampen the sand to a damp earth consistency, add Medusa Waterproofed Cement and hydrated lime, and mix as usual. When sand, Medusa Waterproofed Cement and lime are uniformly mixed add only enough water to secure proper consistency.

When a batch mortar mixing machine is used, dampen the sand and put into the mixer with the Medusa Waterproofed Cement and hydrated lime; allow mixer to run until cement, sand and lime are uniformly mixed. Then add only enough water to secure proper consistency.

Mortar for Laying Exterior Common Brick Walls

Notes: The object of using Medusa Waterproofing Powder or Paste is to prevent efflorescence, dampness and discoloration of the face brick or the exterior face of the brick wall.

See our pages in Waterproofing Section describing Medusa Waterproofing, Powder and Paste.

Cement—All cement shall be an approved brand of portland cement conforming with the requirements of the American Society for Testing Materials.

Sand—All sand shall be clean bank sand, light in color and evenly graded from fine to coarse, all passing through a ⅛"-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Waterproofing Powder (or Paste)—All waterproofing shall be Medusa Waterproofing Powder (or Paste) mixed according to the directions of the manufacturers or their representatives.

Water—Water in all cases must be added slowly and only sufficient water used to reach a stiff, workable consistency.

Note: If Medusa Waterproofing Paste is to be used the above Water clause should be omitted.

Measuring—Assuming that 1 bag of cement contains 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring of sand or other material with a shovel or other implement that has no positive dimensions will not be allowed.*

Setting Mortar—Mortar for laying exterior brick walls shall consist of:

1 part approved portland cement.
⅛ part hydrated lime, by volume.
3 parts sand.

(A) Medusa Waterproofing Powder shall be used in quantity equal to 2% by weight of the cement (8 lbs. to the barrel) thoroughly mixed with the dry cement, then in turn with the sand. All according to the directions of the manufacturers or their representatives.

Note: If Medusa Waterproofing Paste is used instead of powder, the following clause (B) should be used in place of clause (A).

(B) Medusa Waterproofing Paste shall be used as follows: 1 gal. (8 lbs.) of Medusa Paste shall be added to 20 gals. of water. This is sufficient to gauge 1 barrel of cement. All according to the directions of the manufacturers or their representatives.

Note: If Medusa Waterproofing Paste is to be used the above Water clause should be omitted.

Architectural Stone Made with Medusa Stainless White Portland Cement (Plain or Waterproofed)

No better grade of cement can be employed as the principal ingredient in manufacturing artificial architectural stone, such as cut cast stone and cast stone both plain, moulded and ornamental, than Medusa Stainless White Portland Cement (Plain or Waterproofed) especially due to its whiteness, which is permanent; its stainless qualities; and when Medusa Waterproofed White Portland Cement is used, the manufactured product becomes impervious to water and moisture.

Special attention must be given to the aggregates used to produce different results. This information we will gladly furnish at your request.

Continued on next page

Salina Memorial Hall, Salina, Kan.

Charles Shaver, Salina, Architect
Peterson Construction Co., General Contractors
Cast architectural trim stone made by the Concrete Products Company, Salina. This product, faced with Medusa White Cement, is known as Granitite

Beautiful Cast Stone Work on the John Bindley Estate, Cocoanut Grove, Fla.

Kiehnel & Elliott, Pittsburgh, Pa., and Miami, Fla., Architects
John B. Orr of Miami designed and executed the cast architectural trim stone

Fountain in the Courtyard of the "Alcazar," Cleveland, Ohio
Cast stone work by Fischer and Jirouch, Cleveland, Ohio
Imitation caen stone

Fountain and Garden Furniture Faced with Medusa White Portland Cement

SUPER CEMENT

MANUFACTURED AND NATIONALLY DISTRIBUTED BY

BESSEMER CEMENT CORPORATION
Youngstown, Ohio
Plants: Walford, Pa., and Buffalo, N. Y.

MARQUETTE CEMENT MFG. CO.
Chicago, Ill.
Plants: La Salle, Ill., and Cape Girardeau, Mo.

LAWRENCE PORTLAND CEMENT CO.
Boston, Mass., New York, N. Y., Philadelphia, Pa.
Plants: Siegfried, Pa., and Thomaston, Me.

VULCANITE PORTLAND CEMENT CO.
New York, N. Y.
Plant: Phillipsburg, N. J.

PEERLESS-EGYPTIAN CEMENT CO.
Detroit, Mich.
Plants: Detroit, Union City, Port Huron and Fenton, Mich.

Under License From

The Super Cement Company

Buhl Building, DETROIT, MICH.

A post card to any of the above manufacturing companies will bring you full information about Super Cement

What Super Cement Is

SUPER CEMENT is a more efficient form of portland cement, producing concrete which is permanently waterproof, oilproof, and highly resistant to destructive agencies.

SUPER CEMENT is used instead of, and in exactly the same way as ordinary portland cement, and no special methods of handling are necessary.

SUPER CEMENT is always sold in bags carrying the registered trade-mark as reproduced on this page.

Advantages

SUPER CEMENT ensures smoothly working mortars and concretes without using admixtures; durable, dustless wearing surfaces without using hardeners; permanently waterproof, dampproof structures without supplementary membranes or applications; concrete that resists the attacks of frost, sulphur waters and other destructive agents without the aid of expensive treatments; denser, stronger and more uniform concrete, through absence of tendency to segregate in handling.

Specifications

Cement—

The cement to be used in all concrete shall be a tanno-catalysed portland cement marketed under the registered trade name SUPER CEMENT by its various manufacturers, and shall meet all test requirements of the current A.S.T.M. Standard for Portland Cement.

Aggregate—

Fine Aggregate—Fine aggregate shall consist of natural sand having clean, hard, strong, durable, uncoated grains, free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam, or other deleterious substances. The sand shall be of such sizes that it shall all pass a ⅜-in. sieve, at least 15 per cent shall be retained on the No. 8 sieve, and the fineness modulus shall not exceed 3.20.

Coarse Aggregate—Coarse aggregate shall consist of gravel, crushed stone, crushed air-cooled blast-furnace slag weighing not less than 70 lb. per cu. ft. or other approved inert materials, having clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter. Coarse aggregate shall not have more than 10 per cent finer than the No. 4 sieve and the maximum size shall not exceed —**.

Proportioning of Aggregate—Fine and coarse aggregates shall be proportioned in the field in such ratio as to obtain maximum weight per unit volume of combined aggregates.

Water—

Water for concrete shall be from the city water supply or other approved source. Total mixing water (including that contained in the aggregates) shall not exceed the following amounts for various types of concrete:

Class 1—3000 lb. 7 day—4¼ gal. per sack of cement.
Class 2—2000 lb. 7 day—5¾ gal. per sack of cement.
Class 3—3000 lb. 28 day—6 gal. per sack of cement.

Cement per Cubic Yard—

The amount of cement per cubic yard of concrete shall be determined by the requirements of workability, but unless specifically mentioned hereafter or specifically authorized by the engineer, shall in no case be less than the following:

All work below grade, and concrete exposed to the elements, not less than 7 sacks per cubic yard;

All other concrete not less than 6 sacks per cubic yard.

Workability—

The engineer shall be the sole judge of the degree of workability required for all concrete, and this quality shall be attained either by variation of the cement content plus the specified water per sack, or by variation of mixing time.

Mixing Time—

In no case shall time of continuous mixing after all materials including water are in the mixer, be less than one and one half (1½) minutes.

Temperature—

Concrete when deposited shall have a temperature of not less than 40° F. and not more than 120° F. In freezing weather suitable means shall be provided for maintaining the concrete at a temperature of at least 50° F. for 72 hours or more after placing, or until the concrete has thoroughly hardened. The methods of heating the materials and protecting the concrete shall be approved by the engineer. Salt, chemicals, or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing.

Special Specifications

Specifications for Super Cement—

Stucco, swimming pools, oil tanks, vats, floors, waterproofing, remedial waterproofing, etc., will be supplied on application.

**Maximum size to be filled in by the Engineer.

ADENSITE CO., INC.

Manufacturers of Concrete Waterproofing and Hardeners

116 West Thirty-ninth Street
NEW YORK, N. Y.

LABORATORY: 36-17 34th Street, LONG ISLAND CITY, N. Y.

Products

ADENSITE, a Liquid Integral which is used in the gauging water for Hardening and Waterproofing portland cement concrete and mortar.

PURTONE COLORS, mineral color in powder form for portland cement floor finish.

ADAFLINT, a flush-on floor hardener in crystal form.

A LIQUID INTEGRAL ADENSITE ITS FUNCTION GUARANTEED

TRADE-MARK

Adensite

Uses—Waterproofing concrete walls below grade, either in mass concrete or in plaster coat.

Hardening and dustproofing cement floor finish.

Waterproofing portland cement stucco.

For brick masonry, Adensite gauged mortar is smooth working, does not drag and prevents "riding."

Authoritative Tests—Upon request, we shall be pleased to furnish the architect with authoritative test data on Adensite, compiled from testing laboratory results and research work carried out at the U. S. Bureau of Standards for the A. S. T. M.

Guarantee—Adensite is unconditionally guaranteed to produce positive and permanent results by the manufacturers, the ADENSITE CO., INC.

Surety maintenance bonds furnished on waterproofing jobs.

Service—Our field men visit construction operations while Adensite is in use.

Independence Hall, Philadelphia
Waterproofed with Adensite gauged plaster coat

Colored Floors

PurTone colors are specially prepared for use with portland cement in floor finish and are used integrally throughout the entire top finish, assuring permanent and positive results.

(Specifications upon request.)

Applied Hardener

Adaflint, dissolved in water, 2 lb. to the gallon and slushed over an old or new floor, will render a cement finish hard and dustless.

Adaflint is furnished in natural gray, oak and green.

Shipments

Adensite is shipped in 5, 30 and 50-gal. containers.

PurTone Color is shipped in 550-lb. barrels.

Adaflint is shipped in 2-lb. boxes, 25 to a case.

Adensite Specifications

Waterproofing Mass Concrete—The gauging liquid for concrete shall be prepared by placing from 3 to 4 gal. of Adensite in a 52-gal. barrel and adding water. For every 1-bag batch, use between 3 and 4 gal. of the prepared liquid (amount of liquid varies with fineness of aggregate and temperature).

Joints Between Pourings—Shall be thoroughly grouted with Adensite grout.

Waterproof Plaster Coatings—Shall be ⅝ in. in thickness, applied in 2 coats and properly coved and bonded to the floor.

Bonding New to Old Concrete—All surfaces before application of new work shall be thoroughly roughed, cleaned and dampened with Adensite grout to insure perfect bond.

Adensite Grout—Add 1 part Adensite to 3 parts water and enough cement to give mixture a creamy consistency.

Protection of Green Work—To protect green work against action of water, the pump shall be kept in operation 24 hours after pouring or trowelling of work.

Floor Hardening—Upon the plain concrete floor slab shall be laid a 1-in. topping of 1 part cement and 2 parts clean sand. This dry mix shall be tempered with a liquid composed of 3 gal. of water to 1 qt. of Adensite for every 1-bag batch. No dryer shall be used.

Gauging Liquid for Floor Finish—Gauging liquid may be prepared by putting 4 gal. of Adensite into a 52-gal. barrel and adding water (no stirring required).

Bond—When slab is over 48 hours old, before topping is stretched, it shall be given a coating of Adensite grout.

When slab is over 7 days old, before topping is stretched, it shall be roughed with a pick or chisel, cleaned and given a coat of Adensite grout.

Brick Masonry—The mortar shall be composed of 1 part portland cement, and 3 parts clean sand, tempered with a liquid composed of 1 part Adensite to 12 parts water.

Some Users of Adensite

Grosvenor Atterbury, New York, N. Y.
Alfred C. Bossom, New York, N. Y.
Harold B. Brady, Elizabeth, N. J.
William J. Boegel, New York, N. Y.
Bureau of Yards & Docks, Washington, D. C.
Clinton & Russell, New York, N. Y.
Coffin & Coffin, New York, N. Y.
C. B. Comstock, New York, N. Y.
George W. Conable, New York, N. Y.
Fanning & Shaw, Paterson, N. J.
Day & Klauder, Philadelphia, Pa.
Delano & Aldrich, New York, N. Y.
Dennison & Hirons, New York, N. Y.
I. E. Ditmars, New York, N. Y.
J. H. & W. C. Ely, Newark, N. J.
John F. Jackson, New York, N. Y.
Jardine, Hill & Murdock, New York, N. Y.
Mack & Sahm, Wilkes-Barre, Pa.
John Molitor, City Architect, Philadelphia, Pa.
New York Central Railroad Co., New York, N. Y.
John T. Rowland, Jr., Jersey City, N. J.
F. B. & A. Ware, New York, N. Y.
Warren & Wetmore, New York, N. Y.

ANTI-HYDRO WATERPROOFING CO.

TELEPHONE
TERRACE 5440

265-291 Badger Avenue
NEWARK, N. J.

ESTABLISHED 1904

REPRESENTATIVES, SERVICE AND STOCK IN ALL LARGE CITIES

Products and Services

"ANTI-HYDRO-PERMANENT," a Liquid Integral Compound for waterproofing, dampproofing, accelerating, without weakening, and for hardening all portland cement mixtures.

ARMORTOP, a liquid applied Hardener and Dust Preventer for cement floor surfaces.

ACCELLO, a water solution of commercially pure calcium chloride for Refrigeration and for Accelerating the Set of Concrete in cold weather, without freezing.

CONSULTING WATERPROOFING ENGINEERS, for consultation and design for all waterproof constructions. Correspondence invited.

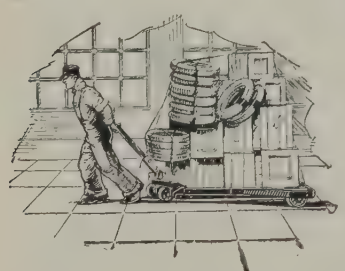
Guarantee

On many important installations we have furnished a written guarantee for a period of five years on the maintenance of waterproof concrete and the dustproofing and hardening of concrete floors. A Surety Bond will be furnished on all waterproofing installations supervised by our Engineering Department.

"Anti-Hydro" Concrete Integral Waterproofer and Hardener

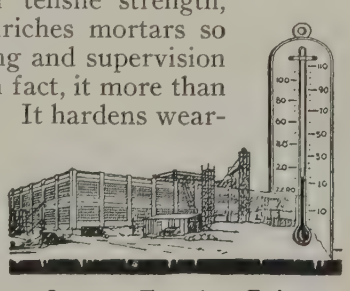
Description — "Anti-Hydro" is a liquid compound, with an affinity for cement. When added, in certain percentage to the water used in gauging portland cement mixtures in the usual way, it has the effect, without retarding setting, of rendering cement in all kinds of masonry impervious to water, moisture, frost, gas, oils, odors, sugar solutions, alkalis and most acids. It excites and brings into service all the cohesive or colloidal possibilities of portland cements, which in themselves are most efficient waterproofing mediums. There are no alums, hydrate of lime, greases, oils, stearic acid or decomposable ingredients used; neither are there any iron admixtures—all of which disintegrate concrete in time.

ANTI-HYDRO
FOR PERMANENT CONCRETE
HARDENS WATERPROOFS
TRADE-MARK



Hardens and Dustproofs Concrete Floors

"Anti-Hydro's" function may be expressed as waterproofing cement with cement; that is, filling the voids with a cement solution, which crystallizes at the same time as the cement, integrally forming a hard, insoluble silicate of greater tensile strength, density and activity. It enriches mortars so that cost of troweling, mixing and supervision is reduced to a minimum. In fact, it more than pays its cost in labor saving. It hardens wearing surfaces to a degree that makes them dustless and adamant. It lowers the freezing point of the gauging water, permitting concreting when the temperature is as low as 15° F.



Lowers Freezing Point

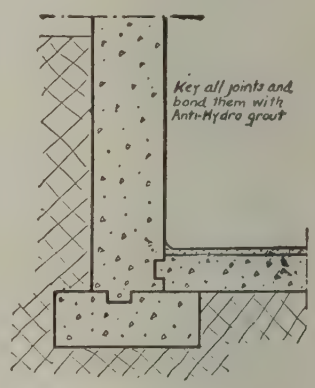
When mixed with portland cement "Anti-Hydro" forms a plastic mass which sets up very quickly and is used for calking metal passing through concrete, and for stopping leaks under pressure. Mixed with water and cement, it forms a dampproof paint which can be applied to the inside of masonry walls or to the back of limestone to prevent discoloration.

Dampproofs Brick Mortar and Prevents Efflorescence

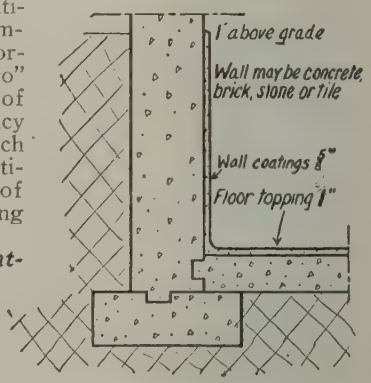
"Anti-Hydro" is used for hardening cement floors, waterproofing concrete in mass and in surface coating, and bonding topping to underlying slab; dampproofing and waterproofing brick mortar and for preventing efflorescence; waterproofing, hardening and bonding concrete roads.

Approval—The superiority of "Anti-Hydro" for waterproofing and concrete hardening is demonstrated by the permanency of work completed since 1904, and by the comparative tests of the United States Bureau of Standards. Their Technologic Paper No. 3 designates "Anti-Hydro" as Compound No. 40, and states "It is the most impermeable of any of the mortars."

Specifications—***Waterproofing in Mass***—To the 1:2:4 mix, for gauging, add 1½ gal. of "Anti-Hydro" for every cubic yard of concrete. Proper consistency will be obtained if, for each barrel of cement, 1 gal. "Anti-Hydro" and from 10 to 15 gal. of water be used. If forms are below water level, concrete should be poured extremely stiff. Unless walls and floor are poured at one time, key all joints and bond them with "Anti-Hydro" grout. (See bonding directions below.)



Floor Hardener—The 1-in. floor topping of 1:2 mix shall be gauged by addition of "Anti-Hydro" to all water used in tempering dry mixture, in proportion of 1 gal. of "Anti-Hydro" to each barrel (4 bags) of cement. The proper consistency will be obtained if, for each barrel of cement, 1 gal. of "Anti-Hydro" and 10 to 12 gal. of water be used. (See bonding directions below.)

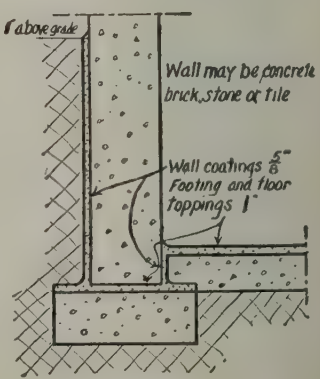


Waterproofing in Coatings—Floor work shall be 1 in. in thickness, and shall serve the double purpose of waterproofing agent and dustless wearing surface.

Wall coatings (2-coat) shall be ⅝ in. in thickness from floor level, where they shall be properly coved and bonded to floor, and carried up to at least 1 ft. above grade.

The 1:2 mortar shall be gauged by addition of "Anti-Hydro" to all water in proportion of 1 gal. "Anti-Hydro" to each barrel (4 bags) cement.

Perfect Bond—To assure perfect bond to underlying masonry, all surfaces, before application of waterproofing, shall be thoroughly roughened, cleaned, dampened and grouted.



Continued on next page

A slush or grout of neat cement, using 1 part "Anti-Hydro" to 3 parts of water, is first applied. Coatings shall be applied not later than 24 hours after surfaces have been prepared and while slush coat is still wet.

Note: Specifications for waterproofing *Brickwork, Stucco on Solid Masonry* and *Stucco on Metal Lath* and *Dampproofing* furnished on request.

Acid Resisting—Write for special specifications.

Road Work—"Anti-Hydro" is especially suited for concrete pavements and roads. It makes concrete as hard in 24 hours as it would ordinarily be in 8 days and actually increases the strength of concrete 22%. Due to its quick hardening qualities, roads are made ready for use in 24 hours after they are laid by mixing 1 gal. of "Anti-Hydro" to 10 gal. of water.

"Anti-Hydro" can be used with any portland cement at a minimum cost.

For maintenance work, "Anti-Hydro" will bond new concrete securely to old.

"ANTI-HYDRO" QUANTITIES

Kind of work	Quantity Anti-Hydro per bbl. cement	Covering capacity
Waterproofing in mass 1:2:4 concrete	1 gal.	⅔ cu. yd. concrete
Waterproofing ⅝-in. plaster coat	1 gal.	100 to 125 sq. ft.
Waterproofing 1-in. floor topping	1 gal.	100 to 80 sq. ft.
Waterproofing stucco ⅞ in.	1 gal.	100 sq. ft.
Waterproofing brickwork ⅜-in. joint	1 gal.	700 brick or 35 cu. ft.
Dampproofing brickwork ⅜-in. joint	1 gal.	1000 brick or 50 cu. ft.
Dampproofing in cement wash	8 gal.	3200 sq. ft.—2 coats
Hardening cement floor 1-in. topping	1 gal.	100 to 80 sq. ft.

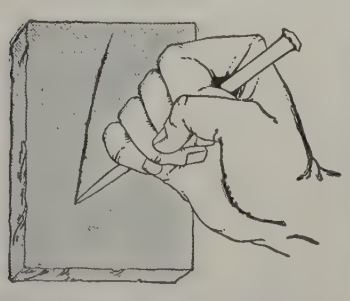
Armortop Concrete Applied Dustproofer and Hardener

Description—Armortop is a liquid compound which, when applied to any concrete surface, old or new, changes the soft granular topping of the concrete into a granitelike mass that resists the most severe wear and abrasion without dusting up. The application of Armortop insures added years of wear and use for any cement floor whether it has just been laid or whether it has been in service for several years. It saves tearing up and relaying old floors which are beginning to rut.

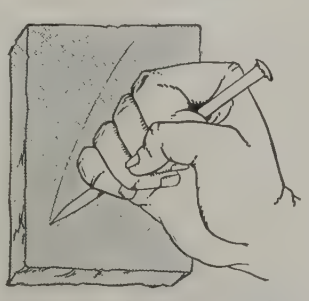
ARMORTOP
THE APPLIED HARDENER FOR CONCRETE
TRADE-MARK

So easily, quickly and surely does Armortop transform soft, crumbling, dusting floors into new, hard, dustproof ones, that the whole job can be performed in the evening after closing hours by any ordinary laborer. Next morning floors are ready for use without loss of time, costly shutdowns and delays to manufacturing.

No skill is required to apply Armortop. Simply mix it with water and brush it with a stiff brush or broom over the surface to be treated.



An Ordinary Concrete Surface Can be Deeply Cut with a Nail or Pointed Instrument as Shown Above



The Same Concrete Surface Treated with Armortop Becomes so Hard That It Can Scarcely Be Scratched with the Same Nail

Armortop reacts chemically with cement and combines with it, forming a new compound which binds the loose, disintegrating particles of the concrete mix into a dense hard mass. Because of this reaction, Armortop results are permanent and should not be confused with temporary paint coatings. The covering capacity of Armortop varies with the density of the floor. One gallon will cover from 70 to 150 sq. ft. of floor surface.

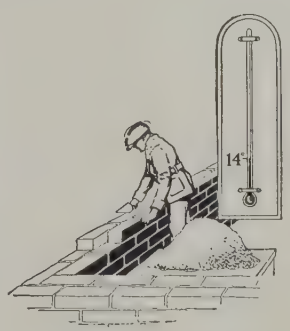
A concrete test slab treated with Armortop will be sent to any one desiring to make the comparative test.

Specifications—Upon the clean, dry floor apply a solution of 1 part Armortop and 1 part water in 2 or more coats, depending upon the density of the floor. Allow 4 hours to elapse between coats.

Accello Concrete Accelerator and Anti-Freeze

Description — Accello, a liquid solution, is used to accelerate the set of cement mortars and floor finish in very cold weather, and to make possible the hydration of portland cement mixtures at temperatures as low as 14° F.

ACCELLO
For Accelerating the Set of Cement
TRADE-MARK



In plain concrete, cement plaster, floor toppings, brick mortar, and road work, the use of Accello during the winter months, when the temperature falls as low as 14° F., is indispensable. It insures masonry work against frost and freezing, and permits work to continue during the cold weather.

Accello makes better concrete road work possible, speeds up work and reduces delays to traffic to a minimum.

Accello makes bricklaying possible until the temperature drops below the point at which it pays to keep the men at work.

Accello is a standardized solution of calcium chloride, uniform in quality and strength. It is easy to use. Any unskilled workman can add it to the gauging water. The proportions necessary are shown below:

Proportions of Accello and Water at Outside Air Temperatures—

35° F., use 1 part Accello with 20 parts water
32° F., use 1 part Accello with 15 parts water
28° F., use 1 part Accello with 12 parts water
25° F. (or less), use 1 part Accello with 10 parts water
14° F. (or less), mechanical heat is necessary

Detailed Information

Write for complete data and specifications for any work within the scope of "Anti-Hydro" products. The services of our Engineers are available at all times.

Dealers Everywhere Carry Stock

A complete stock of "Anti-Hydro" products is carried by dealers throughout the country.

Shipment

"Anti-Hydro" is shipped in standard containers of 5, 10, 20 and 30 gal.

Armortop, in containers of 5, 30 and 50 gal.

Accello, in barrels of 50 gal.

ESTABLISHED 1895

THE ANTIHYDRINE COMPANY

308 Washington Building
NEW HAVEN, CONN.

Product

Manufacturers of ANTIHYDRINE, a Coating for Dampproofing and Stainproofing.

Description

Antihydrine is a material made of a high grade of asphalt carefully prepared in combination with several chemicals, which combination gives it the peculiar property of *forming (without heating) a continuous glossy and impervious coating upon porous surfaces, without penetration.*

Antihydrine is the pioneer dampproof paint, having been first made in 1895. *There has been no subsequent change in formula.*

Advantageous Features

(1) Antihydrine eliminates the necessity of using lath and wood furring for interior plastering of outside walls, plastering being applied over the Antihydrine within 24 hours.

(2) Renders walls dampproof.

(3) Prevents staining of plastering on walls and on fireproof work; also, the following:

Applied to Inside of Outside Walls—(4) No furring needed—cost of and space occupied by furring are saved.

(5) Dangerous places to harbor vermin and encourage fires (when wood furring is used) are eliminated.

(6) Outside walls are made absolutely dampproof.

(7) Building is made warmer and more easily heated.

(8) All staining of and efflorescences on plastering are avoided.

Applied to Fireproof Blocks in Ceilings and Partitions—(9) All staining and efflorescence prevented.

(10) Plastering on blocks dries quickly, saving much time.

(11) All plastered surfaces permit diversified decoration without danger of damages from dampness.

(12) Discoloration of plastering from smoky brick is prevented.

Applied to Built-in Surfaces of Iron, Limestone, Marble, Face Brick, etc.—(13) All ironwork built in wall is preserved.

(14) Staining and efflorescence on exterior of limestone, marble and brick are prevented.

(15) Use of *ordinary* cement mortar in the backing is allowed, thus saving time and money otherwise spent in preparation of expensive cement mortar.

Application

After being well stirred, the Antihydrine contents are poured into a pail and any laborer can apply same *cold* with a brush. Material is fully prepared, ready for use, and is applied as easily as whitewash; *the coating, however, must be kept absolutely continuous, covering every part.* A second coat can be applied, if desirable, within a few hours after the first application.

Covering Capacity

Extensive, by reason of its lack of penetration. 1 gal. covers about 100 sq. ft. of brickwork or fireproofing, 1 coat; or, 60 sq. ft., 2 coats; 1 coat, properly applied, is sufficient for the prevention of dampness and stains.

Shipment

Antihydrine is delivered in casks of 10 and 50 gals.

Cost

The cost of Antihydrine is $1.25 per gal.

Specification Data

The brush shall be the kind used for oiling brick fronts; contents of barrel to be thoroughly stirred before application; every part to be covered, leaving no small holes, etc.; coating to be thin where it is to be plastered over, with sufficient body to leave a glossy surface; and the Antihydrine to be soft or "tacky" when plastering is applied.

First coat of plastering, as thin as will allow of proper scratching, will dry quickly; second coat is applied immediately thereafter; after drying, third and last coat of plastering is applied when, after a few days, surface will be ready for painting and decorating.

References

A few buildings in which Antihydrine was used:

New York, N. Y.

American Museum of Natural History
Delmonico Building
St. James Building
Manhattan Hotel
Skin and Cancer Hospital
Home for Aged Men and Married Couples
Journeay Building
Public School Buildings
New York Hospital
New Hall of Board of Education
Commercial Academy of Marest Bros.
Clara Hirsch Home for Working Girls

Other Cities

Lincoln Memorial, Washington, D. C.
St. John's Home for Boys, Brooklyn, N. Y.
Brazer Building, Boston, Mass., Cass Gilbert, Architect
Masonic Temple, Boston, Mass., Loring & Phipps, Architects
Residence, Beacon St., Boston, Mass., R. Clipston Sturgis, Architect
Hotel Dartmouth, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
St. Joseph's Novitiate, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
Hotel Cambridge, Boston, Mass., W. T. Sears, Architect
Hall of Missions Church, Boston, Mass., T. J. Untersee, Architect

THE ARCO COMPANY

Manufacturers of Dum Dum Plaster Bond

CLEVELAND, OHIO

For Paints, Varnishes, Enamels and Caulking Compounds, see pages B2032-2033

Dum Dum—A Method for Plastering Direct to Concrete

Dum Dum insures permanent adhesion of plaster to concrete surfaces. It is the result of years of intensive research and tests. It has been extensively used without a failure since 1915.

Initial Dum Dum jobs installed early in 1915 are in perfect condition with no sign of deterioration and with every indication that the plaster will adhere to the concrete for many years longer. The success of the above instances and others that followed were sufficient to warrant the continued use of Dum Dum by many nationally known architects.

What Dum Dum Is

Dum Dum is an original patented product which the ARCO COMPANY alone has and it cannot be classed with any of the other methods of bonding plaster to concrete. It is a plastic material that is applied with a trowel, forming a layer between the concrete and plaster. Dum Dum takes the place of the scratch coat. If the surface is smooth, the brown coat can be finished off and used as a finish coat. The condition of the concrete usually determines whether one or two coats of plaster are necessary to produce an even surface.

No time is wasted when applying Dum Dum—put Dum Dum on, then plaster over it immediately. Dum Dum comes ready for use. It is applied by the plasterer. It eliminates the necessity of other trades and at the same time affords the advantage of one trowel coat where more than one coat is required. Dum Dum and plaster are applied from the same scaffold.

Many architects specify suspended ceilings even when appearance is not an object, simply to insure permanance. Since the advent of Dum Dum this is no longer necessary. Not only is Dum Dum absolutely permanent, but its cost is lower than older methods.

How Dum Dum Solves the Five Causes of Plaster Failures

The failure of plaster when applied directly to concrete and masonry surfaces has been attributed to many widely different causes, and, while there may be various contributing factors, the fundamental reasons can be reduced to the following: efflorescence, vibration, unequal rate of expansion and contraction between concrete and plaster, laitance, and smooth concrete.

Efflorescence—The free lime and salt content that is in practically all concrete is carried to and deposited on the surface by means of the moisture that is continually passing through the concrete slab. These deposits form a salt crust known as efflorescence. This action is continuous, even when plaster is applied directly to the concrete, as there is nothing to seal the pores of cement. These deposits act as a wedge and force the plaster from the concrete.

Dum Dum eliminates this condition. It seals the pores in the concrete with an elastic film about ⅛ in. thick, which shuts off the circulation within the concrete. Dum Dum remains permanently plastic and does not disintegrate—it provides a permanent seal and thus safeguards against the paramount cause of plaster failures—efflorescence.

Vibration—Constant vibration causes only a limited portion of plaster to adhere to the concrete even under the best of conditions, because the force of the jar asserts itself at the bond due to the difference in the strain at this point.

By reason of its elasticity, Dum Dum acts as an air cushion, shock absorber taking up the jar.

Expansion and Contraction—As concrete and plaster do not expand and contract at the same ratio there is an internal strain at the bond during change in temperature. As the bond is the weakest part of the construction it is the first to give way. When Dum Dum is applied it remains permanently elastic and produces a film of ⅛ in. thick that takes care of this unequal rate of expansion and contraction and furnishes the necessary strength required to insure the permanency of the plaster adhesion.

Laitance—Laitance is a spongy surface film developed during the setting process of concrete with the result that a very undesirable surface is presented for the adhering of plaster. Dum Dum nullifies the effect of laitance. It is a combination of unusually tenacious and adhesive oils. These oils penetrate through the laitance, to the solid concrete, enter the pores, completely seal them, and at the same time bond the laitance coating firmly and solidly to the concrete surface so that no peeling can ever occur. Permanent elasticity of Dum Dum is maintained by incorporating a much greater percentage of oil than would ordinarily be required. This allows for the extraction of enough oil to bind the laitance to the concrete and to film over the pores so as to eliminate further oil extraction.

Smooth Concrete—Smooth hard finish concrete is so unusually dense and the pores are so very small that it is practically impossible to force plaster into the pores and secure the necessary suction. The oils of Dum Dum penetrate into the concrete just enough to work in and around the pores and bind the particles of cement into a homogeneous mass. After this action takes place, Dum Dum, which is applied ⅛ in. thick, sets up a tough rubbery film on the side next to the cement and on the side next to the plaster, thus leaving the Dum Dum between these two films permanently elastic so as to provide a "live" bond.

Standard Specifications for Bonding Plaster to Concrete Ceilings with Dum Dum

(1) Preparation of the Surface—(a) The plaster contractor shall allow sufficient time after removal of the forms to insure thorough drying and hardening of the concrete.

(b) Loose sand, pebbles, or cement shall be removed by wire brushing.

(c) Efflorescence shall be removed by treating the surface with acid, and thoroughly washing with clean water. In all cases the concrete surface must be absolutely dry and clean before the application of Dum Dum.

(2) Application—Trowel one coat of Dum Dum on all concrete surfaces to which plaster is to be applied.

(3) Application of Plaster—Plaster may be applied to the Dum Dum at any time up to three hours after the application of the Dum Dum. No plaster shall be applied to the surface after this time.

AQUABAR WATERPROOFING PRODUCTS

Waterproofings, Dampproofings, Floor Hardeners, Technical Paints and Steel Coatings—"Known the World Over"

GENERAL OFFICES
Perry Building
PHILADELPHIA, PA.
Representatives in all Principal Cities. Nearest Distributer's name furnished on request

Products

- Aquabar Integral Compound No. 1, Waterproofing Paste.
- Aquabar Aquatite Integral Liquid Waterproofing.
- Aquabar Clear-Coat No. 2, Colorless Waterproofing Liquid.
- Aquabar Statite Plaster Bond No. 3 Dampproofing Paint.
- Aquabar Marine Cement No. 3A.
- Aquabar Stone Backing No. 3B.
- Aquabar Mastic Insulite Cement No. 4.
- Aquabar Iron-Clad Crystals No. 7B Floor Hardener.
- Aquabar Integral Liquid Floor Hardener.
- Aquabar Crysteel Metallic Floor Hardener No. 7.
- Aquabar Quick Set Cement Accelerator and Anti-Freeze Compound.
- Aquabar Wood Floor Preservative.
- Aquabar Conco Cement Floor Paint.
- Aquabar Elasticote No. 6 Waterproof Paint.
- Aquabar Marine Waterproof Paint.
- Aquabar Roof Coating No. 5.
- Aquabar Sterilite Flat Wal Finish.
- Aquabar Wal-Wite Enamel (Mill White).
- Aquabar Fabricators Red Oxide, Carbonite Steel Coating (Structural Steel Coatings).
- Aquabar Triple Seal System of Waterproofing.

Twenty-seven Years of Quality and Service—1901-1928

For the past 27 years we have specialized in the manufacture of waterproofing and dampproofing materials, floor hardeners and protective coatings of all kinds.

As pioneers in solving the most difficult waterproofing problems, Aquabar has proven to be a most economical and efficient waterproofing compound. It is used extensively in the construction of swimming pools, reservoirs, vaults, foundations, tunnels and all other kinds of masonry construction.

Detailed architects' specifications and information on any of our products will be furnished upon request, without any obligation on your part.

Integral Waterproofing

No. 1 Integral Compound—A soft semipaste which is easily dissolved in water for waterproofing mass concrete, cement plaster, cement mortar for brick and stone work, stucco, etc. It does not affect the strength of concrete, but increases its effectiveness with age.

Specifications for Waterproofing Mass Concrete—A dry mixture of cement, sand and stone—1:2:4 mix, shall be tempered to a medium wet consistency with water, to which 1 part of Aquabar Integral Compound No. 1 has been added to every 50 parts of water, in strict accordance with manufacturer's directions.

Covering Capacity—From ½ to ⅔ gal. will waterproof 1 cu. yd. of mass concrete 1:2:4 mix.

Senior High School, Reading, Pa.
Ritcher & Eiler, Architects M. Melody & Son, Contractors
A. H. Leader, Superintendent of Buildings
Foundation walls, floors, etc., waterproofed with Aquabar Aquatite Integral Liquid Waterproofing. Subject to pressure of water

Specifications for Waterproofing Cement Mortar and Stucco—The waterproofed cement mortar, consisting of 1 part cement, 2 parts sand with water, shall be prepared by tempering to required consistency, to which 1 part Aquabar Integral Compound No. 1 has been added to every 25 parts water, in strict accordance with manufacturer's directions.

Covering Capacity—1 gal. will waterproof approximately 150 to 175 sq. ft. 1-in. top coat 1:2 mixture cement mortar, or, approximately, 200 to 250 sq. ft. of cement stucco 1 in. thick.

Aquatite Integral Liquid Waterproofing—A liquid compound for waterproofing and accelerating mass concrete and cement mortars.

Specifications for Waterproofing Mass Concrete—To the 1:2:4 mixture for gauging add 1½ gal. of Aquatite for every cubic yard of concrete. Proper consistency will be obtained if for each barrel of cement 1 gal. of Aquatite and from 10 to 15 gal. of water be used. If forms are below water level, an extremely stiff mixture should be poured.

Specifications for Waterproofing Cement Mortars—The 1:2 mortar shall be gauged by the addition of Aquatite to all water used in the proportion of 1 gal. of Aquatite to each barrel (4 bags) of cement.

Covering Capacity — Approximately 1½ gal. will waterproof 1 cu. yd. concrete 1:2:4 mix; 1 gal. will waterproof 100 sq. ft. 1-in. top coat 1:2 mix cement mortar.

Continued on next page

Colorless Waterproofing—Clear-Coat No. 2

A colorless, transparent liquid for waterproofing and dampproofing outside walls (above grade) of brick, stone, concrete cement, terra cotta, stucco, etc. Clear-Coat No. 2 does not discolor surfaces to which it is applied. Penetrates readily, filling all pores, rendering the surface impervious to moisture and driving rains.

If required, we will submit estimates for furnishing and applying by spray.

Covering Capacity—Approximately, 125 sq. ft., 1 coat; 80 sq. ft. per gal., 2 coats, depending upon porosity.

Dampproofing

Statite Plaster Bond No. 3—A black compound for application to masonry surfaces of all kinds, so as to form a dampproofing and bond for plaster. It eliminates furring and lathing.

Covering Capacity—Approximately, 75 sq. ft. per gal., 1 coat; 50 sq. ft. per gal., 2 coats.

Marine Cement No. 3A—A black compound of heavy consistency for dampproofing exterior foundation walls below grade, also for application to floor slabs of ground floors. Applied cold.

Covering Capacity—Approximately, 60 sq. ft. per gal., 1 coat; 40 sq. ft., 2 coats.

Stone Backing No. 3B—A black compound for dampproofing unexposed surfaces of cut stone and for rustproofing metal surfaces. It is applied just as it comes from the container.

Covering Capacity—Approximately, 125 sq. ft. per gal., 1 coat; 75 sq. ft., 2 coats.

Mastic Insulite Cement No. 4—A black mastic for waterproofing foundation walls, tunnels, etc., against heavy water pressure; for overcoating, calking and patching old roofs; sealing cracks, open joints, etc. Applied cold (with trowel) $\frac{1}{8}$ to $\frac{3}{16}$ in. thick according to the smoothness of the surface. When set, it has the consistency of hard rubber, never gets brittle and is unaffected by changes in temperature. Very elastic and adhesive; works freely.

Covering Capacity—Approximately, 25 to 30 sq. ft. per gal., 1 trowel coat.

Floor Hardeners

Iron-Clad Crystals No. 7B (Surface Treatment)—These crystals are dissolved in water, and applied to the concrete surface with a stiff brush or broom in 2 coats of equal strength for wearproofing, waterproofing and dustproofing of same.

Covering Capacity—Approximately, 2½ lb. will treat 100 sq. ft. of surface with 2 coats.

Liquid Floor Hardener (Integral Method)—This liquid is added to the water used in mixing the cement top coat for wearproofing, waterproofing and dustproofing cement floors.

Covering Capacity—1 gal. will harden, approximately, 100 sq. ft. of 1-in. top coat, 1:2 mixture cement mortar.

Crysteel Metallic Hardener No. 7—Metallic particles that are mixed with the cement used for top coating. It forms a metallic crust that will withstand most severe traffic. Designed for factories, warehouses, etc.

Covering Capacity—Approximately, 30 lb. mixed with 30 lbs. portland cement will treat 100 sq. ft. of surface dust coat.

Quick Set Anti-freeze and Accelerator

This liquid is added to the water used in mixing mass concrete, cement mortar, etc., for accelerating the set so as to prevent freezing. Causes a rapid evaporation of the water and speeds the final set permitting work to continue in temperatures as low as 20° F.

Floor Coatings

Wood Floor Preservative—A translucent liquid for preserving and dustproofing maple and yellow pine floors, without changing the appearance of the surface. It prevents rotting and decay, and adds to the wood those essential elements of preserving its life and appearance.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 350 sq. ft. per gal. for 2 coats, depending upon the porosity.

Conco Cement Floor Paint—For coating cement floors above or below grade. It prevents dusting and disintegration of floors; is extremely durable, and resists wear to a remarkable degree.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 150 sq. ft. per gal. for 2 coats.

Paints

Elasticote No. 6 Waterproof Paint—A highly specialized liquid cement coating for waterproofing and dampproofing exterior and interior concrete, brick, cement, stucco, plaster and masonry walls. Gives a handsome stonelike appearance and offers excellent wearing qualities. Made in various colors.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. for 2 coats.

Marine Waterproof Paint—A decorative and protective coating for application to interior surfaces, swimming pools and surfaces immersed in water. It covers well and adheres firmly. Made in various colors.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. per gal. for 2 coats.

Roof Coating No. 5—A pure Trinidad asphaltum product having remarkable adhesive and saturating properties for overcoating and waterproofing roofs of every description. Restores life and waterproofing properties to any roof which had been exhausted by exposure to the sun. It is applied cold with a brush.

Covering Capacity—Approximately, 100 sq. ft. per gal. for 1 coat.

Sterlite Flat Wal-Finish—A high grade washable paint for finishing interior plastered surfaces.

Wal-Wite Enamel and Undercoating (Mill White)—A high grade mill white possessing high light reflecting qualities. Particularly useful for application to walls, ceiling and columns for daylighting interiors. It retains its whiteness and can be repeatedly washed without injuring it. Will not turn yellow.

Fabricators Red Oxide, Carbonite Steel Coating (Structural Steel Coating)—A paint made of the best rust inhibitors or moisture excluders known. For the protection of structural steel. Resists electrolysis to the maximum degree.

Triple Seal System of Waterproofing

This system is used for waterproofing swimming pools, reservoirs, tunnels and basements where the water head is 2 ft. or more. It has a combination of the old membrane and the new integral systems.

Specialties

We furnish and apply dampproof coatings and colorless waterproofing, furnishing guarantee with same.

THE ASPHALT PRODUCTS CO., INC.

Manufacturers of Bituminous Products

SYRACUSE, N. Y.

DISTRIBUTORS IN MANY CITIES OF THE UNITED STATES, REPRESENTATIVES IN ALL

Products

123 "Hydro Proof"—a permanent waterproofing and Dampproofing Agent.

"Hydro Proof" Plaster Bond.

"Hydro Proof" Plastic—a Calking Compound.

"Bond-N-Seal"—a Setting Compound for Corkboards and Blocks.

"Bitumet"—a Protective Coating for all metals.

Hydro-Proof

123 "Hydro Proof"—A Permanent Waterproofing and Dampproofing Agent

For walls, floors, cisterns, pits, etc.

123 "Hydro Proof" is pure Mexican base asphalt atomized and held in suspension in a water vehicle without the use of oils, solvents or adulterants. Having the physical characteristics of water, it is carried by capillary attraction into every pore and void of the surface on which it is applied. It is odorless and tasteless, and expands and contracts without checking or cracking.

Superficial Method—Engineers and architects agree on the success of this method. It embraces the use of 123 "Hydro Proof" applied to the surface by brushing, mopping, or spraying. Its application on the outside of walls below ground level is desirable, and it will be found fully efficient for inside use except where high hydrostatic pressures exist.

Specification for Superficial Method—

For use on new or old walls where high hydrostatic pressure does not exist.

The outside [inside] face of all foundation walls below grade level shall be treated with 123 "Hydro Proof" Waterproofing as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—All surfaces shall be dry, free from dust, oil and grease to assure proper penetration. Thoroughly stir contents of container and reduce part for the bonding or priming coat with not more than 20% clean water by volume. "Hydro Proof" shall be applied at a temperature not lower than 50° F. with a clean brush or mop, (free from oil and grease) or spray, covering approximately 80 sq. ft. per gal. After priming coat has set, apply a full strength coat (material as received thoroughly stirred).

Protection—The final coat shall be protected with a ½-in coating of cement mortar.

Note: Where this waterproofing has been applied on exposed masonry surfaces and black color is objectionable, use the following clause:

Finishing Coat—The final coat on all exposed walls shall be covered with a thin wash of portland cement and sand brushed on. After the finishing coat has set apply with a brush a coat of ..... stucco color.

Membrane Method—Here again, the superiority of 123 "Hydro Proof" is apparent, as it bonds perfectly without decreasing the crushing or tensile strength of the construction, and in addition to its water, acid and alkali resisting qualities has the necessary characteristics of strength and flexibility to bridge over hair cracks in the concrete due to defective workmanship or other causes.

The membrane is built as an inset in the concrete wall, floor, etc., and forms an indestructible waterproof skin, excluding all moisture. It is protected from abrasion by the concrete on both sides.

It has been found by experience that about ½ in. from the finished thickness on the water pressure side is the proper place to introduce the 123 "Hydro Proof" membrane. It does not allow penetration of sufficient moisture in the remaining concrete applied over the membrane to cause trouble from freezing, or the penetration of acids, alkalis, etc.

Specification for Membrane Method—

For use on new walls and floors where hydrostatic pressure exists.

The outside face of all foundation walls, top of footings, and the surface of all concrete floors at least 4 in. below finished floor level shall be treated with 123 "Hydro Proof" Waterproofing as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—All surfaces shall be dry, free from dust, oil and grease, to assure proper penetration. Thoroughly stir contents of container and reduce part for the first coat with not more than 20% of clean water by volume. "Hydro Proof" shall be applied at a temperature not lower than 50° F., brushing it thoroughly on the unfinished concrete (the brush shall be free from oil and grease). When set, flow on a heavy second coat (full strength), using 2½ to 3 gal. per 100 sq. ft.

Protection—The final coat on all vertical surfaces shall be protected with at least ½-in. coating of cement mortar [.... in. of concrete].

The final coat on all floors shall be protected with .... in. of concrete including a 1-in. finished surface.

Note: Not less than 4 in. of concrete should ever be used where hydrostatic pressure exists. Mass concrete should be sufficient in weight to withstand the pressure, or where less concrete is desired, the concrete slab between waterproofing membrane and finished floor must be reinforced.

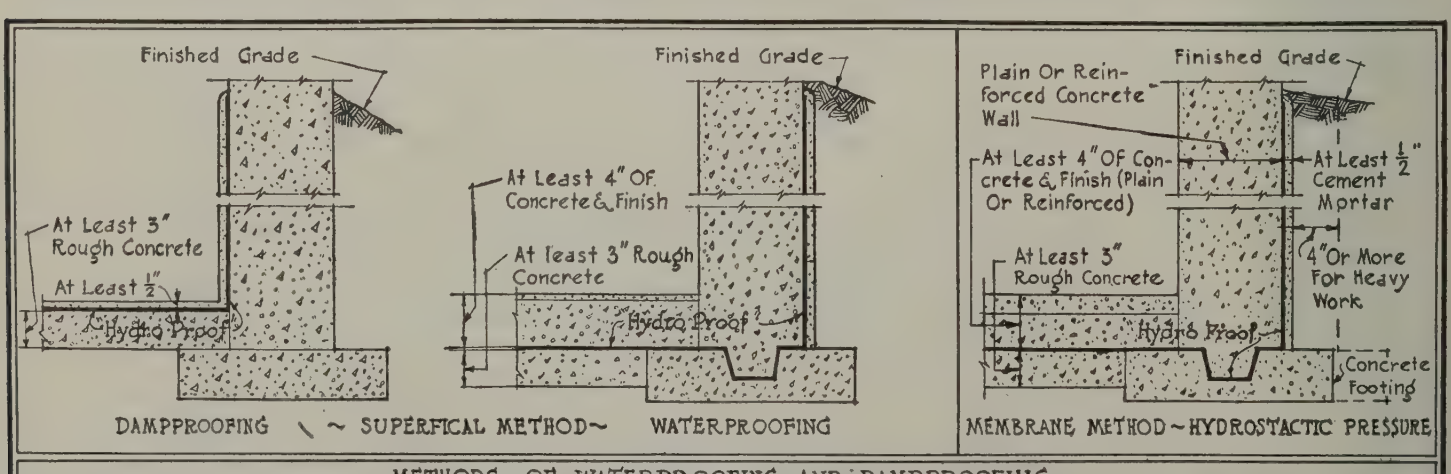
"Hydro Proof" Plaster Bond—

For bonding plaster or stucco to concrete, brick, tile, gypsum, etc.

This permanent waterproofing agent being atomized pure Mexican base asphalt, suspended in a water vehicle without the use of solvents, oils or adulterants, has the physical characteristic of being absorbed by capillary attraction into any porous wall construction over which it is applied, permanently sealing same against dampness and moisture which would otherwise penetrate and stain the interior finish.

"Hydro Proof" Plaster Bond eliminates the necessity of furring or lathing except on ceilings.

Used on woodwork to be set against new masonry or con-



METHODS OF WATERPROOFING AND DAMPPROOFING

Continued on next page

struction subject to moisture, it will prevent rotting, cracking or warping.

Remains elastic—expanding or contracting under all atmospheric variations.

Specification for Plaster Bond—

For use on old or new interior or exterior masonry walls and ceilings.

General—All interior and exterior—surfaces (specify surface) shall be given two (2) coats of "Hydro Proof" Plaster Bond as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Preparation of Surface—Surfaces shall be dry, and free from all loose and foreign materials. Where paint, oil, grease, etc. are present, a suitable cleaner shall be used, the surface flushed with clean water and permitted to dry.

Application—"Hydro Proof" Plaster Bond shall be applied in two (2) coats with a new, clean, wide brush or suitable spray.

If brush is used, the first coat shall be diluted with 20% clean water, by volume; the second and final coat undiluted and as received in container.

If sprayer is used, "Hydro Proof" Plaster Bond shall be diluted to the consistency required by spray nozzle. Only sprayer suitable for heavy paints or asphalts shall be used.

"Hydro Proof" shall be brushed or sprayed in a continuous coat over all surfaces of walls, working it well into all corners and joints; also on walls where partitions and floor slabs will abutt the exterior walls. When this is not feasible, it shall be carried out from the exterior walls for a distance not less than 12 in. on such intersecting partitions and floor slabs.

Note: The following provision shall be included by the Architect in his specification for Plastering Work.

Plaster or stucco shall be applied directly over "Hydro Proof" Plaster Bond after the latter has thoroughly set, which will be indicated by its being slightly tacky to the touch, but which will not adhere to the fingers.

"Hydro Proof" Plastic—A Glazing and Calking Compound

For glazing, calking, airproofing, soundproofing, waterproofing, dampproofing, etc.

A compound of pure Mexican base asphalt suspended in water and processed without the use of oils, solvents or saponifying agents. *It is not a coal tar product.* When applied, it contracts and expands under all climatic conditions without checking, cracking or peeling. It is fire-safe, odorless and tasteless.

To this asphalt base is added pure Canadian asbestos. It is automatically machine mixed, thus guaranteeing a uniform product.

Glazing—"Hydro Proof" Plastic is a permanent and economical glazing compound. Used the same as putty, it may be spread with a putty knife or our automatic gun. Does not check, crack or peel and is unaffected by the elements as it contains no oils or solvents to oxidize.

"Hydro Proof" Plastic seals the glass to the frame, making it impervious to moisture, snow, rain, air, acids, alkalis, chemical or noxious gases.

For greenhouses it is the most satisfactory glazing compound as it stays in place, never cracks or peels off from the vibration of the greenhouses during heavy winds, and it keeps the building watertight.

Calking—"Hydro Proof" Plastic, applied with our automatic gun or with a putty knife will permanently fill and seal all cracks and crevices around windows and doors, as well as seams in metal roofing or siding, cracks in masonry, etc. It also has the desirable quality of being a non-conductor of sound, and may be confidently used with soundproofing materials.

Colors—"Hydro Proof" Plastic is black. Where a maroon glazing compound is wanted, we can supply one of bitumen, an indestructible filler with just a sufficient quantity of high grade oil to hold the coloring matter.

Specifications for "Hydro Proof" Plastic—

For use as a glazing compound:

All wood [metal] sash throughout the building shall be glazed with "Hydro Proof" Plastic as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—"Hydro Proof" Plastic shall be applied with a putty knife or an automatic gun and smoothed the same as putty.

Note: The automatic gun is sold by The Asphalt Products Co., Inc., of Syracuse, N. Y.

For use as a calking compound:

All wood window and door frames shall be calked with "Hydro Proof" Plastic as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—All exterior staff beads or exterior moulds shall be removed and space between wood frames and masonry [metal] jambs, heads and sills shall be raked out and cleaned, then calked tightly with oakum leaving a recess at least ½ in. deep; this recess shall be filled and calked with "Hydro Proof" Plastic applied with a putty knife or an automatic gun. Smooth with putty knife.

Note: The automatic gun is sold by The Asphalt Products Co., Inc., of Syracuse, N. Y.

"Bond-N-Seal" — A Setting Compound for Corkboard and Block Insulation

This quick setting, odorless compound permanently bonds corkboard to walls and ceilings, also corkboard to corkboard and joints around same.

"Bond-N-Seal" is waterproof, airproof, acidproof, alkaliproof and verminproof. It is not affected by ammonia fumes, chemical or noxious gases or salt brine.

"Bond-N-Seal" is pure asphalt with a patented silica filler. Contains nothing to oxidize or deteriorate. The pure asphalt used in the manufacture of "Bond-N-Seal" contracts and expands under all temperature changes encountered in the cold industries without checking or cracking.

Specifications for "Bond-N-Seal"—

For setting corkboard lining of masonry refrigerators:

The interior walls, ceilings and floors of all masonry refrigerators shall receive a 3/32-in. thick coat of "Bond-N-Seal" applied with a trowel. After this coating has set (2 to 3 hours) the corkboard shall be set. Coat the back and edges of each board with "Bond-N-Seal" 3/32 in. thick and press firmly in place, all joints shall be thoroughly pointed. Cork must be held against ceiling with skewers until set.

Note: If walls and ceilings are to be protected or covered with cement plaster or tile and the floor covered with finished concrete or tile, use the following clauses:

The entire surface of the corkboard lining on walls, ceilings and floors shall receive a 3/32-in. thick coat of "Bond-N-Seal" applied with a trowel, as a bonding coat to the finished masonry lining.

The application of "Bond-N-Seal" shall not be done in a temperature lower than 65° F.

"Bitumet"—A Protective Coating for All Metals

A jet black, glossy, permanent preservative for all metallic surfaces. It is unaffected by any temperatures from a low minus to 400° F.

"Bitumet" is not affected by the action of any commercial acid or alkali, consequently it is immune to the action of any fumes or gases encountered in any industry.

Being composed of pure natural asphalts "Bitumet" is waterproof. It can be applied at any temperature where it works out under a brush, or it can be applied with a spray. It dries quickly and has a covering capacity of 300 sq. ft. per gal.

No distilled or blown asphalts are used in the manufacture of "Bitumet." It is a supercoating that will meet in a highly satisfactory way every problem for protecting metallic surfaces against all forms of corrosion. This blend contains no oxidizing agents whatsoever, consequently is not amenable to cracking or checking under varying temperature changes.

"Bitumet" is recommended for coating all structural steel, brine coolers, blowers, running gears of trucks, tanks, coils, condensers, ice cans, cooling towers, water softeners, steam and waterpipes, valves, fittings, etc.

Specifications for "Bitumet"—

The contractor shall thoroughly clean the surface of all structural steel (or insert other metal) free of all rust scale, dirt, grease, oil, etc., and shall then apply, with brush or spray strictly in accordance with manufacturer's instructions, one [two] coats of "Bitumet" as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

THE BITU-MORTAR WATERPROOFING COMPANY, INC.

Manufacturers of Cement Waterproofing; Waterproofing Engineers and Contractors

TELEPHONE
CALEDONIA 5663, 5664

274 Madison Avenue
NEW YORK, N. Y.

Products

"B-M No. 78" BITU-MORTAR LIQUID WATERPROOFING COMPOUND.

BITU-MORTAR WATERPROOFING
WATERPROOFS PERMANENTLY
TRADE-MARK

Services and Guarantee Bond

Contractors for the execution of waterproofing in all sections of the country, making a specialty of difficult operations where other materials have failed.

Will furnish bond from any bonding company, when required, guaranteeing work to remain absolutely watertight for a long term of years.

An engineering department is maintained, which is at the service of all seeking advice on any questions concerning waterproofing of tunnels, subways, foundation walls, sewers, reservoirs, etc.

"B-M No. 78" Bitu-Mortar Liquid Waterproofing Compound

This is a bituminous emulsion which can be readily incorporated in ordinary portland cement mortar, rendering same absolutely and permanently impervious to water, even under severe pressure.

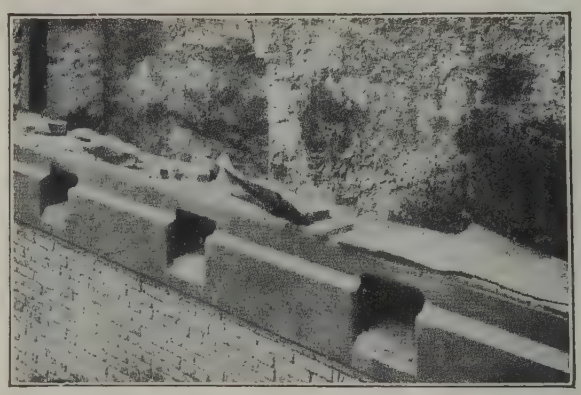
Mortar so prepared will bond perfectly to either old or new concrete, brick, stone or iron, and can be applied to surfaces even when water is coming through.

FISK BUILDING, 57TH STREET, BROADWAY AND EIGHTH AVENUE, NEW YORK, N. Y.

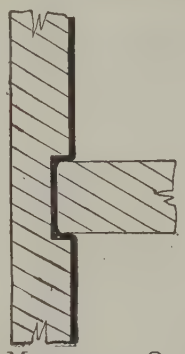
CARRERE & HASTINGS, Architects — FRED T. LEY, Contractor

Suggestions for Application

NATURE OF WORK	CONDITIONS	MATERIAL REQUIRED
Tunnels, subways, cellar walls.	Already constructed. Water coming through floors, ceilings or sidewalls.	Bitu-Mortar Liquid Waterproofing Compound, "B-M No. 78."



METHOD OF CARRYING WATERPROOFING BACK OF BEAMS



METHOD OF OBTAINING CONTINUOUS COATING WHERE INTERIOR WALL BUTTS AGAINST OUTSIDE WALL

METHOD OF WATERPROOFING UNDER GRILLAGES
A—First operation, "dampcourse"
B—Second operation
C—Third operation, finished floor

Partial List of Installations

Architectural Insurance Co., Watertown, N. Y.; York & Sawyer, Architects; Charles I. Wills, Inc., Contractor

Reconstruction Hospital, 100th Street, Central Park West, New York, N. Y.; York & Sawyer, Architects; Charles I. Wills, Inc., Contractor

R. H. Macy & Co., W. 34th and 35th Streets, New York, N. Y.; Robt. D. Kohn, Architect; Marc Eidlitz & Son, Contractors

New York County Courthouse, Pearl and Centre Streets, New York, N. Y.; Guy Lowell, Architect; George A. Fuller Co., Contractors

American Museum of Natural History, 77th Street and Central Park West, New York, N. Y.; Trowbridge & Livingston, Architects; James Stewart & Co., Contractors

Westchester Biltmore Country Club, Harrison, N. Y.; Warren & Wetmore, Architects; George A. Fuller Co., Contractors

Ajax Rubber Co., Trenton, N. J.; Owner's Engineers; Owner's Contractor

Munson S. S. Co. Building, Wall and Beaver Streets, New York, N. Y.; Kenneth Murchison, Architect; George A. Fuller Co., Contractors

Kerr S. S. Co. Building, 38 Beaver Street, New York, N. Y.; Warren & Wetmore, Architects; George A. Fuller Co., Contractors

Combustion Engineering Co. Building, 43-47 Broad Street, New York, N. Y.; Ludlow & Peabody, Architects; George A. Fuller Co., Contractors

7 Gold Street and 83 Maiden Lane Building, New York, N. Y.; Clinton & Russell, Architects; Cauldwell, Wingate Co., Contractors

Jas. A. Hearn & Sons, 26-28 W. 13th Street, New York, N. Y.; Dunsmore & McClear, Engineers; R. H. Howes Construction Co., Contractors

Astoria Gas Plant, Astoria, L. I. (Underground Tunnel); W. Cullen Morris, Engineer; George A. Fuller Co., Contractors

BUILDERS SPECIALTY COMPANY, INC.

Manufacturers of Concrete Coloring, Waterproofing and Hardening Specialties

1844 North Front Street
PHILADELPHIA, PA.

103 Park Avenue
NEW YORK, N. Y.

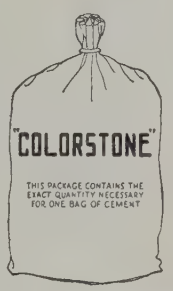
"Colorstone" for Coloring, Hardening and Dustproofing Cement Floors (Interior or Exterior)

"Colorstone" is a scientifically compounded mineral and chemical powder which, when added to cement mixtures, produces color effects that are permanent, non-fading, acid resistant and not affected by actinic rays of light. It makes the cement extremely dense and hard.

"Colorstone" can be used with equal satisfaction in portland cement mixtures for colored floors, walks, steps, porches, roof gardens, tennis courts, swimming pools, mortar, stucco, precast articles and fountains.

Method of Use

"Colorstone" comes packed in individual packages, each of which contains the exact quantity required for one bag of cement. This eliminates all weighing or guesswork on the job and insures a uniform result.



Quantities Required Per Bag of Cement

Red, brown, blue, battleship gray, french gray, yellow, orange and black...10 pounds
Green .....15 pounds
Cement Gray ..... 5 pounds

Also more than 100 special colors and shades.

"Colorstone Wax" for High Gloss Finish Floors

"Colorstone Wax" is supplied in colors to match "Colorstone" floors, and provides a permanent high gloss finish. One application of "Colorstone Wax" will last for many years.

Architect's Specification for "Colorstone" Floors

All cement floors as listed herein shall have incorporated in the finish coat, in strict accordance with the manufacturer's directions, "Colorstone" coloring and hardening compound, as manufactured by the Builders Specialty Company, Inc., Philadelphia, Pa. One package of the desired color shall be used per bag of cement in the mix.

Top Coat Mix—Shall be one part portland cement, two parts clean, sharp, coarse sand and one package of "Colorstone" of desired color for each bag of cement used in the batch. Only sufficient water shall be added to make a stiff mix, and the mixer shall revolve two full minutes before the discharge of each batch. Place the topcoat in the usual manner and at the proper time float and trowel to a smooth and even texture, mark off in blocks as directed by the architect. Three steel trowelings shall be given the surface, the last troweling to be done when the surface will finish off without defects of any kind.

Curing and Protection—After floors are sufficiently hardened so as not to be damaged they shall be covered with two inches of non-staining sawdust or sand and this protective covering shall be kept wet for five days.

Protection Against Stains—After the curing coat has been removed all floor surfaces shall be coated with "Anti-Stain" (as furnished by the Builders Specialty Company, Inc.) to protect the floors from plaster stains, etc. When all work liable to stain floors has been completed the "Anti-Stain" shall be removed by scrubbing, using hot water or water and ammonia.

Waxing and Polishing—After the "Anti-Stain" has been removed the floors shall be waxed with "Colorstone Wax" as furnished by the Builders Specialty Company, Inc., Philadelphia, Pa. The "Colorstone Wax" shall be applied as thinly as possible, using a soft cloth, and the floors immediately polished with hair brushes by [hand] [machine]. The "Colorstone Wax" shall match the floor color.

Gray Metallic Hardener "Orthite" No. 10

For use on interior cement floors which are subjected to heavy traffic such as will be found in warehouses, factories and garages. A product (secured by pulverizing iron) which is mixed with neat cement and applied as a dust coat to the fresh concrete floor. It produces practically wearproof, dustproof, waterproof and oilproof surfaces. Being of a much harder and tougher nature than the aggregate, it produces a wearing surface which withstands the most severe usage. In our fifteen years' experience we have seen "Orthite" No. 10 floors subjected to the severest kinds of traffic without a single failure.

Specification for "Orthite" No. 10 Floors—*Monolithic Method*—The concrete shall be 1:2:4 mix, using clean, sharp, coarse sand and ⅛ to ¾-in. stone or pebbles and shall be poured between screeds to the finished floor level, carefully straightedged so that no hollows or voids remain. As soon as the surplus water has left the surface, a dust coat, consisting of one bag (100 lb.) "Orthite" No. 10 Gray Metallic Hardener as furnished by the Builders Specialty Company, Inc., Philadelphia, Pa., mixed thoroughly with one bag of portland cement, shall be evenly dusted over the surface of the floor, using this quantity for each 300 sq. ft. of surface. This dustcoat shall be thoroughly floated into the concrete and at the proper time finished off with two steel trowelings, the last troweling to finish the floor smooth and even and free from defects of every kind.

Curing—After 48 hours (not before) the floors are to be covered with 2 in. of non-staining sawdust or sand and kept wet for five days.

Topcoat Method—Install 1:2 mix topcoat and apply "Orthite" No. 10 Gray Metallic Hardener as for monolithic method.

"Orthite" Colored Metallic Hardener

For interior floors only. Has all the advantages of "Orthite" No. 10 and in addition provides the decorative feature of a permanent color. For heavy duty floors where color effect is desired, such as powerhouse, dairy, shop, office and toilet floors. Furnished in red, brown, green, blue, tan and black.

Specification—For either monolithic or topcoat method apply in same manner as "Orthite" No. 10. Finished surfaces shall be protected during construction by applying "Orthite" Anti-Stain and, just before occupancy, the floors shall be waxed with "Colorstone Wax" of matched color.

Liquid Hardener After Treatment "Orthite" No. 14

For hardening and dustproofing cement floors after installed. Floors showing wear and dusting can be hardened and dustproofed by applying "Orthite" No. 14. "Orthite" No. 14 is a colorless liquid compound which is flushed over the floor surfaces and allowed to dry into the pores of the concrete. It forms granite-hard insoluble crystals in the pores, reinforcing the wearing surfaces and practically furnishing the equivalent of a new floor.

No skilled labor is required to apply "Orthite" No. 14. It is recommended for use in practically every type of building where previously described "Orthite" products are not particularly adapted or desired.

Specification—*Note: All floors to be treated must be clean and dry.* All cement surfaces to be hardened shall be flushed with two or more coats of "Orthite" No. 14 Liquid Hardener After Treatment, as furnished by the Builders Specialty Company, Inc., Philadelphia, Pa. The liquid shall be evenly distributed over the surfaces with brooms, the preceding coat to be allowed to dry in before applying the next coat. Not less than one gallon of "Orthite" No. 14 shall be used for each 200 sq. ft. of surface each coat. A sufficient number of coats shall be applied in this manner to harden the surfaces to the entire satisfaction of the architect.

Integral Liquid Hardener "Orthite" No. 8

A colorless liquid which is added to the topcoat mix to harden the topping throughout and produce plain cement floors of exceptionally smooth finish. Makes the topping mix very fat and enables the cement finisher to put a polish on the floor with his trowel, without additional effort or time.

This type of floor is very popular for schools, institutions and similar locations requiring dense, smooth, hard, waterproof, sanitary floors which are easily scrubbed. The cost of "Orthite" No. 8 runs less than one cent per square foot of surface for a one-inch topping.

Specification—The topcoat shall consist of one part cement and two parts clean, sharp, coarse sand. For each bag of cement in the batch, one quart of "Orthite" No. 8 Integral Liquid Hardener, as furnished by the Builders Specialty Company, Inc., Philadelphia, Pa., shall be placed in the drum of the mixer immediately before the aggregates are placed therein. The mixer shall be allowed to revolve a full two minutes before discharging the batch. The topping coat shall be placed in the usual manner, floated thoroughly with wooden floats and at the proper time finished off with two steel trowelings to a smooth and even surface, free from defects of every kind. The floor shall be protected with non-staining sawdust or sand, kept wet for five days thereafter.

BUILDING CHEMICALS CORPORATION

"Chemicals for Building Construction"

51 East 42nd Street, NEW YORK, N. Y.

REPRESENTATIVES AND DEALERS IN PRINCIPAL CITIES

Products

BRIXOPE CONCENTRATED—a brick cleaning compound.

WATERPROOFINGS and DAMPPROOFINGS—integral and surface treatments.

BITUMINOUS COATINGS—for dampproofing and calking.

ACCELERATOR and ANTI-FREEZE COMPOUNDS.

FLOOR HARDENER and SPECIAL FLOOR TREATMENTS.

COLORLESS DAMPPROOFINGS—for face masonry.

DRY FLOOR and MORTAR COLORS.

BONDING COMPOUND.

PLASTER PRIMER.

WOOD PRESERVATIVE POWDER.

Also Technical Paints, Calking Compounds; Expansion Joint Cement and Floor Finishing Oil.

Complete Service—Advisory, Research and Contract

(1) Sales engineers and dealers, located at important points—prepared to advise the correct use and application of our materials.

(2) A laboratory—equipped to analyze unusual problems of concrete and masonry construction.

(3) A service organization—trained to supervise or contract for the application of B.C.C. Products.

Note: We service all jobs where our materials are used.

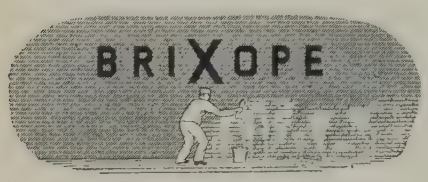
References

A list of installations, or of architects who approve or specify B.C.C. Products, will be furnished on request.

Catalogue

Our catalogue "Chemicals for Building Construction" contains complete information and detailed specifications. Your files should contain a copy of this booklet.

BriXope Concentrated

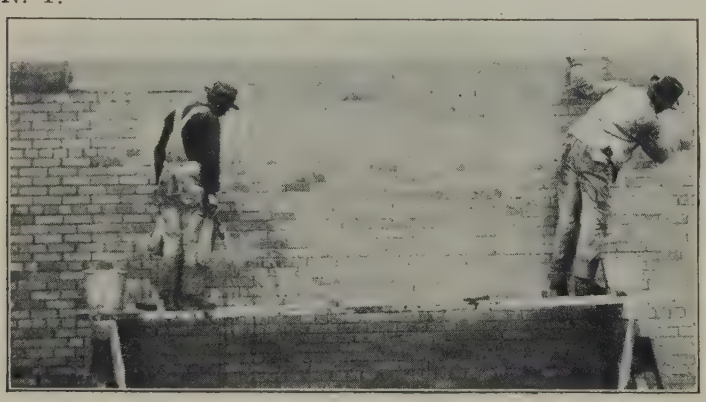


Removes Efflorescence, Cleans Any Ordinary Stain, Waterproofs the Surface

The ideal cleaner for brickwork. Removes efflorescence and gives greater resistance to moisture, without injury to the mortar joint. *All work is performed in one hanging of the scaffold.*

Estimated Cost—BriXope Concentrated does not raise the cost of cleaning a wall 10%. It is easy to apply, enhances the beauty of the wall and preserves the surface. The material cost is about 1¢ per sq. ft.

Specification—Clean down face brick and other masonry with BriXope Concentrated, scrubbing over and wetting each spot twice, in strict accordance with directions of the manufacturer, BUILDING CHEMICALS CORPORATION, New York, N. Y.



Cleaning a Brick Wall

The left side shows the finished surface

B.C.C. Integral Waterproofings (Liquid and Powdered)

For concrete below grade, cement finish and brick mortar. These chemicals are mixed with the gauging water or poured directly into the mixer. (The powdered form requires the addition of water, but goes into solution immediately.)

Result—a dense concrete or mortar, capable of resisting moisture. A lower cost and a lower freezing point due to acceleration of the set.

Estimated Cost—Liquid—$1.00 to $2.00 per cu. yd. of of concrete, labor and material; 1¢ to 1½¢ per sq. ft., labor and material, for cement finish; and $1.00 per thousand brick, labor and material. Powdered—30¢ to 40¢ per cu. yd. of concrete, labor and material; ½¢ per sq. ft., labor and material, for cement finish; and 35¢ per thousand brick, labor and material.

Specification—To all concrete below grade, cement finish and brick mortar, add B.C.C. Integral Waterproofing (specify Liquid or Powdered) in strict accordance with directions furnished by the manufacturer, BUILDING CHEMICALS CORPORATION, New York, N. Y.

B.C.C. Crystal Hardener

A chemical after-treatment for cement finish floors. It hardens the wearing surface, eliminates concrete dusting and protects the floor against disintegration.

Estimated Cost—1¢ to 3¢ per sq. ft., labor and material, depending on texture of the surface and the area to be treated.

Specification—All cement finish surfaces are to be treated with two applications of B.C.C. Crystal Hardener in accordance with directions of the manufacturer, BUILDING CHEMICALS CORPORATION, New York, N. Y.

B.C.C. Oil Waterproofing

A specially prepared waterproofing made up in oil, for mixing with brick mortar *during hot weather.* It prevents efflorescence and leakage.

Estimated Cost—$2.50 per thousand brick, labor and material.

Specification—Add to all brick mortar, B.C.C. Oil Waterproofing in accordance with directions of the manufacturer, BUILDING CHEMICALS CORPORATION, New York, N. Y.

B.C.C. Bituminous Coatings

Mastic (Fibrous Trowel Coating) and semi-mastic (asphalt and fibrous brush coatings, and asphalt paint). Also asphalt emulsions. Extensively used in all building construction for dampproofing, waterproofing and calking—above and below grade.

B.C.C. Colorless Dampproofings (Liquid and Powder)

Protects and preserves exterior concrete, stucco, artificial stone and light faced brick against moisture and dirt.

B.C.C. Accelerator—Anti-freeze (Solution and Powdered)

Speeds up the set of cement and prevents freezing of the mix at low temperatures.

B.C.C. Color Coatings

Furnished in natural, gray, brown, red and green.

Eliminate concrete dusting immediately and give to an otherwise cold-looking surface a warmth and color, rich and high in gloss.

B.C.C. Dry Floor Colors and Dry Mortar Colors

For coloring concrete or cement mortar by integral mixing.

B.C.C. Bonding Compound

For setting cement finish directly on stone or concrete arches. Also for bonding old floors to new.

B.C.C. Plaster Primer

The foundation for the decorative wall coat on important structures and expensive decorations. It hardens the plaster and prepares it for painting.

B.C.C. Wood Preservative Powder

An odorless crystalline chemical which destroys and prevents fungus growth and vermin.

HERMAN G. LOEW, President and Treasurer ORSON CORNMAN, Vice-President EDWARD P. CAFFALL, Secretary

CAFFALL-CORNMAN CORPORATION

Waterproofing and Dampproofing Engineers and Contractors
"Caffall's Scientific Process"

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225 Broadway
NEW YORK, N. Y.

Services

Waterproofing and Dampproofing Engineers and Contractors, specializing in "Caffall's Scientific Process" of Preserving, Waterproofing and Cleaning all kinds of buildings above grade.

"Caffall's Scientific Process" of Preservation

This process is the standard method of permanently preserving all masonry exposed to the weather, and is recognized as such by government, state and city authorities as well as by the scientists.

The process consists in applying a special preparation of paraffin and chemicals to the exterior walls of marble, granite, brick, terra cotta, stucco, and masonry of all kinds, either old or new. All stone is porous. Moisture penetrates it, especially when accompanied by strong winds. In communities where there is much smoke from factories, etc., carbon soot settles upon the surface and is carried into the pores by the rain. The union of this soot and moisture gives a sulphuric acid solution which quickly causes stone to crumble. Lime salts and frost also cause quick disintegration and are very damaging, especially when moisture is present.

The compound employed in this process is invisible, insoluble and imperishable. It penetrates the material to which it is applied to a depth of ¼ in. or more, depending upon the porosity of the stone, but it is possible to impregnate a brick through its entire thickness. It completely fills all pores or voids, forming an impenetrable barrier to water or moisture and preventing all disintegration.

The preservative used is unaffected by acid and alkali solutions, gases and moisture, and is highly resistent to oxidation. One treatment will last as long as the surface to which it is applied.

"Caffall's Scientific Process" is not an experiment. It has stood the test of time and has an enviable record for durability. Structures treated with it over 50 years ago are still waterproof and in good condition.

Many public buildings of historic interest, as well as churches, monuments, commercial buildings and many private residences have been successfully treated by this process, some of which are:

The Obelisk in Central Park, New York, N. Y.
Fraunces Tavern, Broad Street, New York, N. Y.
The new American Wing of the Metropolitan Museum, New York, N. Y.
Trinity Church, New York, N. Y.
Alexander Hamilton Monument, New York, N. Y.
Christ Church Cathedral, Hartford, Conn.
Buckingham Memorial Fountain, Chicago, Ill.
Residence, I. N. P. Stokes, Greenwich, Conn.
Residence, Carll Tucker, Mt. Kisco, N. Y.
Hotchkiss School, Lakeville, Conn.
Residence, Mrs. Morgan-Hamilton, Sterlington, N. Y.
Hotel Savoy-Plaza, New York, N. Y.

Important Waterproofing Suggestions

There are certain vulnerable parts of the gable walls of buildings, which, if protected against the weather, will go far to insure a dry building. These are the parapet walls. If the average wall is examined, it will be found that the top of the parapet wall is the first part of the masonry to show signs of disintegration and wasting away of mortar joints. If the following specifications are used, the penetration of dampness will be eliminated. North and east exposures are always subject to dampness, but the commencement of the trouble is generally at the top of the building.

Specification Suggestions as Alternate Bid

When "Caffall's Scientific Process" is specified, the furring of walls is unnecessary from the standpoint of weather penetration, and no other form of waterproofing is required. This, with our guarantee, assures the architect and owner of a dry building over a long period of years.

Suggestion No. 1—All exterior walls above grade shall be treated with "Caffall's Scientific Process" for preserving and waterproofing, as applied by Caffall-Cornman Corporation, 225 Broadway, New York, N. Y.

Suggestion No. 2—Brickwork of penthouses, bulkheads, side, rear and fire walls topped with stone, tile or terra cotta from roof flashline over and including the coping, down to the lintel level of the top story windows shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by Caffall-Cornman Corporation, 225 Broadway, New York, N. Y.

Suggestion No. 3—Brick or stone work of chimneys above roof flashing shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by Caffall-Cornman Corporation, 225 Broadway, New York, N. Y.

Guaranteed Results

We guarantee that the masonry (stonework, brick or terra cotta) treated by us with "Caffall's Scientific Process" will not discolor, disintegrate, chip, break, crumble or allow the penetration of moisture or water for a period of twenty (20) years from date of treatment; or should any of the aforesaid defects occur during that period, we will treat same where necessary without charge.

References

New York, N. Y.

H. deB. Parsons, Consulting Engineer
Cass Gilbert, Architect
Grosvenor Atterbury, Architect
Walker & Gillette, Architects
Bowen Bancroft Smith, Architect
I. N. Phelps Stokes, Architect
Geo. B. Post & Sons, Architects
Alfred Busselle, Architect
Richard C. Hollyday & Co., Inc., Real Estate
Julius Gregory, Architect
McKim, Mead & White, Architects
C. P. Jennewein, Sculptor
Geo. A. Fuller Co., Building Construction

Other Cities

Bennett, Parsons & Frost, Architects, Chicago, Ill.
Whiton & McMahon, Architects, Hartford, Conn.
Brown & Von Beren, Architects, New Haven, Conn.
Hacker & Hacker, Architects, Fort Lee, N. J.
John P. Koch, Architect, Rocky Mount, N. C.

THE PHILIP CAREY COMPANY

Manufacturers of Waterproofing and Dampproofing Materials

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

CAREY PERCOPROOF COATING.
CAREY PERCOPROOF PLASTER BOND.
CAREY PLASTIC WATERPROOFING COMPOUND.
CAREY WATERPROOFING PRIMER.
CAREY WATERPROOFING FELTS.
CAREY WATERPROOFING ASBESTOS FELTS.
CAREY WATERPROOFING FABRICS.
CAREY WATERPROOFING ASPHALTS.

Also Carey Fabricated Membrane; Carey Preformed Membrane System of Waterproofing.

For Built-up Roofing, see pages A440-447.

For Asbestos-Cement Shingles, Roofing, Siding and Wall Board, see pages A472-473.

For Pipe Covering, Boiler Insulation and Refractory Cements, see pages C3222-3223.

Carey PRODUCTS
TRADE-MARK
Registered

Applying Carey Percoproof Coating to the Outside of Foundation Walls

Experience and Facilities

Established in 1873, THE PHILIP CAREY COMPANY has enjoyed over a half century of continuous growth. Our Waterproofing Engineers are at your command. Complete information, specifications and estimates gladly furnished on request.

Carey Percoproof Coating

A black, liquid, bituminous material which is applied in a cold state, similar to paint, using a long handled brush. This material provides an impermeable dampproofing coat on the outside of foundation walls. The first coat penetrates the cracks and pores of the concrete, brick or stone, even to a depth of several inches.

A second coat fills these pores and adds a film approximately $\frac{1}{64}$ in. thick, building up a dampproofing barrier that will withstand the average conditions of ground moisture encountered around the foundation walls of residences or structures built 8 to 10 ft. below ground level.

Carey Percoproof Coating will dry to a tacky state but will not become brittle, flake or peel, and will respond to expansion or contraction of concrete, brick or stone structures. Covering capacity averages 100 sq. ft. per gallon. Comes ready for use, packed in containers from gallon cans to 50 gallon barrels.

Carey Percoproof Plaster Bond

Applied directly over rough hollow tile or brick upon which the plaster is to be applied without the use of furring or lathing. A thin, black, liquid, asphaltic compound, like thin paint, which penetrates and waterproofs the walls. Applied in single coat in order to keep the original rough surface of the wall so that the plaster will bond satisfactorily to same. Forms a barrier to infiltration (percolation) of dampness and prevents hideous plaster stains and loosening of the plaster wall. Also used on outside of masonry walls prior to stuccoing. Comes ready for use and is applied without heat or the addition of any further solvents.

Carey Plastic Waterproofing Compound

A thick, plastic, asbestos waterproofing cement like putty, applied cold with a trowel to foundation walls for uses similar to Percoproof Coating, except that it will stand moderate hydrostatic (water) pressures of 1 to 10 ft.

Consists of tough waterproofing cements, selected solvents, and asbestos rock fibre. The result being a plastic, fibrous cement that will form a tough, flexible waterproof membrane within 24 to 48 hours.

It is unaffected by the acids and alkalies in ground water. It is permanent, dependable and simple to apply in a cold state using an ordinary trowel. Responds to moderate expansion and contraction without injuring the coating, and will adhere to any rough, smooth, wet, dry, cold or warm surface.

Comes ready for use, packed in 10 to 500-lb. containers.

Carey Waterproofing Primer

Carey Waterproofing Primer is a pure asphalt primer manufactured from natural asphaltic petroleums and well selected solvents. It is a standard product, manufactured to meet the specifications of the American Society for Testing Materials for a primer to use with asphalt in dampproofing and waterproofing below and above ground or water level. It comes ready for use, packed in 3 gallon cans to 50 gallon barrels.

Carey Waterproofing Asbestos Felts

These felts are especially applicable to waterproofing floors in chemical plants and mill construction on account of their acid, alkali and fire resisting qualities.

Made of pure asbestos rock fibre and impregnated with a specially prepared asphalt that makes the felts waterproof, flexible and tough. They contain nothing that will deteriorate or decay.

Carey Waterproofing Fabrics

These materials are made from 100% pure cotton fabrics thoroughly saturated with a flexible asphaltic compound so as to insure an extremely high tensile strength with a reasonable percentage of stretch. They are applicable in waterproof membranes for railroad bridges and other structures where expansion and contraction or vibration are excessive.

Carey Waterproofing Felts

These materials are high grade asphalt saturated rag felts.

A waterproof membrane built up of waterproofing

Continued on next page

felts according to our specification forms a flexible, economical permanent application.

Carey Dampproofing Specification "B"

For Dampproofing the Interior Surfaces of Outside Masonry Walls, Prior to Plastering

(1) Work Included—This specification contemplates furnishing all materials and labor required to properly apply Carey Percoproof Plaster Bond to the interior of all outside brick or masonry walls above ground level, prior to plastering.

(2) Work Not Included—This specification does not include pointing up masonry or plastering and cementing of any kind. All cracks and holes shall be carefully filled with portland cement mortar, prior to applying Carey Percoproof Plaster Bond. Twenty-four hours after applying Carey Percoproof Plaster Bond the plaster may be applied.

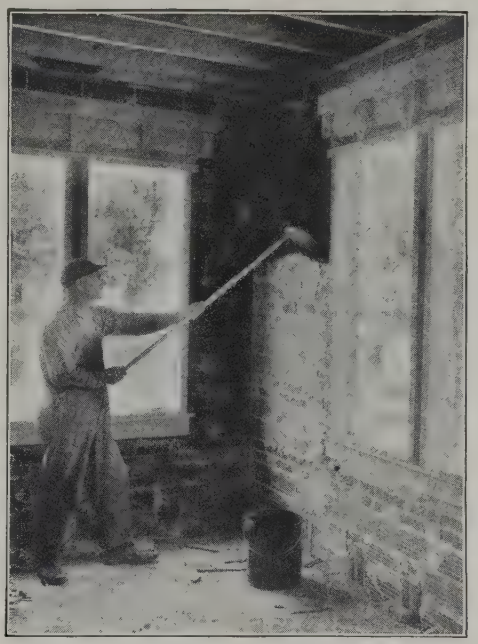
(3) Materials—1 coat Carey Percoproof Plaster Bond, 1½ gals. per 100 sq. ft.

(4) Application—After all cracks and holes have been filled carefully with portland cement mortar and the wall is perfectly dry and free from any foreign matter that would interfere with the penetration or bonding qualities of the dampproofing coat, Carey Percoproof Plaster Bond shall be applied uniformly, with a good bristle brush, to the interior of outside masonry walls from grade level to roof.

In cases where the Carey Percoproof Plaster Bond can not be applied to the walls continuously through the floor construction, it shall be applied back on the ceiling for at least 12 in. from the wall.

Carey Percoproof Plaster Bond shall be applied behind window casings and to all cut-outs and recesses in the wall.

A second coat of about 1 gal. per 100 sq. ft. shall be applied to all very absorbent portions of the wall only.



Applying Carey Percoproof Plaster Bond Prior to Plastering

Carey Dampproofing Specification "C"

For Dampproofing the Outside of Foundation Walls, Concrete Bridges, Abutments, Culverts, Retaining Walls and Other Structures Below Ground Level

(1) Work Included—This specification contemplates furnishing all materials and labor required to properly apply Carey Percoproof Coating to the outside of all foundation walls below ground level.

(2) Work Not Included—This specification does not include pointing up masonry or cementing of any kind. All cracks and holes should be carefully filled with portland cement mortar, and the surface shall be thoroughly cleaned and shall also be smooth and sufficiently dry to obtain good adhesion prior to applying Percoproof Coating. Drain tile may be laid around the footings.

(3) Materials—1 coat Carey Percoproof Coating 1½ gal. per 100 sq. ft.; a second coat Carey Percoproof Coating 1 gal. per 100 sq. ft.

(4) Application—After all cracks and holes have been filled carefully with portland cement mortar, and the foundation wall is perfectly dry and free from any foreign matter that would interfere with the penetration or bonding qualities of the dampproofing coat, Carey Percoproof Coating shall be applied uniformly with a good bristle brush or spraying machine to the outside of foundation walls from footings to ground level.

Not less than twenty-four hours after applying the first coat of Carey Percoproof Coating a second coat shall be applied.

Carey Dampproofing Specification "D"

For Dampproofing the Outside of Foundation Walls, Earth Filled Bridges, Abutments, Culverts, Retaining Walls, and Other Structures Below Ground or Water Level

Work Included—This specification contemplates furnishing all materials and labor to properly apply the dampproofing coat to all outside surfaces below ground or water level.

Work Not Included—For this specification the excavation should be made at least 2 ft. beyond the foundation wall line, to permit a man working room for application of the dampproofing coat to the outside of the foundation walls.

Pointing up masonry or cementing of any kind is not included. All cracks, holes and voids should be carefully filled with portland cement mortar and the surface shall be thoroughly cleaned and shall also be smooth and sufficiently dry to obtain good adhesion prior to applying the primer and asphalt.

Earth backfilling may be started twenty-four hours after the last coat.

Drain tile may be laid around the footings.

Materials—(a) 1 coat Carey Waterproofing Primer—(1½ gal.) 14 lb. per 100 sq. ft.

(b) 1 coat Carey Dampproofing Asphalt No. 113—(6 gal.) 54 lb. per 100 sq. ft.

Application—After all cracks, holes and voids have been filled carefully with portland cement mortar, and the wall is perfectly dry and free from any foreign matter that would interfere with the penetration or bonding qualities of the primer, the Carey Waterproofing Primer shall be applied uniformly with a good bristle brush, using at least 1½ gal. for each one hundred square feet.

When the primer has dried to a slightly tacky state it is ready for the asphalt coat.

Carey Dampproofing Asphalt, No. 113, shall be heated to about 250° F. to 300° F. in a kettle. From there it shall be transferred to large buckets and mopped on the primed surface using a minimum of (6 gal.) 54 lb. for every 100 sq. ft.

Carey Specification No. 31

For Waterproofing Outside Foundation Walls Below Ground Level and on Underbed of Basement Floor

(1) Work Included—This specification contemplates furnishing all materials and labor to properly apply Carey Waterproofing Compound to the foundation walls below ground level and underbed of basement floor.

(2) Work Not Included—For this specification the excavation should be made at least 2 ft. beyond the foundation wall line, to permit a man working room for application of the waterproofing compound to the outside of the foundation walls.

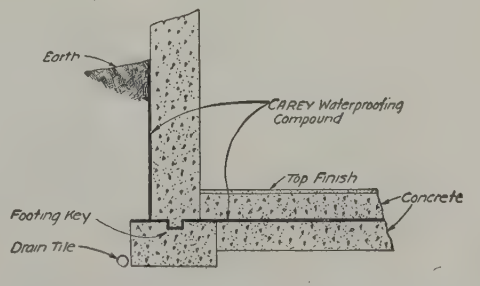
Pointing up masonry or cementing of any kind is not included. The foundation walls, whether masonry or concrete, should be placed immediately on the fresh waterproofing compound applied to the footings. The waterproofing compound on the foundation walls shall be permitted to dry for 48 hours before back filling with earth, and then back filling should be done very carefully in order not to injure the membrane. The underbed of the basement floor shall be made by the cement contractor and shall consist of 1 in. thick concrete well tamped and leveled off.

(3) Materials—Carey Waterproofing Compound ⅛ in. thick on foundation walls—approximately 80 lb. per 100 sq. ft. Carey Waterproofing Compound ¼ in. thick on underbed of basement floor and footings—approximately 160 lb. per 100 sq. ft.

(4) Application—***Footings***—Carey Waterproofing Compound shall be smoothly troweled ¼ in. thick on all footings.

Foundation Walls—A smooth trowel coating of Carey Waterproofing Compound shall be applied to the outside of all foundation walls below ground level. This coating shall be approximately ⅛ in. thick and at no place shall the wall appear uncovered.

Basement Floor—In waterproofing the basement floor Carey Waterproofing Compound shall be applied ¼ in. thick to the underbed. It shall be troweled over small areas and the concrete for the finished floor applied immediately by cement contractor, so that no hauling or tramping is done in waterproofing compound.



Cross Section Showing Application of Carey Waterproof Compound. Specification No. 31

Continued on next page

Carey Waterproofing Specification No. 32

For General Waterproofing

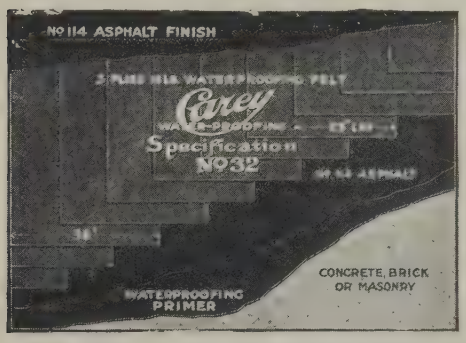
(1) Work Included—This specification contemplates furnishing all materials and labor to properly apply the built-up waterproof membrane to (state here surfaces to be waterproofed) below ground or water level.

(2) Work Not Included—This specification does not include pointing up the concrete, brick, stone, tile, masonry or cementing of any kind. All cracks, holes and voids shall be carefully filled with portland cement mortar. The surface shall be thoroughly clean and shall also be smooth and sufficiently dry to obtain good adhesion prior to applying the Primer.

(3) Materials—Carey Waterproofing Primer (1 gal.) 9 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 50 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft. Total approximate weight per 100 sq. ft. to be 179 lbs.

(4) Application—Carey Waterproofing Primer shall be applied uniformly and thoroughly brushed in. When the primer has dried to a slight tacky state the surface shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded the first sheet of Carey Waterproofing Felt. The successive sheets of felt shall overlap the previous sheet 25 in., making eight courses of asphalt and felt, including the primer. All the sheets of felt shall be solidly cemented together with asphalt so that at no place shall felt touch felt.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of 15-lb. Carey Waterproofing Felt cut to extend at least 6 in. each way from the angle. Two such sheets shall be applied—one immediately after applying the primer, and another after the membrane is completed.



Carey Waterproofing Applied to Outside Walls and Underbed. Specification No. 32

Application of Carey Membrane System of Waterproofing Specification No. 34

Application of Carey Membrane System of Waterproofing Specification No. 35

Carey Waterproofing Specification No. 33

For Waterproofing Floors in Mill Construction, Alkali, Acid and Fire Resistant

(1) Work Included—This specification contemplates furnishing all materials and labor to properly apply the built-up waterproof membrane to the wood floors in mill construction.

(2) Work Not Included—All knotholes and open cracks shall be tightly sealed. The floor shall be made free from splinters and nails before applying the waterproofing. Over the membrane shall be laid a second flooring and the flashings on the walls shall be covered with baseboards.

(3) Materials—Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 35-lb. Waterproofing Asbestos Felt, 35 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 15-lb. Waterproofing Asbestos Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 15-lb. Waterproofing Asbestos Felt, 15 lbs. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.

(4) Application—The clean dry base floors shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded sheets of 35-lb. Carey Waterproofing Asbestos Felt lapped 2 in. Over this shall be applied 2 plies 15-lb. Carey Waterproofing Asbestos Felt overlapping one another 19 in. and also embedded in hot asphalt No. 114.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of 35-lb. Carey Waterproofing Asbestos Felt cut to extend at least 6 in. each way from the angle. Two such sheets shall be applied—one prior to applying the first sheet, another after the membrane is completed. A finishing coat of Carey Waterproofing Asphalt No. 114 shall be applied over the entire membrane.

Carey Waterproofing Specification No. 34

(1) Work Included—This specification contemplates furnishing all materials and labor to properly apply the built-up waterproof membrane to (state here the surfaces to be waterproofed) below ground level.

(2) Work Not Included—Proper excavation or other provision must be made to permit working room for applying the membrane.

Pointing up masonry or cementing of any kind is not included. All cracks, holes and voids should be carefully filled with portland cement mortar, and the surface shall be cleaned and shall also be smooth and dry prior to applying the waterproof membrane. A cement mortar or brick protection shall be placed over the waterproofing for best results.

(3) Materials—Materials used in the construction of the waterproofing shall be as follows:

Carey Waterproofing Primer (1 gal.), 9 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 50 lbs. per 100 sq. ft.; Carey Fabricated Membrane, 40 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Fabricated Membrane, 40 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft. Total approximate weight per 100 sq. ft. to be 189 lb.

(4) Application—Carey Waterproofing Primer shall be applied uniformly and thoroughly brushed in. When the primer has dried to a slight tacky state the surface shall be mopped with Carey Waterproofing Asphalt, No. 114, into which, while still hot, shall be embedded the first sheet of Carey Fabricated Membrane. The second sheet of Fabricated Membrane shall overlap the previous sheet 19 in., making six courses of asphalt and Fabricated Membrane including the primer. Both sheets of Fabricated Membrane shall be solidly cemented together with asphalt, so that no place shall membrane touch membrane.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt, No. 114, applied hot, into which shall be embedded one thickness of Carey Fabricated Membrane cut to extend at least 6 in. each way from the angle. Two sheets shall be applied. One immediately after applying the primer and another after the membrane is completed.

Carey Waterproofing Specification No. 35

For Waterproofing Bridges and Structures Where Expansion and Contraction Are Excessive

(1) Work Included—Use paragraph 1 Specification No. 32.

(2) Work Not Included—Use paragraph 2 Specification No. 32.

(3) Materials—Carey Waterproofing Primer (1 gal.), 9 lb. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 50 lb. per 100 sq. ft.; Carey Heavy Waterproofing Fabric, 11 lb. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lb. per 100 sq. ft.; Carey Heavy Waterproofing Fabric, 11 lb. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lb. per 100 sq. ft.

(4) Application—Carey Waterproofing Primer shall be applied uniformly and thoroughly brushed in. When the primer has dried to a slight tacky state the surface shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded the first sheet of Carey Heavy Waterproofing Fabric.

The second sheet of Carey Waterproofing Fabric shall overlap the previous sheet 19 in. and also be embedded in hot asphalt No. 114 so that at no place shall fabric touch fabric.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of Carey Waterproofing Fabric cut to extend at least 6 in. each way from the angles. Two such sheets shall be applied—one immediately after applying the primer and another after the membrane is completed. A finishing coat of Carey Waterproofing Asphalt No. 114 shall be applied over the entire membrane.

CELITE PRODUCTS COMPANY

Manufacturers and Distributers of Insulating Materials and a Workability Agent for Concrete

11 Broadway
NEW YORK, N. Y.

225 East Superior Street
CHICAGO, ILL.

1320 South Hope Street
LOS ANGELES, CAL.

OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

CELITE PRODUCTS LIMITED, New Birks Building, Montreal, Que.
CELITE PRODUCTS CORP., 147 Windsor House, Victoria Street, Westminster, London, England

Products

CELITE, a Workability Agent for Concrete.
SIL-O-CEL HIGH TEMPERATURE INSULATING MATERIALS.
Also Filter-Cel and Super-Cel Aids to Filtration.

Celite

Celite is a dry powder composed of extremely fine particles of amorphous silica. Added to a concrete mixture with the other dry materials it stabilizes the mass, holding the portland cement, water, sand and coarse aggregate in the same relation to each other throughout handling and placing as when they left the mixing drum.

Improved Workability—The first benefit of Celite in a concrete mixture is improved workability. It obviates the use of excess mixing water and makes it possible to successfully place concrete of drier consistencies in mass structures or in intricate forms, without danger of honeycombing or segregation.

What Improved Workability Means—(1) It results in quicker and cleaner discharge.

(2) The concrete can be placed with less labor and manipulation.

(3) The concrete will flow into place in the forms around intricate reinforcing, completely filling all corners and recesses.

(4) Relatively dry concrete can be satisfactorily handled by chutes without the need for excess water.

(5) In cases where central mixing is employed no segregation will be encountered in transit from the mixer to the job, and difficulties in dumping from trucks will be eliminated.

Uniformity and Strength—Segregation is the principal cause of non-uniformity in a concrete structure. It can be absolutely overcome through the correct use of Celite, so that the minimum strength (which is in fact the effective crushing strength of the concrete) is greatly increased.

A higher average strength also is made possible since concrete containing Celite can be placed with a lower slump, ordinarily, than would otherwise be used.

Water-tightness—Celite provides integral water-tightness in concrete in which it is used—a result of improved uniformity and decreased void sizes.

Amount of Celite Necessary—The quantity of Celite which should be used to secure best results varies with the mix. Harsh aggregates may require a slight increase over the amounts specified. In any case, however, the amount of Celite constitutes only a very small proportion of the entire mixture.

AMOUNT OF CELITE RECOMMENDED

Concrete mix	Economic limits per bag of cement	Average recommendations per bag of cement
1 : 1½ : 3	1½–3 lb. Celite	2 lb. Celite
1 : 2½ : 3½	2 –4 lb. Celite	3 lb. Celite
1 : 2 : 4	2 –4 lb. Celite	3 lb. Celite
1 : 2½ : 5	3 –6 lb. Celite	4 lb. Celite
1 : 3 : 6	4 –8 lb. Celite	5 lb. Celite

Increased Yield—The cost of Celite in many cases is repaid alone by the increased yield of finished concrete in place. In a 1:2:4 mix, for example, the use of 3 lb. of Celite per bag of portland cement ordinarily results in an increase in the yield of finished concrete of approximately 5 per cent.

1:2:3½ Concrete Containing 3 lb. of Celite per Bag of Cement
Slump 3 in. Note extreme workability and freedom from segregation

Method of Use—No changes of equipment or in methods of mixing or placing concrete are involved in the use of Celite. This powdered material is simply added with the other dry ingredients at the mixer. The mix is handled in the usual manner. No more water is added to a concrete mix containing Celite than is necessary to give an equal or lesser slump than would be secured with plain concrete.

Standard Specifications—Celite shall be used in all concrete in the proportions set forth below for the different concrete mixtures.
... : ... : ... concrete ... lb. per bag of cement
... : ... : ... concrete ... lb. per bag of cement.
The Celite may be measured by a pre-determined volume in such a manner as will insure the correct proportion by weight, and shall be added at the mixer with the dry materials.

Only sufficient water shall be used to give a workable consistency and in no case shall more water be added than will give a slump of ... in.

Sil-O-Cel Insulating Materials

For the insulation of all types of boilers and auxiliary heating and power plant equipment, Sil-O-Cel is provided in the form of brick, block, powder, plastic and hard finish cements and coarse aggregate (C-3) for making insulating concrete.

Building walls, partitions and roofs are ordinarily insulated and sound deadened with a filling of Sil-O-Cel Coarse Grade Powder.

Sil-O-Cel Standard Insulating Brick—Recommended for insulating service behind the refractory or over steel surfaces where direct temperatures will not exceed 1600° F.

Sil-O-Cel C-22 Insulating Brick—These brick are free from shrinkage at direct temperatures as high as 2000° F.

Sil-O-Cel Super Brick—Semi-refractory, withstand direct temperatures up to 2500° F. without shrinkage or deterioration.

Mortar for Laying Sil-O-Cel Brick—This is included with each shipment. The brick are well packed in cartons of 25 for convenience in storage and handling.

Insulating Powder and Coarse Grade Insulation—Used as an insulating filler in hollow walls and over the tops of heated equipment.

C-3 Aggregate—A coarsely ground calcined material used as an insulating filler in hollow walls or bases where temperatures behind the refractory run as high as 2000° F. Weight in place, 31 lb. per cu. ft. Four parts of C-3 mixed with one part by volume of portland cement make an insulating concrete of great durability, which weighs when dried, only 60 lb. per cu. ft.

Insulating Cements—"Plastic" and "Hard Finish," made with Sil-O-Cel, are provided for covering irregular surfaces where insulating brick could not be conveniently used.

Insulating Blocks—Made of Sil-O-Cel and long fibered asbestos, are supplied in 6 and 12-in. widths, lengths of 18 and 36 in., and thicknesses of 1, 1½, 2, 3 and 4 in.

Celite Engineering Service

Celite Engineering Service is freely available at every office of the Company to co-operate toward the solution of any problems relative to the proportioning and placing of concrete, or the insulation of buildings or heated equipment.

CERESIT WATERPROOFING CORPORATION

Waterproofings, Dampproofings, Floor Hardeners, Protective Coatings

512-514 South Canal Street
CHICAGO, ILL.

Products

CERESIT WATERPROOFING COMPOUND.
CERESIT WATERPROOFING POWDER.
CRESOLAC TRANSPARENT WATERPROOFING.
CERESIT METALLIC HARDENER.
INDURITE LIQUID HARDENER.
CRAXEMENT CONCRETE REPAIR COMPOUND.
CRESCRETE ACCELERATOR and FROSTPROOFING.
CEROX COLORED CEMENT.
CERETONE CEMENT COLORING PIGMENT.
CEM-BRIC WATERPROOF PAINT.
CERESIT ASPHALTIC DAMPPROOFING.
CERESIT ASPHALTIC PLASTER BOND.

Service

Advisory engineering service available on waterproofing or concrete surfacing problems.

Literature

Bulletins describing materials and containing complete data sent on request.

Ceresit Waterproofing Compound

(a) An integral waterproofing in paste form.
(b) To be added to portland cement mixtures at the time of mixing.
(c) Its use increases workability.
(d) Reduces labor costs in placing.
(e) Permits reduction in water content without loss in plasticity.
(f) Densifies and permanently waterproofs concrete, cement stucco and cement plaster.

Requirements—For mass concrete, use 8 lb. per cu. yd. For portland cement plaster, use 2 to 3 lb. to each sack of cement. For portland cement stucco use 2 to 3 lb. to each sack of cement.

Standard Specification—All concrete [cement plaster] [cement stucco] shall be waterproofed by the addition of Ceresit Waterproofing Compound, an integral waterproofing, manufactured by CERESIT WATERPROOFING CORPORATION, Chicago, which shall be used in accordance with the manufacturer's directions.

Ceresit Waterproofing Powder

An integral waterproofing in powder form. Added to concrete at the time of mixing. This material performs the same function as Ceresit Waterproofing Compound.

Requirements—Use 2 to 3 lb. to each sack of cement. Mix dry with cement before adding water or aggregates to batch.

Cresolac Transparent Waterproofing

A transparent liquid applied with a brush or spray to concrete, brick or other masonry for protection against penetration of water or moisture. This material penetrates the surface pores and makes the treated surface water repellent. It does not affect or change the original color. It is particularly effective on concrete block or tile.

Covering Capacity—Two coats required. 1 gal. covers 200 sq. ft., 2-coat work.

Crescrete Accelerator and Frostproofing

For accelerating the set of portland cement and protection against freezing at low temperatures. Also of value as an integral hardener and waterproofing agent.

Ceresit Metallic Hardener

A finely ground and graded metallic compound for incorporation in the top of wearing course of concrete floors. This material is particularly well adapted for heavy duty floors, producing a surface which is dustless and extremely dense and hard. It is furnished in gray or red.

Requirements—25 to 35 lb. to each 100 sq. ft., depending on traffic conditions.

Indurite Liquid Hardener

A colorless liquid for application to concrete floor surfaces. This material greatly increases hardness, and eliminates dusting. The treatment is made in two applications.

Requirements—1 gal. will treat 100 sq. ft.

Craxement Concrete Repair Compound

A special quick-setting repair cement for permanently repairing cracks, holes, breaks and worn spots in concrete floors. It bonds securely to old concrete and produces a hard, dense surface of high strength and wearing quality.

Cerox Colored Cement

A colored waterproof portland cement for use wherever colored concrete surfaces are required. Used in the same manner as standard portland cement. Made in a variety of colors. Eliminates measuring and mixing of colors and cement on the job.

Ceretone Cement Coloring Pigment

Ceretone densifies, hardens, waterproofs and colors cement mixtures. Its greatest use is for colored cement floors. It provides an attractive floor surface which is durable both as to service and permanence of color.

Ceretone colors are red, brown, buff, green and black.

It is shipped in 20 and 100-lb. containers.

Cem-Bric Waterproofing Paint

A specially prepared paint for use on concrete, brick and masonry surfaces. Dries to dense and hard surface.

Ceresit Asphaltic Dampproofing

A heavy asphaltic paint for application on foundations of concrete, brick, or other masonry, below grade, to protect against dampness or surface water. It is also used for a primer and cement coat for membrane waterproofing.

Covering Capacity—For 1-coat work, 1 gal. will cover 60 to 70 sq. ft. For 2-coat work, 1 gal. will cover 40 to 50 sq. ft.

Ceresit Asphaltic Plaster Bond

A heavy asphaltic compound for application to the inside surfaces of outer or exposed walls on which plaster is to be applied. This material prevents injury to the plaster from dampness.

Covering Capacity—For 1-coat work, 1 gal. will cover 60 to 70 sq. ft. For 2-coat work, 1 gal. will cover 40 to 50 sq. ft.

CONTRACT WATERPROOFING CO.

INCORPORATED

Waterproofing Engineers and Contractors

1956-57 Railway Exchange Building

ST. LOUIS, MO.

BRANCH OFFICES

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Services

We are ENGINEERS and CONTRACTORS for the perfect WATERPROOFING, OILPROOFING, FROSTPROOFING or FUMEPROOFING of any structure of concrete, brick, tile or stone.

Ferro-Tite Method

Ferro-Tite, the iron method of waterproofing, is used in the performance of all of our contracts.

The surfaces are first thoroughly prepared, after which sufficient coats of Ferro-Tite are applied to secure the desired results.

The first coat penetrates the concrete and, on oxidation, expands and perfectly seals all pores of the concrete.

The succeeding coats form a solid sheet of oxidized iron on the surface. After these coats have thoroughly set, slush coats of sand and cement containing Ferro-Tite are applied, which restores the surface to the color of ordinary concrete.

Plaster may be applied directly to this surface, or it may be painted over.

Specifications

Walls—The following surfaces.....shall be waterproofed by the application of Ferro-Tite, the iron method of waterproofing as applied by the CONTRACT WATERPROOFING CO.

Floors—All floors resting on earth shall be waterproofed by the application of Ferro-Tite, the iron method of waterproofing as applied by the CONTRACT WATERPROOFING CO.

This contractor shall apply his material to the top of the rough slabs for these floors, after which others shall at once apply the finish topping.

USE FERRO-TITE METHOD

Guarantee

We will guarantee any surfaces waterproofed by us to be waterproof and dampproof for a period of ten years, subject to causes beyond our control, such as fractures in walls, etc.

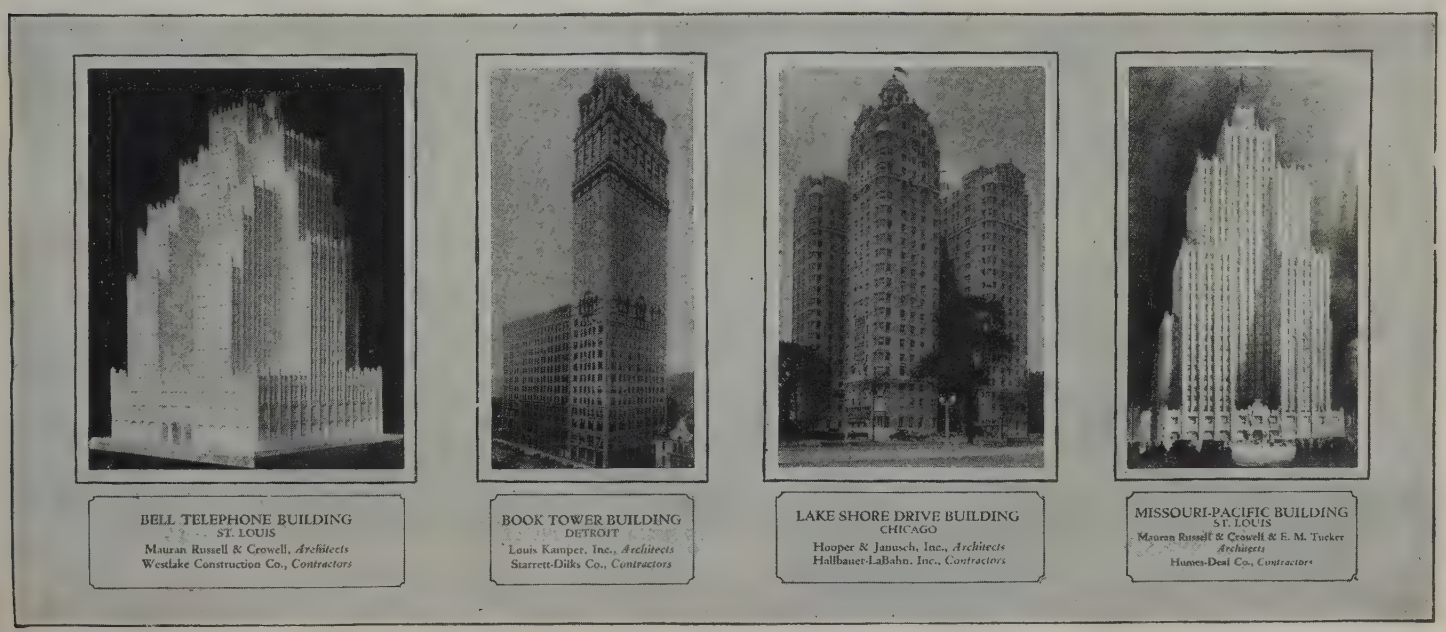
Resistance to Hydrostatic Pressure

Although we prefer to, and usually do, apply Ferro-Tite to the inner surfaces of exterior walls, etc., it will withstand any pressure of water that the walls can withstand. This is also the case where Ferro-Tite is applied to the outside of exterior walls.

Engineers, Architects and Contractors

Write for our handbook on structural waterproofing, which contains valuable information, suggestions and hundreds of references from the foremost architects, engineers and contractors in the country.

Our reputation as waterproofers is based on accomplishment.



BELL TELEPHONE BUILDING
ST. LOUIS
Mauran Russell & Crowell, *Architects*
Westlake Construction Co., *Contractors*

BOOK TOWER BUILDING
DETROIT
Louis Kamper, Inc., *Architects*
Starrett-Dilks Co., *Contractors*

LAKE SHORE DRIVE BUILDING
CHICAGO
Hooper & Janusch, Inc., *Architects*
Hallbauer-LaBahn, Inc., *Contractors*

MISSOURI-PACIFIC BUILDING
ST. LOUIS
Mauran Russell & Crowell & E. M. Tucker *Architects*
Hunes-Deal Co., *Contractors*

CONCRETE SURFACE CORPORATION

"Surfacing Concrete for Bond or Appearance"

342 Madison Avenue
NEW YORK, N. Y.

FACTORY AT CLEVELAND, OHIO
REPRESENTATIVES IN PRINCIPAL CITIES

What Con-Tex Does

Con-Tex, in its several forms and usages, makes concrete a new and better medium for construction and for architectural expression. Through the agency of Con-Tex, concrete becomes more than a material of structural utility alone and lends itself to manifold new uses, to better uses and with new advantages in economy.

LICENSED UNDER PRODUCT AND PROCESS PATENT RIGHTS OF NATHAN C. JOHNSON, IN U.S.A. AND ABROAD

How Con-Tex Acts

Con-Tex is applied to concrete either by brushing it on forms before concrete is cast and allowing it to dry, or by brushing or spraying it on the fresh surface of concrete, as in top surface work.

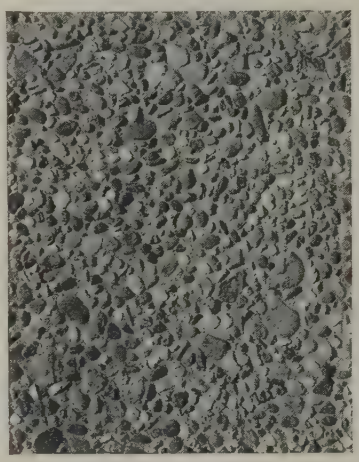
During the hardening of the concrete, this Con-Tex keeps the surface layer of cement and sand from setting, so that this surface layer may be easily removed by wire brushing when the body concrete has hardened.

Con-Tex neutralizes and stops the setting action of a surface film of cement only. The action stops entirely at the predetermined depth and there is no partially set material.

This unset material when brushed or washed off leaves a surface of cleanly exposed stone and sand.

Con-Tex has no action on concrete that has already hardened.

The labor cost of using Con-Tex, both for applying Con-Tex and for brushing away the unset material, should not exceed ⅝¢ per sq. ft. at the highest. The material cost of Con-Tex depends on the quantity purchased, but should not exceed 2¾¢ per sq. ft., without job overhead or profit.



A Typical Con-Texed Surface on Cast Concrete

Types of Con-Tex

There are three types of Con-Tex and the following different strengths:

(1) Form Con-Tex, a liquid, varnishlike material—applied to wood, metal or other forms. This is manufactured in four grades or strengths—light, medium, heavy and bonding. All grades dry quickly and when dry are quite impervious to weather.

(2) Top Surface Con-Tex, a creamy liquid—applied directly to the surface of freshly placed concrete. This is also manufactured in four grades—light, medium, heavy and bonding. This is used for preparing the surfaces of underslabs to receive topping; for ornamental work on plaza areas, roadways, sidewalks, etc.

(3) Stucco Con-Tex—a creamy liquid. Applied to the surface of freshly troweled stucco to reveal the aggregate and to prevent cracking of the stucco. It also exerts a strongly curative effect on the stucco. Dries slowly and is not impervious to weather. Furnished in one strength only, except for special requirements.

Con-Tex Fabric

A preshrunk, impregnated fabric, fastened to the inside surfaces of forms. Must be stretched tightly and fastened securely with staples or nails and tin washers every 4 in., or with our special fasteners. Can be used on wood forms only. Regular fabric produces shallow, checkerboard indentations in the concrete, but does not remove form skin or laitance. These impressed indentations furnish a mechanical bond only and do not reveal sand or stone.

The material cost of regular Con-Tex Fabric is about the same as for the liquid

Entrance Detail, Meridian Hill Park Enclosure Wall, Washington, D. C.

District Park Department, Designing Architects, Washington, D. C.
Horace W. Peaslee, Consulting Architect, Washington, D. C.
Fred Drew Company, Constructors, Washington, D. C.

Continued on next page

Con-Tex Surfaced Gateway and Fence, Estate of Maynard D. Smith, Port Huron, Mich.
Leslie G. Larkin, Architect, Detroit, Mich.
Note the effect secured by using Con-Tex

Con-Tex. The labor cost of using Con-Tex Fabric is indeterminate, depending on the nature of the operation and the skill and care of the users.

Special Con-Tex Fabrics can be supplied which will produce the full revealed stone, just as Con-Tex produces it, but the ordinary fabric is designed to produce a mechanical lock only.

Use of Con-Tex to Secure Architectural Textures on Cast Concrete Surfaces

Architectural textures, varied by the selection of aggregates, are easily produced on concrete poured in forms by coating the forms with Form Con-Tex before the concrete is placed.

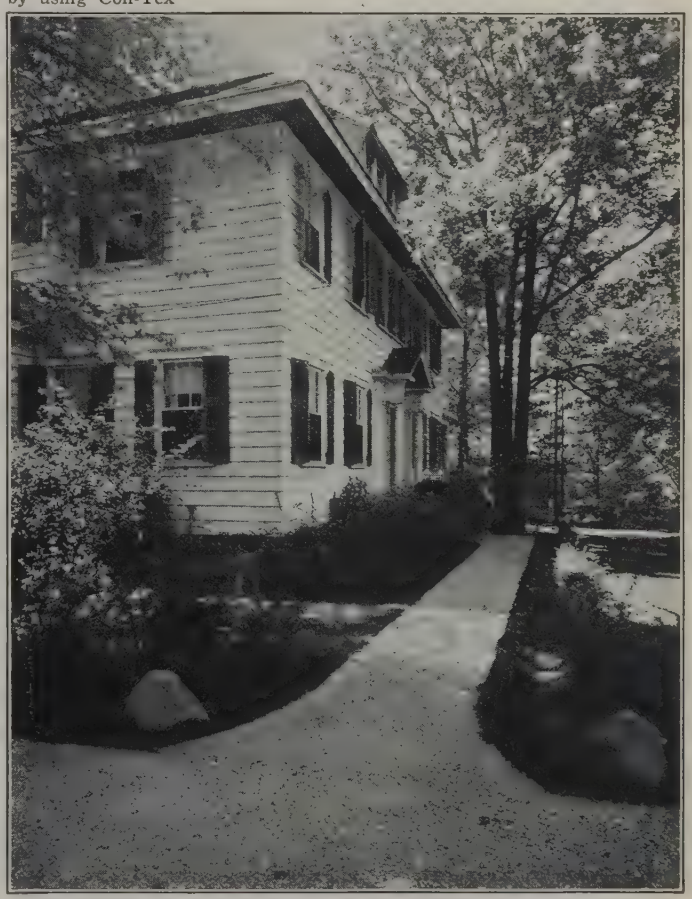
A certain care must be exercised in selecting aggregates for such work, and in placing the concrete. Naturally, fine aggregates produce a more even texture, while coarse aggregates give a more rugged relief. The use of Form Con-Tex removes from the concrete surfaces all trace of the usual dull, uninteresting, flat "form skin" and reveals the colorful aggregates, producing a surface texture of architectural character and permanence.

Send for our Bulletin No. 1, which illustrates and describes the use of Con-Tex to produce architectural textures on form cast concrete.

Con-Tex for Architectural Textures on Plazas, Areas, Driveways, Sidewalks, and other Horizontal Areas

Architectural textures, non-slip surfaces, etc., are easily obtained on horizontal planes by the use of Top Surface Con-Tex, which is sprayed on after the concrete has been finished to a level.

Further information, specifications, etc., may be obtained by writing for our Bulletins Nos. 1 and 4.



Con-Tex Surfaced Driveway and Walk, Residence of Nathan C. Johnson, Englewood, N. J.

Continued on next page

Con-Tex Bonding Surfaces on Concrete

"All cementitious materials will unfailingly bond to clean sand and clean stone." Success in bonding is easy, once this fact is known and recognized, for right beneath the "form skin" of concrete are clean sand and clean stone in quantity, and it only remains to uncover this perfect bonding surface.

Acid washing, thorough hacking of the surfaces, bush hammering and power tooling of various kinds have long been attempted methods of securing a bond surface but usually prove either unpleasant, slow or costly, or have all three disadvantages.

Con-Tex, supplied either to the surfaces of the forms before the concrete is poured, or sprayed on after the slab is placed but not set, provides a method both economical and efficient for all classes of concrete.

When concrete is thus treated with Con-Tex certain "active" elements are slowly fed from the Con-Tex into the surface film of concrete and stop the "set" of a thin surface layer of the concrete. This action is so controlled that it obtains to a definite and predetermined depth and no further. Con-Tex has no effect on hardened concrete.

Forms are removed as usual when the mass of concrete has hardened. Then the thin surface film of unset concrete produced through the action of Con-Tex is brushed off with wire brushes, thus exposing or "revealing" the aggregates ordinarily hidden beneath the "form skin." In top surface work the unset film is broomed away with wire brooms.

It is this revealed aggregate surface that constitutes the bonding surface which unites so perfectly with new cement, mortar, plaster or other materials of similar character in a secure and permanent bond of full strength.

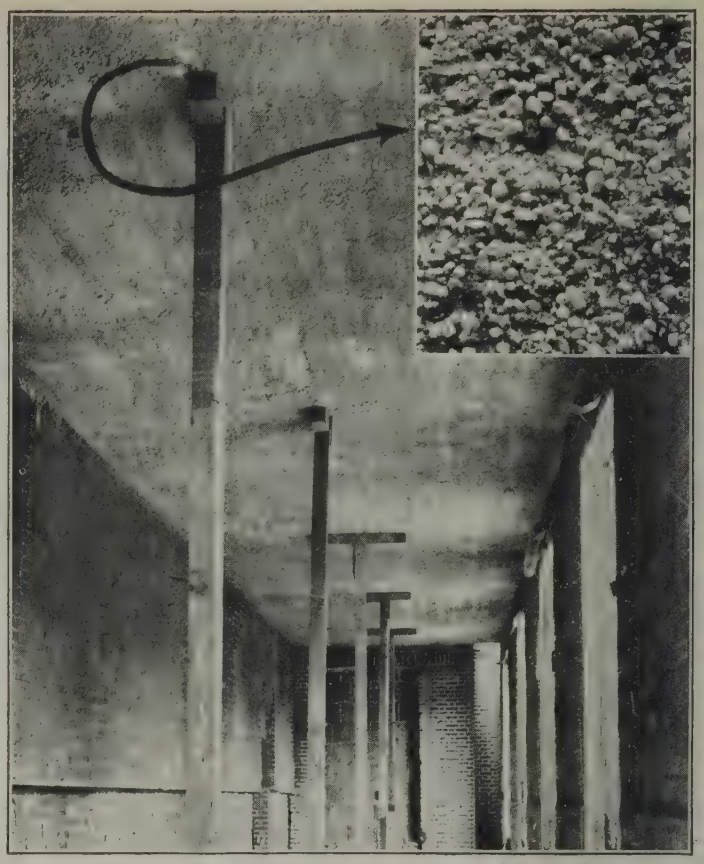
This Con-Tex "Interlok Bond" surface provides a sure method for bonding together the various sections of monolithic work, for bonding tile, brick, etc., to vertical walls, bonding stucco to a concrete base, and for bonding the floor finish to the rough slab.

The whole process is simple, economical and sure. Many millions of square feet of concrete surfaces are treated in this way each year and the demand for Con-Tex is constantly increasing.

Send for our Bulletin No. 2 for further details regarding the use of Con-Tex to produce bonding surfaces.

Plaster Bond Surfaces on Concrete

Plastered ceilings—with many thousands of pounds suspended overhead—must be made assuredly secure. With Form Con-Tex Bonding Grade specified, ceilings and walls have a clean stone bond surface which automatically assures lasting satisfaction because of the true union of the exposed stone surfaces of the concrete with the plaster finishes applied thereafter.



Garden City High School, Garden City, L. I.
Permanent plaster bond on Con-Texed concrete
Starrett & Van Vleck, Architects

Floor and Other Top Bond Surfaces

Top Surface Con-Tex is sprayed or brushed on after the rough slab has been screeded and before the concrete takes its initial set. After the body of the concrete has set, the loosened surface layer is removed by wire brooms. Bonding the top surface to the slab beneath makes sure a permanent, satisfactory floor and credit may be obtained in most codes for the topping as an integral and permanent part of the slab.

The Bonding Con-Tex "Interlok Bond" Surface—Natural Size—1:2:4 Concrete with Trap Rock
A husky, "sure-fire" bond surface with both mechanical and chemical bond

Continued on next page

Permanently Beautiful Stucco Effects Secured Through the Use of Con-Tex

Concrete is structurally excellent, but stucco over concrete, to be permanently satisfactory must be so thoroughly bonded to a concrete surface as to become an integral part of the concrete. To secure this bond it is absolutely essential that the stucco be allowed to bond (as it will, unfailingly and permanently) to a clean sand and clean stone surface such as is produced by the use of Con-Tex. By this proven method of construction the stucco becomes as permanent as the concrete itself.

Unless such a bond is obtained between the stucco and the concrete, early loosening will result, followed sooner or later by the scaling and peeling of the stucco. But by means of Bonding Con-Tex a full-area bonding surface of clean sand and clean stone is obtained. To this rough, clean-stone Con-Texed surface stucco will bond in a firm and lasting union—so strong that even hammer blows, repeated to the point where the stucco and the concrete beneath are *pulverized,* will not loosen one material from the other.

Write for our Bulletin No. 5.

Revealing Color and Texture in Stucco by Stucco Con-Tex

The possibilities of stucco finishes over concrete, once a bond is furnished by Bonding Con-Tex, are limited only by creative and artistic ability, for another variety—Stucco Con-Tex—comes forward at this point to play its part.

Stucco Con-Tex is sprayed or brushed on the stucco after screeding and floating, to remove an exceedingly thin layer, just sufficient to give a slight reveal to the aggregates which have been incorporated in the stucco.

In this way stucco can have a permanent color, without resort to mortar colors for the sole effect, although mortar colors may be used where desired, and a texture as well.

Revealed stucco over Con-Tex bond-surfaced concrete provides permanent, colorful and architecturally beautiful construction. Our Bulletin No. 5 furnishes further information.

Southampton Beach Club Swimming Pool, Southampton, L. I., N. Y.

Peabody, Wilson & Brown, Architects

Other Specific Applications of Con-Tex Bonding Surfaces on Concrete

Brick Veneer and Tile—Con-Tex produces so satisfactory a bond that brick veneer can be bonded to concrete without the use of metal ties.

Tile, when set against or laid on a Con-Texed surface, are permanently locked to the base.

Concrete Steps—Bonding the top surface to the rough cast concrete through the use of Con-Tex eliminates cracking off and peeling away of the finish coat from the structural concrete.

Swimming Pools—When sides and floors of swimming pools are treated with Con-Tex, a sure bond for the tile or mortar or stucco sidewalls and floors results. This has become standard for pool construction.

Pouring Planes to Pouring Planes—Disintegration of concrete at and near pouring planes in such structures as dams, reservoirs, tanks, swimming pools, bridges and every other kind and class of structure, causes serious trouble. Con-Texed surfaces produce non-leaking, permanently tight joints which are both chemically and mechanically an integral part of the mass.

Applying Stucco Coat Over Concrete, Bond Surfaced by Con-Tex, on One of the 42 All-concrete Buildings of the Rockland County Hospital at Orangeburg, N. Y.

Department of Public Works, Albany, N. Y., Architects and Designers Niewenhous Company, Inc., N. Y., Builders and General Contractors
James Conroy & Sons, N. Y., Plastering Contractors

Note Con-Tex being applied to stucco to produce revealed color and texture in the stucco; and detail of bond surface on the body concrete inserted at lower left

THE ELATERITE PAINT & MANUFACTURING CO.

Waterproofing and Bonding Materials

DES MOINES, IOWA

EASTERN DISTRIBUTERS

ELATERITE PRODUCTS CORPORATION

NEW YORK, N. Y., 22 East 17th Street—Telephone, Algonquin 9084 BOSTON, MASS., Room 819, 6 Beacon Street—Telephone, Haymarket 3346

PACIFIC COAST DISTRIBUTERS

LOS ANGELES, CAL., Borland-Dorsey Waterproofing Co., 8048 West Third Street—Telephone, Oregon 7407

AGENCIES IN ALL PRINCIPAL CITIES OF THE UNITED STATES

Products

No. 60, Des Moines Elaterite for Waterproofing and Bonding; No 65, Des Moines Elaterite for Stone Backing.

Also manufacturers of Preservative Paints for all classes of surfaces, including Acid and Heat Resisting Paint; and Metal Protective Paint.

DES MOINES ELATERITE

TRADE-MARK

No. 60, Waterproofing and Bonding

No. 60, Des Moines Elaterite, is both a waterproofing and a bonding material. Its base is an intensely adhesive, extremely elastic, non-porous, acid resisting, absolutely waterproof hydro-carbon known as "mineral rubber." It seals the pores of concrete, cement, brick, tile or stone, destroys capillary attraction and provides a continuous film which completely shuts out dampness. In addition, its intensely adhesive quality makes it an ideal bonding material, permitting the direct application to it of plaster or stucco coats.

Applying Plaster Coat Directly to "Des Moines Elaterite" Waterproofing and Bonding Coat

Uses—For waterproofing all brick, stone, concrete and cement surfaces and as an integral waterproofing to be mixed in concrete or cement mortars, plaster, floor and roof toppings and stucco, and for bonding plaster, stucco, tile, linoleums, etc.

Advantages—Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room and saving in labor and material costs. It meets every waterproofing requirement, thus there is no need to specify a different material for outside foundations, inside walls, basement floors or bonding or integral waterproofing.

Application—Applied cold, it spreads rapidly with broad flat brushes or may be applied with an air gun or spray. No hot swabbing or layers of felt required and any workman can apply it.

Covering Capacity—100 to 150 sq. ft. (one coat) per gal. or from 80 to 100 sq. ft. (two coats) on cement, brick or stone, depending on porosity; 250 to 300 sq. ft. on wood or metal.

Specifications—*(a) For Waterproofing Substructures*—The waterproofing contractor shall apply a waterproof membrane of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, to the outside of all foundation walls to a point 6 in. above grade, including piers, and to be carried over all footings and properly joined to waterproofing course on outside walls. Membrane to consist of 2 coats properly applied so there shall be no pinholes or uncovered spaces. At least 24 hours must elapse after the application of first coat before applying a heavy second coat, allowing it to dry thoroughly before covering. Walls shall be cleaned thoroughly to remove all loose particles, must be dry and, if of concrete, thoroughly set before applying No. 60, Waterproofing and Bonding, Des Moines Elaterite.

(b) For Dampproofing Interior Walls Which Are to Be Plastered, or for Waterproofing Exterior Walls Which Are to Be Stuccoed—The contractor is to apply 2 coats of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, over the inside surface of all exterior walls which are to be plastered, and outside surface of all walls which are to be stuccoed. The walls are to be clean and dry and the application to be so made that there shall be no pinholes or uncovered spaces. At least 24 hours must elapse between the application of the first and second coat, which is to be a heavy coat.

Plaster is to be applied directly over the coating of No. 60, Des Moines Elaterite, after the second coat is "set" but while it is still "tacky," though not sooner than 3 hours after the second application, nor longer thereafter than 10 days. Stucco is to be applied directly over the coating of No. 60, Des Moines Elaterite, while it is "tacky," but not sooner than three hours after application of the second coat nor longer thereafter than 10 hours.

The waterproofing and bonding coats may be applied with air gun or spray, if contractor prefers.

(c) For Integral Waterproofing Use—All mortar to be made waterproof must have No. 60, Waterproofing and Bonding, Des Moines Elaterite, as manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, incorporated integrally, proportioned either with the water used for tempering or with the quantity of portland cement used in the batch in the following manner:

If proportioned with the water used for tempering it should be 1 to 8—1 part No. 60, Des Moines Elaterite, to 8 parts water.

If proportioned with the portland cement it should be 1 gal. No. 60, Des Moines Elaterite, to each 1⅔ bags of portland cement used.

The No. 60, Des Moines Elaterite, is to be added to the mixture in the foregoing proportions after the water has been put in for tempering, and the mixing is then to be continued until there is complete and thorough distribution throughout the mixture. It must not be added to the water before the latter has been put in for tempering the mixture.

This specification covers mortars for laying up brick or rubble stone; for stucco; plaster for coating the inside of cellar and other walls; for cement floor and roof toppings; for cement slabs to be spread over cinder fill in roof construction; for concrete not subject to heavy water pressure.

For integral mixture in waterproofing concrete which is subject to heavy water pressure, the proportion should be changed to 1 part No. 60, Des Moines Elaterite, to 4 parts water used—1 gal. No. 60 to each 4 gal. of water. The No. 60 to be added after the water has been stirred into the mixture and the stirring continued until there is complete distribution.

No. 65 Stone Backing

Specification—All stone to be coated, before setting, on the five unexposed sides; also entire inner surface, including joints, to be coated after the stone is set with No. 65, Stone Backing, Des Moines Elaterite, as manufactured by The Elaterite Paint & Manufacturing Co. of Des Moines, Iowa.

Protecting Stone Facing from Discoloration with "Des Moines Elaterite"

Prices and References

These will be gladly sent on request.

EUCLID CHEMICAL CO.

Manufacturers of Concrete Floor Hardeners and Waterproofings

CLEVELAND, OHIO

Products

Euco Iron Waterproofing.
Euco Concrete Floor Bond.
Euco Floor Hardener Crystals.
Also Integral Hardeners; Waterproofings; Colors; Anti-Freeze Compounds; Window Caulking Compounds; Floor Enamels.

Engineering Service

Our Engineering Department is at your service. They will be glad to study your problems in connection with cement or masonry construction and recommend the best methods for waterproofing, hardening, bonding or other treatment of cement and masonry.

Euco Iron Waterproofing

Description

Euco Iron Waterproofing is a heavy powder, chemically prepared, one of the principal ingredients of which is finely divided metallic iron. It is applied in a mixture of cement grout to the interior or exterior. While the grout or cement is setting the iron oxidizes, forming a binder which hermetically seals all pores and forms an effective barrier against water.

Advantages

Positively seals the surface of masonry and concrete walls against pressure.

Easily applied by any handy building laborer.

Applicable to either old or new jobs.

Inexpensive, 20 lbs. will cover 100 sq. ft. of surface with 3 coats.

Directions for Use

Clean the walls with a stiff brush to remove all loose particles.

Wet the surface before the waterproofing coat is applied.

Mix dry 2 qts. of Euco Iron Waterproofing with 1 qt. of Portland cement in a 2-gal. bucket and add water until the mixture has the consistency of heavy paint. Keep well stirred so that the iron, which is heavier than cement, does not settle to the bottom.

Apply with a brush, giving three coats, allowing time for each coat to dry.

Continue to apply over moist portions until leaking is completely stopped.

"Bleed" the wall, if flow is very heavy, by chiseling a small hole and inserting pipe. Apply waterproofing around pipe. After waterproofing is hardened remove pipe and plug hole with blue clay or yellow ochre mixed with Euco Iron Waterproofing.

Leaks around doors may be stopped by removing frame and waterproofing surface against which frame rests.

Euco Concrete Floor Bond

Description

Euco Concrete Floor Bond is a finely pulverized metallic substance chemically treated, which, when applied to concrete slabs prior to laying the topping, effectively and permanently bonds the topping to the slab and forms a bond stronger than the concrete itself.

It is a time-tried and time-tested product that has been used with unfailing success. Its trifling cost makes its use profitable on all jobs.

Advantages

Eliminates for all time the risk of toppings coming loose as it bonds the slab and topping together with a lasting mechanical key.

Topping and slab are made into one unit that has the same co-efficient expansion so that it is unaffected by temperature changes.

Inexpensive, 5 lbs. will bond 100 sq. ft. of floor surface at a cost of a fraction of a cent per square foot.

Directions for Use

The floor slab should be thoroughly cleaned with a wire brush or broom. If surface is extremely smooth, roughen slab.

Remove all loose particles, dust, etc.

Where surface is oil soaked, greasy, etc., wash the slab with one part muriatic acid and 5 parts of water.

Twelve hours before applying floor topping, soak the slab with water. When the water is absorbed, apply bond coat as follows:

Mix 1 measure of Portland cement and 2 measures Euco Concrete Floor Bond, into a 5-gal. bucket. This should be mixed thoroughly (dry), then add sufficient water and stir until this mixture becomes the consistency of a heavy paint.

Apply with whitewash brush or broom, thoroughly brushing this slush coat into the surface and immediately follow with the floor topping, laid in the usual manner.

Euco Floor Hardener Crystals

Description

It is a well-known and definite fact that Magnesium Fluosilicate is the hardening agent in practically all liquid surface floor hardeners. Euco Magnesium Fluosilicate Crystals have won a widespread reputation in surface hardening operations on concrete floors based on their convenience, economy and uniformly good results. Instead of buying trade named hardening solutions that carry a large element of advertising expense and a still larger profit let us furnish you with Euco Magnesium Fluosilicate in dry (crystal) form.

After careful investigation, the Associated General Contractors of America conferred its "Seal of Successful Performance" on Euco Crystals based upon recommendations from members who had used them and were unanimously favorable in their reports.

Directions for Use

Euco Crystals of Magnesium Fluosilicate are furnished in barrels of 325 lbs., half barrels of 200 lbs., kegs of 125 lbs., pails of 40 lbs.

Mix them in the proportion of 2½ lbs. to 1 gal. of water. One gallon treats 100 sq. ft. with three coats.

Euco Crystals will keep indefinitely without deterioration.

GENFIRE STEEL COMPANY

(THE GENERAL FIREPROOFING BUILDING PRODUCTS)

Waterproofing and Dampproofing Products and Technical Paints

YOUNGSTOWN, OHIO

For Branch Offices, see page B1694

Products

WATERPROOFINGS, Integral and Membrane; DAMPPROOFINGS, above and below grade; ROOFINGS, built-up membrane and plastic; CEMENT ACCELERATORS and FROST PREVENTIVES; FLOOR HARDENERS and PRESERVATIVES for cement or wood, integral, plain and colored, and after-treatments; STEEL and IRON PAINTS; ACIDPROOFINGS; BONDING COMPOUND; TIMBER PRESERVATIVE; OILPROOFING.

For Windows, see page A1175; for Metal Lath, Steel Joists and other Metal Building Specialties, see pages B1694-1695.

Waterproofings, Integral

GF 10 Waterproofing Paste—An ammonium stearate paste used in the gauging water for densifying and waterproofing all kinds of concrete and cement work.

GF 11 Waterproofing Powder—Especially suitable for cast stone, cement blocks, and other similar work where a minimum of water is used.

GF 12 Cement Accelerator—A colorless liquid to be mixed with the gauging water. It accelerates the set of cement so that in 2 days the work is as hard, throughout, as ordinary work in 30 days. It raises the temperature of the mass and lowers the freezing point of water, so that it becomes a frost preventive, thereby eliminating the necessity of heating water, aggregates or finished work. It densifies the mass and makes cement work waterproof.

GF 14 Ironcote—A finely ground iron powder chemically treated to form a waterproofing for walls and floors subjected to hydrostatic pressure.

Waterproofings, Membrane

GF 17 Bitumen—A high grade pure bitumen to be melted and used hot, with either GF 18 Waterproof Felt or GF 21 Saturated Fabric.

GF 18 Waterproof Felt—A strong, bitumen-saturated felt, made of all rag stock weighing 15 pounds per 100 square feet, single-ply. Each fiber is impregnated with bitumen.

GF 21 Saturated Fabric—A cotton duck fabric, saturated with GF 17 Bitumen. For use in deep foundations or on bridges and floors subject to vibration and stresses.

Dampproofings

GF 16 Brush Coating—A pure bitumen paint, applied cold as a brush coating to the exterior faces of walls below grade, and on concrete underbed below wood floors.

GF 250 Mastic Cement—A heavy plastic coating, applied cold with a trowel for the same uses as GF 16. Can be applied to damp surfaces. Also made in colors for caulking.

GF 251—A special form of GF 250 made in light and dark gray of a heavy consistency to be used by hand for caulking.

GF 100 Transparent Waterproofing—For waterproofing exposed exteriors of brick, stone, stucco or concrete. Prevents staining, discoloring and efflorescence.

GF 101 Brick and Cement Coating—Made in various colors for the same uses, under the same conditions, as GF 100. It is unaffected by the alkalis and lime of cement and will not crack or peel.

GF 102 Cement Paint—A dry cement paint powder to be mixed with cold water. Made in a variety of colors.

GF 200 Dampproof Coating—A bitumen paint to be applied to interior surfaces of exposed walls above grade.

GF 220 Stainproof Backing—A bitumen paint to be applied cold to the built-in parts of all cut stone, to prevent staining and discoloration.

Floor Hardening and Preserving

GF 12 Accelerator—Described under Waterproofings. Also made in colors to make an integrally colored cement floor equal in appearance and durability to tile.

GF 12 Colored Wax—Made in the same colors as GF 12 colored, for application to colored cement floors to give a gloss finish and to rectify patchiness of the surface.

GF 140 Metallic Hardener—Pure iron particles properly graded and specially treated to become temporarily nonabsorbent for troweling on to the surface of cement floors at the time of laying.

GF 141 Oilproofing—A finely ground pure iron powder for mixing with cement and sand.

GF 145 Crystalrox—To be dissolved in water and applied to exposed cut stone, or cement work, to harden the surface and prevent stains.

GF 155 Floor Enamel—A colorless or colored cement floor paint to hide or cover any stains or discolorations of the surface, being unaffected by the alkalis of cement.

GF 160 Wood Floor Preservative—A highly wear resistant transparent oil filler and finish combined, for either hard or soft wood floors, that is unaffected by water, oils, alkalis, etc. Prevents dry rot, shrinkage and splintering. Gives an eggshell gloss finish, that can be varnished, waxed or polished.

Roofings

GF 17, 18, and 21 Membrane—Described under Waterproofings.

GF 250 Plastic and Mastic Cement—Described under Dampproofings.

GF 250 Colored—A trowel coating, for the same purpose as GF 250 Mastic Cement, made in brown, red, gray, buff and green.

GF 253 Brush Coating—A brush coating containing asbestos fiber and of a similar nature to GF 250 Mastic Cement, to be used cold, for recoating and repairing all kinds of built-up membrane roofings.

Coatings for Structural Steel, Iron and Timber

GF 300 Steel Coating—A shop coating for structural steel.

GF 325 Alkali Coating—A bitumen paint to be used on structural steel embedded in masonry or exposed to the weather.

GF 350 Galvanic Primer—A transparent coating that penetrates the greasy film left by the galvanizing process, bonds to the iron and forms a bond for any ordinary linseed oil paint.

GF 550 Timber Preservative—For application to structural timbers to be embedded in earth or masonry, or exposed to the elements. Prevents dry rot and disintegration from heat, cold, dampness, oils, insects and fungi.

GF 160 Wood Preservative—Described under Floor Hardening.

Acidproofings

GF 99 Acidproofing—Renders surface immune to the action of acetic acid, alcohol, alkalis, ammonia, blood, caustic soda 50%, disinfectants, ensilage, garbage, hydrochloric acid 25%, lactic acid, live steam, malic acid, molasses, muriatic acid, oxalic acid, picric acid 25%, septic fluids, sewage, smoke, sodium chloride, sugar, tannic acid, wine.

GF 17 Bitumen—Applied hot to protect against alum, ammonia, hydrofluoric acid, hydrochloric acid, mineral acids and dilutes, nitric acids, picric acid, sulphuric acid.

GF 145 Crystalrox—Protects concrete and cement work against creosote, lactic acid, malic acid, molasses, sugar.

GF 220 Bitumen Paint—Applied cold with brush to protect against acetic acid, mineral acids and dilutes, cyanides.

Bonding Concrete

GF 140 Bonding Compound—A powerful acid powder applied to any concrete or cement surface to afford a monolithic bond for new work. Develops a bonding strength of 80 pounds per square inch.

Service and Handbooks

The Waterproofing Handbook covers all ordinary problems in waterproofing, dampproofing and preservation of different parts of building construction. We also maintain a Waterproofing Service Department at Youngstown, Ohio, whose advice and assistance are supplied without cost or obligation.

THE HYDROLITHIC WATERPROOFING CO., INC.

Engineers and Contractors for Waterproofing

725 Grant Building
PITTSBURGH, PA.

TELEPHONE, ATLANTIC 1890, 1891

EASTERN REPRESENTATIVE: TAYLOR-HYDROLITHIC CO., 95 Liberty Street, New York, N. Y.—Telephone, Bowling Green 3295

Services

We are ENGINEERS and SPECIALISTS for WATERPROOFING, making a specialty of Cement Coat Waterproofing.

Registered HYDROLITHIC TRADE-MARK

We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, boiler rooms, elevator pits, etc.; guaranteeing a positive and permanent waterproofing for all kinds of masonry construction.

Our Engineering Department is always at the service of architects, contractors, or others.

Advantages

The advantages of our Hydrolithic System over the old membrane method or integral waterproofing are many, as follows: it is permanent; it is cheaper, no extra supporting walls are required; no additional floor finish is necessary; ease and economy with which repairs can be applied without delaying the other building trades; it can be applied as readily to old buildings as to new; it forms a good wearing surface on the floor and an attractive wall finish; it is not affected by heat and can be used in boiler rooms and other places where the heat would destroy pitch and felt waterproofing.

Thirty Years without a Failure

All work is executed in the well-known Winslow's Hydrolithic System which was invented by E. J. Winslow more than 30 years ago. It is the original plaster coat method and, although its wonderful success has inspired a host of imitators, it is still easily the leader in its field. During the thirty years it has been in use, we have not had a failure.

Application

Hydrolithic is applied as a cement plaster coat to the inside of exterior walls and top of floors. Wall coatings are 5/8 in. and floor coatings 1 in. thick, all surfaces being thoroughly chipped and cleaned before application. Due to the special qualities of Hydrolithic and the expert care with which it is applied, a perfect bond is secured. Hundreds of successful installations are in existence all over the country where Hydrolithic has for many years remained absolutely dry, although subjected, in some cases, to very high hydrostatic pressure.

Specifications

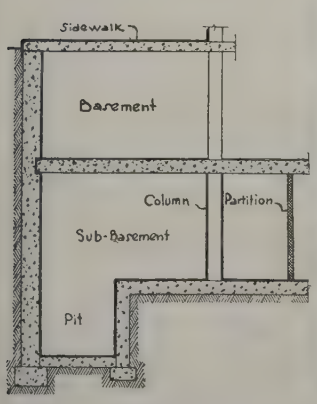
The interior surface of all exterior walls to a height of .... feet above the finished basement floor and the upper surface of the concrete floor slab of the entire basement [sub-basement] as well as all trenches, pits and machinery foundations shown on the plans, shall be waterproofed with Winslow's Hydrolithic Cement Coatings, applied by THE HYDROLITHIC WATERPROOFING CO., INC. All surfaces, before waterproof coating is applied, shall be thoroughly chipped and cleaned. Wall coating shall be 5/8 in. thick, applied in 2 coats, thoroughly floated and troweled to a smooth and even finish, free from imperfection. Floor work shall be 1 in. thick and serve the double purpose of a waterproofing agent and a wearing surface. Floor coating shall be floated and finished as described for wall coating.

Guarantee—THE HYDROLITHIC WATERPROOFING CO., INC., shall furnish a written guarantee covering their work for a period of three years. During this time they shall, at their own expense, promptly repair any leaks which may develop; providing such leaks are not due to structural changes in the building or to external damage to the waterproofing for which they are not responsible.

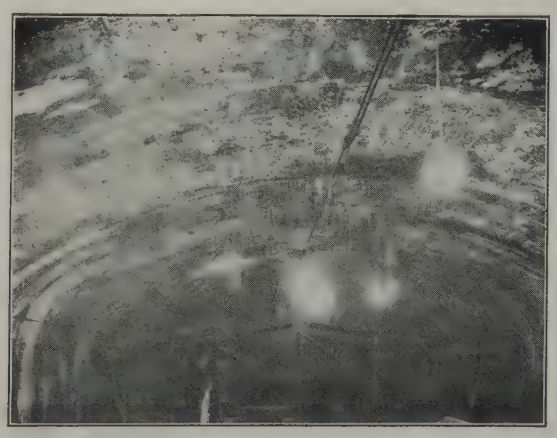
Representative Contracts

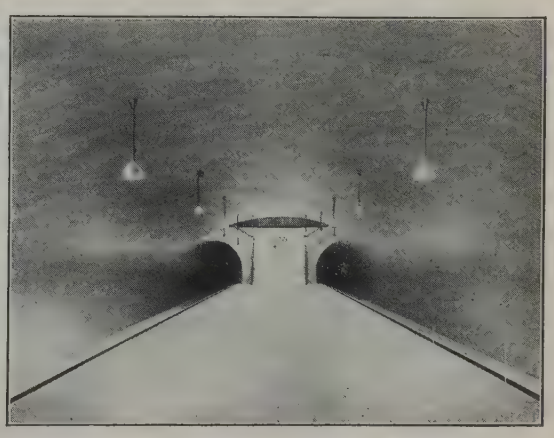
BUILDING	LOCATION	ARCHITECTS
Mellon National Bank	Pittsburgh, Pa.	Trowbridge & Livingston and E. P. Mellon
Exchange National Bank	Pittsburgh, Pa.	Weary & Alford
Joseph Horne Store	Pittsburgh, Pa.	Benno Janssen
Colonial Trust Company	Pittsburgh, Pa.	F. J. Osterling
Professional Building	Pittsburgh, Pa.	Hunting, Davis & Dunnells
Catholic Boys High School	Pittsburgh, Pa.	Edward A. Link
Fifth Avenue Building	New York, N. Y.	Maynicke & Franke
Manhattan Eye & Ear Hospital	New York, N. Y.	York & Sawyer
Standard Oil Building	New York, N. Y.	Carrere & Hastings
Oil City National Bank	Oil City, Pa.	Weary & Alford
B. F. Goodrich Company	Akron, Ohio	Purdy & Henderson
Third National Bank	Springfield, Mass.	Starrett & Van Vleck
U. S. Post Office	Asbury Park, N. J.	U. S. Government
Victor Talking Machine Co.	Camden, N. J.	Ballinger & Perrot
Standard Sanitary Co., Bldgs.	Various Cities	Hunting, Davis & Dunnells
Peoples National Bank	Jackson, Mich.	Rockers & Vatet
National Exchange Bank	Roanoke, Va.	Wyatt & Nolting
New York Harbor Dry Dock Co.	Staten Island, N. Y.	
Bell Telephone Buildings	Various Cities	McKenzie, Voorhees & Gmelin

Hundreds of other structures over the United States.



Interior Method of Foundation Waterproofing





The Hudson Tubes Before and After Being Waterproofed with Hydrolithic Cement Coat Waterproofing

Continued on next page

A. C. HORN COMPANY

Chemical Products for the Conservation of Buildings

Room 505, Horn Building, LONG ISLAND CITY, N. Y.

BRANCH OFFICES

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DETROIT, MICH., 3756 Commonwealth Avenue
OAKLAND, CAL., Builders Exchange Building
LOS ANGELES, CAL., 2119 Venice Boulevard
SEATTLE, WASH., Skinner Building
FORT WORTH, TEX., 830 Taylor Street

Agencies Located in Principal Cities of United States, Canada, South America and Australia
The Names of our Distributors and Nearest Points of Distribution will be given on request

Products

HYDRATITE INTEGRAL WATERPROOFINGS for concrete; DEHYDRATINE DAMPPROOFING COMPOUNDS; SYMENTREX, Decorative Waterproof Coating for concrete and masonry; KONCREX, Decorative Coating for cement floors; VULCATEX CALKING COMPOUND, for windows and joints; HORN'S DRY COLORS for coloring cement, mortar and stucco; STAYBRITE for coloring, hardening and waterproofing cement floor finish in one operation; HORNSTONE CRYSTALS for dustproofing and hardening cement floors; FERRO-FAX METALLIC FLOOR HARDENER; TRIPLEFLEX COTTON FABRIC for membrane waterproofing; KERAMIK KEMIK PROCESS for producing pottery effects in concrete.

Also Kopper Karbol Wood Preservative; China Flat Wall Paints; Bondsit for Bonding Old and New Concrete; Expansion Joint Cement; Hornrock, a Decorative Waterproof Coating, can be applied on green concrete and wet surfaces.

Service

We have a waterproofing engineering staff that designs materials and methods for unusual situations. Their service is offered gratis to engineers, architects and contractors. *An architect's folder, containing specifications on individual sheets,* offered free on request.

References

Over thirty years of experience. Tests made by governmental departments, engineers, laboratories, etc. We have a long list of jobs where our materials have given satisfactory service in every section of the world.

Hydratite Integral Waterproofing Compound

A compound to be mixed with cement to make permanently watertight concrete mixtures. Made in paste and powder form. Paste is a white, smooth material to be dissolved in gauging water and distributed by it through the concrete or cement mortar. In mass concrete, use 1 part to 33 parts of water; in cement plaster and stucco work, 1 part to 17 parts of water.

Dehydratine Dampproofing Coating

These black compounds are applied to the inside surfaces of exterior brick, stone and terra cotta walls, dampproofing them and providing insulation. Dehydratine No. 1 brush coating for use on brick, stone or terra cotta. Dehydratine No. 10 trowel coating for use on brick walls only. The use of these materials eliminates the necessity of furring and lathing. Gypsum plaster may be applied directly to the dampproof film thus provided.

Dehydratine No. 2 Transparent Exterior Waterproofing Brush Coating

A transparent liquid for dampproofing and reducing the porosity of brick, stone, stucco, masonry or concrete surfaces. It is applied with a brush and has a high penetrating capacity, thereby completely filling the pores and preventing absorption. It is applied on the outside of the building only.

Dehydratine No. 3 Stone and Trim Stainproofing Backing

A specially prepared, quick-drying, black, brush coating to be applied on all unexposed surfaces of cut stone or of wood trim.

Vulcatex Calking Compound

Vulcatex is a permanently elastic material, unaffected by the changes in temperature: Is unexcelled for calking windows, pointing up terra cotta and masonry joints, and for expansion joints in concrete or masonry. It is made in gray, red, and brown.

Hornstone Crystals

A chemical floor hardener composed of mineral salts, dissolved in water. It is flushed over cement floors, producing a harder, more compact and dustless surface, that is proof against absorption of all liquids for all time. It can be used on old or new floors.

Ferro-Fax Metallic Floor Hardener

A ground metallic aggregate and hardener introduced into the top surface of cement floors when laid, and mixed with cement finish coat or topping. Ferro-Fax insures a smooth, hard, dense surface that withstands severe traffic. Furnished in gray, black, red or green.

Symentrex—Decorative Waterproof Coating for Concrete, Stucco and Masonry

Symentrex applied, presents the finest surface texture and meets most effectively the severe requirements for enduring waterproof effect combined with sustained fine appearance.

Symentrex is produced in four attractive colors, permitting a wide choice of color schemes. It is furnished in liquid form and is applied to the dry surface in two coats by means of brush or spray. The coating bonds effectively to the underlying surface, is thoroughly waterproof and provides a uniform, non-fading color effect which is easily kept clean with soap and water.

Staybrite (Integral Coloring, Waterproofing and Hardener for Cement Floor Topping)

This material integrally colors, hardens and waterproofs cement floor topping in one operation. Furnished in following colors: Tile Red, Mexican Red, Japanese Black, French Gray, Persian Yellow, Alaskan Brown, Linoleum Brown, China Blue, Egyptian Green.

Horn's Dry Colors—Coloring for Cement, Lime and Composition Mixtures

These colors are high grade metallic oxides, and have great tinctorial strength. They are unaffected by the actinic rays of light as well as by the various chemical reactions prevalent in cement mortar and masonry.

These colors are economical as but small quantities are required to the bag of cement, and because of the small percentage needed to permanently color cement for floors and mortar, the strength of the cement is maintained.

Quantities Required per Bag of Cement—Tile Red, 8 lb.; Mexican Red, 8 lb.; Japanese Black, 3 lb.; Persian Yellow, 8 lb.; Alaskan Brown, 10 lb.; Linoleum Brown, 10 lb.; China Blue, 8 lb.; Egyptian Green, 8 lb.

The foregoing proportions are for maximum depth of color. Lighter shades are obtained by reducing the quantity of color per bag of cement used.

Dehydratine No. 80 Liquid Integral Cement Accelerator, Antifreeze Compound and Hardener

A liquid compound to lubricate, harden and permanently strengthen cement, mortar and concrete mixtures. Cuts the time and labor by accelerating the set of cement. In freezing weather, it acts as an Antifreeze, makes cement mortar more "fatty" and increases the bond in masonry work. It is mixed in the gauging water.

Koncrex Liquid Protective Coating for Cement Floors

Prolongs the life of cement, producing a hard, dustproof, washable surface, impervious to the destructive action of oils and other liquids.

Continued on next page

Waterproof Basements

The use of Hydratite Integral Waterproofing renders mass concrete and cement plaster thoroughly and permanently waterproof.

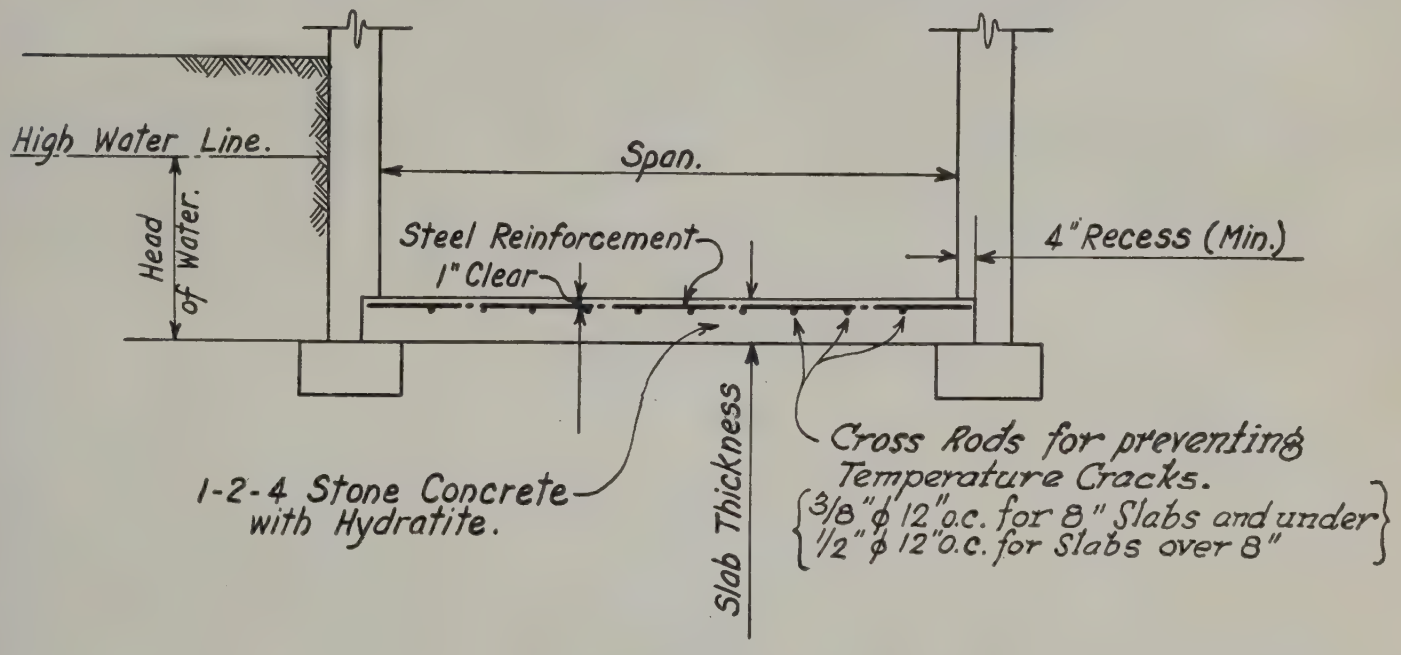
In foundation work, however, in addition to waterproofing, the walls and floors must be properly designed to prevent cracking under the action of hydrostatic pressure.

While basement walls are ordinarily able to withstand such pressure, the floor slabs in contact with earth require special design to prevent lifting or cracking as a result of the upward load thus imposed.

Therefore, for the architect's convenience in designing such slabs, our Engineering Department has prepared the table below.

CONCRETE FLOOR SLABS

Waterproofed by Hydratite Integral or Plaster Coat Methods



All reinforcement to be round deformed rods. For greater head of water or larger spans our Engineering Department should be consulted for special layout.

Use of Table:

Problem—Head of water = 8'-0". Distance between walls = 15'-0". Opposite the 8'-0" Head and the 15'-0" Span column we find an 11" slab reinforced with 5/8" ϕ @ 4" o.c. which should run from wall to wall. This slab should have 1/2" ϕ @ 12" o.c. cross rods.

Detailed Specifications for solution of any Waterproofing Problem furnished upon request.

Slab Thickness and Reinforcement for Various Heads and Spans

HEAD		SPAN																			
		6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	23'-0"	24'-0"	25'-0"
1'-0"	Slab	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"	4¼"	4¼"	4¼"
	Steel	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 12" o.c.	3/8"ϕ 10" o.c.	3/8"ϕ 9" o.c.	3/8"ϕ 8" o.c.	3/8"ϕ 7" o.c.	3/8"ϕ 6" o.c.	3/8"ϕ 6" o.c.	3/8"ϕ 5½" o.c.	3/8"ϕ 5" o.c.	3/8"ϕ 6" o.c.	3/8"ϕ 6" o.c.	3/8"ϕ 5½" o.c.
2'-0"	Slab	4"	4"	4"	4"	4¼"	4½"	4¾"	4¾"	5"	5¼"	5½"	5¾"	5¾"	6"	6¼"	6¼"	6½"	6½"	7"	7"
	Steel	3/8"ϕ 11" o.c.	3/8"ϕ 8" o.c.	3/8"ϕ 6" o.c.	3/8"ϕ 5" o.c.	3/8"ϕ 4½" o.c.	3/8"ϕ 4" o.c.	3/8"ϕ 4" o.c.	3/8"ϕ 4" o.c.	1/2"ϕ 6½" o.c.	1/2"ϕ 6¼" o.c.	1/2"ϕ 6" o.c.	1/2"ϕ 5½" o.c.	1/2"ϕ 5½" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 5" o.c.	1/2"ϕ 5" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4½" o.c.
3'-0"	Slab	4"	4¼"	4½"	4¾"	5"	5½"	5¾"	6"	6¼"	6½"	7"	7½"	7½"	8"	8"	8"	8½"	8½"	9"	9"
	Steel	3/8"ϕ 5" o.c.	3/8"ϕ 4½" o.c.	3/8"ϕ 4½" o.c.	3/8"ϕ 4" o.c.	1/2"ϕ 6¾" o.c.	1/2"ϕ 6" o.c.	1/2"ϕ 5½" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 5" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5¼" o.c.
4'-0"	Slab	4¼"	4½"	5"	5½"	6"	6½"	6½"	7"	7½"	8"	8"	8½"	9"	9"	9½"	9½"	10"	10½"	10½"	10½"
	Steel	3/8"ϕ 4½" o.c.	3/8"ϕ 4½" o.c.	1/2"ϕ 6¾" o.c.	1/2"ϕ 6" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 5" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4½" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4½" o.c.	5/8"ϕ 4½" o.c.
5'-0"	Slab	4½"	4¾"	5½"	6"	6½"	7"	7½"	8"	8½"	9"	9"	9½"	10"	10"	10½"	11"	11"	11½"	12"	12"
	Steel	3/8"ϕ 4¼" o.c.	3/8"ϕ 4" o.c.	1/2"ϕ 6" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5¼" o.c.
6'-0"	Slab	4¾"	5½"	6"	6½"	7"	7½"	8"	8½"	9"	9½"	10"	10½"	11"	11½"	12"	12"	12½"	13"	13½"	14"
	Steel	1/2"ϕ 7" o.c.	1/2"ϕ 6" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 4½" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5¼" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 4½" o.c.
7'-0"	Slab	5¼"	5½"	6½"	7"	7½"	8½"	9"	9½"	10"	10½"	11"	11½"	12"	12"	12½"	13"	13½"	14"	14½"	15"
	Steel	1/2"ϕ 6¼" o.c.	1/2"ϕ 5¼" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 4½" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4¼" o.c.
8'-0"	Slab	5½"	6½"	7"	7½"	8½"	9"	9½"	10"	10½"	11"	12"	12½"	13"	13½"	14"	14½"	15"	15½"	16"	16½"
	Steel	1/2"ϕ 6" o.c.	1/2"ϕ 5" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5¼" o.c.	5/8"ϕ 5" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5¼" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4" o.c.	3/4"ϕ 4" o.c.
9'-0"	Slab	5¾"	6½"	7½"	8"	9"	9½"	10"	11"	11½"	12"	12½"	13"	13½"	14½"	15"	15½"	16"	16½"	17"	17½"
	Steel	1/2"ϕ 5½" o.c.	1/2"ϕ 4¾" o.c.	1/2"ϕ 4¼" o.c.	5/8"ϕ 6" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4" o.c.	3/4"ϕ 4" o.c.	7/8"ϕ 5¼" o.c.	7/8"ϕ 5" o.c.	7/8"ϕ 4¾" o.c.
10'-0"	Slab	6"	7"	7½"	8½"	9"	10"	10½"	11½"	12"	12½"	13½"	14"	14½"	15"	15½"	16½"	17"	17½"	17½"	18½"
	Steel	1/2"ϕ 5¼" o.c.	1/2"ϕ 4½" o.c.	1/2"ϕ 4" o.c.	5/8"ϕ 5½" o.c.	5/8"ϕ 5" o.c.	5/8"ϕ 4¾" o.c.	5/8"ϕ 4¼" o.c.	5/8"ϕ 4" o.c.	3/4"ϕ 5½" o.c.	3/4"ϕ 5¼" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4¾" o.c.	3/4"ϕ 4½" o.c.	3/4"ϕ 4¼" o.c.	3/4"ϕ 4" o.c.	7/8"ϕ 5¼" o.c.	7/8"ϕ 5" o.c.	7/8"ϕ 4¾" o.c.	7/8"ϕ 4½" o.c.

HYDROSEAL WATERPROOFING COMPANY

FORMERLY CONCRETE WATERPROOF PAINT CO.

829-835 North 3rd Street, PHILADELPHIA, PA.

Products

HYDROSEAL BITUMASTIC COATINGS; PENETRITE INTEGRAL WATERPROOFINGS; PENETRITE FLOOR HARDENERS and COATINGS; HYDROSEAL METALTITE; KLING-KOAT CEMENT COATING; MASONRY COATINGS.

Below is a list of the specific materials for the average conditions.

HYDROSEAL

PENETRITE

METALTITE

TRADE-MARKS

Advantages

Years of specialized experience has taught us that the *proper application* is no less important than the use of the highest quality materials. This has led to the maintenance of reliable men with experience pertaining to the application of waterproofing and dampproofing materials.

In using our materials we co-operate with the architect to see that he receives the results that he desires, as well as to see that the material is being applied correctly.

Our liquid materials such as Hydroseals, Kling-Koat Cement Coating and Penetrite Transparent Waterproofing Compound, are applied by spray under 80-lb. pressure. This method insures the Hydroseal, etc., penetrating the surfaces by force, and at the same time gives the surface a coating, making a perfect plaster bond, dampproof coating or waterproofing.

The many prominent buildings on which our materials have been used successfully are permanent testimonials of the quality of our materials and our knowledge of waterproofing.

Policy

After more than ten years' experience in manufacturing waterproofing materials we are convinced that they should be made only of the highest quality.

From the time we started we adopted the policy of making the very best possible materials. Regardless of competition we have maintained the highest standard of our materials. *Due to our quantity production you can obtain the greatest possible value.*

Our customers appreciate that it does not pay to jeopardize the entire result of the work when the proportionate cost of the waterproofing materials is practically a few per cent of the entire contract. *We have never sacrificed the high quality of our products to meet competition.*

When you use materials manufactured by the HYDROSEAL WATERPROOFING COMPANY you are insuring yourself against unsatisfactory results.

Brands, Uses and Specifications

PURPOSES	MATERIAL	SPECIFICATIONS
For Dampproofing and Waterproofing Concrete, Brick and Cement		
To dampproof exposed walls to be plastered—unfurred or furred with hollow brick, furring tile or concrete blocks.	*Hydroseal* No. 330	Coat the interior of all exposed walls 1 coat, and, if necessary, 2
To prevent surface infiltration and dampness in basements and cellars	*Hydroseal* No. 640	Apply 2 heavy continuous coats
For dampproofing the interior of exterior walls above or below grade	*Hydroseal Semi-mastic*	To be applied (stipulate where) by a 4 knot brush, to be a continuous coating from grade to roof line, 1 ft. on ceiling
To prevent and resist severe conditions of dampness and water below sub-level	*Hydroseal* No. 640, in conjunction with burlap, felt or cheesecloth.	Apply No. 640, and burlap, etc., alternately 3 to 5-ply until the hydrostatic pressure is equalized
To render waterproof by physical mixture with concrete and cement	*Penetrite* Integral Waterproofing Paste	For ordinary work add 1 gal. to 32 gal. of water
	Penetrite Integral Waterproofing Powder	Use 2 lb. to a bag of cement; under most severe conditions, 3 lb.
An iron waterproofing applied on the inside face of exterior walls below grade, and on top of structural slabs	*Hydroseal Metaltite*	To be applied and guaranteed by Contract Department of H. W. Co.
Used as an integral waterproofer, an integral hardener, as well as an anti-freeze	*Conwatco Mix*	Conwatco Mix as waterproofer for mass concrete, use 1 gal. to 15 gal. of gauging water
For Stainproofing Limestone and Marble		
For the protection of limestone, marble, etc., against stain caused by the cement through surrounding masonry	*Hydroseal* No. 309	Apply to all unexposed sides of stone, 1 continuous coat
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	*Penetrite* Transparent Compound	Apply 2 coats, having joints well mortared
For the Protection of Metal		
For prevention against electrolysis and corrosion of exposed structural steel	*Hydroseal* No. 352	Apply 1 shop coat, to be followed by a field coat, different color
For Waterproofing and Beautifying Concrete and Plaster Surfaces		
To beautify and protect exterior walls of brick, stucco cement, and concrete	*Kling-Koat* Cement Coating (flat and gloss)	Applied like paint, 2 coats
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	*Penetrite* Transparent Compound	Apply 2 coats, having joints well mortared
For Treatment of Floors		
To prevent the dusting and abrasion of concrete floors	*Penetrite* Floor Finish	Apply 1 coat primer and 2 coats finish. Allow 24 hours between applications
For application after cement or concrete floor is laid. Makes the floor hard, dustproof and waterproof	*Penetrite* Liquid Floor Hardener	One application is all that is necessary if the condition is not severe
Mixed with the cement to harden and waterproof	*Penetrite* Metallic Floor Hardener	Approximately 20 lb. to a sq. ft. in the 1-in. top coat
Used as an integral waterproofer, an integral hardener	*Conwatco Mix*	For mass concrete and top coat use 1 gal. of gauging water. For mortar work use 1 qt. to 1 bag of Portland cement
For Caulking		
	Hydroseal Caulking Compound	

JOHNS-MANVILLE CORPORATION

EXECUTIVE OFFICES

292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see page A15

Products

WATERPROOFING and DAMPPROOFING.

For other Johns-Manville Products, see pages in this edition, as follows:

Acoustical Treatment .....page A15
Transite Corrugated Asbestos.....page A175
Rigid Asbestos Shingles.....page A478
Specification (Built-up) Roofing.....page A452
Pipe Coverings and Insulations.....page B1672
Asbestos Ebony and Electrical Products.....page C3413

Also Packings for all purposes; Floorings; Refractory Cements and Furnace Linings; Asbestos Wood; Insulating Lumber; Asbestos Products of all kinds.

Waterproofing

Installed only by approved contractors.

The Johns-Manville system of waterproofing is based on the membrane, and not on the integral, method.

The latter method is reliable only in so far as the walls retain their integrity and do not crack—a condition which the incorporation of the waterproofing media into the cement cannot eliminate.

In the membrane method, however, the waterproofing is practically a separate unit, dependent for its waterproof characteristics, not on the integrity of the concrete, but on its own strong, flexible, substantial construction.

The Johns-Manville system of waterproofing uses only high grade materials, the reason why experience has proved it to be most economical and most satisfactory.

In the Johns-Manville system of waterproofing the following materials are used:

Johns-Manville Concrete Primer
Johns-Manville Asbestos Felted Fabrics
Johns-Manville Standard Saturated Cotton Fabrics
Johns-Manville Asphalt Waterproofing Cement

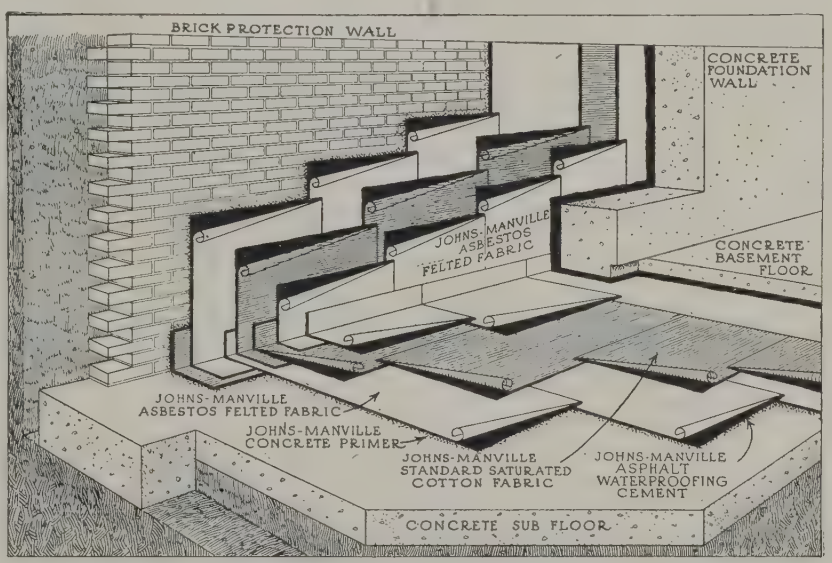
The amount of waterproofing that should be used on any particular building is so intimately related to that building, and is influenced to such an extent by local conditions, that it is not practical to write a specification for waterproofing that will be applicable in all cases.

Dampproofing

Dampproofing, which is the protection against moisture or dampness on the inside surface of walls or floors, is used only when the presence of this moisture is not caused by hydrostatic pressure. Whenever there is any indication of hydrostatic pressure, waterproofing methods must be used. Dampproofing is, therefore, a simpler problem than waterproofing, but in this case also a proper specification can only be written when the local conditions are thoroughly understood. Johns-Manville recommends the following materials for dampproofing:

Johns-Manville Aquadam
Johns-Manville Concrete Primer
Johns-Manville Liquid Waterproof Coating
Johns-Manville Waterproof Cement
Johns-Manville Asbestos Felted Fabric

These materials are used singly or in combination depending on local conditions and amount of dampproofing required to successfully combat the moisture.



Typical Installation of Johns-Manville Waterproofing

Johns-Manville Service

Architects are urged to avail themselves of the free service of the waterproofing engineers maintained at all branch offices of JOHNS-MANVILLE CORPORATION, for consultation on waterproofing and dampproofing problems, and for the preparation of proper specifications.

Belle Isle Bridge, Detroit, Mich., Waterproofed with Johns-Manville Waterproofing Membrane

LEWIS ASPHALT ENGINEERING CORPORATION

SUCCESSORS TO GARDINER AND LEWIS, INC.

ENGINEERS AND MANUFACTURERS

Specializing in Protection Against Water and Corrosion

30 Church Street, NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

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Karnak Membrane Waterproofing System

The Karnak system is based on the use of a highly refined and very ductile asphalt, reinforced and held in place by a strong elastic interlocking membrane, made of cotton cloth saturated with asphalt. Because Karnak asphalt contains no impurities or foreign matter and because this waterproofing is held in place by a strong elastic binder, less plies are required than in felt systems. In the usual case, 2 plies of Karnak fabric with 3 heavy moppings of Karnak asphalt will give absolutely adequate results.

KARNAK

Uses—This system will be found to be thoroughly dependable for use on building foundations, bridges, viaducts, pump wells, retaining walls and wherever sub-level construction is exposed to water pressure.

Karnak Asphalt—Melting point 150° to 160° F.; penetration at 32° F. not less than 10, at 115° F. not more than 100; ductility at 77° F. not less than 30 cm.; loss in weight and penetration under the standard A.S.T.M. heat test, less than 0.5% and 10% respectively.

Karnak Fabric—An elastic cotton fabric, thoroughly impregnated with Karnak Asphalt, having a minimum tensile strength of 50 lbs. per in. and a minimum stretch of 10% in either direction. The thread count shall be between 18 and 26 threads per inch assuring an open mesh. The raw weight shall be less than 4½ oz. and the saturated weight from two to three times the raw weight.

Architects' Specification—The waterproofing course shall consist of 2 plies of Karnak Fabric and 3 layers of Karnak Asphalt, applied in strict accordance with the manufacturer's directions.

Tests—Every lot of asphalt and fabric is tested at the source by an independent laboratory which places its seals and identification numbers on each package. A copy of this test will be sent directly to the architect by the testing laboratory.

Publications—We have bulletins covering all points: a technical discussion of bituminous waterproofing; lists of architects, engineers and railroads who use Karnak; lists of typical Karnak installations; detailed descriptions of some particularly interesting projects.

Karnak Cut-backs and Plastics—We make a complete line of primers, brush plastics, trowel plastics, joint fillers.

Karnak Special Purpose Asphalts—To meet the needs of manufacturers. State your needs to our Engineering Department.

Karnak Roofing—The same as the waterproofing blanket. Particularly adaptable for roofs protected with tile or concrete because the expansion of the surfacing will not tear the roofing blanket.

Krodeproof

A Preventive of Corrosion and a New Method of Applying Asphalt as a Waterproofing Agent—Krodeproof consists of minute particles of asphalt suspended in water together with a special agent. When applied to any surface, wood, steel or concrete, the water evaporates and there is left a composite structure of asphalt and agent particles which is actually more effective than pure asphalt as a protective coating.

KRODEPROOF

TRADE-MARK

Advantages—Krodeproof, being a dispersion of asphalt and water, is always applied cold. It can be applied with an air spray, brush or trowel; and it may be built up to any thickness. After the Krodeproof has set up it will not flow, bleed or run at any temperature up to 300° F.

Uses—Krodeproof is most effectively used wherever protection is required against moisture, acid or alkali fumes.

Users—Railroads; against locomotive gases, brine drip and on the decks of concrete bridges, and retaining walls.

Marine; against salt water corrosion.

Contractors and engineers; against moisture below grade and for surfacing roofs.

Hydro-electric plants; on penstocks, transmission towers, etc.

Manufacturing plants; for lining coal bunkers, for lining acid chimneys, boiler setting compound, etc.

Coverage—80 sq. ft. per gal. on steel; 40 sq. ft. per gal. on concrete.

Korkseal

Korkseal is an asphalt plaster used for the protection of cork board insulation. It is made from Krodeproof mixed with inert materials; which gives a creamy plastic, very easy to apply, firmly bonding to the corkboard—setting up into a tough rubbery protection coating which will not crack, and will not permit the penetration of moisture into the corkboard—thereby preserving the original usefulness of the insulating material.

KORKSEAL

TRADE-MARK

Engineers and contractors have found Korkseal more efficient, and less expensive. A representative list of installations will be sent on request.

Refrigeration Specifications—To maintain the efficiency of corkboard as an insulator, it must be kept dry; to do this it is necessary to keep all "live" air out of the corkboard. Therefore: (1) Prime the masonry wall with Krodeproof. (2) Erect the corkboard to the primed masonry wall with 180° M.P. Karnak Asphalt. (3) Protect exposed surface with a ⅛-in. coat of Korkseal. All of these materials to be applied strictly in accordance with the instructions of the manufacturer.

THE MASTER BUILDERS COMPANY

Specialists in Masterbuilt Concrete Floors

CLEVELAND, OHIO

SALES OFFICES

NEW YORK, N. Y.	DETROIT, MICH.	MINNEAPOLIS, MINN.	WASHINGTON, D. C.	LOS ANGELES, CAL.
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MONTREAL, QUE.	TULSA, OKLA.	TORONTO, ONT.	CINCINNATI, OHIO	SEATTLE, WASH.

Master Builders Concrete Hardening, Waterproofing and Dampproofing Products

Integral Hardeners—MASTER BUILDERS METALLIC CONCRETE HARDNER, a waterproofer and dustproofer in standard gray and seven other colors, for use in either topping type method or Master Builders Monolithic Method on floors subject to heavy usage....page A83

MASTER MIX, colorless hardener, waterproofer and dustproofer of cement floor topping for commercial, light industrial or foot traffic. Functions at all low temperatures down to 15° F.....page A84

COLORMIX, in nine basic permanent colors, for producing wear-resisting, dustproof, waterproof concrete floors in colors .....page A84

STAINPROOF, a jellylike coating applied 36 hours after troweling, which dries to a tough, impenetrable film, to protect surfaces of new floors during construction period. Removed after job is completed and floor cured .....page A84

COLORWAX, for finishing Colormix floors.....page A85

Surface Hardeners—*In Colors*—DYCROME, a hardening, dustproofing and coloring "after treatment" for finished cement floors. Comes in seven colors. Used singly or in duo-tone combinations.....page A85

DYCROME WAX, a special wax for finishing Dycrome processed floors.....page A85

DYCROME STAINLESS OIL, a special oil for finishing Dycrome floors exposed to weather or staining.....page A85

Colorless—SANISEAL, an "after treatment" for plain floors. Makes porous, dusting concrete floors hard, wear-resisting and dustproof .....page A86

EFFLOREX, a liquid chemical for removing efflorescence permanently.....page A86

Surface Waterproofings—*Colorless*—MASTERSEAL, for use over decorative surfaces.....page A86

Colored—MASTERTEX, in 10 colors for tinting and waterproofing concrete, stucco, masonry, brick and non-glazed tile, etc.....page A86

Integral Waterproofing for Mass Concrete and Cement Mortar—

Liquid—Concentrated .....page A87

Powder .....page A87

Paste.....page A87

Cold Weather Waterproofing—MASTER MIX, for waterproofing winter brick mortar or floors...page A87

Pressure Resisting—METALLIC WATERPROOFING .....page A87

Dampproofings—*Surface Applications*—PLASTER BOND, an interior dampproofing.....page A87

FOUNDATION COATING, for the exterior of masonry below grade .....page A87

Descriptions and Advantages of Masterbuilt Floors

In 1910 THE MASTER BUILDERS COMPANY instituted the principle of hardening concrete and produced the first concrete hardener. Since that time THE MASTER BUILDERS COMPANY has been supplying hardeners for concrete floors in practically every type of building—to serve under every sort of industrial or commercial process, to resist the wear of every kind of traffic or use. It is the policy of THE MASTER BUILDERS COMPANY to base their recommendation in each instance on knowledge of what each type of hardener will do under the kinds of traffic to which the floors will be subjected.

Masterbuilt Floors are constructed according to definite, standardized principles, employing Master Builders Integral and Surface Hardeners of five general types.

Type 1—Metallic Hardener—Integral—For new floors, Master Builders Metallic Hardner, a water-absorbent, pure metallic granular aggregate, produces a surface half iron, half cement. Metallic Hardner is floated and troweled into the finish of the cement floor when it is laid and exact specifications, which govern quantities and qualities of materials and method of workmanship, control the installation of the top finish from start to completion. This type hardener is made in standard gray, red, buff, green, blue, brown, battleship gray, and black.

Type 2—Integral Admixture Hardener—For new floors, Master Mix, a semi-liquid chemical, which, added to the gauging water, is introduced into the mortar when it is being mixed, resulting in one operation in increased resistance to abrasion, to acid and alkali action, and produces a non-dusting and a waterproof floor. Although less resistant to wear than the metallic hardened floor, this surface is ideal for office and commercial buildings, loft and light manufacturing purposes. Here again, the hardener, added during installation, is made an integral part of the floor; the strength and density are built in throughout the thickness of the wearing course. Master Mix contains no calcium chloride.

Type 3—Colored Hardener—Integral—An adaptation of Type 2 is Colormix, which produces wear-proof, waterproof and dustproof concrete floors in permanent colors—tile red, linoleum brown, battleship gray, nile green, buff, white, french gray, blue, and black. Colormix contains no calcium chloride.

Continued on next page

Type 4—Surface Hardener (After Treatment)—For floors already installed, Saniseal, a powerful chemical combination, is applied to the set surface of a finished floor. By the ensuing chemical reaction, the surface is made dust-proof and wear-resisting. This type of hardener meets the demand for a hardening remedy for floors that are already in, and for old floors that are dusting and wearing out. Applied to the set concrete, any surface treatment is superficial and effective only on a thin layer of the surface. Although its principal function is dustproofing of surfaces already down, surface hardener is frequently specified for new floors under the *baseless assurance* that it enables them to bear heavy traffic indefinitely. (See "Integral vs. Surface Treatments" below.)

Type 5—Colored Surface Hardener (After Treatment)—A development of Type 4 is Dycrome, a colored liquid hardener which, applied to the surfaces of plain cement floors, both hardens and colors them through chemical reaction. Recommended for floors in apartments, hotels, stores, residences, theaters, clubs, etc.

What Building Owners Say about Hardened Concrete Floors

Since the introduction of hardeners in 1910, thousands of the integrally hardened type of concrete floors have been laid; thousands of plain concrete floors have been treated with surface hardeners. To determine what the comparative performance of the two methods has been over the seventeen-year period, the H. P. Gould Company, industrial investigators, asked the engineers and owners of 2250 leading American industrial concerns what their experience has been with floor hardeners. 412 replied. The questions and answers are summarized below.

Briefly, these answers prove (1) That over 60% of plants use hardened concrete floors, (2) That additional expense for hardening is considered justified, (3) That the majority of integrally hardened concrete floors have a life exceeding ten years, while the effectiveness of surface treatments is only from one to four years.

Summarized Reports

(1) "Have you installed or operated on *hardened concrete floors?*" 257 owners said "Yes." 155 owners said "No."

(2) "If so, has it been your experience that *hardened concrete floors* are, as a general rule, sufficiently more efficient and longer lived to warrant the additional cost of the hardening treatment?" 202 owners said "Yes." 36 said "No."

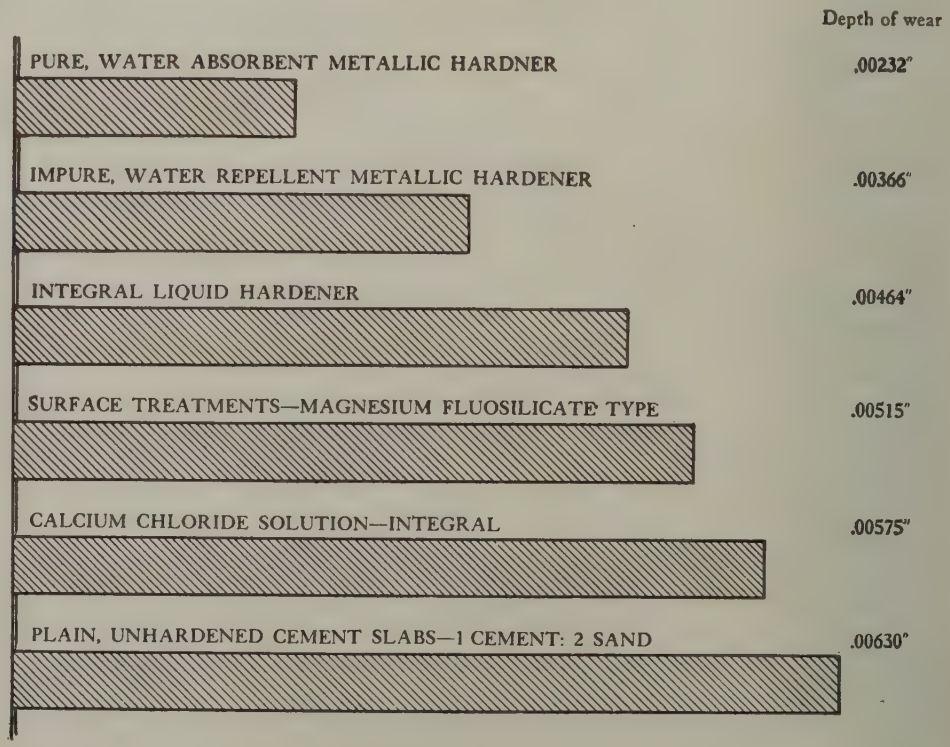
(3) "Is it your experience or judgment that a floor, into which the hardener is incorporated, *when the floor is laid,* is longer lived than one treated with a surface treatment?" 110 owners said "Yes." 21 owners said "No."

(4) With reference to your experience with *floors hardened with Integral Hardener,* over what period of time have these treatments seemed to be effective?" 45.3% said "10 years or over"; 27.5% said "5 to 9 years"; 27.1% said "1 to 4 years."

(5) "With reference to your experience with floors treated *with Surface Applications,* over what period of time have these treatments seemed to be effective?" 11.7% said "10 years or over"; 30.3% said "5 to 9 years"; 58.0% said "1 to 4 years."

How Hardened Concrete Floors Resist Abrasion

At the recommendation of the Portland Cement Association, the Engineering Experiment Station of Ohio State University was engaged to test the various types of hardened and unhardened concrete surfaces to determine their relative wear under abrasion. The results of these tests are shown graphically here. Complete report of the Gould Survey and of these tests in a book entitled "Plain Talk About Concrete Floors" sent upon request.



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Master Builders Metallic Concrete Hardner

This perfectly graded metallic aggregate is especially manufactured for mixture with the sand and cement used in production of concrete floors. As it replaces its own volume of brittle sand, it imparts to the aggregate its own metallic qualities: ductility, toughness, strength, permanence. Master Builders Metallic Concrete Hardner consists of water-absorbent, scientifically graded, rough, jagged particles that lock securely in the mixture. It is absolutely free of impurities and exactly uniform in every respect at all times.

Master Builders Metallic Concrete Hardner gives concrete a ductility, or elasticity which plain concrete does not have. This characteristic gives the Masterbuilt Floor a "give and take" that greatly lengthens its life under even the most severe service.

Compressive Strength Tests—How the introduction of metallic hardener greatly increases the strength of the floor is demonstrated by tests made by the Robert W. Hunt Company's Pittsburgh Testing Laboratories.

SUMMARY OF RESULTS OF COMPRESSIVE STRENGTH TESTS

Age of concrete	Plain concrete*	Metallic hardened concrete*	Percentage of increase
3 days	3274	6927	111%
7 days	3626	8695	139%
28 days	6129	13245	116%
90 days	6583	14302	117%

*Pounds per square inch.

Master Builders Metallic Concrete Hardner is especially recommended for heavy duty floors; boiler rooms, trucking aisles, shipping platforms, loading docks and elevator approaches in all buildings; and for all floors in such structures as warehouses, railroad stations, forge shops, foundries, machine shops and industrial buildings generally.

Specifications for Topping Type Method

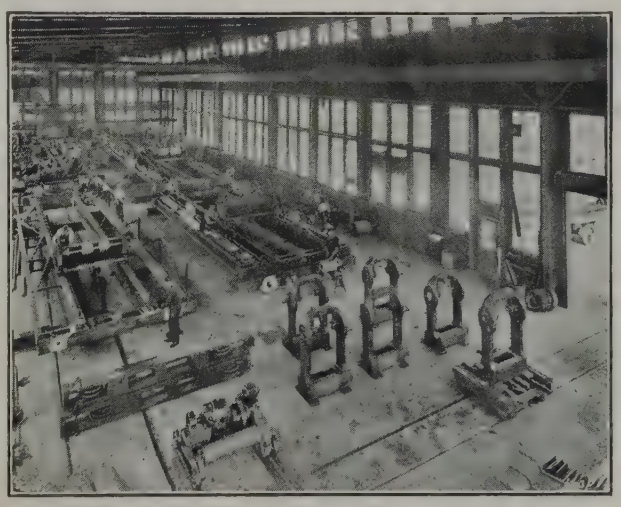
Preparation of Topping—Wherever practicable, topping to be laid before base has set. Topping (not less than full ¾-in. thickness) shall consist of following proportions by *volume*: 1 part tested portland cement to 2 parts coarse, gritty, clean sand.

For heavy duty, specify as follows: 1 part tested portland cement; 1½ parts roofing gravel, trap rock or equal (not exceeding ¼ in. size) free of dust; 1 part clean, coarse, gritty sand.

Mixing—Aggregate and cement shall be thoroughly mixed dry until uniform in color, showing no streaks or patches of the constituents. If mixed by hand the mass shall be turned over dry at least three times. Sufficient water to saturate the mixture shall be added and the mix turned over once again. Special care shall be taken to avoid a sloppy consistency.

Application of Topping—The topping shall be laid and straightedged to a true and even surface, well floated to close all voids and hollows.

Application of Metallic Hardner—After the surface has been floated, but before steel troweling, a dry mixture of 1 part of Master Builders Metallic Concrete Hardner, to 1 part tested portland cement (by weight), mixed to an even color, shall be sprinkled evenly over the surface, using a sieve to get uniform distribution. Not less than 30 lbs. of Master Builders Metallic Concrete Hardner and 30 lbs. of tested portland cement shall be distributed in this manner over each 100 sq. ft. of surface. This shall be floated in thoroughly and troweled; a second steel troweling shall be given the surface when it has set sufficiently to finish hard and smooth. Under no circumstances shall the mixture of hardener and cement be applied when there is any surplus water on the floated surface.



Typical Metallic Hardened Floor Under Heavy Foundry Service at Chesapeake Iron Works, Baltimore, Md.

Expansion Joints—Are recommended at regular intervals in all topping floors. Joints to be cut through the full thickness of the topping with narrow tool and edges to be hard finished.

Safeguarding the Floor—The green floor surface shall not be wet until it is 48 hours old. After the surface has set up 48 hours, the contractor shall cover it with a uniform layer of soft-wood sawdust, shavings or other suitable covering. This covering must not be applied until experiment shows surface hard enough to prevent the covering from scratching or injuring the finish. Surface shall then be kept wet for not less than 5 days. Floors, when prepared as above, will be ready for light traffic in about a week, and for heavy traffic in about 3 weeks under favorable weather conditions.

Exceptions—The use of 30 lbs. of Master Builders Metallic Concrete Hardner to every 100 sq. ft. of surface provides a wearproof finish sufficient to withstand any normal usage.

For floors to bear heavier than normal traffic specify 35 lbs. of Master Builders Metallic Concrete Hardner to every 100 sq. ft.

For floors to bear extra heavy traffic specify 40 lbs. of Hardner per 100 sq. ft.

Specifications for Monolithic Method

The term "monolithic" is interpreted in various ways—and these various interpretations produce various results. Master Builders Monolithic Method is the proven method, by which the floor slab is poured, straightedged, finished and troweled in one operation.

Master Builders Monolithic Method should be definitely specified to secure a Masterbuilt Floor with the following definite results: (a) base and topping are one, with no danger of loose bond, cracking or breaking under service; (b) time, labor and material for extra topping saved; (c) dead weight of topping and necessity for expansion joints eliminated; (d) surface hardened with Master Builders Metallic Hardner resulting in the same great increase in wearing strength as in the topping type method.

Mixing and Placing Slab—The slab shall consist of a mixture of: 1 part tested portland cement, 2 parts coarse, gritty, clean sand, and 4 parts crushed rock (or 1: 2½: 5, when gravel is used). All aggregate to pass 1-in. screen. These materials must be thoroughly mixed; then deposited between screeds to the finished floor level (on heavy slabs, exceeding 6 in. in thickness, ⅛ in. allowance must be made for shrinkage). Thoroughly tamp and screed with straightedge, taking special care to leave no hollows, pits or pockets on the surface.

First Application Metallic Hardner—Shall immediately follow leveling off of concrete slab. A dry mixture containing 1 bag (100 lb.) Master Builders Metallic Concrete Hardner, 2 bags standard portland cement, and 3 bags clean, coarse sand shall be thoroughly (dry) mixed and then distributed evenly (using a sieve) over approximately each 1000 sq. ft. of surface. This preliminary finish will immediately become saturated with the surplus water remaining on the surface; it must then be thoroughly floated into the concrete with heavy wooden floats.

Final Application Metallic Hardner—Immediately following the floating in of the preliminary finish, a dry mixture consisting of 1 bag (100 lb.) Master Builders Metallic Concrete Hardner and 1 bag (100 lb) of standard portland cement, thoroughly mixed to a uniform color, shall be evenly distributed (using a sieve) over each 500 sq. ft. of the floated surface. This final finish must be floated in with wooden floats and immediately steel troweled, with a second steel troweling after surplus water has disappeared. Finished surface must be free from depressions or defects of any kind, presenting a smooth and even texture.

Curing and Protecting Floor—Sawdust or curing sand without grit shall be evenly distributed over the surface to a depth of not less than 2 in., as soon as the concrete has sufficiently hardened. This covering shall be kept moist for not less than 8 days. Contractor to provide sufficient canvas or other covering and heat, before work starts, to protect surface from damage in event of rain, frost, etc.

Continued on next page

Master Mix Integral Hardener and Waterproofer

Master Mix CONTROLS CONCRETE
TRADE-MARK

Master Builders Master Mix is a chemical admixture which is added to the gauging water to permanently increase the strength of concrete floors throughout the entire wearing course or topping. Master Mix contains no calcium chloride.

Master Mix improves the workability and increases the density of mortar, introduces a hardening element and a waterproofing element and increases resistance to acid and alkali action. It functions regardless of temperature down to 15°, specially valuable for winter construction of floors, brickwork and masonry.

Master Mix accelerates the final set of cement from 2 to 4 hours; greatly increases the tensile strength in the first 24 hours and from 10 to 20% permanently; increases the ultimate compressive strength from 10 to 13%. Master Mix has been in use for over twelve years to produce Masterbuilt Floors that are wear-resisting, non-absorbent, dustproof and acid-resisting.

Compressive Strength Tests—How the introduction of Master Mix greatly increases the strength of the floor is demonstrated by tests made by the Robert W. Hunt Company's Pittsburgh Testing Laboratories.

SUMMARY OF RESULTS OF COMPRESSIVE STRENGTH TESTS

Age of concrete	*Plain concrete	*Master Mix concrete	Percentage of increase
3 days	2950	4051	37.3
7 days	3670	4066	10
28 days	4261	4806	12.7
90 days	6265	7046	12.6

*Pounds per square inch.

Specifications

1-in. topping shall be installed, proportioned 1 part fresh, tested, portland cement and 2 parts clean, coarse, sharp sand. Mix thoroughly, dry. Add Master Mix to gauging water, gradually, in proportion of 1 qt. Master Mix for every bag of cement used. Pour, float and trowel cement in usual manner. A second troweling shall be given when surface is sufficiently set to produce a hard, smooth finish.

Protect surface from injury with not less than 2 in. soft wood sawdust or curing sand, and keep it wet until surface is hard.

Colormix Colored Integral Hardener

COLORMIX
TRADE-MARK

Colormix is an integral colored hardener for producing wearproof, dustproof, waterproof concrete floors in permanent colors, for use where decorative, hard type floors of tile-like beauty and durability are desired. Dissolved in the gauging water, Colormix dyes every particle of sand and cement in the entire topping a deep, uniform, permanent color.

Whereas ordinary coloring agents seriously weaken concrete, Colormix contains hardening elements which maintain the full tensile and compressive strength.

Colormix is made in the following colors: Tile Red, Linoleum Brown, Nile Green, White, Buff, French Gray, Black, Battleship Gray and Blue.

Uniformity, purity and color permanence characterize Colormix, and the color permanence has been tested and reported satisfactory by the Portland Cement Association. Colormix contains no calcium chloride.

Stainproof—Used to protect the fresh Colormix surface from staining and marring during the construction period and to promote proper curing, insuring clean, unstained floor, free from efflorescence. This invaluable protection for colored concrete floors is an exclusive Colormix advantage.

Specifications

Colormix Top Finish—A top finish of not less than 1½-in. thickness shall be used on a set slab and not less than ¾-in. thickness shall be used on a green slab, topping to be composed of 1 part cement to 2 parts clean sharp sand.

Colormix can be used in the entire thickness of the top finish, but from the standpoint of cost, it is advisable to run the top finish in two layers, using Colormix in the top layer only.

If two layers are run, it is simply necessary to scratch a layer of ordinary 1:2 top finish over the slab, leaving it ¾ in. below finished surface line.

This must be followed immediately by the Colormix top finish.

To Mix Colormix Top Finish—If mixed by machine, first place a small quantity of water in the mixer and then throw in a shovelful or two of sand; then add the right proportion of Colormix as specified below. The above should be agitated by the mixer 10 to 20 revolutions, which dissolves the Colormix. Then add the balance of the batch into the mixer. Allow this total mix to be thoroughly mixed so as to assure a uniform and even color. Care should be taken that mortar is not mixed too sloppy.

If mixed in mortar box by hand, proceed as follows: procure a 1-gal. open top paint pail and a small spring scale. Dissolve the proper amount of Colormix for each batch in the pail first.

Use this solution as the gauging water to hydrate the 1:2 sand and cement mixture in the mortar box. If additional water is required to get proper mortar consistency, add slowly and sparingly, making sure that a perfect and complete mix is secured.

Proportions of Colormix to Be Used—As each color of Colormix weighs differently per unit of volume, one color must not be confused with any other color. Colormix must be proportioned exactly to each bag of cement per the following schedule:

Color	Per bag cement
Tile Red	Use 12 lb.
Linoleum Brown	Use 12 lb.
Battleship Gray	Use 5 lb.
Nile Green	Use 17 lb.
Buff	Use 17 lb.
White	Use 14 lb.
French Gray	Use 10 lb.
Black	Use 10 lb.
Blue	Use 17 lb.

Laying the Top Finish—Apply the Colormix Top Finish to the floor and straightedge, float and trowel in the usual manner. Hard trowel the surface a second time, when it begins to set hard, to a glossy smoothness.

Typical Gray Colormix Floors in John Wanamaker's New York Store Help to Attract Crowds of Shoppers and Withstand the Heavy Traffic

Continued on next page

Expansion Joints—Shall be cut through the full thickness of the topping, at intervals of not exceeding 6 ft.

Protecting the Finished Surface—Master Builders Stainproof, a specially prepared compound for protecting new floors, shall be applied to the surface wherever possible, 36 hours after final troweling is completed, without the previous use of water for curing the concrete surface. A simple test: When the surface is not marked by thumbnail scratching the surface is ready for the stainproof application.

However, where the absorbent nature of the base or fill causes quick drying out of the topping, the surface shall be kept wet with clear water for 3 days. On the fourth day, when surface moisture has disappeared and the thumbnail test has been applied, a heavy paintlike film of Stainproof shall be applied from the container over the entire surface.

This Stainproof film shall be left to dry for 36 hours and shall not be removed until just before the floor is to be turned over for use.

Removing Stainproof Film—After the plastering, painting, labor, and other trades have finished and are out of the building, and just before the floors are to be made available for use, the Stainproof film shall be removed. *First*—cover a limited portion of surface with water (hot preferred) and let stand for 15 minutes. *Second*—remove by brushing or scraping any area of film spotted with plaster or paint droppings. *Third*—with brushes or squeegees remove balance of film on area moistened.

Proceed with a second limited area in same manner. When all debris is removed, the surface shall be mopped thoroughly with clear water, allowed to dry, and then polished, preferably with machine polisher.

Note to Architect: Include next paragraph in specifications where high gloss finish is desired.

Color Waxing the Floor—After the Stainproof film has been removed and the floor is again dry, the surface shall be given an application of Master Builders Colorwax of the same color as the floor.

Dycrome Hardening and Coloring "After Treatment" for Finished Floors

Dycrome is a chemical compound which, applied to concrete surfaces, produces by chemical reaction with the cement a variety of permanent, attractive tints and colors. At the same time, Dycrome hardens and renders the surface wear-resisting and dustproof. Unusual color results are obtained as the degree of chemical reaction between Dycrome and cement varies on different parts of the floor, giving variegated tones that lend interest and distinctive character to the floor.

The colors include Flemish Oak, Weathered Bronze, Cordovan, Palmetto Green, Jade, and Nile Green, and various combinations of these colors in duo-tone effects.

Merits and Advantages—Dycrome can be applied to any unmarred plain cement floor that is clean, free from oils, greases and other foreign substances. This treatment is recommended for surfaces that were left as "plain cement" in the original specification, but which are later found to require a decorative finish. This is of material advantage to those erecting buildings to be occupied by tenants with varying requirements which cannot be incorporated in the original specifications, but must be provided before the tenants move in.

Complete Application Service—The Dycrome treatment may be applied by any capable contractor or workman, or on important jobs is applied by or under the direction of Master Builders Service, Inc., a corps of experts specializing in Dycrome applications.

Specifications

All cement floor toppings to be treated with Dycrome shall be of proportions 1 part standard portland cement and 2 parts clean, sharp sand. Before the cement is added there shall be mixed thoroughly into the sand 2 lb. of hydrated lime for every bag of cement used. Cement shall then be added and mixed dry, then tempered with just sufficient clear water to make a workable mortar. No integral or surface hardeners or waterproofers, other than Dycrome, shall be used.

All surfaces shall be given 2 hard steel trowelings and shall be left uniformly smooth and free from trowel marks. Joints shall be cut throughout the full thickness of the topping, where and as indicated on plans, and shall be kept clean and unmarred by troweling. All special jointing or marking as indicated on plans shall be exactly followed. Under no circumstances shall retempering of surface be done by sprinkling water, nor shall any cement be dusted on surface.

Curing of Cement Surface—All cement floors to be treated with Dycrome shall be cured by spraying once or twice a day with water for 4 days. If this is not possible, floors shall be covered 48 hours after final troweling with 2-in. layer of clean sand which shall be kept thoroughly wet for a period of a week. No building paper, sawdust, earth or shavings shall be used to cover floor.

Floors should be at least 30 days old before Dycrome is applied.

Protection of Cement Floor During Curing Period—Traffic shall be kept off floors for a period of not less than 4 days, and no heavy traffic shall be permitted until the Dycrome Process is fully completed.

Drop cloths shall be used to protect surface from staining by paint, putty, oils, solder paste, marking by wire insulation, or any other damage that may result from other crafts working over the floors.

These floors to be treated with Dycrome shall be turned over to Master Builders Service, Inc., or the Dycrome contractor, free from paint, grease, oil, scratches, mars, stains or other disfigurements which will in any way interfere with the Dycrome Processing or injure the final results.

The general contractor shall arrange to keep these areas free from interruption or trespassing during the application of the Dycrome treatment, and any surfaces that are injured by other crafts either before or after treatment shall be replaced or reconditioned at the expense of the craft responsible for the damage.

Weathered Bronze and Cordovan Dycrome Floor, in the Studio of F. R. Walker of the Firm of Walker & Weeks, Architects, Cleveland, Ohio

Special Finishes — *Dycrome Wax*—Interior areas are finished with Dycrome Wax, a special wax manufactured by The Master Builders Company, to emphasize the color values of Dycrome Floors and give the floors a smooth, soft feel under foot like that of linoleum.

Dycrome Stainless Oil—Exterior areas of floor subject to moisture or staining are finished with Dycrome Stainless Oil, which will not stain nor turn white when wet, an exclusive advantage with Dycrome treatments.

Continued on next page

Saniseal, Colorless Hardening and Dustproofing "After Treatment" for Plain Floors

SANISEAL

Saniseal is a corrective for concrete floors which have started to dust, crumble and disintegrate.

It is a liquid chemical preparation which combines with the lime in the cement, forming a new crystal that is exceedingly hard and wear-resisting. It changes the soft, porous surface to a flintlike hardness.

Saniseal is easy to use. No complicated dilutions or applications necessary. Except where a floor is particularly porous, 1 gal. of Saniseal will cover approximately 100 sq. ft.

It does the work overnight in most cases, thus preventing delays.

Specifications on request.

Master Builders Efflorex

Efflorescence on exposed walls of masonry buildings is an unsightly nuisance for which a permanent cure has long been sought. The complete remedy was found through the development by Master Builders Research Laboratories of Efflorex. Where masonry walls are waterproofed following construction with a product such as Masterseal (see below) efflorescence is prevented. Otherwise efflorescence often appears and even a thorough acid wash removes it only temporarily.

Master Builders Efflorex is a liquid chemical compound which, when applied in accordance with the manufacturer's directions, removes all signs of efflorescence and permanently waterproofs the wall against its return.

Master Builders Surface Waterproofings

MASTERSEAL COLORLESS SURFACE WATERPROOFING

TRADE-MARK

Master Builders Masterseal—A specially prepared transparent colorless liquid for waterproofing the exposed surfaces of brick, stucco, stone or concrete walls, where it is necessary or desirable to retain the original appearances. Protects surfaces indefinitely against disintegration, stain, efflorescence, mildewing, checking, cracking, spalling, etc.

Masterseal is a permanent treatment that renders the surface, including the mortar joints, waterproof, by introducing a highly water-repellent element into the surface pores. The penetration is greater than that of the usual treatment. The treatment prevents dirt, grime, soot, etc., from becoming embedded in the pores and, as a result, makes cleaning of the surface easy.

Masterseal is manufactured from a solid hydrocarbon base which is acidproof and alkaliproof, and insures permanency.

Specifications—Master Builders Masterseal shall be applied in 2 coats to all surfaces as indicated, and shall be applied exactly in accordance with the manufacturers' directions.

E. W. Goebel Residence, Kansas City, Mo.
E. W. Tanner, Architect
Waterproofed with Masterseal

MASTERTEX

TRADE-MARK

Master Builders Mastertex—A waterproof cement-base coating that both decorates and waterproofs concrete, brick, stucco, and other masonry surfaces. Colors are White, Brick Red, Blue, Light Green, Cream Ivory, Light Gray, French Gray, Dark Gray, Brown and Pink.

Applied with equal success on exterior or interior surfaces. It can be applied to wet surfaces, such as moist basement walls, fresh stucco, fresh reinforced concrete or surfaces of tanks, vats, pools, etc.

Mastertex takes a set like that of concrete, forming an insoluble, non-porous, crystalline coating which, unlike oil paints, is not affected by extreme weather conditions nor by any of the elements in the concrete. Does not dry out to a chalky, dusty coating; does not wash or rub off. An ideal white coating for common brick houses. Does not check, peel or turn yellow.

By excluding air and moisture from reinforced concrete both Mastertex and Masterseal prevent cracking or spalling due to the corrosion of reinforcing metal and overcome this common form of disintegration which is both difficult and expensive to repair.

Specifications—Master Builders Mastertex shall be applied in 2 coats to all surfaces as indicated, and shall be mixed and applied exactly in accordance with the manufacturers' directions.

George Feiss Residence, Shaker Heights, Ohio
Maier & Walsh, Architects
Common brick painted with white Mastertex

Continued on next page

Master Builders Integral Waterproofing for Mass Concrete and Cement Mortar

Master Builders Waterproofing Liquid (Concentrated)—Added to the gauging water. Waterproofs by depositing insoluble, water-repellent coating. Increases colloid formation. Requires less water to complete hydration. Produces high initial strength.

Because its use is so simple and easy—the workmen merely adding it to the gauging water, which carries it to every part of the mix—complete, efficient results are insured. No extra labor needed for weighing out, dissolving or mixing; hence, nothing can be neglected to the detriment of the job.

Specifications—Master Builders Waterproofing Liquid, Concentrated, shall be added to the gauging water in the proportions of ⅔ qt. of Waterproofing Liquid to each bag of cement in the mixture to be gauged. This requires 1 gal. per cu. yd. for 1:2:4 concrete.

Concrete shall be poured as dry as consistent with good practice, shall be placed in one continuous operation, and shall be thoroughly spaded to procure uniform density.

Special care shall be taken to clean and roughen the surfaces of previous pourings that have been set before placing additional concrete.

Master Builders Waterproofing Powder—An insoluble, water-repellent powder which coats cement particles, preventing seepage. Permanent insolubility insures permanent watertightness. Prevents the early evaporation of moisture, thereby increasing the colloid formation.

Specifications—Master Builders Waterproofing Powder shall be mixed dry with the portland cement in the proportions of 8 lb. of Waterproofing Powder to each barrel of cement (400 lb.) used. This mixture shall be thoroughly stirred so that a complete and uniform mixture is assured.

This mixture of Waterproofing Powder and cement shall then be added to the other aggregates. The whole volume shall then be thoroughly mixed until a uniform color and mixture is obtained, before adding the tempering water.

Master Builders Waterproofing Paste—A white, concentrated paste which is dissolved readily in the gauging water and is carried to every part of the mass. Produces a stable, water-insoluble, water-repellent crystal, which coats cement particles, nullifying the capillary action.

In complicated formwork it is sometimes considered necessary to use an excessive amount of water to obtain proper flowability of the mixture; with Master Builders Waterproofing Paste less gauging water is required to give complete hydration and proper flowability. Increases colloid development, colloid swells to fill the voids thus giving double protection against percolation of water.

Specifications for Waterproofing Mass Concrete—To 6 lb. or three qts. of Master Builders Waterproofing Paste add 1 gal. of water, and stir to a smooth mixture.

Use this mixture, together with sufficient clear water (about 33 gal. additional) to hydrate 1 barrel (400 lb.) of cement and its corresponding sand and stone, which shall be in the proportions of 1 part cement, 2 parts sand, 4 parts stone.

Special care shall be taken to clean and roughen the surface of previous pourings that have become set before placing additional concrete.

Specifications for Waterproofing Cement Mortar—To 6 lb. or 3 qt. of Waterproofing Paste add 1 gal. of water and stir to a smooth mixture.

Use this mixture, together with sufficient clear water (about 16 gal. additional) to hydrate 1 barrel of cement (400 lb.) and its corresponding sand, which shall be in the proportions of 1 part cement, and 2 parts sand.

Master Mix—A chemical admixture, a combination concrete hardener and waterproofer, which is added to the gauging water. Refer to page A84 for description and functions of this product.

Master Mix
CONTROLS CONCRETE

Specially recommended for winter construction of brickwork and masonry, as it improves the workability and increases the density of cement mortar, hardening and waterproofing the joint, doing so uniformly regardless of temperature down to 15° F.

Specifications for Waterproofing Brick Masonry—Mortar in which bricks are laid shall be 1 part cement and 2 parts sand. Mortar shall be tempered with water to which has been added 1 gal. Master Mix to each 10 gal. of water. Carefully grout each course of brick, taking care that all joints are filled with mortar.

Specifications for Waterproofing Mass Concrete—Master Builders Master Mix shall be added to the gauging water for mass concrete in the proportions of 1½ gal. of Master Mix per cubic yard of concrete.

Master Builders Metallic Waterproofing

Metallic Waterproofing—A perfectly graded uniform metallic powder used on outside or inside face of concrete or other masonry surfaces to make them impervious to water, even under pressure. Its application varies with the conditions to be remedied.

Specifications and Data—On request.

Master Builders Dampproofings

Master Builders Plaster Bond—For application to the inside of exterior walls. Prevents dampness from passing through exterior walls into the atmosphere of the rooms, insulates and prevents staining and discoloration. Forms a perfect bond between surface and plaster coat.

Foundation Coating—For coating exterior walls below grade. Semipliable, yielding to expansion and contraction without breaking, checking or peeling.

Specifications for the Use of Plaster Bond and Foundation Coating—Master Builders Plaster Bond [Foundation Coating] shall be applied to all surfaces indicated, strictly in accordance with the manufacturers' directions.

Supplementary Literature and Samples

All products described in greater detail, in either concise data manuals suited for the architect, or more descriptive catalogues for the layman, all 8½x11 in., indexed and tabbed for A. I. A. filing.

These booklets, as well as specimen blocks of concrete treated by each Master Builders Method and mounted on file-size boards, are sent without charge upon request.

MINWAX COMPANY, INC.

Engineers and Manufacturers of Waterproofing and Protective Products

11 West 42nd Street, NEW YORK, N. Y.

BRANCH OFFICE: CHICAGO, ILL., 230 East Ohio Street

FACTORY: DELAWANNA, N. J.

REPRESENTATIVES

Refer to Local telephone directory listing in the following cities:

ATLANTA, GA.	CHARLOTTE, N. C.	DETROIT, MICH.	MINNEAPOLIS, MINN.	RICHMOND, VA.
BALTIMORE, MD.	CINCINNATI, OHIO	FORT WAYNE, IND.	PHILADELPHIA, PA.	SAN FRANCISCO, CAL
BOSTON, MASS.	CLEVELAND, OHIO	JACKSONVILLE, FLA.	PITTSBURGH, PA.	ST. LOUIS, MO.
BUFFALO, N. Y.	COLUMBUS, OHIO	LOS ANGELES, CAL.	PORTLAND, ORE.	TAMPA, FLA.
		MIAMI, FLA.		

CANADIAN REPRESENTATIVE: The Raines Co. of Canada, 1008 Anderson Street, MONTREAL, QUE.

Products

Waterproofing, Dampproofing, Asphalt Products, Protective Coatings and Finishes. (See "Guide" below.)

TRADE MINWAX MARK

Consultation and Service

The pages which follow present, in condensed form, complete data on Minwax products. A more detailed discussion is furnished in separate bulletins, which will be gladly furnished on request. Our engineers will present complete recommendations on design and specifications and furnish estimates either on the entire problem or on some specific detail or question. Consult with local representative where possible, or write direct giving details as completely as practicable.

Through 24 years of study and experience in this field, our purpose has been to develop for each problem the material best suited for that particular group of conditions. The record of accomplishment made by each product establishes its outstanding efficiency and permanence, and, in many cases, has created new standards of service.

To list or recount the accomplishments of these years in the limits of this catalogue is impracticable, but complete detailed data and a list of nearby installations will be gladly furnished on request.

To assist the architect in immediately locating information on the kind of work he is interested in, we are furnishing a paragraph index below. Necessarily this index cannot perfectly cover all the possibilities of the several materials, but the heading and descriptions will suggest further uses.

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Minwax Membrane Waterproofing System

(1) For Bridges, Pools, Reservoirs, Tanks, Subways, Floors, Roofs, Foundations, Sidewalks, etc.—The Minwax Membrane System is the original cotton fabric or elastic system. It consists of hot moppings of Minwax Waterproofing Asphalt reinforced with Minwax Fabric which has previously been saturated with the same asphalt.

The asphalt possesses four requisite qualities to an unusual degree: Permanence, elasticity at all temperatures, toughness at all temperatures, and smooth flowing and high filming qualities.

Minwax Fabrics are woven from a long-fiber cotton and embody to the highest possible degree all the necessary properties: permanence, strength and elasticity at all temperatures, ease in handling and placing without wrinkles. They become an integral part of the mopping courses.

Note: The Minwax Company, Inc. manufactures two standard Fabrics: Specification Fabric 80-lb. strength, Cotton Cord Cloth 50-lb. strength. Higher strength will give greater protection and is generally recommended. Bulletin No. 31 gives complete data.

Uses—The Minwax Membrane System is recommended by the Joint Committee on Concrete and Reinforced Concrete for *all locations* where thorough waterproofness is required. Being elastic and stretchable, it is the logical system for slab, pool, floor or deck conditions exposed to variations in temperature or vibration where danger of cracking or checking definitely exists.

Tests—Pittsburgh Testing Laboratories show an elasticity of over 10% for the completed waterproofing.

Tests by Columbia University show that the completed waterproofing will stretch, without rupture, ¼ in. at 0° F. under field conditions.

Tests by the Pittsburgh Testing Laboratories show that the completed 2-ply unsupported membrane is waterproof up to a bursting pressure of 374 lb. per sq. in.

Approvals—Since introduced by this company in 1906, the Minwax Membrane System has established the standard of waterproofing efficiency. The results obtained with the Minwax System definitely established the superiority and greater final economy of the cotton fabric system over all others in the face of slightly higher first cost, and largely formed the measure for the standards established by the American Society for Testing Materials, American Specification Institute, Federal Specifications Board and the United States Bureau of Standards.

Minwax materials meet and exceed all requirements of these specifications and deliver many valuable properties which could not be included in a general open specification.

Number of Plies—Two plies of fabric and three moppings of asphalt for average conditions; use a third ply on heads of over 15 ft. or under difficult working conditions.

Covering Capacity—Use 12½ yd. of fabric per ply and 4 to 5 gal. of asphalt per mopping for each 100 sq. ft. of surface.

(2) How Shipped—Fabric, 50-yd. rolls 36 in. wide; asphalt, 50-gal. sheet metal drums.

Specification—The waterproofing shall consist of not less than 2 plies of Minwax Specification Fabric [Cotton Cord Cloth] and 3 moppings of Minwax Waterproofing Asphalt applied by experienced mechanics in accordance with the manufacturer's directions.

All surfaces shall be smooth, firm and temporarily dry. Completed work shall be protected from puncture.

(3) *Slabs, Sidewalks, Floors, Promenades, etc.*—Membrane waterproofing shall be continuous, extending over and into expansion joints and connected to wall waterproofing, or flashed 3 in. above finished grade.

(4) *Pools, Tanks, etc.*—Reinforce all corners and angles with 18-in. strip. Build first ply on walls, lapping 6 in. out on floor. Build two-ply on floor, lapping 6 in. up on wall. Build second ply on walls. Provide 9-in. flange on all pipes for flashing. Waterproofing shall turn over top of wall and across floor where necessary. Use third ply on pools in upper stories.

Note: Do not place tile directly on waterproofing membrane. There should be a minimum of 3 in. of concrete or 4 in. of brick between tile and waterproofing.

(5) *Showers*—Two-ply membrane waterproofing shall be installed continuous over entire surface of the shower stall floor, and shall extend up on sidewalls or curbing at least 6 in. In no case shall this distance be less than 3 in. above finished shower stall floor level. Waterproofing on walls shall be 1-ply carried to height shown.

Note: Tile can be applied over membrane in stalls only. In rooms handle as for swimming pools.

(6) *Foundations*—From grade, membrane waterproofing shall be carried down outside of walls, through at footings, across basement floor, under and around all pits and trenches, and under or up all columns, forming a complete, watertight envelope. Protect all waterproofing with 1-in. coat of cement mortar.

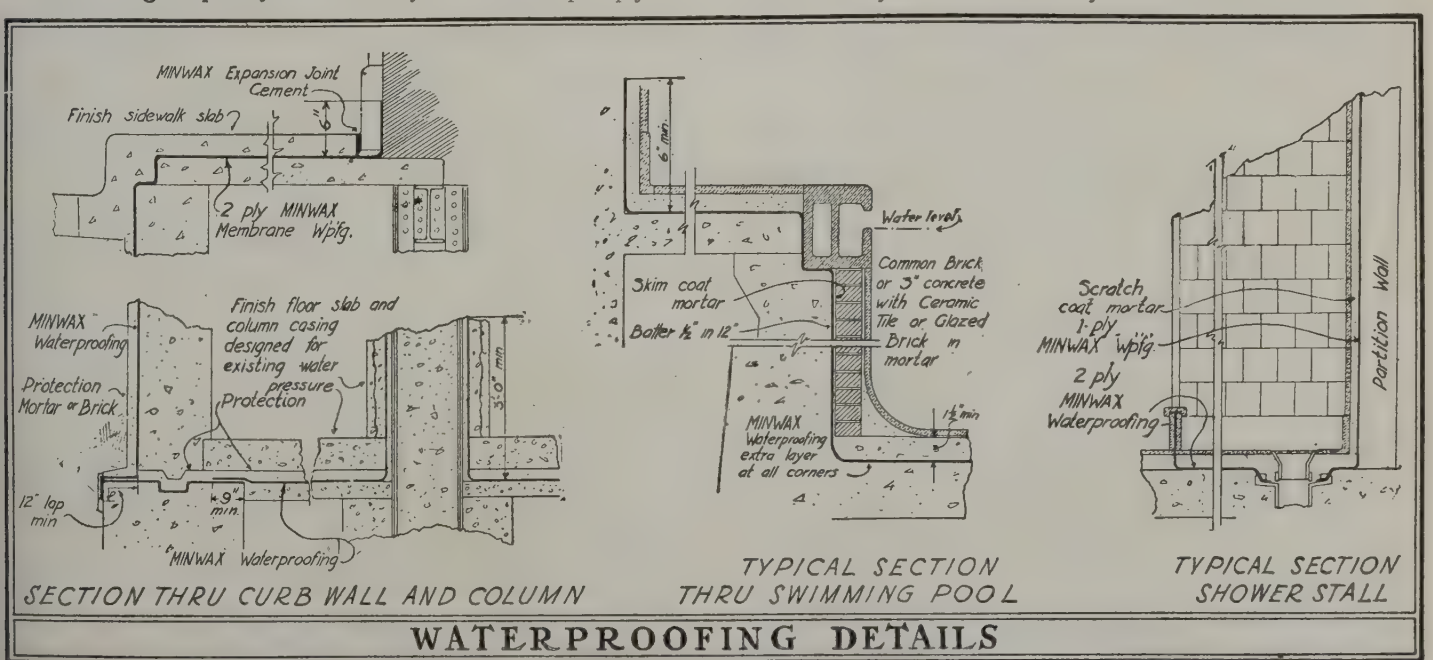
Where impossible to work outside of wall, build brick course against sheathing, apply waterproofing and cast wall against same.

Where waterproofing must be applied inside structural walls, cover same immediately with concrete designed to hold existing pressure.

Provide pumping to remove all pressure and seepage, and keep surface dry during waterproofing and until concrete has set.

Minwax Fibrous Brush Coat (Semi-mastic)

(7) For Dampproofing the Backs of Abutments, Retaining Walls, Foundations, Underneath Plaster, etc.—This material is applied cold (as delivered) with a long handled roofer's brush. It eliminates heating equipment cost, wastage, etc. It is a combination of Minwax Asphalts and special graded asbestos fiber. The asphalts penetrate the surface and a soft, sticky, fibrous skin is formed which closely approximates a full membrane system in efficiency.



SECTION THRU CURB WALL AND COLUMN — TYPICAL SECTION THRU SWIMMING POOL — TYPICAL SECTION SHOWER STALL

WATERPROOFING DETAILS

Continued on next page

This coating can not be chipped or flaked off, and backfilling handled in a normally careful manner will in no way cut or damage it.

Covering Capacity—Approx. 100 sq. ft. per gal. per coat.

(8) How Shipped—In 5, 30 and 55-gal. containers.

Specification—Walls shall be coated from grade to footing with 2 thorough applications of Minwax Fibrous Brush Coat, allowing 12 hours to elapse between coats. Materials shall be applied cold, without adulteration, with a long handled roofer's brush and well brushed into all surfaces, leaving no voids. Backfill in not less than 12 hours, exercising care to prevent damage of surface. Material shall be thoroughly stirred before and during application.

Note: It is important to provide subsoil drainage to carry off water and prevent development of hydrostatic pressures.

Special Asphalt Fillers for Sidewalk Lights, Grooves, Expansion Joints, etc.; Putties and Caulking Compounds

(9) Minwax Vault Light Cement—An asphaltic cement for sidewalk or vault light joints and other horizontal grooves and joints as in promenade decks, etc. It develops a strong watertight bond to concrete, stone or metal and its reliability has made it a standard in the trade. It will not "stew" under sun action or become brittle in cold weather. Use only in joints and grooves that are nearly level. Prime the joints with Minwax Asphalt Primer, heat the Minwax Vault Light Cement and pour it into the joints.

(10) Minwax Fibrous Expansion Joint Cement—For expansion joints in waterproofing membrane or joints where there is considerable movement. Prime the joints with Minwax Asphalt Primer, heat the Fibrous Expansion Joint Cement and pour it into the joints.

How Shipped—Both Minwax Vault Light and Fibrous Expansion Joint Cement are shipped in 1, 5 and 25-gal. containers (231 cu. in. per gal.).

(11) Minwax Caulking Rope—A moulded, fibrous, asphaltic rope for vertical joints, grommets, etc. Prime surfaces before using. Made in $\frac{3}{16}$, $\frac{5}{16}$ and $\frac{7}{16}$-in. sizes. Shipped as desired.

(12) Minwax Asphalt Primer—Thin liquid primer to assure perfect bond. Allow at least 1 hour after application.

(13) Minwax Asphalt Caulking Compound—A black fibrous asphaltic putty compounded of Minwax Asphalts and asbestos fiber for caulking around windows. Will not harden or become brittle. Applied cold as received, this material is of proper consistency for use in hand caulking gun or with trowel.

Covering Capacity—1 gal. fills 45 to 70 ft. of ½-in. joint.

(14) Minwax Caulking Compounds Nos. 1 and 2 (Gray)—A special elastic non-staining composition that never becomes hard and adheres strongly to all materials. Made in standard gray, special colors extra. When filling joints in stone or wood, first coat the sides of joint with Minwax Caulking Primer, a special non-staining priming liquid. Used also for glazing in steel or wood sash. Made in consistencies: No. 1 for hand gun, No. 2 for trowel.

How Shipped—5, 25, 50, 100, 500 and 800-lb. containers.

(15) Specifications—*Wood Windows, Doors, etc.***—Pack space to within ¾ in. of face with oakum and fill solidly with Minwax Asphalt Caulking Compound forced in with hand caulking gun. Replace staff bead, or finish to smooth triangular bead.

(16) *Steel Windows***—For new work butter inside edge of masonry opening or surfaces of sash to be embedded, with thin coat of Minwax Asphalt Caulking Compound. Caulk finished job or old work around head, jamb and sill carefully with Minwax Asphalt Caulking Compound, finishing to neat bead.

**Note:* Use Minwax Caulking Compound (Grey) where color or non-staining is essential.

(17) *Pointing Stone, Terra Cotta, etc.*—Rake out all joints for elastic pointing ¾ in. deep. Paint sides thoroughly with Minwax Caulking Primer. and fill with Minwax Caulking Compound, color to match or as selected. Horizontal joints in copings, cornices, sills, etc., especially important.

(18) Minwax Fibrous Mastic—A stiffer grade asphaltic putty for application with trowel. Especially valuable for damp courses and for making tight joint between concrete and brick or for shrinkage joints in concrete. Bonds firmly to fresh concrete or mortar.

Covering Capacity—1 gal. spreads over 10 to 14 sq. ft., ⅛ in. thick.

How Shipped—Minwax Fibrous Mastic shipped in 1, 5, 30 and 55-gal. containers.

(19) Specifications—*Waterproof Cut-off for Damp Courses, Window Sills and Heads, Parapets, Footings, Joints, etc.*—Prime surface with Minwax Asphalt Primer and trowel on good heavy coat of Minwax Fibrous Mastic. Set masonry, sill or coping. For severe exposures use fabric reinforcing as recommended in paragraph 20. Caulk coping joints with Minwax Asphalt Caulking Compound or Caulking Compound (Gray).

(20) *Spandrel Waterproofing*—Apply 2 good trowel coats of Minwax Fibrous Mastic reinforced with 1 layer of Minwax Cotton Cord Cloth, extending from within 1 in. of face of wall at base of beam, up face and across top of beam, under back-up tile, turning up 4 in. or connecting with inside dampproofing.

Minwax Bituloid (Emulsified Asphalt) Plain for Brush Application, Fibrous for Trowel Application, Fibrated Flooring for Mixing with Sand, etc.

(21) Minwax Bituloid consists essentially of fine asphalt particles suspended in water and has the same protective value as a hot mopped-on coating of acidproof asphalt without the difficulty and expense of the latter. Minwax Bituloid adheres perfectly to damp surfaces. Applied cold with brush or spray, it reaches cracks and corners apt to be overlooked in mopping. Made plain and fibrous for brush or trowel application.

(22)—In addition to its use as dampproofing, Bituloid can be mixed with sand and cement for flooring or floor patching and is especially valuable for cork protection in refrigeration work.

Covering Capacity—Average 80 sq. ft. per gal. per coat.

How Shipped—In 1, 5, 30 and 50-gal. containers.

(23) Specifications—All surfaces to be coated shall be free from oil and loose scale. No coating work shall be carried on at a temperature below 40° F.

Apply 2 generous coats of Minwax Bituloid, flowing it on with a soft, long bristle brush, or use a spray. Allow first coat to become touchdry before applying second coat. Shall be applied in consistency as received, first stirring it thoroughly.

Minwax Transparent Waterproofings for Waterproofing, Frostproofing, Stainproofing and Preserving Concrete, Brick, Stucco and Stone

(24) There are three types of Minwax Transparent Waterproofings: Minwax Clear Waterproofing for concrete, stucco, stone and brick surfaces; Minwax Heavy Clear Waterproofing for especially porous brick, stucco or concrete and for surfaces subject to immersion; Minwax Colorless Waterproofing for limestone, artificial stone, cream faced brick and other light colored surfaces. These three types are necessary to most efficiently meet the wide variety of conditions and materials for which a penetrative surface waterproofing is required.

Advantages—All Minwax Transparent Waterproofings are liquids applied as received with a brush or spray. Ease of application assures positive effective results regardless of the character of the surface. When applied they penetrate into and below the surface for a considerable depth, sealing all pores and making the material waterproof. There is, therefore, nothing to be worn off, broken through or to scale loose; the waterproofing is really inside the surface. Minwax Transparent Waterproofings are applied as the final application, protecting the finished job, sealing craze checks and porous spots. They are independent, positive insurance against moisture penetration. Their waterproofing value is highly permanent, the result of the mineral wax base, and is proven by 24 years' service and test.

How Shipped—All Minwax Transparent Waterproofings are shipped in 1 and 5-gal. cans, 30 and 55-gal. drums.

(25) Minwax Clear Waterproofing—For concrete, stucco, stone and brick surfaces. A light amber-colored liquid which, when applied, penetrates deeply into the surface and cures, depositing a tough mineral

Continued on next page

gum which, in two applications, will completely fill and seal the surface. Its action is purely physical or mechanical rather than chemical and is absolutely positive and independent of the nature of the surface to be waterproofed. It does not form any film or deposit on the surface or change the texture in any way. It changes the color slightly, which change decreases in time.

Covering Capacity—Saturate surface. Generally requires 1 gal. for each 200 to 250 sq. ft. per coat on concrete and stucco; 150 to 200 sq. ft. per coat on brick.

(26) ***Specification***—*General*—Surfaces shall be thoroughly dry, clean, sound and carefully pointed. No work shall be done at wall temperatures below 50° F. Brush dirt and dust off surface and apply 2 thorough coats with a brush or air spray, saturating and working the material into every part of the surface at each coat. Waterproofers shall do further incidental pointing, rubbing Minwax Pointing Paste into small cracks or holes immediately after application of first coat. Allow 24 hours between coats.

(27) *Wall Waterproofing*—All exposed surfaces must be waterproofed from roof flashing over and including coping and down outside surface to grade. Test all brick joints and repoint as necessary, repairing or replacing loose stucco or concrete. Test and carefully recaulk all window and door frames. (See Minwax Caulking Compounds.) Apply 2 coats as above specified.

(28) *Preventing Efflorescence*—Wall must be allowed to become absolutely thoroughly dry, work should only be undertaken under most favorable conditions. Clean off efflorescence with wire brush or dilute muriatic acid solution. When surface is thoroughly dry proceed as above for wall waterproofing.

(29) Minwax Heavy Clear Waterproofing—For especially porous brick, stucco or concrete and for surfaces subject to immersion. This material is heavier grade having a larger percentage of mineral wax and is applied and functions in the same way as Minwax Clear Waterproofing.

Covering Capacity—*See Minwax Clear Waterproofing.*

Specifications—*See Minwax Clear Waterproofing.*

Special Note: No work shall be done at temperatures below 60° F.

(30) Minwax Colorless Waterproofing—For limestone, artificial stone, cream colored face brick and light colored surfaces. This material, developed from Minwax Clear Waterproofing, deposits a superrefined mineral wax supplemented by certain preservative water-repellent chemicals and causes absolutely no change in color even on the lightest surfaces.

On artificial and natural stone, Minwax Colorless Waterproofing performs three important functions: (1) Applied at the mill it protects the surface of semicured stone from absorption of dirt and stain while in transit and prior to setting. (2) In the completed job it waterproofs the exposed surface so as to prevent the accumulation of grime and stain and assists in keeping the building in a light, clean condition. (3) It prevents water and frost action and serves as a protective preservative treatment against disintegration and weather.

Covering Capacity—Saturate surface. Generally requires 1 gal. for each 150 to 300 sq. ft. per coat.

(31) ***Specifications***—*General*—Same as for Minwax Clear Waterproofing except that this material can be satisfactorily applied at temperatures down to 35° F.

(32) *Cut Stone* (new)—All stone shall be absolutely clean and dry before application of the waterproofing. After erection and cleaning and when dry, all exposed surfaces shall receive the second thorough saturating coat of Minwax Colorless Waterproofing. Special attention shall be paid to horizontal and projecting surfaces, as at cornices, copings, etc.

(33) *Existing Stone Work*—Surfaces shall be cleaned down by washing with soap and water or sandblasting and shall receive 2 thorough saturating coats of Minwax Colorless Waterproofing applied with a brush or spray, 12 hours between coats.

Minwax Brick and Cement Coating for Waterproofing and Decorating Exposed Surfaces of Cast Concrete, Brick or Stucco

(34) This Minwax product is a pigment coating produced in a series of attractive flat color tones. It is a combination of the highest grade inert mineral pigments obtainable in a carrying vehicle based on Minwax Clear Waterproofing (one of the oldest, best known and most efficient mediums for exposed wall waterproofing).

This vehicle not only binds the coating on the wall surface so that it stays put, but it penetrates and eliminates the porosity factor and thus prevents the possibility of a dusty, loose coating.

It is not saponifiable and will not burn or peel from alkali action. The coating penetrates and becomes part of the concrete or brick, and the Minwax Clear Waterproofing vehicle penetrates well below the surface and permanently waterproofs it.

The effect produced is flat, without a painty sheen. It changes the texture of concrete or stucco but slightly and maintains the tone of the structural material and gives it the fresh, clean, uniform color selected. On masonry and brick, it gives a whitewash effect.

Applied with a brush or spray. Handles with unusual ease. Covers rapidly and effectively.

Uses—Because Minwax Brick and Cement Coating is primarily a waterproofing, it is a very efficient means of decorating and beautifying concrete, brick or stucco and of preserving them from the disintegrating effects of water and frost

Recommended also as a coating for light courts where a durable, fadeproof, white surface is desired.

Colors—Finished in 11 standard colors: white, cream, yellow, cement gray, limestone gray, caen stone, green, brownstone, terra cotta, water blue and brick red. Special colors extra.

Covering Capacity—Varies between 160 and 250 sq. ft. per gal. per coat, depending upon the roughness and porosity of the surfaces to be treated.

How Shipped—In 1, 5, 30 and 55-gal. containers.

(35) Specifications—***General***—All exposed surfaces as directed shall receive 2 thorough coats of Minwax Brick and Cement Coating, color as selected. These surfaces shall be thoroughly dry, clean and sound, and shall be subject to the approval of painter before work proceeds. They shall be brushed to remove dust immediately before application of first coat. No work shall be carried on at temperatures below 45° F. The first coat shall be thinned with Minwax Brick and Cement Thinner according to the porosity of the surface. (Average conditions require from 10% to 20%.) Painters shall do incidental pointing of open cracks or joints rubbing them full of Minwax Pointing Paste immediately after first coat is applied, brushing surplus from edges of crack and retouching to uniform appearance. When dry retouch light spots in surface with first coat mixture. After 48 hours apply second coat using material as received.

Note: It is especially important that parapets and horizontal surfaces should be done with greatest care. For dampproofing work all exposed surfaces from roof flashing to ground must be coated as per paragraph 27.

(36) ***Newly Laid Brick Walls or New Cast Concrete Surfaces***—Shall receive 1 saturating coat of Neutralizer (see paragraph 38) to be followed when thoroughly dry by the first coat of Minwax Brick and Cement Coating.

(37) ***Old Work***—A sound solid surface must be obtained to get satisfactory service from coating. Wire brush surface thoroughly and repair and repoint all loose mortar or concrete. Use Minwax Pointing Paste for filling small cracks and holes.

(38) Minwax Neutralizer—This is a solution of 2 lbs. of zinc sulphate in 1 gal. of water which preages the concrete surface, assuring maximum coverage and effectiveness from Minwax Brick and Cement Coating. For all new work.

Covering Capacity—150 sq. ft. per gal. One saturating coat required.

How Shipped—1, 5, 30 and 50-gal. containers.

(39) Minwax Pointing Paste—A special putty for filling small cracks and holes in stucco, concrete or brick work. Rub in crack after first coat and remove surplus from edges with stiff brush. Can be mixed with wet Portland cement to stiffen for larger cracks.

Colors—The same as Minwax Brick and Cement Coating.

How Shipped—½, 1 and 5-gal. cans.

Minwax Plasterbond Dampproofing

(40) Applied in 2 good brush or spray coats to inside of wall beneath the plaster finish. It cures tacky and remains pliable and elastic indefinitely. It forms a tough, rubberlike, absolutely impervious, waterproof and dampproof skin that bonds securely to wall and plaster. It eliminates furring and prevents staining.

Covering Capacity—80 to 125 sq. ft. per gal. per coat.

How Shipped—In 5, 30 and 55-gal. containers.

Note: Not recommended for concrete ceilings or conditions where the weight of the plaster may be largely suspended on the coating.

Continued on next page

Minwax Treatments for Concrete, Terrazzo, Tile and Composition Floors

(41) **Minwax Concrete and Terrazzo Floor Finish**—Fills the pores in the surface and subsurface of concrete floors with a tough mineral gum. Applied cold as a liquid after the floor has dried and cured, its action is mechanical and positive, creating an absolutely dense smooth surface. It thus eliminates the cause of dusting and disintegration and prevents the penetration of water, stains or liquids of any sort. The mineral gum is highly resistant to and gives maximum protection against the action of *brine, creamery and packing plant acids, or oils and dilute acids* found in industrial plants, and makes the floors highly *sanitary*.

On terrazzo and marble tile it brings out color, creates an easily cleaned sanitary surface and prevents dusting and staining. On composition and magnesite it prevents stains, disintegration by water and kills salts.

Covering Capacity—Concrete and composition, 200 to 400 sq. ft. per gal. per coat; terrazzo, marble and tile, 400 to 600 sq. ft. per gal. per coat.

How Shipped—In 1, 5, 30 and 55 gal. containers.

(42) ***Specifications***—*Concrete, Magnesite, etc.*—Floors shall be clean and dry. For concrete and composition floors, apply 2 saturating coats with "T" head cotton floor mop leaving no puddles or excess material, allowing 12 hours to elapse between coats. Second coat to cure 24 hours before using.

(43) *Terrazzo, Tile, etc.*—Mop up surface with water to remove all dust and as soon as surface appears uniformly dry apply first coat of Minwax Concrete Terrazzo Floor Finish. Cross-mop first coat to even out and take up surplus. After 24 hours apply second coat in same manner. Dense tile or terrazzo should be wiped up with dry rags 2 hours after each coat.

(44) **Minwax Colored Concrete Floor Finish**—Penetrating and permanent stain colors are added to Minwax Concrete and Terrazzo Floor Finish at the factory and the Minwax Colored Concrete Floor Finish delivered on the work ready for use. These stains bite well into the surface, giving a soft textured color that will resist even concentrated wear. It is especially valuable for integrally colored concrete and magnesite floors that show uneven appearance.

Covering Capacity and Shipping Packages—Same as Concrete and Terrazzo Floor Finish.

Colors—Tile red, linoleum brown and cement gray.

(45) ***Specifications***—Floors shall be clean, dry and absolutely free from dust and stain. Apply 1 thorough coat of Minwax Colored Concrete Floor Finish with a mop, cross-mopping the surface half hour after application to spread material uniformly. After 24 hours apply second coat in exactly the same manner, and about 2 hours after applying the second coat, wipe up the surface thoroughly with dry rags. Polish in not less than 48 hours with Minwax Finishing Wax in color to match.

(46) **Minwax Concrete Floor Binder**—This material is a heavier special grade developed from Minwax Concrete and Terrazzo Floor Finish and is designed for binding together the surface and subsurface particles of a granular, soft or sanding concrete floor.

It is not recommended for average sound concrete floors. On such surfaces Minwax Concrete Terrazzo Floor Finish should be specified and used.

Packages—Same as for Minwax Concrete Floor Finish.

(47) ***Specifications***—2 thorough coats applied with long handled brush. First coat thinned 10% with turpentine.

Minwax Concrete Floor Paint

(48) A high quality long-lived durable floor enamel. Two coats recommended.

Standard Colors—Buff, light gray, dark gray and red.

Covering Capacity—500 sq. ft. per gal. per coat.

Minwax Finishes for Wood Floors and Trim

(49) **Minwax Flat Finish**—For finishing, preserving and staining wood floors and trim. A combination of certain carefully blended oils and mineral waxes in the natural and carrying a series of clear stain colors. Applied in saturating coats, it penetrates rapidly, filling the wood with a tough mineral gum. In its natural or clear color (without stain) it does not darken the wood, but by waterproofing and stainproofing, insures the permanence of the clean, fresh surface.

Effects—In general, the effects produced are of the natural wood stained to the color selected and with a soft waxy sheen. A paste filler can be used where a closed, uniform surface is desired and where the wood is open grained.

Economical in First Cost and Maintenance—Minwax Flat Finish offers important savings, not only in first cost, but in cost of maintenance. It accomplishes results in 2 easily applied coats, reducing the cost per square foot of finished woodwork to the minimum.

It is non-fading and sunfast, highly water-repellant and water-resistant, and will give unusual service on exterior trim exposed to the weather. Under all conditions maintenance is startlingly simple—a cloth dampened with Minwax Flat Finish and used to wipe down the surface will brighten and renew the finish without showing patches or laps, and, periodically used, will maintain permanently and enhance and enrich the beauty of the finish.

Colors—Minwax Flat Finish is made in the following stain colors: No. 9 (natural); No. 11 (light oak); No. 12 (dark oak); No. 13 (walnut); No. 716 (dark walnut); No. 750 (Jacobean); No. 15 (mission green); No. 16 (mahogany).

How Shipped—1, 5, 30 and 55-gal. containers.

(50) ***Specifications***—*Trim*—Wood shall be clean, dry and carefully sanded and shall be stained and finished with 2 coats of Minwax Flat Finish applied with a brush and in color as selected. Each coat shall be wiped with rags in 2 to 6 hours to remove surplus. Allow 12 hours between coats. Do not apply at temperatures below 55° F.

(51) *Floors*—Wood shall be clean and dry and shall be carefully scraped or sanded with the grain (all old finish, varnish, shellac or wax shall be removed). Apply 2 coats Minwax Flat Finish, color as selected, as directed for trim. Protect and, on completion of building, clean floors and polish with weighted brush or electric polisher. For high polish apply Minwax Finishing Wax before polishing.

(52) *Maple Floors (Partial Penetration)*—Apply 2 thorough saturating coats of Minwax Flat Finish No. 9 in accordance with above directions, using special care to remove all surplus after each coat. Close off the floors and protect them against traffic for at least 3 days to permit perfect curing of the materials. Then cover the floor with paper or clean sawdust until ready for final occupancy.

Note: The stain colors are not recommended for maple floors.

(53) **Minwax Penetrating Finish**—Will penetrate the full thickness of 1-in. flooring, sealing and filling the surface and protecting the whole body of the wood, will retard dry rot, warping, swelling, etc. Curing to a tough gum, it binds the surface fibers with tough wear-resisting material.

(54) ***Specification***—*(Complete Penetration)*—Apply 1 thorough even coat of Minwax Penetrating Finish with a brush using 1 gal. for each 350 sq. ft., working it well into the wood. Wipe up the surface thoroughly with clean cloths in not less than 12 nor more than 24 hours after application to remove any excess material. Close off the floor from traffic for from 1 week to 10 days. If necessary, floors can be washed with soap and cold water after thoroughly cured.

(55) **Minwax Acid Stains**—True fuming water stains that develop and burn the color on and into the surface of the wood. Produced in three tones: No. 120, light fume; No. 122, Flemish; No. 123, dark Flemish.

Shipped—In ½, 1 and 5-gal. glass containers.

Covering Capacity—Approximately 300 sq. ft. per gal.

(56) ***Specification***—Apply Minwax Acid Stain with a brush or sponge as conditions require. Sand lightly when dry and apply Minwax Flat Finish, color to be selected. Add colored fillers to No. 9 Flat Finish and wipe off ½ to 1 hour after applying.

Minwax Finishing Wax

(57) A special hard drying paste wax for application over Minwax Finishes for wood and concrete floors where a high wax luster is desired. As already noted, open grained wood can be filled before waxing. Made in natural, tile red and linoleum brown. Apply with a cloth and polish with a weighted brush.

Packed in 1, 3½, 7 and 35-lb. containers.

THE METALCRETE MANUFACTURING CO.

Manufacturers of Concrete Floor Hardeners, Waterproofers and Building Specialties

CLEVELAND, OHIO

Products

REG. Metalcrete TRADE-MARK

METALCRETE (Metallic Concrete Hardener).

LIQUID METALCRETE (Surface Hardener for old or new concrete floors).

LIQUID METALCRETE CRYSTALS (easily converted into Liquid Metalcrete by dissolving).

INTEGRAL LIQUID METALCRETE (a Concrete Hardener, Waterproofer and Accelerator).

INTEGRAL LIQUID METALCRETE CRYSTALS (easily converted into Integral Liquid Metalcrete by dissolving).

METALCRETE METALLIC WATERPROOFER (for waterproofing against pressure).

COLORCRETE (a colored Concrete Floor Hardener).

Also Graphilatum (Roofing products); Long Life Paints (for all purposes); Kleinvar Varnish (excellent for floors and all interior and exterior work).

Metalcrete

Metalcrete is a concrete hardener, scientifically made, chemically pure and absolutely free from foreign matter which injures the setting of cement.

Metalcrete not only hardens, but waterproofs concrete floors. Made of specially treated metallic particles which, when coming in contact with water, expand and seal the pores in the concrete, producing a dense, hard, wearproof and non-absorbing surface.

How to Use Metalcrete—

For Floors in Schools, Office Buildings, Theaters, Garages, etc.—Thoroughly mix one-half each of Metalcrete and good tested portland cement by weight (dry), until uniform in color and showing no streaks. Set aside until ready for use.

Lay floor base and topping as usual, topping to be at least ¾ in. thick and made of 1 part good tested portland cement and 2 parts clean, sharp, coarse sand. Topping to be not too wet.

After topping is laid and evened, *powder* or *dust* the floor with the Metalcrete-cement mixture using 30 lb. of mixture (15 lb. Metalcrete and 15 lb. cement) to each 100 sq. ft. Use a sieve for sifting or distributing over the surface. Allow to stand five minutes, then float mixture with wooden trowel. Then trowel hard. When fairly set, showing no surplus water on surface, trowel a second time to a smooth hard finish.

After 24 to 48 hours, cover floor with a layer of wet pine sawdust or shavings, sand or cinders and rewet twice daily for four or five days. Do not apply the sawdust, etc., until thoroughly set as same may adhere to and ruin the finish.

Note: If the topping and base are not laid at the same time, we recommend a bond coat. Do not use floor for seven days, or while it is curing.

For Factory Floors, etc., Subjected to Extreme Wear and Heavy Trucking—Same as above but using 25 lb. each of Metalcrete and portland cement mixture for every 100 sq. ft.

For Laying a Metalcrete System Monolithic Floor Saving the Cost and Weight of Finished Topping—This is recommended for factories subjected to extreme heavy trucking. The concrete slab should be one, two and four mix, using coarse gravel in preference to crushed granite. Same should be thoroughly mixed, and laid or poured very wet. Dust surface with a mixture of 1 part cement and 2 parts clean, coarse sand, sufficient to absorb surplus water, the quantity depending upon the amount of water. This is to be floated.

Mix 100 lb. Metalcrete, 2 sacks of cement and 1 sack of clean, coarse sand. After floor has been floated sprinkle this dry mixture over a surface of about 300 sq. ft. (use about 30 lb. of Metalcrete, 60 lb. of cement and 30 lb. of sand to each 100 sq. ft.). When distributed and thoroughly saturated (absorbing remaining water) it should be well floated, then troweled. A second hard troweling should be given when fairly dry.

Allow it to *set hard,* then cover with wet sawdust or shavings, and keep wet for three or four days. Floor should not be used for at least a week and no trucking allowed for two weeks.

For Retopping and Repairing Old Floors—Thoroughly mix one-half each of Metalcrete and portland cement by weight (dry), until uniform in color and showing no streaks.

Chip floor with pickaxe, making surface rough. Remove all loose particles, dust, etc. If oil soaked, greasy, etc., it should be washed with one part muriatic acid to five parts water. Allow this to remain until the effervescence or bubbling stops, then rinse floor thoroughly. Turn a hose of floor and let water soak in for 3 hours.

When water is absorbed, apply a slush or bond coat of Metalcrete with a good stiff brush. Slush or bond coat should consist of equal parts of Metalcrete and portland cement, thoroughly mixed (dry), add water (stirring) until it has the consistency of cream. Requires 5 lb. each of Metalcrete and cement to 100 sq. ft. for bond coat.

While still wet, lay topping and after laid and evened, follow first or second instruction above as required.

Liquid Metalcrete

Liquid Metalcrete is a surface hardener which if used on new or old concrete floors produces a dustproof, wearproof, and waterproof surface.

How to Use Liquid Metalcrete—

Sweep the floor as clean as possible; if oily or greasy, wash with 1 part muriatic acid and 5 parts water. When action of muriatic acid solution has ceased, rinse floor with water.

Then flush a liberal coat of Liquid Metalcrete solution, consisting of 1 part Liquid Metalcrete and 2 of water—simply empty a bucketful on the floor and distribute it evenly with a white-wash brush (long handled).

Repeat 24 hours later using 1 part Liquid Metalcrete and 1 part water.

The final coat should be applied 24 hours after second coat, using 2 parts Liquid Metalcrete and 1 part water. Last coat should be very liberal, applying as much as floor will absorb.

This may be done after business hours and the floor used during the day after each treatment. Covering capacity depends upon the porosity of the concrete but will average 75 sq. ft. to the gallon for the three applications. May be applied by any laborer.

Liquid Metalcrete Crystals—

To convert Liquid Metalcrete Crystals into Liquid Metalcrete simply place 2½ lb. of the crystals in a 1-gal. container and fill the container with water. When the crystals are thoroughly dissolved you have 1 gal. of Liquid Metalcrete.

When dissolving Liquid Metalcrete Crystals do not use a metal container.

Metalcrete Metallic Waterproofing—

Metalcrete Metallic Waterproofing is finely ground iron, chemically treated, and when used according to specifications will fill the voids, hermetically sealing the surface regardless of pressure. Will permanently waterproof concrete, brick or stone above or below grade against pressure; easily applied and inexpensive.

How to Use Metalcrete Metallic Waterproofing—

Preparation—Roughen the surface to be treated. Brush well, removing all loose particles. Then soak surface well.

Mixing—Mix 1 qt. of Metalcrete Metallic Waterproofing with 1 qt. of portland cement (dry), until uniform in color. Put into a bucket and add water to reduce to consistency of heavy paint or cream.

Application—Stir this well as used. Apply with a stiff brush directly to the surface, brushing hard to force into the voids. When set in twenty-four hours), apply a second coat (never heavy), and if necessary a third coat. When last coat is set, spray the surface treated with water. Spray two or three times five hours apart.

Unusual Pressure—For heavy water pressure, bore several small holes in wall and insert small pipes to drain. Treat as above and when wall is dry, remove pipes. Apply a coat of liquid mixture to the inside of the holes and plug with a putty of one-half waterproofing, one-half cement, and enough water to make it plastic.

Quantity Required—To determine amount required, estimate 10 lb. Metallic Waterproofing to each 100 sq. ft.

Floor, Walks, etc.—Clean slab and apply as above while still wet, lay topping of 1 in. or more, using 5 lb. of waterproofing to each bag of cement in the aggregate.

Integral Liquid Metalcrete

Integral Liquid Metalcrete is a concrete hardener, waterproofer, and accelerator. It speeds the setting of the cement and will give you a seven-day maturity in forty-eight hours. Integral Liquid Metalcrete is indispensable for retopping and patching old floors.

How to Use Integral Liquid Metalcrete—

For mass concrete mix 1 gal. of Integral Liquid Metalcrete with each 10 gal. of water used for gauging or tempering purposes. This means about 1 gal. of Integral Liquid Metalcrete for each bag of cement.

Integral Liquid Metalcrete Crystals—

To convert Integral Liquid Metalcrete Crystals into solution simply place 4 lb. of crystals in a 1-gal. container and fill the container with water. When the crystals are thoroughly dissolved you have 1 gal. of Integral Liquid Metalcrete.

Colorcrete

Colorcrete consists of two products, Dry Colorcrete and Liquid Colorcrete. The Colorcrete method introduces a modern economical method of laying a beautiful floor which has the durability of concrete and the colors and combinations of any floor design with the same ease of laying as an ordinary concrete floor. Tile effects, medallions, and ribbon borders are all possible if Colorcrete is used. Colorcrete is especially recommended for banks, office buildings, sales rooms, hospitals, restaurants, dormitories, hotels, theaters, porches, garages, etc.

How to Use Colorcrete—

Preparing Slab—Have base or slab finished rough or roughen it with picks. Thoroughly clean and soak it with water 24 hours before topping is to be laid. Make a thin mixture of cement and apply to base, rubbing in thoroughly with a stiff brush, and pour the topping immediately.

A ¾ or 1-in. Colorcrete topping is applied directly to slab. If a ½-in. Colorcrete topping only is wanted, then pour a ½-in. ordinary cement first and Colorcrete topping on this while still wet.

Quantities Required—To mix Colorcrete use the following quantities of *dry* color to each sack of cement, depending upon shade wanted: 8 lb. of Red, 10 lb. of Nile Green, 3 lb. of Battle Ship Grey, 3 lb. of Black, 8 lb. of Linoleum Brown, or four times these quantities to the barrel of cement, making 100 sq. ft. of 1-in. topping of one and two mix, or 200 sq. ft. of ½-in. For white Colorcrete simply use white cement together with white sand.

Specific Directions—Thoroughly mix the *dry* color with the cement *dry* until uniform in color and showing no streaks. Then add 192 lb. of clean sharp sand (free from loam) to each bag of cement, or 768 lb. to each barrel of cement used. Mix the Colorcrete-cement and sand until uniform in color and showing no streaks.

Then mix Colorcrete with tempering water, using 1 gal. of Liquid Colorcrete to each barrel of cement (which should be about 1 gal. of Liquid Colorcrete and 10 gal. of water). Mix as ordinary concrete, not a sloppy mix, but fairly dry, using only sufficient water to allow proper troweling.

Then lay cement and tamp well, screed off and float or cork float until voids are well filled. If deeper color is wanted, dust floor with Dry Colorcrete-cement mixture (without sand). Then float again good with wood float; then shove the joints in (no other time). Rub well with steel trowel and then give final finish by one good troweling with steel trowel.

MITCHELL-RAND DAMPPROOFING CORP.

Manufacturers of M-R Protective Coatings

15 Vesey Street
NEW YORK, N. Y.

Products

DAMPPROOFING (Interior):
- M-R FURRING COMPOUND.
- M-R SEMI-MASTIC.
- M-R DAMPPROOFING MASTIC.
- M-R STONE BACKING COMPOUND.
- M-R RUBBERSEAL SPANDREL CLOTH.

INTEGRAL WATERPROOFING:
- M-R DOUBLE STRENGTH WATERPROOFING PASTE.
- M-R LIQUID WATERPROOFING.

EXTERIOR WATERPROOFING (above Grade):
- M-R COLORLESS WATERPROOFING.
- M-R BRICK and CEMENT COATING in colors.

M-R SUPERIOR CEMENT COLORS.
M-R SHIELD BRAND CONCRETE FLOOR WAX.

Also M-R Anti Freezing Liquid and Cement Accelerator, M-R Caulking Cement, M-R Roofing Cement, M-R Fibre Roof Coating, M-R Black Asphalt Paint, M-R Expansion Joint Asphalt and Gilsonite, Waxes and Asphalts.

Experience

In 1902 we started the manufacture of dampproofing compounds under formulae developed by L. F. Rand, Chemist, and many of the largest buildings throughout the country, representing all classes of structural work, are references to the quality and durability of these products. Twenty-five years of research and experiment have produced a line of waterproofing and dampproofing compounds that makes the trademark "M-R" synonymous with first quality.

Our contracting department, in charge of experienced men, will estimate on furnishing and applying M-R Furring Compound, M-R Semi-Mastic, M-R Dampproofing Mastic, M-R Colorless Waterproofing and M-R Cement and Stucco Coating; also on pointing up brickwork, waterproofing exterior brick, stone or stucco buildings, and the calking of window and door frames. Only expert mechanics are employed in each special line.

We manufacture the compounds. We do the work.

Experience proves that a most satisfactory way to dampproof is by the use of an asphalt-gilsonite mixture, *applied in sufficient quantity.*

M-R Furring Compound

This is a black, elastic, waterproof material, and specified extensively by prominent architects and builders. It is applied by means of a brush to the interior of outside walls above the grade level prior to the application of plaster. This compound prevents the penetration of dampness, and renders the inside of walls verminproof and stainproof.

M-R Furring Compound is recommended for use, also, on terra cotta ceilings and furring to prevent plaster from staining; it bonds perfectly with plaster.

The material can be employed with equal effectiveness for rough concrete surfaces, but should not be used on smooth concrete to which portland cement mortar or plaster is to be directly applied.

The approximate covering capacity of M-R Furring Compound is 60 sq. ft. per gal., 1 coat. It is shipped in barrels, half-barrels and 5-gal. containers.

Typical Specifications—***Preparation of Surfaces***—Point up all voids and breaks in masonry surfaces specified to be dampproof. Patch defective brickwork at ceiling due to centering. Treat similarly the angle of wall and ceiling with cement or lime mortar to form a continuous surface.

Application—The interior surfaces of exterior exposed walls to be plastered are to receive 2 coats of M-R Furring Compound, and in accordance with directions of the manufacturer, the Mitchell-Rand Mfg. Co., M-R Furring Compound shall be applied between floor level and ceiling below. Where the arches are placed prior to this application, the coating shall be carried back 12 in. from the outer walls on the underside of the connecting ceiling.

Cut-outs, wall chases, etc., shall be coated thoroughly before pipes or other work is installed.

M-R Semi-Mastic

Recommended for use on hollow back-up tile walls, where there are deep corrugations in the tile.

Made of high grade asphaltic gums interlaced with asbestos fiber. Has a soft consistency which enables it to be easily applied with heavy roof brushes.

An application gives a coating many times heavier than ordinary dampproof paint.

In one day a man can apply, approximately, one 50-gal. barrel. Packed in 50-gal. barrels, half-barrels and 5-gal. pails.

Specifications—The work included consists of dampproofing all exterior walls above grade.

All surfaces shall be dry and free from dirt and foreign matter. All vertical and horizontal mortar joints are to be pointed up by the mason contractor to the satisfaction of the dampproofing contractor.

The M-R Semi-Mastic is to be applied with a brush in 2 coats, and shall be returned on the reveals of openings, carried around the column castings and concrete beams adjoining such surfaces, in and around all chases, recesses and cut-outs and extend 12 in. on the adjoining concrete slabs.

The material shall be M-R Semi-Mastic. One gallon is to cover not more than 30 sq. ft. and the dampproofing contractor is to state in his estimate the number of 50-gal. barrels of dampproofing material he agrees to use on this job. This is to be checked by general contractor and verified by architect.

M-R Dampproofing Mastic

A black, plastic, waterproof compound, containing only the best ingredients and blended under a scientific process. It is applied with a trowel, similar to cement or any other plastic substance, and is ready for immediate service as received in original packages; no heating or thinning necessary.

Used extensively on the interior of outside walls instead of dampproof paint. It bonds perfectly with plaster, absolutely prevents the penetration of dampness, and makes the inside of walls verminproof and stainproof. Furring and lathing are unnecessary when this material is used.

The approximate covering capacity is 20 sq. ft. per gal. on brickwork. It weighs about 10 lb. per gal., and is shipped in barrels, half-barrels and 5-gal. containers.

Typical Specifications—***Preparation of Surface***—Point up all voids and breaks in masonry surfaces specified to be dampproof. Patch defective brickwork at ceiling due to centering. Treat similarly the angle of wall and ceiling with cement or lime mortar to form a continuous surface.

Application—The interior surfaces of exterior exposed walls to be plastered are to receive 1 troweled coat of M-R Dampproofing Mastic, and in accordance with directions of the manufacturer, the Mitchell-Rand Mfg. Co., M-R Waterproof Plastic shall be applied between floor level and ceiling below. Where the arches are placed prior to this application, the coating shall be carried back 12 in. from the outer walls on the underside of the connecting ceiling.

Cut-outs, wall chases, etc., shall be coated thoroughly before pipes, or other work is installed.

M-R Rubberseal Spandrel Cloth

The most effective method of dampproofing spandrel beams is the M-R system using M-R Rubberseal Spandrel Cloth as described in the following specifications:

Specification—***Scope of Work***—The work included in the drawings of these specifications consists of the dampproofing of the spandrel beams, excepting such work as may be specifically excluded.

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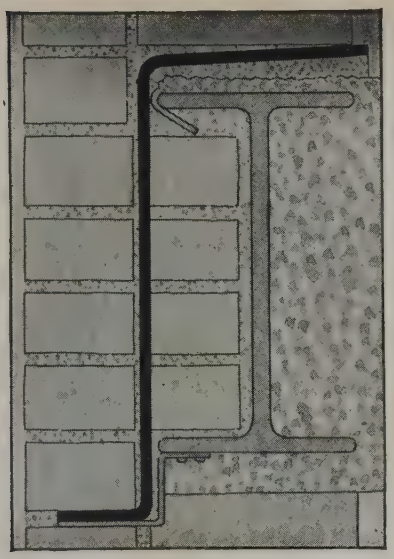


Standard M-R Method of Dampproofing the Spandrel

Application—All surfaces shall be dry and free from dirt and foreign matter. The general contractor shall leave the surfaces to be dampproofed troweled smooth; *all voids, including columns, shall be filled with cement mortar, leaving a slight bevel sloping towards the outside of the building.*

A blanket of M-R Rubberseal Spandrel Cloth shall be installed as per detail, starting 2 in. inside the line of the outside wall, extending out over the spandrel to edge of flange and then down to end of spandrel (or lintel), turning out on the face brick.

When the lintel is placed immediately under the spandrel beam, the blanket of Rubberseal Spandrel Cloth is to be turned out on the lintel, as described.

When the lintel is located more than 1 ft. below the bottom of the spandrel beam, then the Rubberseal Spandrel Cloth is to be turned out on the face brick at the bottom of the spandrel and a strip of Rubberseal Spandrel Cloth or a copper pan placed over the lintel. The cloth or pan is to extend 12 in. beyond each side of the lintel.

Material—Shall be M-R Rubberseal Spandrel Cloth, manufactured by the Mitchell-Rand Mfg. Co., *and shall be equal in every way to sample in architect's office.*

The raw fabric shall be coated with a composition of oxidized asphalt and stearine pitch, fluxed together so as to produce a compound of a rubbery nature not susceptible to temperature changes; i.e., it shall remain flexible in cold weather and shall not soften and run in summer.

The base fabric shall be 4 oz. per sq. yd., tensile strength 75 lb., and thread count 32x28 per sq. in.

M-R Stone Backing Compound

A black, alkaliproof and waterproof paint that protects granite, limestone, Bedford stone, marble or any other cut stone from chemical action and discoloration due to alkali in cement. One gallon applied by means of a 4 or 6-in. flat varnish brush will cover approximately 125 sq. ft. Packed in barrels, half barrels and 5-gal. pails.

Specifications—All surfaces in contact with masonry (the top, bed, sides, and back) are to be thoroughly coated to within 1 in. of the face to prevent staining. The surface of the stone should be dry and clean to insure adhesion; the coating should be continuous, even, and all Lewis holes, anchors, and recesses should be coated. After the cut stone is set it is advisable to apply an additional coat on the back.

M-R Colorless Compound

A colorless liquid for dampproofing the outside face of brick walls where it is undesirable to use a paint on account of such material changing the texture or color of the bricks.

Shipped in barrels, half-barrels, 5-gal. containers, and 1-gal. cans.

Specifications—***Preparation of Surfaces***—Point up all walls wherever necessary, and fill all spaces and voids around window frames and other openings. Walls shall be perfectly dry and surfaces free from foreign matter.

Application—All walls, sills and lintels shall be treated with 2 coats of M-R Colorless Compound, and in accordance with the directions of the manufacturer, the Mitchell-Rand Mfg. Co. The coats shall be applied on successive days, viz., one coat shall be applied when the surfaces are perfectly dry, as noted, and the other coat given the next day.

M-R Brick and Cement Coating

Made in standard colors and white. Used to waterproof and beautify surfaces of concrete, stucco, brick and plaster, both interior and exterior. It prevents hair-cracking and is absolutely waterproof.

Applied in same manner as ordinary paint. Due to its unique film structure, the dampness always present in cement and brick cannot cause it to peel and in this regard it is quite unlike oil paint.

It does not alter the texture of the surface to which it is applied. It dries to a soft, artistic, flat or mat finish which is an integral part of the surface itself, and it may be scrubbed and washed without injuring the film.

Specifications—Loose particles are to be thoroughly cleaned off the surface with a wire brush, and any appearance of salts removed with a solution of muriatic acid and water (1 part to 10) before the coating is applied.

Apply 2 coats of M-R Brick and Cement Coating, of selected color, with a full, wide, clean brush—brushing to settle it into place, only, and not for the purpose of extending it. Allow 24 to 48 hours between coats.

First coat may be thinned with 1 pt. of turpentine to the gallon. Second coat to be applied as received in the original package.

M-R Double Strength Waterproofing Paste

This is an integral waterproofing compound, used for making concrete, cement, mortar and stucco waterproof. It is very effective and in wide use.

It is a smooth plastic material. When used, it is first dissolved in the gauging water, which insures an even and uniform distribution throughout the mass. This method is decidedly economical, and makes possible the solution of different waterproofing problems; it is also very useful in connection with the repairs of a completed structure, as the operation is carried on entirely from the inside.

The material is shipped in barrels, half-barrels, 5-gal. containers, and 1-gal. cans.

Specifications—One gallon of M-R Waterproofing Paste dissolved in 35 gal. of water will waterproof 1 cu. yd. of concrete; 1 gal. of M-R Waterproofing Paste dissolved in 17 gal. of water will waterproof 100 sq. ft. of cement-finish floor, wall or stucco 1 in. thick; 1 gal. of M-R Waterproofing Paste dissolved in 35 gal. of water will waterproof 1 cu. yd. of dry cement and sand for laying up brick or stone walls.

M-R Liquid Waterproofing

This is a liquid with a calcium base, and is used in the gauging water for making concrete, cement mortar and stucco waterproof. It is also used for cement floors where a dense hard non-dusting waterproof finish is desired. Packed in 50-gal. barrels, half-barrels, and 5-gal. pails.

Specifications—M-R Liquid Waterproofing is mixed in the proportions of 1 gal. to 35 gal. of water. This gauging water is used to wet the aggregates in the usual way.

M-R Superior Cement Colors

These are imported iron oxide colors and are non-fading. In pulp or dry. They tend to retard excessive moisture absorption, even to the extent of making the concrete slightly waterproof. They are not susceptible to the action of cement alkalis. They are *all color,* neither lime or any other filler is added. Being unadulterated, *less* is required. As their name implies, they are superior in brilliancy and strength as many tests prove. They consist largely of metallic and mineral oxides, the small percentage of other color material being of such a nature that it has no injurious effect on the bond, cohesive ultimate and tensile strengths of concrete.

M-R Shield Brand Concrete Floor Wax

A high grade wax for treating and polishing old and new concrete floors. Readily cleaned. Gives high luster.

References

St. Regis Hotel, New York, N. Y.
Bank of America, New York, N. Y.
Standard Oil Building, New York, N. Y.
New York County Courthouse, New York, N. Y.
Federal Trust Co., Newark, N. J.
Prudential Insurance Building, Newark, N. J.
Erie Trust Co., Erie, Pa.
Breakers Hotel, Palm Beach, Fla.
Rhode Island School of Design, Providence, R. I.
Rhode Island Hospital, Providence, R. I.
Rhode Island Trust Co., Providence, R. I.
Allerton Houses, Chicago, Ill., and Cleveland, Ohio
Atlanta Department Store, Atlanta, Ga.
Magnolia Oil Building, Dallas, Tex.

NORTH AMERICAN CEMENT CORPORATION

CAL DIVISION

HAGERSTOWN, MD.

CEMENT PLANTS

SECURITY PLANT, SECURITY, MD. HELDERBERG PLANT, HOWE'S CAVE, N. Y. ACME PLANT, CATSKILL, N. Y.

CAL AND LIME PRODUCTS PLANT, BERKELEY, WEST, VA.

GENERAL OFFICES

ALBANY, N. Y. BALTIMORE, MD. BOSTON, MASS. WASHINGTON, D. C.

GENERAL SALES OFFICE, 285 Madison Avenue, NEW YORK, N. Y.

CAL

Products

CAL, for use in portland cement mixtures to obtain early strength; to improve curing; for densifying; for easy workability; as a hardener; and for placing in cold weather.

Also Acme, Helderberg and Security Portland Cement; Berkeley Hydrated Lime.

What Cal Is

Cal is oxychloride of calcium, a dry white powder which, used as an admixture to portland cement concrete and mortar, has a combination of properties which facilitate and expedite new construction and repairs.

What Cal Does

Cal accelerates the hardening of all portland cement concrete and mortar, bringing them to safe working strength in a fraction of the usual time. Just as it comes from the container, Cal is added at the mixer. From actual tests and job experience covering many years, it has been found that when Cal is used, forms may be removed from all kinds of work in much less than normal time; and that road and street construction can be put into full service in from 48 to 72 hours. Road patching can be accomplished with little interruption to traffic. In addition, Cal cures, fattens, hardens, and densifies all portland cement mixtures, and reduces the cold weather hazard.

Workability

Cal reduces the amount of water necessary in making concrete; it prevents the segregation of the aggregates, and makes a concrete mixture more easily workable and easier flowing.

Cal fattens and stabilizes a concrete mixture so that segregation is reduced to the minimum. This is of special importance in chuting concrete or in transporting from central mixing plants.

Curing

Cal prevents the too rapid drying out of concrete or stucco in very hot or dry weather, and thus minimizes the danger of surface cracks, checks, crazing and disintegration.

No Danger of Corrosion

Three-year laboratory tests under the most severe conditions have proven that Cal does not cause corrosion of steel reinforcement.

Cold Weather Work

A conservative analysis of the experience of users indicates that Cal makes concreting and masonry work safe at temperatures 10° lower than for plain concrete or mortar and that with proper additional precautions work may proceed at very low temperatures.

Effect on Strength

There are innumerable laboratory tests which show conclusively that Cal increases the early strength of concrete with no ill effect on the ultimate strength.

The report of American Bureau of Inspection and Tests, Chicago, showed 2450 lb. concrete in three days. The mix was 1:1½:2½ and contained 5 lb. of Cal per bag of cement. In the same series of tests 1:1½:3 concrete treated with 5% Cal by weight of cement gave 2220 lb. in three days. Tests were made in compression on 6x12-in. cylinders with commercial aggregates, and air storage.

Compression Tests

The following table is from tests by Duff A. Abrams, eminent authority on concrete testing. It is taken from Bulletin No. 13 Structural Materials Research Laboratory of the Lewis Institute.

Gulf Island Development Power House on the Androscoggin River

MORTON C. TUTTLE CO., Contractors

Cal used for densifying concrete in the scroll cases and for general frostproofing for the Central Maine Power Co.

Addition to Corcoran Art Gallery, Washington, D. C.

JAMES BAIRD CO., Contractors

Cal used for frostproofing the mortar used in laying up the face brick

Harris-Forbes Building, Boston, Mass.

LOCKWOOD, GREEN & CO., Architects

GEORGE A. FULLER CO., Contractors

Cal used for brick mortar and for reinforced concrete roof slabs, without interruption at temperatures as low as 5° F.

Continued on next page

The effect of Cal on the tensile strength of mortars is similar to its effect on the compressive strength of concrete.

Compression Tests of 6x12-in. Concrete Cylinders—Mix 1:5:2 by volume (1:2:4). Aggregate: sand and pebbles from Elgin, Ill., graded 0 to 1½ in. Cement: portland cement "A" purchased in Chicago. Relative consistency, 1.00 (flow about 180). Specimens cured in moist room until test, tested damp. Each value is the average of from 4 to 10 tests made on different days unless otherwise noted. Strength ratios are percentages of the strength of concrete at same age without admixture. Admixture expressed as per cent of weight of cement.

Cal, per cent	Compressive strength, lb. per sq. in.	Strength, ratio per cent	Cal, per cent	Compressive strength, lb. per sq. in.	Strength, ratio per cent
2-day Tests			3-mo. Tests		
0	950	100	0	4170	100
2	1120	118	2	4050	97
4	1300	137	4	4390	105
7	1430	151	7	4430	106
10	1410	148	10	4460	107
7-day Tests			1-year Tests		
0	1940	100	0	4320	100
2	2060	106	2	4590	106
4	2280	118	4	5000	116
7	2390	123	7	5190	120
10	2260	117	10	5220	121
28-day Tests			3-year Tests		
0	3310	100	0	5020	100
2	3070	93	2	5140	102
4	3320	100	4	5100	102
7	3550	107	7	5980	119
10	3540	107	10	5750	115

The Cal Book

The complete story of Cal is contained in this book which will be sent to any architect on request.

Specifications

All portland cement [concrete] [mortar] [stucco] [finish] shall be treated with Cal, manufactured by the North American Cement Corporation. Cal shall be used in the proportion of .... lb.* per bag of cement and shall be added dry to the mix, according to directions issued by the manufacturers.

*In normal temperatures, the following quantities should be used:

For stucco	5 lb.	Surface wash	8 lb.
Densifying	4 lb.	Easy chuting	5-8 lb.
Bonding and patching	5 lb.	For maximum acceleration in any portland cement mixture	8-lb.
Brick mortar	5 lb.		
Brick mortar	5 lb.	For impermeability in any 1:2:4 or richer mix	4 lb.
Floor topping	3 lb.		
Concrete products	5 lb.		

For cold weather, the following "Schedule of Safety" should be followed:

SCHEDULE OF SAFETY FOR COLD WEATHER

Nature of work	Temperature	Precautions
Floors, walls, brick mortar, roads and streets, mass concrete	Above 20° F.	Aggregates free from frost; 5 lb. Cal per bag cement
Stucco and thin sections	Above 25° F.	
Floors, walls, brick mortar, mass concrete	15° F. to 20° F.	Heat water and aggregates; 8 lb. Cal per bag cement
Stucco and thin sections	20° F. to 25° F.	Heat water and aggregates; 5 lb. Cal per bag cement; protect all exposed surfaces
Floors, walls, mass concrete	10° F. to 15° F.	Heat water and aggregates; 8 lb. Cal per bag cement; protect all exposed surfaces

Where to Get Cal

Building material dealers in most important cities carry Cal in stock. Orders may be sent to any office of the company, to be filled from nearest dealer's stock. Prices on request.

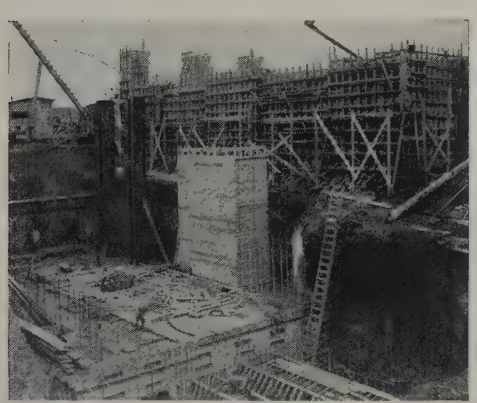
How Cal Is Packed

Cal is packed in convenient non-returnable 100-lb. heavy paper-lined burlap bags which preserve the material indefinitely when stored in a dry place.

References

Sanderson & Porter, Engineers, New York, N. Y.
George A. Fuller Co., Contractors, New York, N. Y.
Simpson Bros. Corp., Contractors, Boston, Mass.
Vang Construction Co., Pittsburgh, Pa.
F. M. Masters, Engineer, Harrisburg, Pa.
Parker, Thomas & Rice, Architects, Baltimore, Md.
Frainey Bros. & Haighley, Contractors, Baltimore, Md.
Fred Drew Co., Inc., Contractors, Washington, D. C.
Milburn-Heister Co., Architects, Washington, D. C.
Louisville Railways, Louisville, Ky.
Capital Traction Co., Washington, D. C.
Lally Column Co., Chicago, Ill.
Commonwealth Edison Co., Chicago, Ill.
James Baird Co., Contractors, New York, N. Y., and Washington, D. C.
A. Burch Fitz Simons, Architect, Washington, D. C.
Lockwood, Greene & Co., Architects, Boston, Mass.
Commonwealth Edison Co., Engineers, Chicago, Ill.
Clyde N. Friz, Architect, Baltimore, Md.
Wm. P. McDonald Construction Co., Contractors, New York, N. Y.
Bland Engineering Co., Minneapolis, Minn.
Morton C. Tuttle Co., Contractors, Boston, Mass.

Additional references furnished on request.



Potomac Edison Co. Power Plant, Williamsport, Md.

Sanderson & Porter, Engineering Contractors

Cal was used at all temperatures—in cold weather primarily for its frostproofing qualities and in mild weather for efficient long chuting—first on the original unit and now, four years later, on the additional unit

St. George's School, Newport, R. I.

Cram & Ferguson, Architects

L. D. Wilcutt & Son, Contractors

Cal used during the winter of 1925 for brick mortar on this building

Clark's Ferry Bridge Across the Susquehanna River, Above Harrisburg, Pa.

Frank M. Masters, Engineer

Vang Construction Co., Contractors

By using Cal the number of arch centers required was reduced from 5 to 3 and the curing time from 28 to approximately 14 days, at an enormous saving

NATIONAL WATERPROOFING CO.

Waterproofing Engineers and Contractors
1077-1081 Columbus Avenue
BOSTON, MASS.

Products and Services

ENGINEERS and CONTRACTORS for WATERPROOFING, DAMPPROOFING and OILPROOFING.

KENNELLY'S LIQUID (INTEGRAL) WATERPROOFING and OILPROOFING for concrete.

KENNELLY'S DAMPPROOFING PAINT and COMPOUND.

KENNELLY'S CONCRETE FLOOR HARDENER.

General

We will absolutely guarantee all waterproofing done by us to be watertight. We will dampproof without discoloring the outside of any concrete, brick or stone structure and will guarantee the work to be absolutely moistureproof. We will apply a floor hardener to any concrete surface and guarantee the work against dusting or softening of the surface. All work done by us will be carried on in such a manner that no delay will be caused the general contractor or any part of the work.

Engineering Department

Our engineers are always at the service of architects, engineers, contractors and owners for the solution of waterproofing problems, for preparing specifications and for estimating the cost of waterproofing all concrete structures, foundations, tunnels, dams, reservoirs, swimming pools, etc.

Kennelly's Liquid Waterproofing (Integral Method)

Kennelly's liquid waterproofing is an integral waterproofing liquid which crystallizes in the mass as the cement sets, sealing completely and permanently the voids or pores between the sand and cement against the passage of liquids, even under heavy pressure. It is used in concrete or cement mortar to prevent the penetration of water or dampness. Having practically the same specific gravity as water, it immediately becomes part of the tempering water when poured into the barrel, thus becoming evenly distributed throughout the mass. Kennelly's liquid waterproofing not only renders concrete, mortar and stucco permanently impervious to water, but prevents discoloration and efflorescence, gives additional protection to the reinforcement and increases rather than decreases the strength of the mass. It does not affect the color or setting of cement mortars or concrete.

Kennelly's Plaster Waterproofing

If a watertight plaster finish is desired, put the compound into the water used in making mortar and then place the mortar on the surface to be covered and work it out to the desired finish. By this method, concrete, cement mortar and stucco are rendered permanently moistureproof and pressureproof, the finished surface is not discolored, and the strength of the concrete is increased rather than decreased.

Kennelly's Exterior Dampproofing (Colorless)

A colorless liquid for dampproofing exterior surfaces of stucco, brick, stone and concrete masonry. Also extensively used as a sizing for lime plaster on interior walls before paint is applied. It is applied with a brush. Efflorescence and blotches are caused by the absorption of atmospheric moisture and exudation of gypsum and lime. By the use of our dampproofing, we have overcome these disfiguring features without discoloring the original surface or joints.

We will guarantee to make any building dampproof by this method at a reasonable cost.

Kennelly's Interior Dampproofing (Dark)

A compound for coating interior surfaces of brick, stone or hollow tile walls. Forms a continuous waterproof film or coating on the surface, completely sealing walls and preventing penetration of moisture. This method eliminates furring and lathing and thus effects a great saving, as the plaster may be applied directly to this coating.

Kennelly's Concrete Floor Hardener

A liquid compound either *mixed with the concrete* finish in new floors *or applied to the surface* of old as well as new floors. In buildings subject to heavy wear, the dusting of a concrete floor induces disintegration and crumbling of the concrete and thus ruins the floor. Our hardener insures against dusting, and provides a non-absorbent surface, more impervious to wear than ordinary concrete, makes a durable top surface, and provides a sure non-slip foothold.

Specifications

Integral Waterproofing and Oilproofing—To each 50 gals. of water (1 bbl.) used in tempering the mass concrete, add 6 qts. of Kennelly's Liquid Waterproofing, thoroughly mixing the concrete and carefully spading it into place so as to avoid stone pockets.

Plaster Waterproofing—Material used in same proportion as for integral work, mixing the waterproofing with water used in making concrete mortar and then placing the mortar on the surface to be covered, using 6 qts. of waterproofing to 50 gals. of water.

Dampproofing—Thoroughly clean surfaces to be dampproofed by washing with warm water. Allow to dry, and then apply dampproofing with brush, covering surface well. Allow 4 or 5 hours to elapse before making second application, and when thoroughly absorbed, make a third application.

Concrete Floor Hardener—First thoroughly clean the floor surface to be treated by scrubbing with warm water, thereby removing all foreign particles, etc. Allow to dry, and then apply the floor hardener with brush, covering the surface well and allow to dry for at least 4 or 5 hours before making a second application. Should any dry spots appear, treat with another coat of hardener.

References

Fuller & Robinson Co., 95 State Street, Albany, N. Y.
Crocker Burbank & Co., Fitchburg, Mass.
Federal National Bank, Boston, Mass.
Pennsylvania Sugar Co., Philadelphia, Pa.
Westcott & Mapes, Inc., New Haven, Conn.
Stone & Webster Engineering Corp., Boston, Mass.
General Electric Co., Pittsfield, Mass.
United Illuminating Co.'s Plants, Bridgeport, and New Haven, Conn.

DR. R. CONSTANTIAN, PRESIDENT FREDERICK S. CONDIT, VICE PRESIDENT

THE OBELISK WATERPROOFING COMPANY

Caffall Process—the Heat Method

TELEPHONE
ASHLAND 1740, 1741

1 Madison Avenue
NEW YORK, N. Y.

BOSTON OFFICE: 950 Park Square Building—Telephone Hancock 0033

Services

Exterior Surfaces of Stone, Brick and Stucco Buildings, above grade, TREATED with the CAFFALL PROCESS, the Heat Method.

Business, Residential and Monumental Buildings and Churches Restored, Dampproofed and Preserved; Exteriors of Delicate Marble Preserved from Weather Disintegration; Monuments Restored and Preserved.

Guarantee

Work done under contract with a 10-year guarantee, or a cost-plus-percentage basis without guarantee.

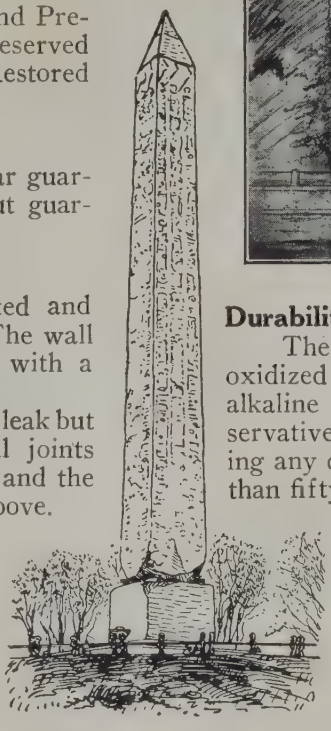
Process

New Structures—The surface is tested and structural defects, if any, are made good. The wall is then impregnated to considerable depth with a melted wax compound forced in by heat.

Old Structures—Where masonry walls leak but material disintegration has not occurred all joints are tested and made sound where necessary, and the entire surface, including joints treated as above.

Where the surface has disintegrated from weather attack, it is restored to sound condition, joints are re-pointed, and the entire surface treated as above. The treatment leaves the appearance unchanged, and one treatment will last for the life of the building.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat dries out the surface and forces penetration of preservative material. On cooling, the wax congeals and becomes an integral part of the material at and below the surface.



Obelisk or Cleopatra's Needle
Restored and preserved by Caffall Process, the heat method, in 1885

Plymouth Rock
Treated 1921

Durability

The principal components can not be easily oxidized and are insoluble in water, acidulated or alkaline solution, or gases. This is the only preservative process having a successful history covering any considerable period. Buildings treated more than fifty years ago are still dry.

Cost

Cost can be ascertained on application to the company. It is determined by the following elements:

Character of material to be treated.

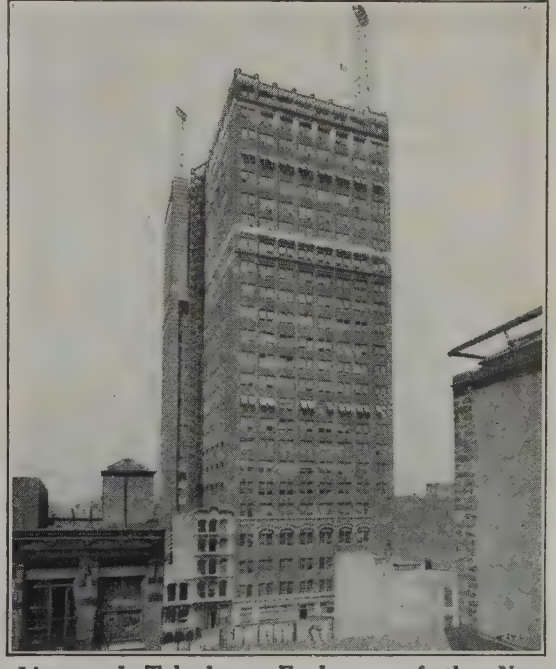
Condition, whether newly erected, old, or requiring renovation.

Area requiring treatment.

Character of surface, whether plain or ornamental.

Location of building or monument.

Roosevelt School, Roosevelt, L. I., N. Y.
TOOKER & MARSH, Architects



Walker-Lispenard Telephone Exchange of the New York Telephone Co., New York, N. Y.
MCKENZIE, VOORHEES & GMELIN, Architects

PERMANENT WATERPROOFING CO.

Engineers and Contractors for Waterproofing

Delaware Corporation

CHICAGO, ILL., 224 South Michigan Avenue
PITTSBURGH, PA., 1213 Chamber of Commerce Building
NEW YORK, N. Y., 40 East 34th Street

Missouri Corporation

KANSAS CITY, MO., 407 Dwight Building
SAN FRANCISCO, CALIF., 625 Underwood Building

Services

Waterproofing is a specialized engineering problem, requiring study and wide experience with all materials and methods, used under all sorts of conditions.

Nearly fifteen years of experience, and an organization reaching from *coast to coast,* is at your service. This applies to Basement Walls and Floors, Pits, Tanks, Swimming Pools, Cisterns, Tunnels, Subways, Concrete Bridges, Retaining Walls, Roundhouses, Piers, etc.

Material

The PERMANENT WATERPROOFING CO. adopts the material best adapted to the conditions which must be met, as a rule the material used being an iron compound.

Application

The waterproofing can be applied to either the *Inside* or *Outside* surfaces of walls after all forms are removed, and to the top of rough floor slabs and footings, in the form of brush coats or in combination of brush and plaster coats.

Appearance

The finished surfaces are left with a finish and color similar to cement brush coat or cement plaster. The surface in either case may be plastered or painted or finished with any type of cement, marble, or terrazzo surfacing.

Paint will not be discolored.

Resistance to Pressure

Applied either upon the inside or outside of walls, this waterproofing will resist any hydrostatic pressure which the wall is capable of withstanding.

Permanency

This material is not a simple coating, subject to injury by ordinary wear and abrasion or by changing atmospheric conditions. It will not "slump," crack or scale. It possesses much chemical vitality and in combination with water becomes very active. It works its way into the pores of the concrete, expands and unites chemically as well as mechanically with the structural materials, forming a strong and impenetrable mass.

The depth of the penetration varies in accordance with the porosity of the masonry—being greatest where the voids are most numerous and seepage most likely. The result is a surface which is part of the wall or slab and can not be removed without actual cutting. Not only does the material form a *permanent waterproofing,* but it also serves as a preservative and strengthener of the masonry.

Bonding Qualities

It is indispensable where a perfect bond between rough slabs or walls and finish coatings of cement, terrazzo, marble, tile, etc., is required.

Working Conditions

The efficiency of any material or methods depends in the last analysis upon workmanship.

The material is mixed with water, and the work can be done at a time when the working conditions are most favorable. This makes possible the highest class of workmanship when combined with the employment of intelligent experienced workmen, properly directed.

Outstanding Features

Waterproofing placed upon the *inside* or *outside* of wet walls, which penetrates and becomes part of the walls or floors.

Waterproofing which actually increases, rather than decreases, the strength and efficiency of the concrete, stone or brick.

Waterproofing which is continuous and assures (instead of breaks) the bond between footings and walls. This should be considered in case of lateral pressures.

Waterproofing which introduces no foreign or injurious materials into the concrete.

Waterproofing which assures bond between rough surfaces and finish and which is not injured by contact or vibration.

Waterproofing which eliminates the necessity for double or protective walls and slabs.

Waterproofing which offers peculiar resistive qualities to sulphurous fumes, gases, acids, fire and electrolysis.

Waterproofing which may readily be repaired in case of structural cracks.

Waterproofing which is *less expensive* than any other real waterproofing.

Waterproofing which is absolutely *guaranteed.*

Specifications

Walls—All outside walls and areas exposed to seepage shall be waterproofed by the PERMANENT WATERPROOFING CO.'s method on the inside surfaces from floor level to outside finished grade level. This work to be done before partitions or other obstructions are installed.

Inside walls and columns extending through the basement slab shall be waterproofed or dampproofed as may be required —upon both sides from the top of the footings to the outside finished grade level.

Floors—After the rough slab has been poured and sufficiently set it shall be thoroughly cleaned and waterproofed according to PERMANENT WATERPROOFING CO.'s method, and finished with a slush containing good sharp torpedo sand to give a good bond surface for the topping. This work shall be done before partition walls, machinery bases, conduits, etc., are placed.

Immediately before the topping is applied wash this surface well and apply a bonding coat of cement and Permanent Waterproofing and thoroughly brush into the slab. Apply finish in the usual way.

Disintegration Problems

The disintegration of concrete, brick and stone surfaces has been studied by us for a number of years. During that time we have handled a number of problems of this nature, and have also made a number of tests under field conditions. We would be pleased to furnish detailed information regarding them.

THE SANDUSKY CEMENT COMPANY

Manufacturer of Medusa Integral Waterproofing

CLEVELAND, OHIO

BRANCH OFFICES

CINCINNATI, OHIO, Builders Industries Building
CHICAGO, ILL., 1016 The Builders Building
NEW YORK, N. Y., 350 Madison Avenue
TOLEDO, OHIO, 1004 Second National Bank Building
YORK, PA., 60 Lehmayer Building

PLANTS

BAY BRIDGE, OHIO · SILICA, OHIO · DIXON, ILL. · YORK, PA. (2)

Product

MEDUSA WATERPROOFING, the standard of integral waterproofing quality for twenty years, in either Powder or Paste form—the original integral concrete waterproofing.

For Medusa Portland Cements, see pages A43-47; for Medusa Portland Cement Paint, see page B2131.

Output

3,000,000 lbs. of waterproofing.

Packages

Medusa Waterproofing Powder is furnished in 40-lb. paper lined cloth sacks. A quart weighs one pound.

Medusa Waterproofing Paste is furnished in metal containers, with large friction seal tops, 1 gal. (8 lbs.) and 5 gals. (40 lbs.) each, packed for shipment in substantial crates of six 1-gal. or two 5-gal. cans each. A pint weighs 1 lb.

Literature

New Medusa literature, in standard size 8½x11 in., describing many uses for Medusa Waterproofing Powder and Paste, will be sent on request.

Uses

Medusa will give positive waterproof and dampproof results in construction of concrete reservoirs, water towers and tanks, swimming pools, tunnels, disposal plants, pumping stations, elevator pits, stucco, basement walls and floors, cisterns, cement blocks, cast stone, etc.

Medusa Waterproofing Comes in Two Forms

Medusa Waterproofing Powder — Medusa Waterproofing Powder is white, finely ground and highly water-repellent. When mixed with any reliable brand of plain portland cement, in proper proportions, it is uniformly distributed through the concrete, being entrapped or held in place by the cement, sand and aggregate. Due to its water-repellent nature, it prevents the absorption or percolation of water, ground or drainage water, spring water, dampness or moisture from the earth or atmosphere.

For every bag of portland cement used, mix 2%, or 2 lbs., of Medusa Waterproofing Powder if you want absolutely waterproof concrete.

Medusa Waterproofing Powder is furnished in 40-lb. paper lined cloth sacks, enough to mix with and thoroughly waterproof, 20 bags of portland cement.

Medusa Waterproofing Paste—Medusa Waterproofing Paste contains the same percentage of water-repellency as Medusa Waterproofing Powder. Its effect on the concrete mass is exactly the same as that of Medusa Waterproofing Powder. It is a heavy paste, to be dissolved in the gauging water used to mix the concrete.

Two per cent of Medusa Waterproofing Paste by weight of the cement, or 2 lbs. per sack, is the correct proportion to render concrete and cement work permanently waterproof.

Integral Method of Waterproofing

Since the earliest days of the manufacture of portland cement in this country, the need for preventing the absorption of water by concrete has been fully recognized. Concrete contains many microscopic pores or capillary tubes constituting from 20% to 40% of the cubic contents. Water enters concrete because of the physical law of capillary attraction and its natural absorptive qualities. To make it waterproof, the absorptive properties must be destroyed.

Medusa Waterproofing becomes an inseparable part of the concrete itself. Designed to be mixed with concrete, to lubricate the particles and form an integral part of the mixture, it thus becomes an inseparable part of the mass, being tightly sealed within the concrete.

Medusa Waterproofing will positively and permanently render concrete dampproof and waterproof.

The integral method of waterproofing is economical, it does not require additional excavation on the exterior of basement or foundation walls, it does not require additional brick or concrete protecting walls, no difficulty experienced in making joints around pipes and at the bottom of outside walls, at footings, at junction of the basement floors and footings, and wherever horizontal or vertical joints occur. Blind leaks are not possible in integral waterproofing. Leaks due to settlement cracks can be economically repaired.

Waterproofed Cement Plaster Coat Method

This is a permanent and inexpensive method of rendering *a completed concrete or masonry structure dampproof and waterproof.* The fact that it results in a clean, neat and pleasing surface renders its use satisfactory for plastering or lining basement walls, for surfacing floors, and other interior work.

A Word as to the Quantity of Waterproofing Needed

Though somewhat less than the quantity recommended may be used in many cases with excellent results, it has proved advisable in any structural work to have a reasonable factor of safety.

The need of such a factor of safety will be appreciated when the varying conditions affecting concrete work are considered.

Specifications vary considerably and so also do the aggregates selected.

It has been found that the quantity prescribed, 2% of the weight of cement (8 lbs. to the barrel) is the correct amount to be used. A reasonable factor of safety is included in this figure and we advise that this specification be rigidly maintained.

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street, NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS. SYRACUSE, N. Y. CHICAGO, ILL. DETROIT, MICH. CLEVELAND, OHIO INDIANAPOLIS, IND.
CINCINNATI, OHIO PITTSBURGH, PA. ST. LOUIS, MO. ATLANTA, GA. KANSAS CITY, MO. PHILADELPHIA, PA.

Solvay Calcium Chloride for Curing, Densifying and Accelerating the Setting of Concrete

A white, dry, flaky chemical which when added to the mixing water accelerates the initial hardening of concrete without affecting the final set; at the same time densifies the concrete, making it more waterproof; reduces the freezing point of water, thereby aiding the fresh concrete to resist freezing in low temperatures. Solvay Calcium Chloride is extremely hygroscopic and dissolves almost instantly in water. It can be used with any brand of portland cement, although results may vary slightly.

Comparative Strength Ratios between Treated and Untreated Concrete—After testing 7500 compression specimens, Prof. Duff A. Abrams, then in charge of Structural Material Research Laboratory of the Lewis Institute, Chicago, Ill., concludes:

"In the use of Calcium Chloride no advantage was gained for percentages of the commercial product greater than 2 or 3 per cent, corresponding to a chloride content of 1 to 1½ per cent. This amount when used in mixes of about 1:5 and in consistencies suitable for building construction, showed an increase in strength of from 100 to 200 pounds per square inch. For richer and drier consistencies the strength increase was greater and for leaner mixes and wetter concretes it was less."

Accelerating Effect—As shown by tests, concrete gauged with Solvay Calcium Chloride, at the end of 48 hours has the same strength as concrete gauged with plain water has at the end of 7 days. The early strength given to fresh concrete prevents collapse of the cell structure during the drying out period. It increases the crushing, tensile and abrasive strengths.

With Solvay Calcium Chloride, floor finishing is possible within a short time after pouring; concrete can be poured late in afternoon and finished, saving overtime charges.

Results Proven by Authoritative Tests—Thorough and extensive tests made by U. S. Bureau of Standards, American Society for Testing Materials, Portland Cement Association, U. S. Engineers, Lewis Institute and our own engineers have definitely established that Calcium Chloride is beneficial to concrete.

At an investigation, carried on by the Bureau of Standards, co-operating with U. S. Engineers at Memphis, Tenn., with many materials, Calcium Chloride showed highest. In the standard mortar test with 3:1 Ottawa sand, it was found that 2% to 4%, by weight of water, of commercial Calcium Chloride increased tensile strength from 155 to 230% at the end of 24 hours; and from 173 to 190% at the end of 48 hours without adverse effect on the final set.

Curing—The use of Solvay Calcium Chloride provides a most practicable method of curing structural concrete.

The forms on concrete afford it some protection against premature drying out. This alone, however, is not sufficient to insure the amount of moisture which concrete must have to attain its maximum strength. Solvay Calcium Chloride incorporated in the mix supplies this need readily by attracting and holding this needed moisture. Complete hydration can then take place naturally and the concrete is enabled to attain its full strength in much less than the usual time.

Workability—Addition of Solvay Calcium Chloride increases the workability of concrete. Experiments on workability conducted by the New Hampshire State Highway Department indicated that the power required to mix concrete is reduced 20% by the addition of 2% of Calcium Chloride.

Advantage of Use in Cold Weather—The qualities of quick initial setting, hardening, densifying and reducing of the freezing point of the mixing water make it possible to progress with concrete work in continued cold weather when using Solvay Calcium Chloride.

A. R. Lord, in his notes on "Wacker Drive" (A. C. I. Proceedings, 1927, p. 59-61) states: "Our 6 and 12 months' tests, while too few in number to be at all conclusive, indicate that concrete placed under cool temperatures in April and May never catches up with that placed under midsummer temperatures."

The usual precautions against cold weather must be taken, but the factor of safety is very materially increased by the use of Solvay Calcium Chloride.

Efficient solutions for use in freezing weather, using 6 gal. of water per bag of cement, are at 28° F., 2 lbs. to 6 gal. of water; 20° F., 3 lbs.; 15° F., 4 lbs.

Waterproofing Qualities—The integral method of waterproofing concrete has been found best by many engineers and architects. The same qualities of hardening, densifying and quick initial setting brought about by Solvay Calcium Chloride tend to make treated concrete more waterproof.

Directions for Using Solvay Calcium Chloride—For the best results, use not less than 1 lb. nor more than 4 lbs. to a bag of cement except in freezing weather when up to 6 lbs. may be used. Solvay Calcium Chloride should be dissolved in the water before water is added to dry mix.

Estimate of amount to be used is approximately 2 lbs. per bag of cement—conditions of temperature, location, mix, etc., will vary this amount.

Cost—Solvay Calcium Chloride, east of the Mississippi, costs, approximately, two cents per pound—in the far West cost is slightly higher.

Shipment—Solvay Calcium Chloride is shipped in metal drums containing 375 lbs. net, and in moisture-proof bags containing 100 lbs. net. In bags it must be given same care as cement. Stock is carried in 75 cities in the United States. Special arrangement for handling carload lots.

Typical Jobs

Solvay Calcium Chloride has been specified by many of America's leading architects, engineers and contractors. A few of the buildings in which it has been used for the purposes described are:

Chicago Tribune Building, Chicago, Ill.
Lincoln Safe Deposit Building, New York, N. Y.
Montreal Rail and Water Terminals
Maccabees Building, Detroit, Mich.
Sesqui-Centennial Stadium, Philadelphia, Pa.

Technical Service

The Solvay Process Company maintains a Technical Service Department whose services are gladly rendered without charge to engineers and architects.

Literature

The new comprehensive booklet, "Solvay Calcium Chloride in Concrete Construction", together with Architects' Specification sheet, will be sent without charge upon request.

SOMMERS & CO., LTD.

Manufacturers of Permantite Waterproofing Products

342 Madison Avenue, NEW YORK, N. Y.

Products

PERMANTITE TRADE-MARK

PERMANTITE CONCENTRATED LIQUID INTEGRAL WATERPROOFING.

DAMPPROOFING PAINTS AND COATING.

Also Liquid Integral Cement Hardener; Gray Elastic Cement; Cement Colors; Anti-Freeze; Steel Coating; Foundation Coating; Stone Backing Paint; Semi-mastic Dampproofing; Mastic Dampproofing; Liquid and Plastic Asbestos Roof Coating; Cement Floor Hardener; Cement Floor Coating; Transparent Dampproofing; Masonry Coating in colors; Waterproofing Fabric; Shingle Stains; Technical Paints and Varnishes.

Services

SOMMERS & CO., LTD., are sole manufacturers of Permantite Waterproofing Products.

The personnel of SOMMERS & CO., LTD., includes waterproofing engineers and construction specialists. These men, with their sixteen years' experience, are at the disposal of architects and engineers, and will be glad to aid in solving waterproofing problems. Where necessity demands special products, Sommers' chemists will gladly work them out in the laboratory.

Permantite Concentrated Liquid Integral Waterproofing

A concentrated liquid waterproofing compound for waterproofing concrete and cement mortar.

Placed in the gauging water of the concrete, or added directly in the mixer, it acts as a lubricant and densifier of the concrete, reducing the power of absorption and the permeability of the mass. In addition, it will hasten the initial set and give added early strength when most needed. Used in cold weather it will reduce the freezing point of the water.

Advantages of Permantite—Effectiveness; permanence; simplicity of use; low first cost. Permantite concrete, owing to decreased porosity is resistant to acids and alkalis. Permantite has a lubricating action on the cement which causes the concrete or cement mortar to become more plastic and workable, producing a smoother and more waterproof surface than untreated concrete.

Tests—Tests show that Permantite Concentrated Liquid Integral Waterproofing in addition to waterproofing adds to the early strength of concrete—the time when strength is most needed. Tests of specimens cured in air show Permantite to be effective in increasing the impermeability and the strength of concrete and cement mortar at all ages.

Quantity to Be Used—1 gallon to cubic yard of 1-2-4 concrete. 1 gallon to 100 square feet cement mortar 1-in. thick. 1 gallon to 1000 brick, 1-3 mortar. 1 gallon to 25 square yards of stucco.

Packages—Shipping weight, 11 pounds per gallon. Put up in 55-gallon drums, 30-gallon half drums, 5-gallon pails.

Specifications—In all concrete and cement mortar throughout there is to be incorporated Permantite Concentrated Liquid Integral Waterproofing as manufactured by SOMMERS & CO., LTD., 342 Madison Avenue, New York, N. Y., and in accordance with their directions.

Damp-Proofing Coating

Damp-Proofing Coating is a black, elastic, full bodied, slow drying, waterproofing and dampproofing compound for application with a brush to the interior surfaces of exterior brick or terra cotta walls, to which gypsum plaster is to be directly applied.

Forms a perfect bond for gypsum plaster (not portland cement mortar) applied directly to the treated surface. Prevents the penetration of water and dampness, and renders the inside of walls proof against vermin and stains. Saves the cost of furring and lathing.

Damp-Proofing Coating is a composition of gilsonite and other asphaltic gums fluxed and blended with vegetable pitches, virgin rubber latex, non-volatile oils, and petroleum distillates.

The intimate combining and proportioning of these ingredients make duplication most difficult; substitutes for Damp-Proofing Coating have therefore been almost impossible.

Damp-Proofing Coating has been used successfully in all climates. It will resist the freezing temperatures of our most northern countries, as well as the humid torrid climates of the tropical zones.

Covering Capacity—Average covering capacity is 80 square feet to the gallon, one coat, depending upon the porosity of the surface to which applied.

Packages—Shipping weight, 9 pounds per gallon. Put up in 55-gallon drums, 30-gallon half drums, 5-gallon pails, 1-gallon cans (6 to a case).

Specifications—The interior surfaces of exterior brick and terra cotta walls above grade shall be dampproofed with Damp-Proofing Coating as manufactured by and in accordance with the directions of SOMMERS & CO., LTD., New York, N. Y.

Damp-Proofing Coating shall be delivered at the building site, ready for use, in the original unbroken packages.

A Few References—Building, Location and Architect

Federal Reserve Bank, New York, N. Y., York & Sawyer
Marshall Field Residence, Huntington, N. Y., John R. Pope
Hotel Shelton, New York, N. Y., Arthur Loomis Harmon
Municipal Building, Brooklyn, N. Y., Voorhis, Gmelin & Walker
Hotel, Port Jervis, N. Y., H. L. Stevens & Co.
Vanderbilt Clubhouse, Deepdale, L. I., N. Y., Warren & Wetmore
Grasslands Hospital, Valhalla, N. Y., Walker & Gillette
Theater, Valley Stream, N. Y., H. G. Wiseman
State Hospital, Brooklyn, N. Y., Sullivan W. Jones
Filley Residence, New York, N. Y., McKim, Mead & White
Dutch Church, Bronxville, N. Y., Harry Leslie Walker
Corn Exchange Bank, New York, N. Y., Fellheimer & Wagner
Standard Building, Albany, N. Y., Shreve & Lamb
Columbia Grammar School, New York, N. Y., Necarsulmer & Lehlbach
Park Murray Building, New York, N. Y., Buchman and Kahn
Sutton Place Apartments, New York, N. Y., Cross & Cross
New York Life Insurance Co., New York, N. Y., Cass Gilbert
Keith Theatre, Syracuse, N. Y., Thomas W. Lamb
Taft School, Watertown, Conn., James Gamble Rogers
Master Craftsmen Building, Flushing, N. Y., Lockwood, Greene & Co.
Calvary Parish House, New York, N. Y., Waldeman Ritter
Lutheran Church, New York, N. Y., Mayers, Murray & Phillip
H. & H. Building, New York, N. Y., F. P. Platt & Bro.
Masonic Temple, Queens, N. Y., Rasmussen & Wayland
Church of The Ascension, New York, N. Y., Robert J. Reiley
Church of the Resurrection, Rye, N. Y., McKenna & Irving
St. Gabriels House, Hollis, N. Y., Renwick, Aspinwall & Guard

(Printed in U. S. A.)

L. SONNEBORN SONS, INC.

Floor Treatments, Waterproofing Materials, Decorative and Technical Paints

GENERAL OFFICES
114 Fifth Avenue
NEW YORK, N. Y.

BRANCH OFFICES
BALTIMORE CHICAGO PHILADELPHIA PITTSBURGH LOS ANGELES
BOSTON SAN FRANCISCO DETROIT SEATTLE

FACTORY: BELLEVILLE, N. J.
SOUTHWESTERN DISTRIBUTORS: SONNEBORN BROS., DALLAS, TEX.

Products

"LAPIDOLITH," the Liquid Chemical Hardener and Dustproofer for concrete and terrazzo floors.

"SONNEBORN'S CEMENT FILLER and DUSTPROOFER" for cement floors (transparent and in colors).

"HYDROCIDE" WATERPROOFING PRODUCTS for interior and exterior surfaces.

"LIGNOPHOL," a Preservative for wooden floors.

"CEMCOAT," an Improved Mill White.

"CEMCOAT" FLOOR ENAMEL.

"SONOTINT," a Flat, Washable Wall Coating.

"STIP-EL-ART," for interior stippling or texturing.

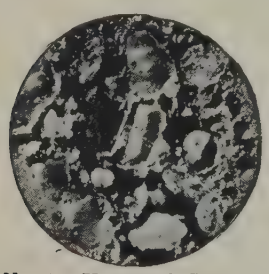
Also Amalie Structural Steel Paints, Galvacote, a coating for galvanized iron; Amalie Pipe Enamel; Amalie Radiator Enamel; Amalie Stack and Boiler Paints; Amalie P & D House Paints; Enamelife.

Hardening, Dustproofing and Waterproofing Old or New Concrete Floors

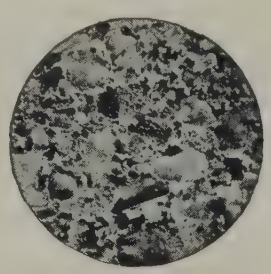
"Lapidolith"—A liquid LAPIDOLITH TRADE MARK chemical which penetrates concrete floors, rendering them hard, dustproof, wearproof and watertight. When applied to old concrete floors, "Lapidolith" will prevent further dusting and disintegration. It does not change the color of concrete.

An Investigation of the Action of "Lapidolith" on Concrete—Following is an extract from the official report of Prof. R. J. Colony of Columbia University, New York, as the result of an examination by him, under the microscope, of treated and untreated concrete:

"The external application of 'Lapidolith' to concrete surfaces results in (a) the formation of an optically isotropic but crystalline substance, derived by a reaction between components of the 'Lapidolith' and the cement matrix of the concrete which (b) has a tendency to fill in voids and cavities and act as a binding agent, thus rendering the surface smoother and more uniform."



No. 1. Untreated Concrete



No. 2. Lapidolized Concrete

Microphotographs of Specimens of Concrete
Magnified 50 diameters

No. 1. Note large numerous voids (black spots) and roughness of surface.

No. 2. Note roughness is reduced and voids filled with network of newly formed hard crystalline substance

Application—"Lapidolith" is mixed with water and flushed on the floor as per detailed directions to be furnished.

Special Service Work—We also contract to apply "Lapidolith" with our own men under the supervision of a service engineer on areas of 20,000 sq. ft. or over at a substantial saving to the owner in material and labor.

Specification for Concrete Floor—Harden and dustproof the following concrete floor (.....) or as noted on the drawings with 3 applications of "Lapidolith," manufactured by L. SONNEBORN SONS, INC., New York, N. Y., and applied as per their directions.

Filling and Dustproofing Concrete Floors Subject to Light Wear

"Sonneborn's Cement Filler and Dustproofer," for concrete floors where there is no excessive wear. Furnished either transparent or in a number of attractive shades. Covering capacity per gal., 1 coat, is 350 sq. ft.; 2 coats, 200 sq. ft.

Specification—Fill and dustproof the following cement floors (.....) with 2 coats of "Sonneborn's Cement Filler and Dustproofer" manufactured by L. SONNEBORN SONS, INC., New York, N. Y., applied as per manufacturer's directions.

"Hydrocide" Waterproofing Products

"Hydrocide" No. 633 (Also Hydrocide Mastic and Semi-mastic)—Plaster bond for dampproofing the inner surfaces of outside walls above foundations.

Ready for use, applied cold with a brush. Saves furring and lathing expense. Should not be applied to smooth concrete surfaces which are to be plastered unless walls are sufficiently roughened. Covering capacity per gal., 1 coat, is 65 to 100 sq. ft.

"Hydrocide" Mastic and Semi-mastic (Also Hydrocide No. 648)—For waterproofing outer surface of foundation walls and footings.

Ready for use, applied cold with a brush. Covering capacity per gal., 1 coat, is 65 to 100 sq. ft.

"Hydrocide" No. 611—For the protection of unexposed surfaces of limestone, caen stone, marble and other fine stones, from stain caused by absorption or communicated by surrounding masonry. Covering capacity from 250 to 350 sq. ft. per gal.

"Hydrocide" Integral Waterproofing (Powder, Paste, and Liquid)—For waterproofing mass concrete, concrete walls, floors, cement stucco and mortars, etc. Mix 2 lb. of powder with each bag of portland cement, then add the sand and stone mixture. Use 1½ qt. of a mixture of equal parts of paste and water for each bag of cement. Use 1 gal. of Liquid for each 10 gal. water, or 1½ gal. for each cubic yard of concrete, 1 gal. for each 100 sq. ft. of 1-in. floor topping.

Continued on next page

Waterproofing Exterior Walls Above Grade without Changing Appearance of Walls

"Hydrocide Colorless" contains no wax, paraffin or similar substance disfiguring the surface.

Grade "A" for light colored surfaces, such as plain concrete and stucco, etc.; "B" for red and buff brick, colored concrete and stucco; "D" for very porous surfaces, such as limestone, concrete cast stone, etc. that are of light color.

Preservative for New and Old Wood Floors

"Lignophol" is a preservative composed of natural wood gums and oils. It penetrates to a considerable depth below the surface of a wood floor, filling the voids in and between the cells and fibers. Prevents splintering, cracking, warping and dry and wet rot.

LIGNOPHOL FOR WOODEN FLOORS TRADE-MARK

"Lignophol" also acts as a dampproofer and dustproofer. Contains a powerful fungicide which checks the growth of fungus and mold. It prevents the disintegration of the wood fibers. It makes floors resilient and more resistant to heavy traffic and wear.

"Lignophol" is satisfactory for wood floors of all kinds in office buildings, churches, schools, hospitals, factories, bakeries, laundries—in fact, in all buildings.

"Lignophol Wax Finish"—For dance floors, residence floors and wherever a medium or high gloss is desired. One coat produces a medium gloss; 2 coats produce a high gloss. Lignophol Wax Finish is also very satisfactory for wood trim.

Covering Capacity—One gallon covers about 350 sq. ft., 1 coat, or about 200 sq. ft., 2 coats. New floors require 1 coat; floors subjected to heavy traffic and old floors should receive 2 coats. Furnished in 4 colors: natural, light oak, medium oak and dark oak.

Specifications—After scraping, all wood flooring shall be given 1 application of Lignophol, manufactured by L. Sonneborn Sons, Inc., New York (color to be selected) and applied in accordance with manufacturer's directions. (Specify 2 coats for floors subjected to heavy wear.)

Lignophol Wax Finish—For medium gloss: After scraping, all wood flooring shall receive 1 application of Lignophol Wax Finish, manufactured by L. Sonneborn Sons, Inc., New York (color to be selected) and applied in accordance with manufacturer's directions. About 6 hours following application, the surface should be polished. (For high gloss specify 2 coats. Apply second coat after first coat has been polished.)

"Cemcoat," a Sanitary, Washable, Light-reflecting Enamel Paint for Interior Walls and Ceilings

A white enamel paint which will stay as white as the most expensive enamels. Very opaque, 2 coats will cover as well as 3 coats of ordinary lead and oil paint. Is not poisonous. Is sanitary, can be washed with soap and water or even with a hose without affecting the surface. Will not peel, crack or blister if properly applied to a normal surface.

Cemcoat TRADE-MARK

For Interior Walls—Can be used on concrete or any other masonry materials, wood or metal. A coat of "Cemcoat" flat undercoat followed by a coat of "Cemcoat" finish will give best results. For very porous surfaces, 1 coat *each* of Amalie Gypsum Size, "Cemcoat" Undercoating and "Cemcoat" Finish.

White Flat "Cemcoat" Finish—Scientific laboratory tests have proven that it gives the unusual reflection factor of 86%, contrary to long established theory that gloss paint has the greatest reflective properties.

Eggshell and Gloss "Cemcoat" Finish—Eggshell is recommended for offices, schoolrooms, etc.; Gloss for conditions involving moisture, steam and other cases requiring this type of finish.

Colors—Made in all standard colors.

Covering Capacity—Approximate number of square feet per gallon, per coat:

	First Coat	Second Coat
Concrete	250	300
Brick	250	300
Plaster	300	350
Wood	400	450
Metal	400–500	500–600

Exterior "Cemcoat" for Exterior Walls

For decorating and dampproofing exterior walls above grade. Comes in 12 attractive colors, flat or gloss finish.

Covering Capacity—On concrete, brick, stone and stucco, approximately 175 sq. ft. for 2 coats; on wood and metal 250 sq. ft. for 2 coats.

"Cemcoat" Floor Enamel for Cement Floors

Exceptionally elastic and durable; will successfully stand up where ordinary floor enamels would fail. Dries in 24 hours to a glossy washable film. Eight attractive colors.

"Cemcoat B" Floor Enamel—For cement floors in basements and those laid directly on the ground where dampness might cause other enamel to peel off. Alkali-proof.

Covering Capacity—Will cover approximately 200 sq. ft. per gal., 2 coats.

"Sonotint," a Flat Washable Oil Paint for Interior Walls and Ceilings of Hospitals, Schools, etc.

A flat oil paint ready for use, which has all the softness and finish of water colors, with the advantage of being washable. It reflects the light without glare. Manufactured in 16 different shades. A color card will be sent on request. "Sonotint" forms a very hard elastic surface not affected by soap and water. Being very opaque, 2 coats cover perfectly and set without showing brush marks.

SONOTINT TRADE-MARK

Covering Capacity—Will cover approximately 250 sq. ft. per gal., 1 coat.

Stip-El-Art

A plastic oil base wall finish for stippling or texturing, easy and inexpensive to apply.

Stip-El-Art offers the painter and decorator the widest range for executing individual textured colorful effects. Ready for use, requires no thinning or mixing.

It is adapted for any style of building, domestic, commercial or civic. Solves the most complex decorative problems.

Covering Capacity—Will cover 60 to 100 sq. ft. per gal., 1 coat.

Further Information

The following printed matter sent on request:

"Specification Data" portfolio arranged according to A. I. A. classification. Fits standard correspondence files, comprises floor treatments, dampproofing and waterproofing, painting.

Booklets: "The Preservation and Strengthening of Wood Floors—Lignophol"; "Cemcoat Reflects the most Light."

Samples treated with Lapidolith, Lignophol, Cemcoat, Hydrocide Colorless, Stip-El-Art.

INCORPORATED 1916

STRUCTURAL WATERPROOFING CO., INC.

Waterproofing and Dampproofing Contractors

285 Madison Avenue, NEW YORK, N. Y.

Our Organization and Service

A reliable organization engaged only in contract work for the protection from the elements of structures above and below grade. Preventative processes during construction or curative processes after completion.

More particularly our service includes:

Cement Waterproofing.
Dampproofing.
"Spandrel-Tite" Waterproofing (on Spandrel Beam).
Exterior Colorless Treatment.
Pointing of Masonry.
Cleaning of Masonry.
Spray Painting.
Special Concrete Work.

Personal Supervision

All contracts receive the personal supervision of the principals.

Materials

The materials used for waterproofing and dampproofing by this company are those as prepared and marketed by the leading manufacturers of waterproofings and technical paints. We have selected and use those products of the several manufacturers which by years of experience we find best suited to meet the respective demands of efficiency, wear and effectiveness.

Because of our ability to use, effectively and honestly, the products of these *manufacturers we enjoy their recommendation, wherever the sale of their products involves service.

*(Names on application).

Guarantees

The guarantees as made by this company are concise, meaningful and binding—depending upon the type of work and other determining conditions they run from two to five years. Once assumed, no attempt is ever made to dodge responsibility when the *client* believes it rests upon us.

Diagram

The drawing on the opposite page represents diagrammatically a section of a building with certain details enlarged. These details are made for those sections of a structure through which water finds ready entrance and are those which require especial attention at the hands of architects.

Recommendations and Suggested Specifications for Architects Use

Dampproofing—We feel that the subject of dampproofing of interior walls is ably handled on the pages of the manufacturers of such compounds. In general, we recommend—2 brush coats of a semi-mastic dampproofing on tile block walls and one trowel coat of mastic on all brick walls.

"Spandrel-Tite" Waterproofing—As pioneers in the introduction and development of spandrel beam waterproofing—the "Spandrel-Tite Method"—we recommend the following:

(1) All beams in exterior walls back of brick veneer (and back of terra cotta and limestone where architectural details permit) shall be waterproofed by the "Spandrel-Tite Method" as installed and guaranteed by the STRUCTURAL WATERPROOFING CO., INC.

(2) The waterproofing membrane shall consist of one ply of Structural Waterproofing Co.'s "Mastikloth" (a cotton fabric super saturated with asphalt). All joints shall be lapped 2 in. and well sealed. The membrane shall start within 1 in. of the outside face of the wall on the top of the lintel or the course below the soffit of the spandrel beam, run up on the flange filling to the top of the beam, inwardly to the inside face of the wall and later turned up at least 3 in. on inside face of wall. Flash fully around all columns for a height of 6 in.

Waterproofed Cement Plaster Coat Process—For this method of waterproofing we would recommend the following:

(1) ***Intent***—It is the intention of these specifications to provide for the waterproofing of all specified surfaces below grade which are in contact with earth or rock. In general, this shall be accomplished by means of the Waterproofed Cement Plaster Coat Process as installed and guaranteed by the STRUCTURAL WATERPROOFING CO., 285 Madison Avenue, New York, N. Y. The following detailed specifications shall be used as a guide and whatever additions or exceptions are, in the opinion of the contractor, required to render watertight the areas specified, are included even though not specifically mentioned.

(2) ***Areas to be Covered and Scope of Work***—

Note: Insert under this heading the areas to be covered, such as, all walls, floors, walls and floors of all pits, trenches; height to which it is to be carried on the walls and columns, etc. In general a complete description of the surfaces to be covered.

The waterproofing shall run under all non-bearing interior partitions, and shall be carried up on the faces of all interior bearing walls to a height of ..... ft.

The contractor shall see that the area immediately under and 2 ft. on all sides and 6 ft. in front of the boiler (or boilers) shall be depressed for a depth of 6 in. to allow for the installation of a sand cushion and fire brick by others to protect the waterproofing from the heat of the boiler.

(3) ***Materials***—The cement waterproofing shall consist of a plaster coat of one (1) part cement, two (2) parts sand and the mixture of a waterproofing medium with the gauging water.

The waterproofing compounds shall be applied in the quantities and in the manner as specified by the manufacturer, and the contractor shall have the choice of using such material in which he has confidence and which he will guarantee, also that will result in a color and finish that will meet the approval of the architect.

The floor work shall be 1 in. thick and applied in one coat over as large an area as is practical at one time.

The vertical work shall be applied in two coats—scratch and finish—totaling not more than ¾ in. in thickness.

All work shall be floated and trowelled to a hard, dense and uniform surface and shall be left as a suitable finish as well as a waterproofing medium.

(4) ***Application***—All concrete surfaces, to receive waterproofing, shall first be thoroughly chipped, wire brushed and washed with a dilute acid water, and then with a clear water to present a new, fresh and clean surface to which the waterproofing will bond.

All brick surfaces, to receive waterproofing, will have had all joints raked out by the Mason Contractor to provide proper bond.

Note: The raking out of the joints in all brick work to be waterproofed should be included in the Specification for Mason Work.

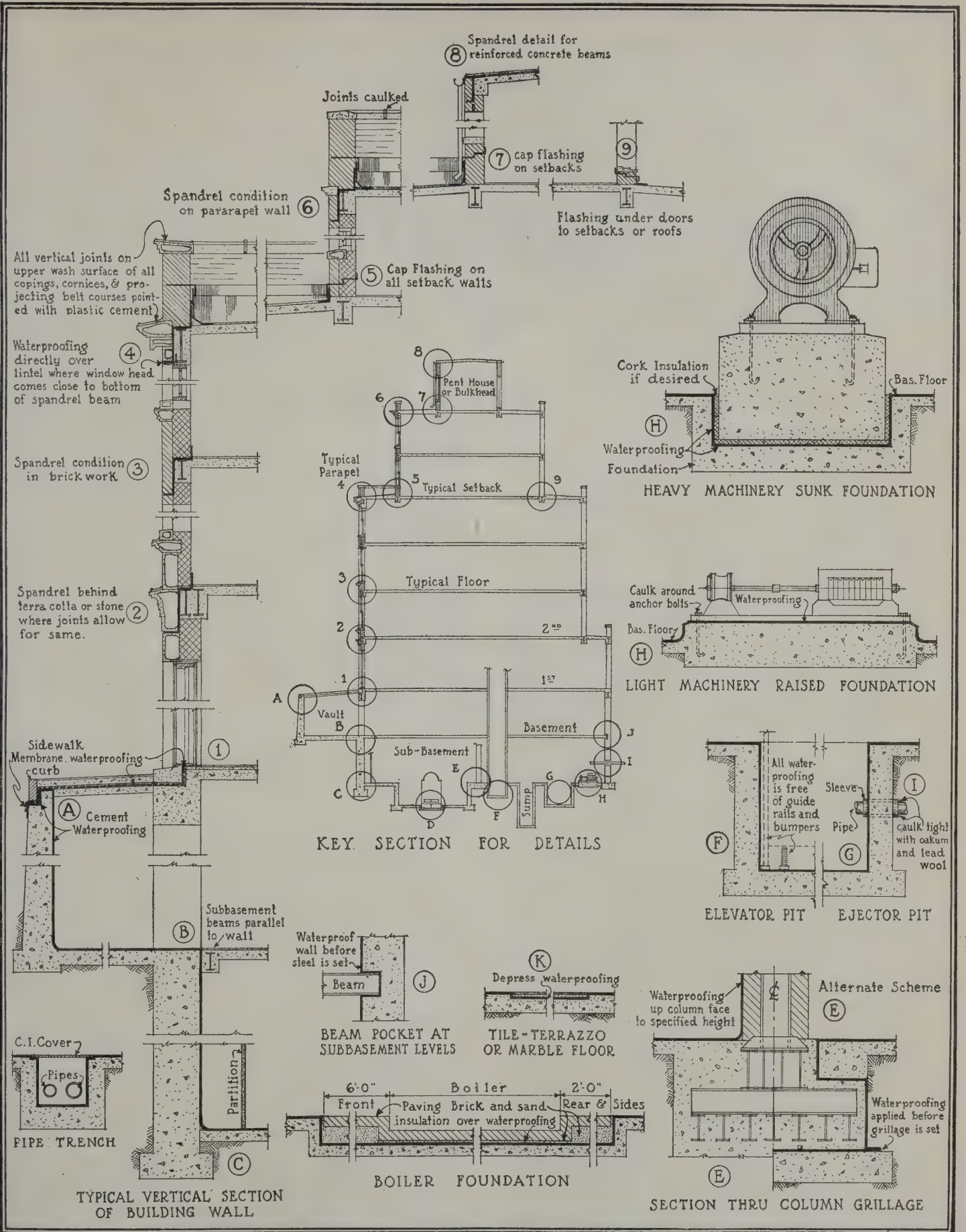
(5) ***Precautions***—The contractor shall take all precautions to insure proper waterproofing around all pipes passing through the walls; to bond carefully one day's work to another; to relieve all water pressure during the course of the work by bleed pipes or pumping as may be required; to examine the site, ascertain the water pressure and to assure himself before starting the work that there is sufficient concrete and reinforcing in the floor slab and walls to withstand the contemplated water pressure.

(6) ***Guarantee***—The contractor shall, on completion of his work, furnish a written guarantee to the effect that no water or dampness shall penetrate through the areas waterproofed by him for a period of three (3) years from date of completion, and that if such leaks should occur he will promptly, upon notification from the owner, architect or general contractor, repair such leaks without cost.

Some Representative Installations

New York Central Building
Sherry Netherland Hotel
Chanin Building
U. S. Appraisers Stores
Aeolian Hall Building
Transportation Building
Fisk Building
Hecksher Building
Columbia Presbyterian Group
Newark Telephone Building

Continued on next page



STRUCTURAL WATERPROOFING CO. INC.	CRITICAL DETAILS OF WATERPROOFING AND DAMPPROOFING	DRAWING No. 1 NOT DRAWN TO SCALE

THE SULLIVAN COMPANY

Cement Mixing Compounds; Technical Paints and Building Products

GENERAL SALES OFFICE
MEMPHIS, TENN.

CABLE ADDRESS
"SULCO, MEMPHIS"

SALES OFFICES

NEW YORK, N. Y., 30 Church Street
LOS ANGELES, CAL.
HOUSTON, TEX., 1201 Post Dispatch Building
CASPER, WYO.
TULSA, OKLA., 312 So. Cincinnati Street
MONTREAL, CANADA

Products

Waterproofing, liquid, paste and powder; Dampproofing; Acidproofing; Rustproofing; Concrete Hardeners; Wood Preservatives; Portland Cement Paint; Caulking Compounds; Canvas Preservatives; Cement Coatings; Cement Patching Compounds; Mastic Flooring, Stucco and Composition Flooring; Mortar Paste and Stucco Colors; Plaster Bond and Stone Backing; Fireproof Nailing Concrete; Oilproof Coatings; Slipproof Cement Grains; Cement Accelerators, colorless and colored; Iron Cement; Wood Cement; Tile Cement; Freezeproofing Compounds; Wax Compounds; Floor Dressings; Boiler Compounds; Boiler Putty; Roofing Paints and Cement; Aluminum Paint; Shingle Stains; Metallic Hardeners; Bonding Compound; Technical Paint and Varnish; Plastic Paint; Tiles.

KONSET
REG. U.S. PAT. OFFICE

Description and Uses of Products

Konset, an Integral Cement Mixing Compound—When mixed with concrete, provides four desirable conditions:

(1) Accelerates the initial and final set and increases the early tensile strength.

(2) Gives greater plasticity and workability.

(3) Increases density, making it hard and waterproof.

(4) Increases freezing resistance.

Konset is also made in any color in paste form, which produces any desired color effect in cement mixtures, such as floors, walls, mortar joints, and it is also used for making cement, brick, tile and stucco.

By using Konset in colorless or colored form you save time, labor and money, and at the same time make a surface that is hard, waterproof, and dustproof. This product is a lasting benefit to architects, engineers, contractors and owners.

Cemset Quick Setting Compound—This solution will accelerate cement and freezeproof concrete at 15° above zero without the use of salamanders or other devices.

Kemi-kal Cement Surface Hardener—In liquid or crystal form. This chemical is for hardening and dustproofing cement floors, walks and roads after they are laid. It also is used for stucco and plaster.

Konseal—A colored liquid filler for hardening and dustproofing cement floors after they are laid; serviceable and ornamental. A sanitary treatment for cement and concrete surfaces. Made in all colors.

Kontite-Portland Cement Paint—A flat coating in dry powder form made from portland cement. It is mixed with water instead of oil, for stucco, brick, stone, plaster, wall board, and all interior and exterior surfaces; is fire-resisting, sanitary, odorless and weatherproof. Made in gray, blue, red, buff, brown, green, white and cement color; or any shade to match.

Rustcotine—A chemical compound in which petroleum products are used as a base vehicle to carry rust inhibitive chemicals which prevent rust and corrosion. Made in paste and semi-paste form, and does not harden like paint.

Sealcote—Surface colorless waterproofing for outside walls of brick, stucco, concrete, stone, etc. Prevents efflorescence. Protects against dampness and lengthens the life of the building.

Sulco Liquid Waterproofing—A liquid integral waterproofing for all mass concrete or any place that portland cement requires waterproofing.

Sulco Waterproofing Powder—For mixing with the dry cement before sand and water are added.

Sulco Waterproofing Paste—A heavy white paste which is added to the gauging water that is used for mixing the concrete.

Sulco Mortar and Stucco Colors—Sulco Mortar Colors possess the characteristics of durability and permanency as they will not fade. The colors run uniformly as to shade, due to the special process used in manufacturing. Sulco Paste Mortar Colors are the finest and strongest for tinting mortar, or cement; quick setting, dustproof, waterproof and freezeproof.

Sulco Oilproof Coating—A liquid coating for oilproofing all surfaces that come in contact with gasoline, kerosene, naphtha, crude oil and its by-products.

Wood-Seal—Preserves new or old wood floors, composition floors, cork, rubber and linoleum; prevents warping, wear, rotting, disintegration or splintering.

Sulco Wood Preserving Oil—A product of wood obtained from the tar produced from the distillation of hardwood—principally oak, hickory, beech, birch and maple. Protects wood from rotting, checking, swelling and shrinking. Experts are available for the solution of any waterproofing problem or other technical information.

Iron-Cote—A metallic hardener for concrete floors in factories, garages, loading platforms, piers, packing houses, etc. It is composed of finely ground iron and other materials; is incorporated in the topping of concrete floors, making them capable of standing the effect of heavy service and protecting them against dusting.

Bux-Skin—A liquid for preserving and rendering awnings, tents, tarpaulins, curtains, covers, fisherman's riggings, hatch covers, canvas and cotton duck goods proof against mildew and water.

Art-Cote—Plastic paint for obtaining rough plastered wall effects.

Sulco Niloak Tile—For Egyptian, Indian, or Aztec motifs.

Aztex—Chemical cement stains.

Sulco Slipproof Grains—An abrasive material in loose form for impregnating cement or composition floors or stair treads to prevent slipping.

Fibermix—For floors, roofs, partitions, plaster and stucco. Nailing concrete and fiber mix combined.

Sulco Glazing and Caulking Compound—For bedding, glazing and caulking skylights, conservatories, hothouses, sheet metal frames, window frames, wood sashes, roofs, walls, concrete copings, swimming pools, tile floors, seams in boats, etc.

Sulco Plaster Bond, Dampproofing and Stone Backing—A dampproof bonding paint, permanent and adhesive.

Sulco Wax Compound—For polishing and treating old and new cement and wood floors; gives a beautiful luster. Easy to clean and soft under foot.

Sulco Insulating Cement—For protecting against heat leakage in piping, furnaces, ovens, and wherever a dependable, plastic, fire-resistant insulating material is needed.

Sulco Iron Cement—For smoothing the surface of steel and iron castings and repairing blowholes and other defects, filling up spongy castings, covering up countersunk bolt heads, pipe joints, or all places where an iron or steel patch is required.

Deflect-O-Lite Aluminum Paint—Deflects the solar heat and keeps the surface cool, protecting it against corrosion. For coating steel storage tanks, water tanks, steel bridges, metal buildings, penstocks, boilers, smokestacks, gas holders and all metal surfaces, concrete, brick and plaster.

Other Sulco Products—We make a specialty of manufacturing railroad and industrial paints and varnishes on specifications; so in purchasing material of this kind you are buying high class products 100% pure, which include: inside white; flat wall paints; factory paints; shingle stains; roof coatings; roofing cements, etc.

Catalogue

Write for our catalogue "Life Preservers for Buildings and Equipment," which includes list of representative users.

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Inventors and manufacturers of STEEL PROTECTIVE PAINTS; DAMP-PROOFING and WATERPROOFING PAINTS and COMPOUNDS; CAULKING and POINTING COMPOUNDS; CONCRETE FLOOR COATING; INSULATING PAINTS; SMOKESTACK PAINT; ROOFING PAINT; ENAMELS; STONE BACKING; WOOD PRESERVATIVE and FILLER; MORTAR, CEMENT and PLASTER COLORS; DECORATIVE PAINTS for all purposes.

R.I.W. REMEMBER IT'S WATERPROOF
Reg. U. S. Pat. Off.
TRADE-MARK

Damp-proofing

No. 232 "R.I.W." Damp-Resisting Paint—A black, elastic, full-bodied, tacky, damp-proofing and plasterbond paint for brush or spray application to the interior surfaces of exterior masonry walls to which hard wall plaster is to be directly applied. Prevents the penetration of dampness, and renders the inside of walls vermin-proof and stain-proof.

Not to be used on ceilings of any kind, nor must concrete or portland cement mortar be applied directly over it.

No. 110 "R.I.W." Damp-Resisting Paint—A black, alkali-proof and waterproof, elastic paint to protect limestone, marble, granite and other cut stone from the chemical action and discoloration due to alkali in cement, and to moisture. Also resistant to mild acids.

"R.I.W." Marine Cement*—A black, damp-proof, thick liquid paint for brush application to the exterior of foundation walls and footings; concrete floor slabs, and wood sleepers laid in concrete. Does not need to be heated.

"R.I.W." Liquid Konkerit (Patented)—Priming and finishing cement paints, ready for use, for damp-proofing, beautifying and overcoming the natural porosity of exposed stucco, concrete and masonry walls. In white and colors. Dries with a flat finish. For gloss finish apply "R.I.W." Flex-Sicco Ready Mixed Paint in any color.

"R.I.W." Toxloxpore*—A colorless, damp-proofing liquid, especially adapted for application to brick, concrete, stucco, limestone, and Bedford stone.

When applied to a perfectly dry surface it will prevent the development of efflorescence and the penetration of dampness.

Caulking and Pointing Compound

"R.I.W." Elastic Caulking Compound, furnished in steel gray and French Caenstone shades; other colors can be made to order. This compound is a waterproof, elastic, non-staining material for the pointing of terra cotta, stone joints, etc., and for caulking metal or wood doors, frames, etc.

Cement and Mortar Colors

"R.I.W." Cement and Mortar Colors—For the coloring of portland cement, stucco, etc. "R.I.W." Edinburgh mortar colors produce strong, permanent colored mortar joints. Furnished in both powder and pulp form. These cement and mortar colors are alkali-proof and furnished in a number of standard shades.

Waterproofing

"R.I.W." Toxement (Patented)—Made in powder (gray) or paste form for the integral waterproofing of all portland cement construction such as concrete foundations, floors, walls, bridges, piers, reservoirs, cement mortar and stucco.

"R.I.W." lubricates the concrete, increases flowability and workability with the minimum amount of water, assuring of a thorough and non-porous mix and eliminates necessity for extreme tamping and chuting.

"R.I.W." Tox-Mix Clear—A colorless liquid to be used integrally in portland cement mixtures, such as concrete, stucco, brick, mortar, etc. When this solution is used a great increase is obtained in the early tensile and compressive strength of portland cement mixtures and it renders the resulting concrete or cement mortar permanently hard and dense.

Concrete and Wood Floor Protective Coatings

"R.I.W." Cement Filler (Patented)—Designed primarily for use as a priming coat on dry concrete floors subjected to ordinary conditions of service. It penetrates the pores, neutralizes the lime inherent in concrete and hardens the surface.

The finishing coat should be "R.I.W." Cement Floor Enamel.

"R.I.W." Cement Floor Enamel (Patented)—For a finishing coat on concrete and wood floors not exposed to the elements. Prevents "cement dusting" and resists wear.

Furnished in high gloss finish.

"R.I.W." Toxbro, Wood Floor Preservative and Filler—A light straw colored material for application to wood floors or other wood surfaces, for binding the wood fibres together; it also prevents the grain of the wood from rising and insures a smooth surface, prevents slivering, splintering, cracking and checking.

"R.I.W." Flintox*—A chemical solution which reacts with the cement and precipitates zinc silicious materials in the pores of the concrete. Intended primarily as a surface hardener, but because of the reaction and precipitation referred to, the material may be said to function as a binder and dust preventive.

Steel Preservative Paints

"R.I.W." Tockolith (Patented)—A cement basic anti-corrosive paint, gray in color, used for priming iron, steel or other metal. A finishing coat must always be applied according to the character of the finished surface required and the nature of the service expected.

No. 1017-A "R.I.W."—An acid-proof, alkali-proof and waterproof china wood oil paint for application to steel or wood. Unaffected by the alkali in cement mortar and concrete.

Furnished in black, red, brown, dark green and other colors.

Nos. 110 and 112 "R.I.W." Damp-Resisting Paints—Waterproof paints which have wonderful resistance to the alkalis in cement mortar or concrete. Recommended for finishing coat on structural steel building frames, brine and condenser pipes, etc.

Furnished in black and maroon.

No. 137 "R.I.W."—A bright red paint recommended either for interior or exterior use over a priming coat of "R.I.W." Tockolith, but 2 coats may be used without a primer.

Used on steel structures exposed to the weather; roofs, gutters, gas holders, tanks, etc., and where acid fumes prevail.

No. 49 "R.I.W." Damp-Resisting Paint—A high grade, exterior exposure paint made in black or dark olive green, and usually applied over a priming coat of "R.I.W." Tockolith.

Withstands the action of locomotive gases, acids and other fumes to which railroad bridges and viaducts are subjected. Used on tanks, lined smokestacks, etc.

Enamels and Wall Coatings

"R.I.W." Hospital and Laboratory Enamel—A waterproof, white, hard usage enamel which resists the action of sulphuretted hydrogen, gases and fumes of acids and other chemicals. Used principally in hospitals, laboratories, bathrooms, kitchens, milk stations, engine rooms, etc.

"R.I.W." Plaster Primer—A liquid coating of semi-opaque character, made in white (can be tinted with color in oil), intended for direct application to clean plastered walls. It overcomes the alkalinity of unpainted plastered walls and obviates the necessity of using sizing materials: i.e., glue size, sealing varnish or similar preparations.

"R.I.W." Machinery and Pipe Enamel—This enamel is intended for use on dynamos, transformers, steam and electric stationary engines, compressors, mill and other machinery, guards, rails, etc., not exposed to the elements.

Specialties

Our Technical Service Dept. can be of assistance to our clients where special materials are required or where unusual conditions are to be contended with.

Correspondence and personal inquiry are invited on technical paint and damp-proofing and waterproofing problems.

*Trade-Mark Registered.

THE TRUSCON LABORATORIES

Integral Waterproofings, Dampproofings, Floor Hardeners

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Products

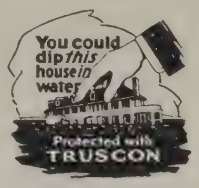
INTEGRAL WATERPROOFINGS for concrete and portland cement mortars.

DAMPPROOFINGS.

CEMENT FLOOR HARDENERS.

ANTI-FREEZE MIXTURES.

For Paints and Varnishes, see pages B2144-2145.



Architectural Service

THE TRUSCON LABORATORIES manufacture a complete line of waterproofings and paint coatings formulated to meet each individual requirement. The representatives of THE TRUSCON LABORATORIES are technically trained men whose duty it is to assist architects, engineers and owners in the selection of the proper material to meet their protective and decorative problems, by making a complete study of the requirement and furnishing detailed recommendations as desired and without obligation.

Truscon Waterproofing Paste, Concentrated

Definition—An integral compound for producing thoroughly waterproof concrete or cement mortar. It is adapted to waterproofing concrete construction of various kinds—foundations, reservoirs, tunnels, dams, cisterns, etc. Also used for waterproofing old brick, concrete and stone structures through the agency of a cement plaster coat into which the waterproofing is introduced. Truscon Waterproofing Paste is also used for producing waterproof cement stucco and cement mortar.

How Used—Truscon Waterproofing Paste, Concentrated, is incorporated into concrete or cement mortar through the medium of the water used for tempering the mix. Being in paste form, it diffuses itself readily through the water, forming a milky mixture. This milky appearing mixture of paste and water is used for tempering concrete or cement in the place of clear water.

Advantages—(1) Water repellent; kills capillary absorption of moisture into concrete or cement plaster. Since "plugging the pores" of cement is physically impossible, the repellent feature of Truscon Waterproofing Paste is the most practical and scientific method of waterproofing.

(2) Colloidal; is concentrated colloid and hence adds to the normal colloidal content of cement mortar, thus increasing its resistance to weathering and wear.

(3) High concentration and freedom from useless filler—it is all waterproofing—contains no clay, lime or such material.

(4) In paste form—the form most easily mixable with wet concrete or cement mortar batches. This insures even distribution of the waterproofing.

(5) Inert—does not react chemically with cement; hence does not lower the strength of the concrete.

(6) Lubricates the mix by cutting the "skin strength" of water—producing a concrete which "chutes" easily to the forms, also a more dense and compact concrete. In the case of cement mortar or stucco, "lubrication" makes these materials of creamy consistency and much easier to apply. Avoids mottling of surface of cement stucco.

(7) Insoluble in water—hence can not be washed out of the concrete or affected by time or weathering. This is an important point because so many of the waterproofings on the market will dissolve in water.

Specifications for Waterproofing Mass Concrete

Estimate 7 lb. of Truscon Waterproofing Paste to the cubic yard of concrete. Applicable to concrete foundations, reservoirs, tunnels, cisterns, swimming pools, etc.

Method—Water tightness shall be secured by the addition of Truscon Waterproofing Paste, concentrated, to all water used to temper the dry mixture of cement and aggregate in the proportions, and mixed, as directed below.

Ingredients and Proportions for Concrete—The concrete composing the structure shall consist of 1 part of cement, 2 parts of sand and 4 parts of stone (1:2:4) properly graded in size from coarse to fine.

The waterproofing is added in the proportion of 1 volume of Truscon Waterproofing Paste to 36 volumes of water in the following manner:

Mixing—First, mix 7 gal. Truscon Waterproofing Paste with 5 gal. of water. Second, use 1 qt. of this paste and water mixture to each bag of cement, adding same to the dry cemented aggregate. Then temper with clear water as usual.

Placing—All concrete shall be placed in one continuous operation, each pouring being thoroughly spaded. In cases where joints are unavoidable, care shall be taken to clean and roughen the old surface, and have it thoroughly wet and slush coated immediately before placing additional concrete.

Specifications for Waterproof Cement Plaster Coat

Estimate 6 lb. of Truscon Waterproofing Paste to the 100 sq. ft. of ¾-in. plaster coat applied to the walls, and 16 lb. of paste to the 100 sq. ft. of 2-in. finish applied to the floor. Applicable to reservoirs, swimming pools, cisterns and similar forms of masonry construction, whether of brick, stone or concrete.

Method—Water-tightness shall be secured by plastering the interior surface of the structure with a continuous coating of portland cement mortar waterproofed with Truscon Waterproofing Paste, Concentrated.

Ingredients and Proportions for Waterproofed Plaster Coat—The mortar composing the plaster coat shall consist of 1 part of cement and 2 parts of clean sand (1:2), free from organic matter and uniformly graded.

Preparation—The waterproofed cement mortar shall be prepared by thoroughly tempering (to required consistency) a dry mixture of 1 part of cement to 2 parts of sand, with water to which Truscon Waterproofing Paste, Concentrated, has been added in the proportion of 1 part of paste to 18 parts of water, and thoroughly mixed as follows:

First, mix 1 gal. of Truscon Waterproofing Paste with 1 gal. of water. Second, use 2 qt. of this mixture to each bag of cement, adding same to the dry cement and sand. Then temper with clear water as usual.

Preparation of Surface to be Coated—Before plastering the waterproofed cement mortar on to the hardened concrete, brick or masonry, proper precautions should be taken to insure thorough bonding and keying of the plaster coat to the wall.

Application of Coating to Sides—Immediately after applying a slush coat, the waterproofed plaster shall be applied in 2 coats each ⅜ in. thick as per specifications of the manufacturer, the second coat being applied just before the first has reached its final set.

Application of Floor Coating—Floors shall be prepared and treated with equal care as the walls to insure proper bonding of the mortar, and finished with a waterproofed cement mortar to a thickness of 2 in. Special care must be exercised in joining the wall coating to the floor coating, so that there is a continuous waterproof coating over the entire surface.

Pressure—When moisture is seeping through the walls, proper drainage must be provided during the application and setting of the plaster coat, until such time as the plaster coat has set and is capable of resisting pressure of its own adhesive strength.

Continued on next page

Truscon Ferritex

Dampproof wash for cement or concrete surfaces.

A pulverized iron compound, made chemically active, that when used as a brush coat over concrete or porous masonry, plugs up the pores and acts as a dampproofing.

It is often desirable to specify Ferritex as a dampproofing for the interior of cellar walls or concrete tanks where a black dampproofing compound would not give service and a waterproof cement plaster coat is found too expensive. It is to be noted, however, that where a decided hydrostatic pressure is encountered Ferritex is not recommended. For such severe conditions, the only remedy is the use of Truscon Waterproofing Paste Concentrated applied in a plaster coat.

Specifications for Ferritex

All concrete shall be dampproofed by the application of (1 to 5) thorough brush coats of Truscon Ferritex, (a porous concrete requires a greater number of brush coats than a dense concrete,) as manufactured and recommended by The Truscon Laboratories, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly cleaned of dirt, grease and foreign matter.

Application—Ferritex powder as received in the can from manufacturer, shall be mixed with water in the proportion of 4 lb. of Ferritex to the gallon of water and applied to the surface with a good, stiff, bristle brush. Allowing from 5 to 6 hours in between coats for drying. The mixture must be kept continually agitated during each application, to insure powder remaining in suspension in the water.

Truscon Stuccotex

Paint for wet concrete and masonry.

A hydraulic paint for uniforming concrete and masonry surfaces, or for decorating wet or damp stone, brick or concrete surfaces, such as swimming pools, retaining walls, etc., on which oil paints cannot be successfully used.

Stuccotex is a dry powder which is mixed with water to the right consistency and brushed on to the surface after that surface has been thoroughly saturated with water.

Stuccotex does not flake nor crumble.

Covering Capacity—125 sq. ft. per gal., 2 coats.

Specifications for Stuccotex

All wet surfaces shall be given 2 coats of Truscon Stuccotex, as manufactured by The Truscon Laboratories, Detroit, Mich.

Condition of Surface—Surfaces to be treated with Stuccotex shall be free of all loose particles, paint, cold water paint, size, oil, grease or any other foreign matter which would retard or prevent direct contact of Stuccotex with the surface.

Preparation—Mix Stuccotex thoroughly with water in the proportion of 10 lb. of dry powder with 2½ qt. of water. Mix only enough for immediate use. Any Stuccotex that has been mixed longer than two hours shall be thrown away.

Application—To the *water saturated* surface (not merely wet, but saturated) apply the first coat of Stuccotex, brushing same carefully into the pores. After the first coat has set about 12 hours, thoroughly saturate surface and apply a second coat.

Caution: Keep Stuccotex surface wet—during very warm or dry weather, spray the surface for several days while painting. Keep Stuccotex container dry and tightly covered.

Truscon Plaster Bond

A black compound for dampproofing interiors of exposed masonry walls. Plaster Bond remains flexible and tacky, providing a permanent bond for a scratch coat of plaster troweled directly on to it, thus eliminating furring and lathing. Plaster Bond is not recommended for use on ceilings.

Covering Capacity—About 80 sq. ft. per gal., 1 coat.

Specifications for Plaster Bond

The inside surface of all exposed walls of the entire building shall be given 1 uniform application of Truscon Plaster Bond as manufactured by The Truscon Laboratories, Detroit, Mich.

The coating shall be perfectly continuous over the entire surface. In cases where the Plaster Bond cannot be run continuously back of the floor construction, it shall be applied back on the ceiling for at least 12 in. from the wall.

Special care shall be taken to coat all portions of the wall where there is any cutting out to permit the passage of pipes subsequent to the application of the Plaster Bond. All portions of the wall which are particularly absorbent shall be given a retouch coat, so that the entire area will have an even, uniform appearance.

The plaster shall not be applied until 24 hours after the wall has been coated with Truscon Plaster Bond.

Truscon Foundation Coat

A black coating furnished ready for use (no heating) for dampproofing masonry walls below grade. Apply with a large mop or brush. More economical and satisfactory than coal tar, or pitch.

Covering Capacity—80 sq. ft. per gal., 1 coat.

Specifications for Foundation Coat

General—The outside surface of all foundation walls shall be given 2 uniform applications of Truscon Foundation Coat as manufactured by The Truscon Laboratories, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly dry and free from any adhering earth or foreign matter so as to insure the thorough penetration and bond of the Foundation Coat.

Application of First Coat—Truscon Foundation Coat shall be applied over the dry masonry surface with a large brush or mop, exercising special care to insure a uniform continuous coat. Allow 24 hours for drying time and apply second coat in one continuous application.

Truscon Foundation Coat shall be allowed to dry for at least 12 hours before being backfilled.

Truscon Temperite

Quick set and antifreeze for concrete and cement mortar.

Truscon Temperite is a chemical compound for accelerating and regulating the set of cement mortars, giving protection against frost, and bringing the cement to its point of final strength and hardness in a much shorter time. It also helps retain moisture and thus assists in hydration and lubrication of the mass, giving a denser concrete.

Truscon Temperite is furnished in liquid, or dry concentrated form.

Specifications for Using Temperite

Truscon Temperite, manufactured by The Truscon Laboratories, Detroit, Mich., shall be used in concrete or cement mortar as directed below:

If Temperite Liquid—Thin in the proportion of 1 gal. liquid to 10 gal. water. Use this mixture of Temperite and water in place of clear water for gauging the mixture of cement and aggregate.

If Temperite Dry Concentrated—Throw 2 lb. of Temperite Dry Concentrated into the mixer for every bag of cement, turning the mixer over a sufficient number of times to insure a thorough solution and distribution of Temperite.

Truscon Super-Por-Seal Transparent Dampproofing

A transparent coating for protecting and dampproofing exterior masonry walls above grade. May be applied by brush or spray. Super-Por-Seal is also suitable for use on unexposed sides of cut stone to prevent penetration of moisture and resulting discoloration.

Covering Capacity—80 sq. ft. per gal., 2 coats.

Truscon StoneTex Concrete Paint

The nationally known lime-resistant masonry coating for protecting and dampproofing exterior brick, stone, stucco or concrete. Furnished in white and 10 standard shades. Applied with a brush or spray. Prevents cold and moisture from filtering through masonry walls and avoids disintegration of concrete. Renovates and beautifies masonry buildings.

Covering Capacity—About 100 sq. ft. to gal., 2 coats.

Truscon Floor Hardeners

Metallic—Truscon Floor Hardener is a metallic hardener designed for giving floors in factories, warehouses and such places greater resistance to wear. Forms a dense, hard finish. Especially applicable to new cement floors, or to floors which need resurfacing.

Quantity required: 30 lb. to each 100 sq. ft.

Chemical Dry—Agatex Crystals, a chemical hardener for cement floors, furnished in dry form. Dissolved in water and applied with a brush or broom.

Quantity required: about 1 lb. to each 40 sq. ft.

Chemical Liquid—Agatex Liquid, a chemical hardener furnished in highly concentrated form for stopping dusting and crumbling of cement floors. Applied with a brush, broom or similarly convenient instrument.

Quantity required: about 1 gal. to each 100 sq. ft.

Specifications

For complete specifications on Truscon waterproofings and dampproofings, ask for a copy of "Truscon Architects' Specifications Book 'A.'"

THE VORTEX MANUFACTURING CO.

The Par-Lock Key for Surfaces to Be Plastered

1978 West 77th Street

CLEVELAND, OHIO

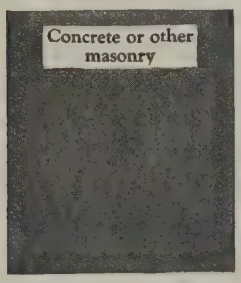
Processes

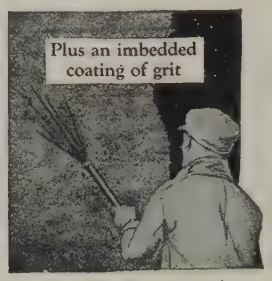
The Par-Lock Process is a widely used and approved method of preparing masonry surfaces for plastering by means of coarse grit embedded in asphalt. Par-Lock may be considered either as the dampproofing that affords an efficient mechanical key or as the Plaster Key that includes a superior job of dampproofing.

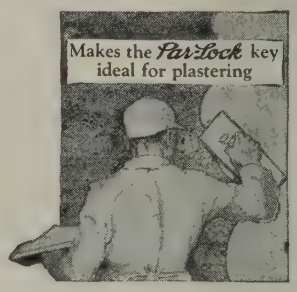
Par-Lock PLASTER KEY Registered U. S. Pat. Off.

Specification "I"—For dampproofing walls to be furred, and for coating cinder fill mixtures under matched flooring.

Collaborate with Nearest Par-Lock Applier—Specifications including any of these uses of Par-Lock should be prepared in collaboration with the nearest Par-Lock Applier in order that best results may be achieved for the particular work intended.







The Par-Lock Plaster Key may be applied to brick, tile or concrete wall surfaces, concrete slabs or clay tile and concrete joist ceilings, and all other interior concrete surfaces receiving plaster direct.

Specification

The inside face of all exterior masonry wall surfaces, all ceiling slab surfaces and all other concrete surfaces within the building, receiving plaster finish direct, are to be prepared, before plastering thereon, with Par-Lock Specification Form B as applied by the Par-Lock Appliers of—(insert name of nearest Par-Lock Applier from list on this page).

Other Par-Lock Specifications

Specification "D"—For dampproofing surfaces to be finished with portland cement or tile and bonding the portland cement or tile finish to structural bodies.

Laboratories, basements, swimming pools, tunnels, etc.

Specification "E"—"Cotton Membrane Waterproofing." For heavy waterproofing on basement walls, floors, footings, swimming pools, tanks, etc.

Specification "F"—For light waterproofing of footings, outside walls below grade line, basement floors, tunnels, etc.

Specification "G"—"Membrane Waterproofing." For heavy waterproofing to resist hydrostatic pressure. Tunnels, swimming pools, reservoirs, and deep basements.

Par-Lock Appliers

Behind Par-Lock is a national organization of expert, responsible applying firms. Par-Lock is a service, not a mere material. For lasting satisfaction rely on the Par-Lock Applier and rely on Par-Lock.

PAR-LOCK APPLIERS

Albany, N. Y., 425 Orange Street
Atlanta, Ga., Bona Allen Building
Baltimore, Md., 613 West Cross Street
Boston, Mass., 45 Commercial Wharf
Buffalo, N. Y., 958 Ellicott Square Building
Chicago, Ill., 111 West Monroe Street
Cleveland, Ohio, 218 Hunkin-Conkey Building
Columbus, Ohio, 751 South Cassingham Road
Detroit, Mich., 2544 First National Building
Kansas City, Mo., 2035 East 19th Street
Minneapolis, Minn., 434 Builders Exchange
Newark, N. J., 24 Commerce Street
New York, N. Y., 50 Church Street
Philadelphia, Pa., 1700 Walnut Street
Pittsburgh, Pa., 614 Bessemer Building
Scranton, Pa., Cedar Avenue
St. Louis, Mo., 1011 Telephone Building
Toronto, Ont., 2258a Bloor Street, West
Trenton, N. J., 339 Broad Street Bank Building
Youngstown, Ohio, 503 City Bank Building
Wilkes-Barre, Pa., 904 Second National Bank Building

THE WATER LOCK CO.

Manufacturers of Admixture for Waterproofing, Hardening, Accelerating and Improving Workability of Concrete

20 East Front Street, CINCINNATI, OHIO

Products

CAMPBELL'S WATER LOCK CEMENT COMPOUND, a powder admixture that makes concrete waterproof and harder, and improves the workability—used strictly as integral.

SAHARA, concentrated form of Water Lock, for plastercoating—will staunch leaks and seepage, and eliminate dampness.

Form

Prepared in powder form, 100 lb. to the sack. Water Lock and Sahara mix right with the cement. No stirring or special treatment necessary.

Features

(1) Contains no acids or chlorides to corrode reinforcing steel or cause faces of walls to crumble or peel.

(2) Gives a buoyancy to the concrete, which keeps the heavy aggregate equally distributed throughout.

(3) Pours evenly and smoothly, requiring no pounding or scraping of mixers, barrows or chutes, thereby effecting a considerable saving in labor.

(4) Gives an early strength to concrete, reduces perviousness of concrete under 3 per cent.

Waterproofer

Whether Water Lock is used as an integral in new construction work, or Sahara as a plastercoat on a completed structure, an absolutely dry job is assured. At Wright Flying Field, Fairfield, Ohio, the Government keeps a constant supply of this material on hand to overcome seepage problems. It is the only waterproofing *tried* which has been found successful there.

Stucco

Water Lock, when used as an integral in the base of stucco, removes the danger of cracking and deterioration, by making it absolutely waterproof and hard.

Accelerator

On a 26-hour test at Purdue University, Water Lock concrete showed a compressive strength of more than two times as great as ordinary concrete. In addition, quoting the Purdue report, "Water Lock concrete showed less voids in the broken test specimens."

Workability

Water Lock improves the workability of concrete. Purdue University, Lafayette, Ind., known internationally for its engineering college, reported after making exhaustive tests that for mass concrete Water Lock possesses these merits:

(1) Improves workability, thereby

(2) requires less water to give workable concrete and consequently yields greater strength, and

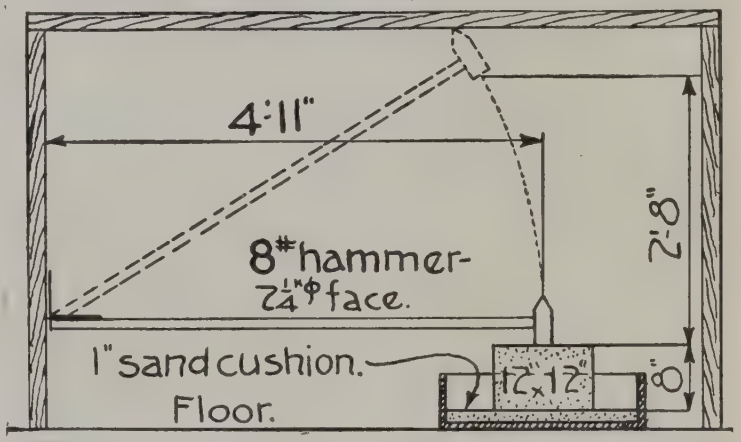
(3) makes the concrete more dense.

Fountain Building, Cincinnati, Ohio
HARRY HAKE, Architect
A typical Water Lock job

Hardener

The following official Government test bears witness to the hardening and workability qualities of Water Lock:

RECORD OF ABRASION TESTS, U. S. ENGINEER OFFICE CENTRAL DIVISION, JULY 19, 1928



No. blows	200		250		300		350		400		450	
	D	V	D	V	D	V	D	V	D	V	D	V
Plain Concrete												
Average	1 1/32	3.7	2 1/32	6.4	2 1/32	9.5						
Water Lock Concrete												
Average	9/32	2.0	27/64	3.1	1/2	4.2						

Notes: D Penetration of hammer, in in.
V Volume of pit made by hammer, in cu. ins.

Eight blocks of concrete, each 12x12x8 in., were made—four of plain concrete and four containing Water Lock. The composition of each plain concrete block was as follows:

Gravel	60 lb.
Sand	30 lb.
Cement	12.5 lb.

The other blocks contained 7.5 lb. of Water Lock and the sand was reduced in weight an equivalent amount.

As each block is 1/40 cu. yd., it is apparent that the mixture corresponds to 5 bags of cement per cu. yd., and that the Water Lock blocks contained 300 lb. of this compound per cu. yd. After the blocks were poured they were set out of doors to cure under natural weather conditions for 28 days following June 22. The method of making the tests and the results obtained are indicated above.

In general the Water Lock blocks showed only about half as much disintegration for a given number of blows as the plain blocks. The results are quite uniform and consistent.

The Water Lock also serves the same purpose as hydrated lime, or diatomaceous silica, which is generally added to concrete used in lock and dam construction to improve workability.

Specifications and Cost

The amount of Water Lock to be used depends upon the purpose, whether as waterproofer, hardener, for workability, etc., or all of them. A specification card is available either at our home office or any building supply dealer handling Water Lock. The cost of Water Lock in a job figures less than 40¢ per cu. yd.

WESTERN WATERPROOFING COMPANY

Waterproofing and Dampproofing Contractors

MISSOURI CORPORATION
ST. LOUIS, MO., Syndicate Trust Building
PHILADELPHIA, PA., Abbott Building
CHARLOTTE, N. C., First National Bank Building

MICHIGAN CORPORATION
DETROIT, MICH., Penobscot Building
CLEVELAND, OHIO, 2341 Carnegie Avenue
COLUMBUS, OHIO, Joyce Realty Building
TORONTO, ONT., 65 Victoria Avenue

NEW YORK CORPORATION
NEW YORK, N. Y., 342 Madison Avenue
BOSTON, MASS., 82 West Dedham Street
BUFFALO, N. Y., 344 Ellicott Square

Concrete Must Be Thoroughly Waterproofed to Insure Dryness and Permanence

Concrete's inherent porosity is its outstanding drawback. No matter how carefully are its proportioning, mixing and placing controlled, concrete always contains an appreciable percentage of "voids." This porosity is responsible for two serious defects: leakage and disintegration.

In basements, tunnels, pits and other structures below grade the danger of leakage with the resultant damage to goods, machinery, etc., is always present. Waterproofing all walls and floors below grade is effective and inexpensive protection against underground water and dampness and permanent insurance against bursting water mains and other accidents resulting in the presence of unusual water.

Absorption of water with alternate wetting and drying, as well as temperature changes, cause expansion and contraction which result in minute cracks. As these minute cracks develop, absorption increases, soluble elements in the concrete are affected, reinforcing steel is corroded, frost action starts, disintegration definitely sets in, the structure is weakened and complete failure is not impossible. Damp concrete exposed to frost, chips off due to the disruptive force of water freezing. Unfortunately, the first stages are deep seated and seldom noticeable until the damage becomes serious.

Disintegration may be repaired, the concrete restored and further disintegration forestalled. Disintegration of concrete may be prevented by proper treatment immediately upon completion.

The WESTERN WATERPROOFING COMPANY'S experience in waterproofing and dampproofing masonry structures and in restoring disintegrated concrete has proven that each problem must be treated as a separate study. This company believes that best results can only be guaranteed if the work is done by experienced workmen under expert supervision. It therefore offers its services as waterproofing and dampproofing engineers and contractors, under a strict guarantee of complete satisfaction. It sells no materials.

Western Waterproofing Methods

Leakage may be permanently prevented in new structures and cured in existing buildings by waterproofing with materials and methods developed and perfected by the WESTERN WATERPROOFING COMPANY. They have waterproofed all walls, floor slabs, etc., in thousands of structures throughout the country and their work has stood the test of time.

Each problem requires varied and individual treatment but, as a basic material, IRONITE gives the most satisfactory and lasting results. IRONITE is finely pulverized iron combined with chemicals. Applied with water the iron swells and completely seals the pores of the concrete. Advantage is taken of the very defect it is sought to cure—porosity and its accompanying suction. Other materials are used when required.

Prevention of disintegration is primarily a problem in waterproofing.

The application of IRONITE is repeated until the pores are completely and permanently waterproof, dampproof and proof against disintegration. The bond between the waterproofing and the structure is so perfect that it will resist *any* hydrostatic pressure the structure is capable of withstanding.

Specifications

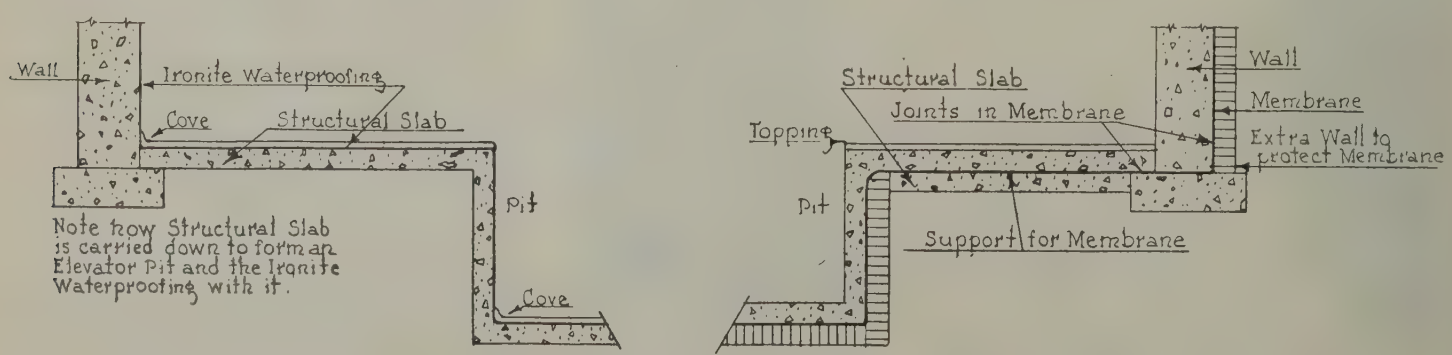
It is our preference to write a separate specification for each specific job. As a general specification the following may be used:

All surfaces to be waterproofed, comprising in general the interior surfaces of all walls and floor slabs in contact with earth, all pits, trenches and other depressions, all columns and interior division walls which penetrate the floor, together with such surfaces as may be hereinafter mentioned or indicated upon the drawings, shall be waterproofed by the WESTERN WATERPROOFING COMPANY (address of nearest office), and fully guaranteed by them, for a test period of two years. Walls shall be left with a brush [float] [steel troweled] finish. Cement floor finish over floor waterproofing is to be provided by this [mason] contractor. Necessary pumping shall be provided by the general [foundation] contractor.

Reminders

The following points are essential to a completely satisfactory waterproofing job. They are given here merely as reminders.

Have you provided continuous, accessible interior waterproofing?



Comparison Showing Saving in Construction

Continued on next page

Park Square Building, Boston, Mass.
Densmore & Leclear, Architects.

National Press Club, Washington, D. C.
Rapp & Rapp, Architects

Basements of above buildings waterproofed by Western Waterproofing Company

Are your walls and floors reinforced against water pressure?

Are your basement floor slabs keyed into the walls?

Are your boiler pits and flues insulated against excessive heat? (Should be included in the masonry or boiler specifications.)

Have you insured against unusual conditions in the adjoining areas—a broken water main—a clogged sewer?

Have you specified that the waterproofing be completed before interior partitions, machinery, or other obstructions are placed?

Are specially designed expansion joints required?

Are watertight construction joints provided?

The Resto-crete System for the Repair of Disintegrated Concrete

This system consists of cutting out all defective concrete, waterproofing with Ironite, which provides a perfect bond, building up to the original surface, again waterproofing with Ironite, and, where necessary, adding a final coating to match the original surface. By this system concrete can be completely restored to its normal condition and appearance. The illustrations of a Packard Building, recently restored by our Resto-crete System, show disintegration that can take place without being suspected. In this building there were practically no surface indications of the underlying damage. Restored by the Resto-crete system, this building is as good as ever, and disintegration has been permanently stopped.

Resto-crete results are absolutely guaranteed.

Other Work

Western Waterproofing Company is also prepared to undertake and guarantee the results of the following:

Waterproofing—Swimming pools, reservoirs, dams, retaining walls, etc.

Prevention of Absorption—In fuel oil tanks, gasoline and light oil tanks, molasses tanks, pickling vats, unusual oil containers, etc.

Protection—Of floors and walls of packing houses, soap factories, tanneries, dairies, etc., against the action of soaps, greases, fats, tannery liquids, dairy acids, etc.

Western Waterproofing Company's Services

We maintain in all parts of the United States, experienced waterproofing and Resto-crete crews, each under the supervision of expert engineers. Work can therefore be undertaken anywhere expeditiously and at a minimum cost. Our offices will be glad to assist in solving any of the problems relating to waterproofing, dampproofing, or the prevention or restoration of concrete disintegration. In requesting advice by mail, please give fullest possible particulars.

Left:

Before Treatment—Column of Disintegrated Concrete

This condition was hidden as hair line cracks only were visible at the surface

Right:

After Treatment

Neat, clean and now permanent result obtained by the Resto-crete system

Disintegrated Column in Packard Motor Car Co. Plant, Detroit, Mich., Repaired with Resto-crete System

Representative Contracts

New York Corporation

Keith Memorial Theatre, Boston, Thomas W. Lamb, Archt.
Park Square Building, Boston, Densmore & Le Clear, Archts.
Biltmore Hotel, Providence, R. I., Warren & Wetmore, Archts.
Railroad Stations of Springfield, Mass. and Erie, Pa., Felheimer & Wagner, Archts.
Half Moon Hotel, Coney Island, George B. Post, Archt.
Savoy Plaza Hotel, New York, McKim, Mead & White, Archts.
National City Banks, Walker & Gilette, Archts.
City National Bank, Bridgeport, Conn., Dennison & Hirons, Archts.
Schools (several), New Jersey, Gilbert & Batelle, Archts.
Y. W. C. A. Bldg., Boston, Shepard & Stearns, Archts.
Harvard University Tunnels, Cambridge, Mass., Densmore, LeClear & Robbins, Archts.

Michigan Corporation

Ford Administration Bldg., Detroit, Albert Kahn, Archt.
J. L. Hudson Store, Detroit, Smith, Hinchman, Grylls, Archts.
Michigan Bell Telephone, Main Exchange, Albert Kahn, Archt.
Edsel Ford Residences, Albert Kahn, Archt.
Wilson Theatre, Smith, Hinchman, Grylls, Archts.
Fordson High School, Vanleyen, Schilling, Keough, Archts.
Highland Park Public Library, Frank Eurich, Archt.
Fox Theatre, C. Howard Crane, Archt.
Book Building, Louis Kamper, Archt.
Berkey & Gay Furniture Company, Grand Rapids, Mich., Lockwood, Greene, Engrs.

Missouri Corporation

Power Plant, Hunlock Creek, Pa., Stone & Webster, Contrs.
Insurance Co. of North America, Philadelphia, Pa., Irwin & Leighton, Contrs.
Federal Reserve Bank, St. Louis, Mo., Westlake Construction Co., Contrs.
Scranton Times Bldg., Scranton, Pa., Dwight P. Robinson, Contrs.
Ben Franklin Hotel, Philadelphia, Pa., John N. Gill Co., Contrs.
Liberty Trust Co. Bldg., Philadelphia, Pa., Irwin & Leighton, Contrs.
Atlanta Biltmore Hotel, Atlanta, Ga., Starrett Bros., Contrs.
Jefferson Standard Life Bldg., Greensboro, N. C., George A. Fuller Construction Co., Contrs.
Nashville Trust Company, Nashville, Tenn., Foster & Creighton, Contrs.
Riverside & Springfield Junior High Schools, Jacksonville, Fla., O. P. Woodcock, Contr.

THE WATERPROOFING COMPANY

345 East 33rd Street
NEW YORK, N. Y.

65 Albany Street
BOSTON, MASS.

Product and Services

Manufacturers of "Cow Bay" Waterproof Cement.

Engineers and Contractors for Waterproofing, making a specialty of Cement Waterproofing. We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, etc., guaranteeing a positive and permanent waterproofing of all kinds of masonry construction.

Designers and builders of Reinforced Concrete Construction.

THE WATERPROOFING CO. ESTABLISHED 1909 NEW YORK BOSTON COW BAY WATERPROOF CEMENT

TRADE-MARK
Reg. U. S. Patent Office

Experience

The Waterproofing Company introduced and perfected cement waterproofing. During the past 24 years this company has successfully completed thousands of difficult contracts in every section of North America, and have gone as far afield as Japan.

Advantages of "Cow Bay" Cement Waterproofing

No extra supporting walls required. Walls are left with a neat finish; no furring and plastering being necessary. Floor coating serves both as waterproof seal and floor finish. "Cow Bay" waterproof coating is as hard as the best portland cement finish; placed beneath grillages and column bases without danger of settlement.

Difficult Waterproofing Job Successfully Handled

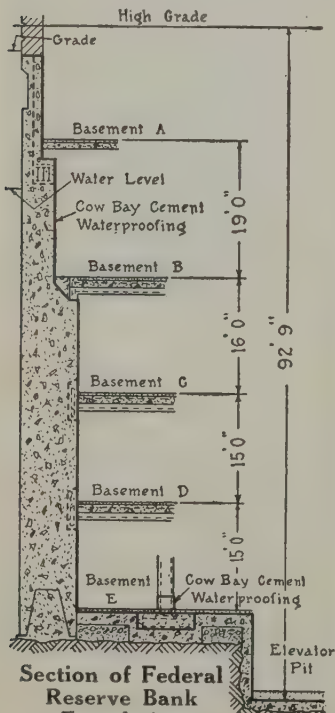
The foundations of the Federal Reserve bank building, the deepest in New York, presented a most difficult waterproofing problem. These foundations were successfully waterproofed by us.

"Cow Bay" Waterproofing Specifications

Material—All interior surfaces of all exterior walls and upper surface of concrete floor slab throughout basement (or subbasement), elevator pits, machinery foundations, trenches, etc., as shown on plans, shall be waterproofed with "Cow Bay" Waterproof Cement, applied by The Waterproof Company.

Workmanship—All surfaces, before application of waterproof coating, shall be thoroughly chipped and cleaned, and coating applied not later than 24 hours after surface has been so prepared. A perfect bond must be secured with underlying masonry. Wall waterproofing shall be ⅝-in. thickness, applied in two coats. The floor work shall be 1 in. in thickness and is to serve as a wearing surface as well as a waterproof coating. All waterproofing shall be floated and troweled to a smooth and even finish free from imperfections.

Guarantee—The Waterproofing Company shall furnish written guarantee that all coating placed by them will be waterproof; that during a period of 2 years after completion of the work, they will promptly repair any leaks appearing through their waterproofing which are not due to causes beyond the waterproofer's control.



Section of Federal Reserve Bank Foundation

A Few Important Waterproofing Contracts

New York, N. Y.

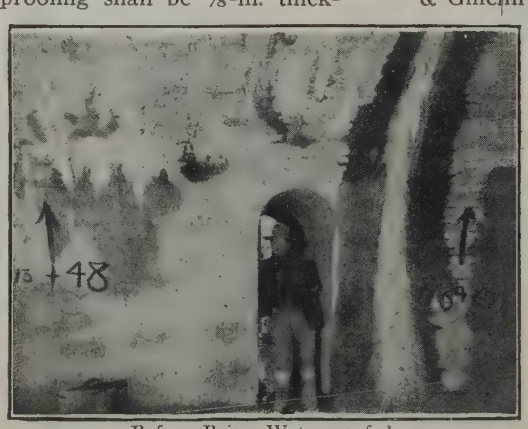
New York Telephone Co., Washington, Barclay, West and Vesey Sts., McKenzie, Voorhees & Gmelin
Federal Reserve Bank, York & Sawyer
Woolworth Building, Cass Gilbert
Hudson Terminal Buildings, Clinton & Russell
Singer Building, Ernest Flagg
American Telephone & Telegraph Co., Welles Bosworth
Stock Exchange, Trowbridge & Livingston
Equitable Society Building, Starrett & Van Vleck
Seaman's Church Institute, Warren & Wetmore
Savoy-Plaza Hotel, McKim, Mead & White
New Equitable Trust Building, Trowbridge & Livingston
Allerton Hotels, 38th, 55th and 57th Sts., Murgatroyd & Ogden
Chase National Bank, Graham, Anderson, Probst & White
Columbia-Presbyterian Hospital, James Gamble Rogers
Church of the Heavenly Rest, B. G. Goodhue Associates
Central Savings Bank, York & Sawyer

Boston, Mass.

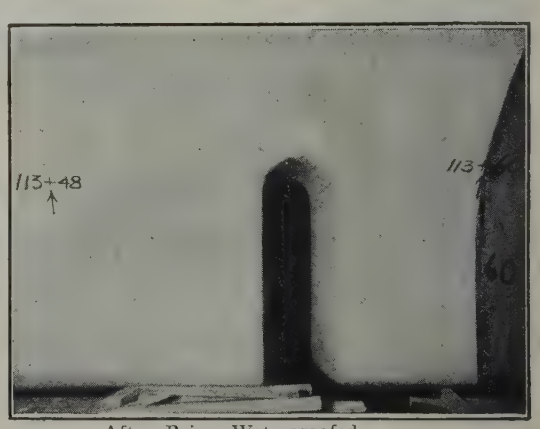
Federal Reserve Bank, R. Clipston Sturgis
Copley Plaza Hotel, Henry J. Hardenbergh
John Hancock Building, Parker, Thomas & Rice
National Shawmut Bank, Parker, Thomas & Rice
Merchants National Bank, Coolidge & Shattuck
Old Colony Trust Company, Coolidge & Shattuck
Employers Liability Assurance Corp., Ltd., Coolidge Shepley Bullfinch & Abbott
Harvard School of Business, McKim, Mead & White
Sears, Roebuck Building, Nimmons, Carr & Wright
New Elks Club, McLaughlin & Burr
Fogg Memorial Museum, Coolidge Shepley Bullfinch & Abbott

Miscellaneous

Mitsui Bank, Tokyo, Japan, Trowbridge & Livingston
Convention Hall, Atlantic City, N. J., Lockwood, Greene & Co., Inc.
Bamberger Department Store, Newark, N. J., Jarvis Hunt
Royal Bank of Canada, Montreal, Can., York & Sawyer and S. G. Davenport, Associate
Ohio Bell Telephone Bldg., Cleveland, Hubbell & Benes Co.
Miners Bank Building, Wilkes-Barre, Pa., W. L. Stoddart
Fort Pitt Hotel, Pittsburgh, Pa., Janssen & Abbott
Oliver Office Building, Pittsburgh, Pa., D. H. Burnham & Co.
Tunnels, Shawinigan Falls, Can., Northern Aluminum Co.
6 Telephone Buildings in various cities, John T. Windrim
51 Telephone Buildings in various cities, McKenzie, Voorhees & Gmelin



Before Being Waterproofed



After Being Waterproofed

Pennsylvania Tunnels Before and After Being Waterproofed with "Cow Bay" Waterproof Cement

THE WHITE COMPANY

Manufacturers of Floor Hardeners, Waterproofings and Technical Paints

GENERAL OFFICES
BALTIMORE, MD.
FACTORY: ORANGEVILLE, MD.

Products

WHYTEX CONCRETE FLOOR HARDENER.
HYDROTEX INTEGRAL CONCRETE WATERPROOFING and HARDENER.
HYDROLOX INTEGRAL WATERPROOFING and DAMPPROOFINGS.
WHYTECOTE MILL WHITE COATINGS and CHEMICAL ENAMELS.
T. W. C. TECHNICAL PAINTS made under specific formulae for specific purposes.
WHYTOL WOODEN FLOOR PRESERVATIVE.

Service

The word service to us has always meant more than a mere word. Giving each individual problem the most complete attention in all its details has been our goal. For that reason T. W. C. Products have enjoyed the utmost confidence of those with whom they have come in contact. We sincerely invite inquiries from architects, engineers, and contractors and assure you of our genuine co-operation.

Whytex Liquid Chemical Concrete Floor Hardener (Applied Over the Surface)

When concrete sets the excess water evaporates leaving innumerable microscopic pores throughout the mass. This decreases the density, therefore the strength of the concrete. The surface of the concrete floor rests on these voids and when subjected to the abrasion of traffic and wear readily disintegrates causing the floor to sand, dust and wear.

WHYTEX TRADE MARK

Whytex fills these voids with an insoluble silicate and converts concrete into a solid mass. It is a positive and permanent concrete floor preservative against traffic, oils, greases, alkalis and acids and will entirely eliminate dusting, sanding and wearing.

Specifications—All finished concrete floors, stair treads, landings, etc., shall be completely treated with Whytex as manufactured by THE WHITE COMPANY, Baltimore Md., in strict accordance with their directions.

Hydrotex Integral Concrete Waterproofing and Hardener

Hydrotex serves a double purpose when added to any mixture containing portland cement, as it is a most efficient waterproofing as well as a permanent hardener. Portland cement in itself, when the set is perfect, is waterproof and as hard as granite. Hydrotex does not add any foreign elements to the concrete but acts as a catalyzer in the setting up of concrete and assures a perfect and complete crystallization of the cement. Hydrotex offers a superior method of waterproofing mass concrete, stucco, brick mortar, waterproof coatings and hardening concrete floors.

HYDROTEX TRADE MARK

Specifications—All the following concrete constructions (mention work to be waterproofed or hardened) shall be treated with Hydrotex as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Whytol Wood Floor Preservative

Used to prevent wear, dry-rot and disintegration of wood floors. Lumber seasoned by modern methods has a tendency to absorb a large volume of moisture which attracts an abundance of fungi, the bacteria that is the cause of decay of wood. However, so long as the pores of the wood are filled with natural gums fungi will not enter the wood and premature decay is prevented. Paraffin and lubricating oils, although they tend to retard the action of fungi, break down the minute cellular structure of the wood, hastening decay. Whytol is a liquid composition of resinous materials and gums chemically blended that adds years to the life of wood floors by penetrating into the cells of the wood and deposits a permanent seal against the action of traffic, dry-rot and disintegration. Whytol is made in both natural finish and imitation wood colors.

WHYTOL TRADE MARK

Specifications—All wood floors, stair treads, landings, etc., shall be treated with Whytol as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Hydrolox Waterproofings and Dampproofings

If the same results could be obtained with concrete as that shown in laboratory tests no waterproofing would ever be necessary. But due to the impracticability of securing consistently uniform materials commercially, skilled labor on the job and assurance of absolute proportions, it is necessary to add some form of material that will overcome these disadvantages in order to produce waterproof concrete.

HYDROLOX TRADE MARK

Hydrolox Integral Waterproofing Paste or Powder—Offers a means by which water repulsive materials are incorporated into the concrete. These materials do not have the least injurious effects on the concrete, but concrete into which they have been added strengthens with age. The Hydrolox Integral method will thoroughly waterproof mass concrete, cement plaster, floor topping, stucco and brick mortar.

Specifications—All the following concrete constructions (mention work to be waterproofed) shall be waterproofed throughout with Hydrolox Integral Waterproofing Paste [Powder] as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Hydrolox No. 230 Dampproofing Plaster Bond—Made for dampproofing the interior surfaces of exposed vertical walls to which plaster is to be applied. It acts as a perfect bond between brick and plaster and prevents dampness, staining and protects against vermin. By its use furring and lathing are eliminated.

Specifications—The interior surfaces of all outside walls wherever plaster is to be applied shall receive two coats of Hydrolox No. 230 as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Hydrolox No. 267 Exterior Black Dampproofing—Prevents seepage and protects against vermin and decay when applied to foundations, masonry work, etc., below grade and wood flooring and sleepers laid over concrete. Hydrolox No. 267 produces an elastic, tough alkali and acid resisting coating, bonds tightly to the surface and yields readily to contraction and expansion.

Under severe conditions, Hydrolox No. 267 should be reinforced with a layer of felt or open burlap. To prevent absorption through capillary action Hydrolox No. 267 should be applied over the footing and underbeds of a concrete floor.

Specifications—All surfaces (mention work) shall be given two heavy coats of Hydrolox No. 267 as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Hydrolox No. 279 Colorless Exterior Dampproofing—Is a transparent liquid that is applied with brush or spray apparatus to dampproof outside surfaces of exterior walls of concrete, stucco, terra cotta, brick, light colored stone above grade. Hydrolox No. 279 is not a wax finish, but is a chemically blended compound of the most water resisting materials known to science. It enters the pores of the surface and deposits a permanent elastic seal against the elements and prevents efflorescence on brickwork. Also made in attractive tints where a colored finish is desired.

Specifications—All outside surfaces of exterior walls above grade shall be treated with Hydrolox No. 279 as manufactured by THE WHITE COMPANY, Baltimore, Md., in strict accordance with their directions.

Whytecote Wall Coatings, Mill White, and Chemical Enamels

Whytecote coatings offer a scientific economical coating that retains its beauty, protective and light reflecting qualities month after month, year after year, because the specially treated oil and selective pigment of which it is composed produce a lustrous finish that is hard and elastic. Whytecote can be applied with equal satisfaction by brush or spraying machine and is made not only in white, but in many beautiful tints. Because of its exceptional opaqueness Whytecote will cover any surface with one coat less than is necessary when ordinary paints or enamels are used. For specific conditions, in order to assure maximum satisfactory service in such places as laundries, bottling plants, etc., specify Whytecote Water-Heat Resisting Enamel. In oven rooms of bakeries, laboratories, etc., or wherever a chemical condition exists, specify Whytecote Chemical Enamel.

WHYTECOTE TRADE MARK

Specifications—As the surface to be coated governs the method of application, we will be glad to send complete detailed specifications upon request.

T. W. C. Technical Paints

Are superior paints because each paint problem is handled by us along its own lines and we endeavor to see that only that paint which will give maximum service shall be used on the particular job for which it is intended.

We invite correspondence regarding any information along these lines and assure you that our laboratory is at your disposal for capable assistance.

Literature and Specifications

Due to the lack of space we do not attempt to give detailed specifications here, but will be glad to send a complete and thorough specification book upon request.

We maintain a staff that is well equipped to advise you in reference to paint and waterproofing problems.

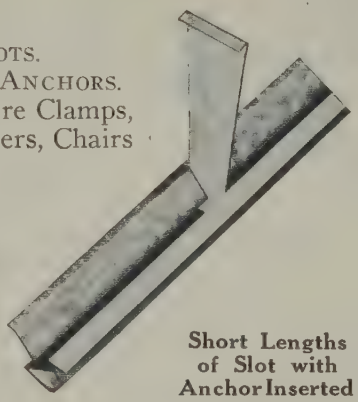
UNIVERSAL FORM CLAMP COMPANY

Manufacturers of Masonry Anchors and Slots, Continuous Sleeper Anchors and Other Construction Accessories

972 Montana Street, CHICAGO, ILL.

Products

MASONRY ANCHOR SLOTS.
CONTINUOUS SLEEPER ANCHORS.
Also Form Clamps, Wire Clamps, Tee and L Heads, Bar Spacers, Chairs and other construction accessories.



Short Lengths of Slot with Anchor Inserted

Masonry Anchors and Slots

Use—Universal Anchors and Slots offer a convenient method of tying brick, terra cotta, stone and tile to concrete, assuring strength and permanence.

Advantages—Safer, permanent, faster jobs are assured. The galvanized steel slot left in the concrete forms an internal part of the structure that can never work loose.

Anchors are inserted at any heights desired, and do not have to be bent and weakened to meet course heights.

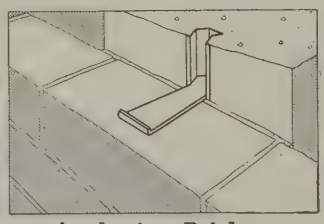
As the masonry is built up, anchors are placed at convenient heights, and a twist of the wrist puts the anchor in place.

Time as well as costs is saved, because measuring of course heights, boring of forms, and drilling of concrete are eliminated.

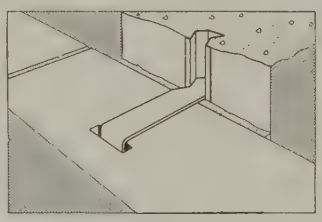
Installation—A length of slot is cut to fit the form, and the slot nailed to the form with the concave side down. The slot is left in the concrete when the forms are stripped, and the anchors inserted at convenient heights as the masonry is built up.

Universal form clamps are used to tie and hang forms for concrete under any conditions and are adaptable to any design of form for walls and columns. Accurate forms are insured and since spreading is absolutely prevented many extra yards of concrete are saved and cost of forms is reduced to a minimum.

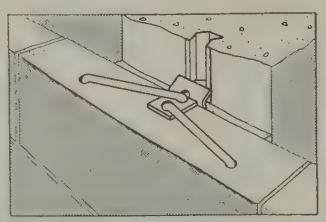
Information—In ordering specify whether brick, terra cotta, stone or tile is to be anchored. Furnished in 4-ft. lengths.



Anchoring Brick to Concrete
The anchor can be inserted at any height desired



Anchoring Stone to Concrete
A twist of the wrist puts the anchor in the slot at any course height

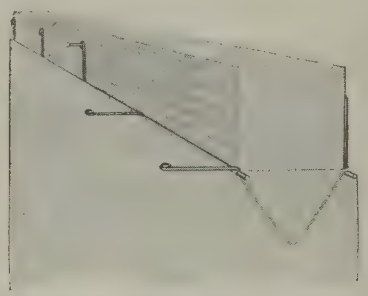


Anchoring Terra Cotta and Tile to Concrete
Two rods placed in holes in the anchor which may be inserted at any height hold the terra cotta or tile tightly to the concrete

Universal Continuous Sleeper Anchors

Use and Installation—Universal Continuous Sleeper Anchors fasten nailing strips to the top surface of concrete slabs. Inserted while the concrete is soft, they provide strong permanent anchorage for sleepers after the concrete is set.

Advantages—The continuous sleeper anchor gives five or six individual anchors with one operation. In little more than the time required to place a single anchor, five or six anchors are inserted, properly spaced.



Continuous Sleeper Anchors, Style "R"

Styles—Universal Sleeper Anchors are made in two styles:

Style "P" (parallel) lies parallel to the sleeper. The V-shaped anchors are of No. 10 wire and form an extremely strong anchorage. Two No. 12 gauge wires connect the anchors. When the concrete is set, the sleeper is placed along and on top of the anchor, and the wire arms with loops bent up and nailed to the sleeper.

Style "R" (right angle) Sleeper Anchors are placed at right angles to the sleeper. Its arms also lie flat and are bent up for nailing.

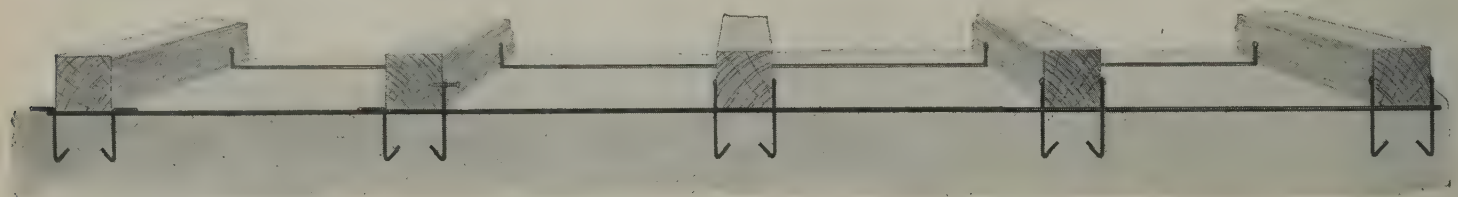
Information—Both Style "P" and Style "R" are carried in stock for 2-in. and 3¾-in. sleepers with anchors spaced 12 in. or 16 in. on center.

Style "P" comes in lengths of approximately 5 ft.; Style "R" in 4-ft. lengths.

Special lengths and spacings can be obtained in either type.

Below

Continuous Sleeper Anchors, Style "P"



WEDGIT TIE CO., INC.

Manufacturers of Positive Concrete Form Ties

95 Liberty Street, NEW YORK, N. Y.

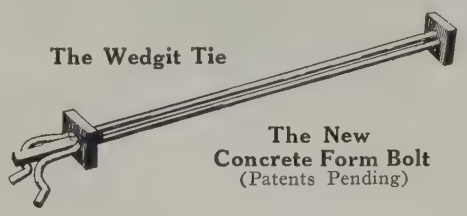
Wedgit Tied Forms Are Always Rigid

Wedgits are a new kind of bolts which automatically produce laboratory conditions in field forms, regardless of the skill of the labor. Each Wedgit is a bolt with two stems and a slotted nut and lock wedge. They are quickly fastened by means of a tightening tool (mule) that has a 30-to-1 pull. The lock wedge cannot be driven until the bolt is drawn rigid.

The stems of Wedgit bolts are unannealed, hard drawn Bessemer rods, with a tensile strength of 1950 to 2760 lb. per rod, which equals 3900 to 5500 lb. per Wedgit. Each rod has a conically upset shouldered bead which is pressed into the bolt head. The other parts are made of screw steel.

Some pouring conditions develop violent impacts on the forms, to overcome which Wedgit buffers (2¼x2¼x⅛ in. hard rolled steel) are used on both ends of the Wedgits—which effectually takes care of the recoil.

The Wedgit Tie



The New Concrete Form Bolt
(Patents Pending)

Rigid Forms Produce Exact Alignment and Better Concrete

Experienced architects, engineers and contractors know that it is the rigidity of laboratory molds that produces uniformly good concrete in the test laboratories, yet honeycomb specifications are quite general. The human equation causes form spread, which causes honeycomb.

That forms spread is shown by the use of short spreaders and the spreaders that drop out as the concrete rises, and also by the necessity of form bracing and face-of-form spading. The proof that there is no form spread when Wedgits are used is that the spreaders do not fall out as the concrete rises in the forms. No bracing is required except to hold the top in alignment and then only on one side. This positive concrete tie, by preventing form spread, prevents honeycomb. In 25,000 sq. ft. of surface, tied with Wedgits on the New York State Office Building, New York, N. Y., there was not a rough place as big as your hand—a broad statement but true.

When forms are rigid, the initial 30 minute set of concrete is not retarded. By catching this initial set Wedgits give *added protection against freezing.*

What Wedgits Will Do

Uses—Wedgits are used to tie irregularly shaped columns or walls, of any size, and battered walls, tie concrete to the back of stone ashlar, tie spandrel beams, belt courses, cornices, balcony risers, pipe trenches, lot line walls, underpinning, and close openings, and all without any bracing, and there are never any bulges. They are also used for hanging girder coverings and fireproofing.

Job Labor—Wedgits are one man ties, and workmen like them. They are true bolts; nevertheless, they are flexible. They work like bolts with a long thread on which the nut could be pushed to the tightening point, and then tightened with one turn of the wrench.

Money Saving—Direct payroll savings accrue when workmen like their tools, when work can be done several times as fast and a more satisfactory and better looking job produced. Results are the basis of our claim that Wedgits save 20¢ every time one is used.

Flexibility—Sometimes there are places where it is very difficult to pass a tie through forms in a straight line. Wedgits were successfully used on more than a mile of sea wall where the tie points on the opposite sides of the forms were as much as 6 in. out of line in both directions.

Satisfaction—Wedgits win quick approval through uniform results wherever they are used as is witnessed by our repeat order records. The progressive builder is quick to appreciate a device which is a step ahead, which saves time, materials, labor and money and does a better job.

Outstanding Advantages of Wedgit Ties

Wedgits are standardized and Wedgit tied forms are always 100% rigid. Wedgits prevent form spread and thus prevent honeycomb.

Spreaders are cut full thickness of walls when using Wedgits.

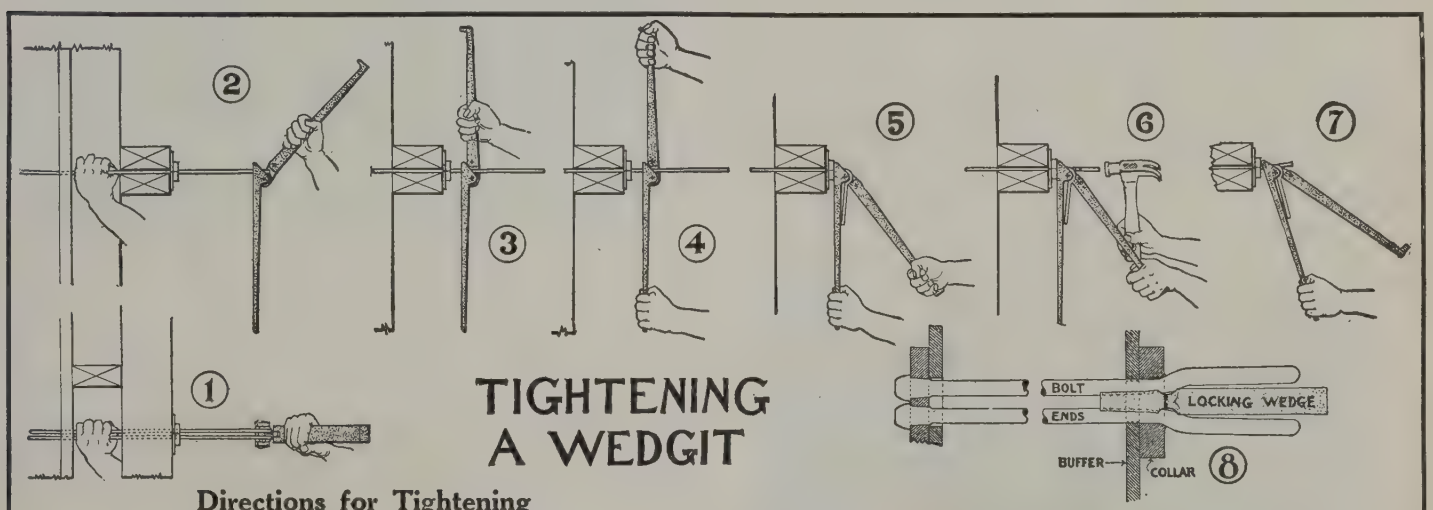
Wedgits never wear out because they are only used once.

They save twice their cost. The workmen like them.

No more labor to pull them than to leave them in; no seepage; no patches; no bulges.

Wedgits have other uses beside tying forms, viz.: tying freight.

Wedgits are flexible bolts.



Directions for Tightening

1 and 2—After placing the buffer and collar, grip the bolt back of the waler, then hold the mule as shown and push the link between the ends of the bolt while raising the handle to a vertical position, then slide the mule onto the bolt as shown in Fig. 3.

3—*Leave from ½ to ¾ in. between the collar and the back of the mule.*

4—Shows tightening grip—pull enough on the bottom handle to balance the throw over of the top handle.

5—If one pull is not enough lift the top handle and pull again, but the finish of the pull should leave the handle *far enough down so as to allow the free driving of the wedge.*

6—After placing the wedge put a good strain on the handle and drive the wedge.

7—To release the mule lift the bottom handle slightly, then lower it and swing it about ⅛ turn to one side and it will be free.

8—Sectional view of the locked Wedgit showing its construction. Don't break off or bend the locking wedges.

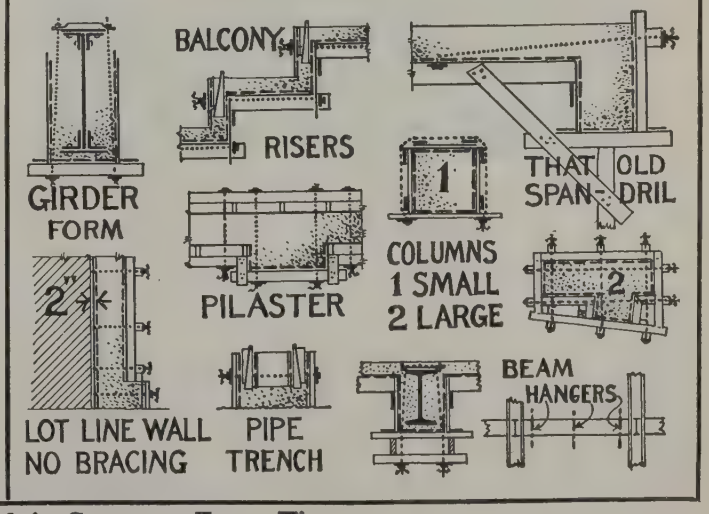
Note: To strip the forms, either cut the bolt back of the walers, or twist the heads off with a wrench.

To Pull Wedgits—All the way or part way, cut the bolts close to the backs of the walers and then proceed the same as when tightening. Always heel the mule on a piece of wood when pulling *Wedgits.*

A few *Wedgit* applications are shown at the right.

STANDARD SIZES OF WEDGITS—THE NEW BOLTS

Over-all length, in.	Max. dim. out-to-out of walers, in.
40	36
48	44
64	60
90	86
120	116



Applications of the Wedgit Concrete Form Tie

HUGH J. BAKER & COMPANY

Removable Wood Joist Forms, Reinforcing Materials and Accessories

INDIANAPOLIS, IND.

BRANCH OFFICES

ATLANTA, GA., 624-5 Candler Building
CINCINNATI, OHIO, Union Trust Building
DECATUR, ILL., Citizens Bank Building
CHICAGO, ILL., 53 W. Jackson Boulevard
FORT WAYNE, IND., 804 Hayden Street
DAYTON, OHIO, Dayton Savings & Trust Bldg.
EVANSVILLE, IND., 41 Kerth Avenue

Products

BAKER REMOVABLE WOOD JOIST FORMS.

Also Reinforcing Steel Bars; Spiral Column Reinforcement; Bar Spacers; Electric Welded Fabric; Metal Lath; Cold Rolled Channels; Baker Shores (Adjustable).

Facilities and Service

An engineering organization, established in 1910, places eighteen years' experience in concrete design and forming at your disposal. A competent force of field engineers is backed by a large engineering department in our main office, to aid in solving your problems in design and forming.

Our bids include the complete forming (erection and removal) of the ribbed slab (concrete joist) construction, including slabs, joist sides, soffits, and shores, complete from beam to beam. The work handled by our men is indicated by the shaded portions of the details on the following page. If preferred, we also include column, beam, and miscellaneous forming in our bid.

A booklet with half-tones of a hundred structures of a wide range of types, erected with the aid of Baker Removable Wood Joist-Forms, will be sent upon request.

Special Features

Wide Range of Adaptability—Every condition, from light loads of hotels to heavy loads of special warehouse design, can be economically met—joist spacing, width and depth of joists, end conditions—all can be varied at will. These forms have been used in many:

Clubs	Garages	Factories
Hotels	Residences	Theaters
Apartments	Warehouses	Office buildings

Forming the Guaranty Building, Indianapolis, Ind.
Note the tonnage stored directly on our forms—possible only with a solid unyielding pan of wood

Eliminate Honeycombing—The design of our forms reduces leakage to a minimum, which practically eliminates honeycombing. The cost of wastage through most types of forming is considerable. Not only the cement and labor cost, but also pointing the resulting honeycombed joists, removing leakage from the floor below by chipping or scraping, etc., are items of real expense.

Solid Working Areas—The unyielding surface of these forms permits the trades to work without fear of crushing or displacing; shows a saving in the cost of placing steel, pouring conrcete, attaching inserts, etc. Being of wood, this forming allows easy placing of outlet boxes, sleeves, etc., with the assurance that they will be found where they were placed when the forms are stripped.

The Time Element—A specialized service *organized for speed* will work to your progress schedule. *We have yet to delay our first job.* We co-operate with and keep ahead of our customer's organization.

Low Cost—These advantages, together with patented features of our forming system, produce a lower cost than can probably be equalled by any other ribbed slab-forming materials, either of the permanent or removable type, where floors are reasonably typical. We do not show so large a percentage of saving where there is little duplication in the forming.

Hollywood Beach Hotel, Hollywood, Fla.
Interior showing excellent results obtained in decorated exposed concrete joists

Exposed and Decorated Concrete Joists

The joists are left exposed in buildings of many kinds, but always for one of two purposes—to save the cost of ceiling construction or for the architectural effect. In either case, clean lines and smooth surfaces are essential to good appearance.

Wavy and irregular soffits or joist sides; projecting humps of concrete on the underside of joist or slabs; ridges, indicating where pans were lapped or butted; all such deformities are objectionable in factory or garage —they are positively impossible in hotels, theaters, apartments, and residences where the exposed joist is used for decorative effect.

Crooked joist lines are eliminated and smooth finished concrete soffits are easily available to the designer who uses Baker Removable Wood Joist Forms. One of our patents covers use of mouldings forming the poured concrete at angle of joist and underside of slab.

To Specify

The forms for the ribbed slabs shall be Baker Removable Wood Joist Forms. They shall be oiled with a light paraffin oil before being used. Before pouring concrete the forms shall be thoroughly wet down with water. Forms shall be so constructed that they can be removed without disturbing shoring.

Note: For more detailed information, call our nearest office. An engineer will respond promptly.

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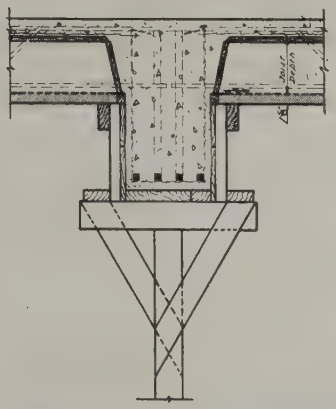
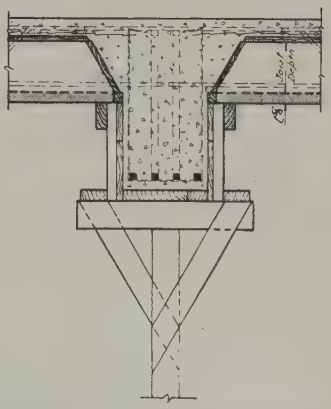
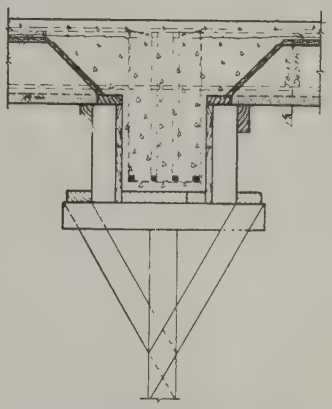


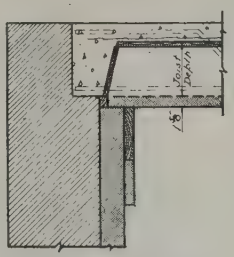
NARROW TEE-HEAD—STRAIGHT



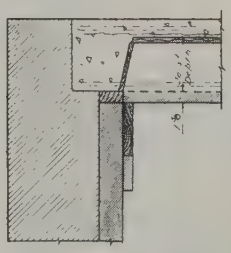
NARROW TEE-HEAD—60° BEVEL



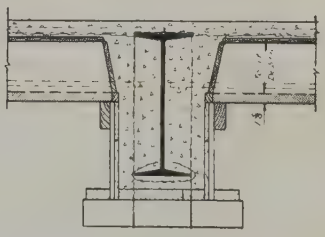
WIDE TEE-HEAD—45° BEVEL



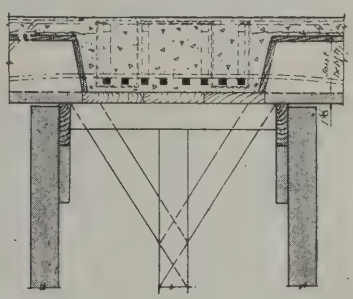
FORMING AT WALLS



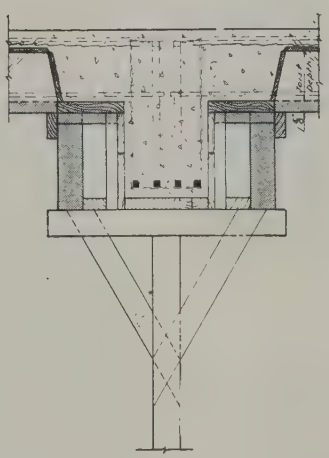
FORMING AT WALLS



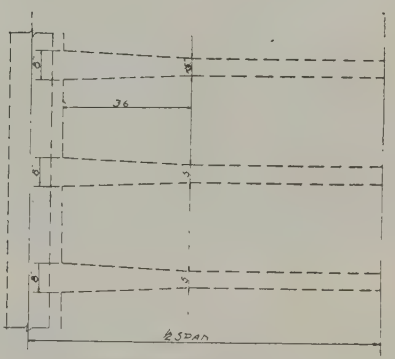
ENCASED STRUCTURAL STEEL



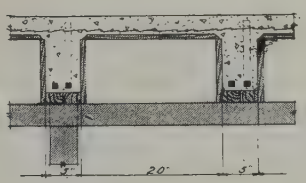
FORMING FOR FLAT BEAMS



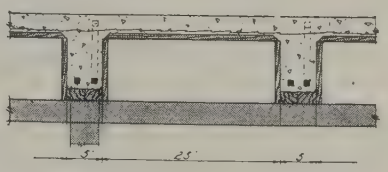
WIDE TEE-HEAD—STRAIGHT



SPREAD END JOISTS



20' FORMS—JOISTS 25' ON CENTER



25' FORMS—JOISTS 30' ON CENTER

BRIDGING DETAIL

STANDARD FORMING DETAILS

SHADED FORM—WORK IN THESE DETAILS
INDICATES MATERIAL AND LABOR
INCLUDED BY US

THE BERGER MANUFACTURING CO.

Berloy Steel Floor Cores

CANTON, OHIO

For Branches, see page A650

Products

BERLOY FLOOR CORES, FLOOR CORE END CAPS.

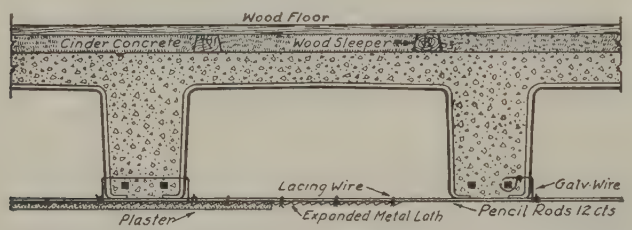
For Metal Ceilings, see pages A650-651; for Metal Building Material, see pages B1685-1689; for Lockers and Shelving, see pages C3798-3799.

Use and Design

Berloy floor cores are metal forms for the construction of continuous slab T-beam concrete floors in steel or concrete framed buildings. They are made in such wide range of styles, sizes and weights that the construction can be adapted to any detail of design. End caps are made for use with all sizes and styles of floor cores.

Permanent Floor Cores

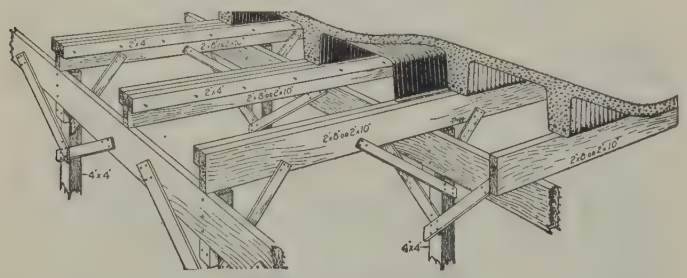
Berloy floor cores of the permanent type are usually made of No. 26 gauge metal and remain as a permanent part of the construction. Where this type is used, Berloy ⅜-in. Ribplex for the ceiling is first laid on the temporary shoring, and the forms on the Ribplex.



Attachment of Lath with Removable or Permanent Cores by Means of Wires Placed Before Concrete Is Poured

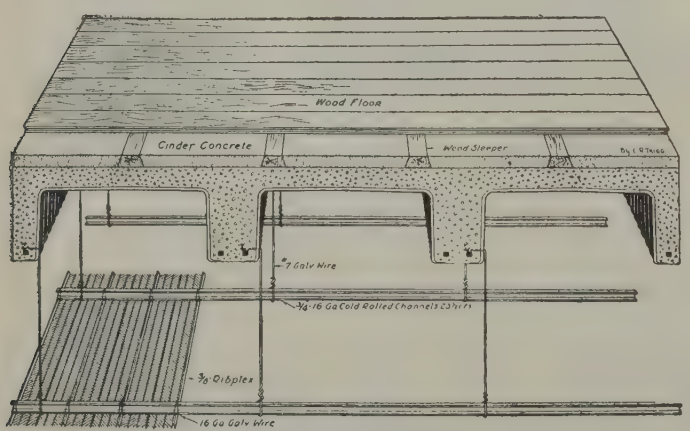
Removable Floor Cores

These are made of No. 22, 20 or 18 gauge material and can be removed and reused several times.



Method of Shoring

This method of shoring permits the removal of the cores for further use as soon as the concrete has taken its initial set

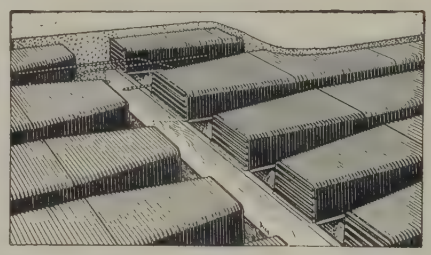


Suspended Ceilings

Details for either permanent or removable floor cores

Special Floor Cores

Concrete joists formed by floor core construction are normally designed to be from 4 to 6 in. wide. To meet special conditions of load and shear Berloy single and double taper floor cores are provided in both permanent and removable types. The special width floor cores also meet special requirements.

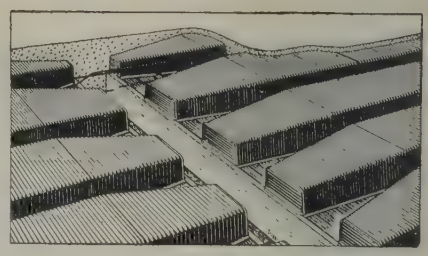


Single Taper Floor Cores

These taper down from the normal width of 20 to 16 in. This increases the width of the joist 4 in. where it enters the concrete beam.

Double Taper Floor Cores

These taper in width from 20 to 16 in. and also 2 in. in height providing an additional 2 in. of thickness of slab at the top where it enters the beam.



Narrow Width Floor Cores

To complete a floor width where standard 20-in. width floor cores are not an exact multiple, standard depth floor cores, either permanent or removable, are made in several narrower widths, with end caps to fit.

25-inch Floor Cores

Wider spacing between joists sometimes provides a more economical design than is offered by the standard 20-in. cores; for such cases special cores 25 in. wide can be supplied. These will produce joists 29 to 30½ in. on centers instead of the standard 24 and 25½ in. on centers.

Sizes, Styles, etc.

Width—20 in. between sides at bottom is standard, 25, 16 and 12 are special. Single and double taper cores are 20 in. wide at one end and 16 in. at the other.

Length—36 and 30-in. covering lengths are standard for Berloy floor cores. Tapered cores are made only in 36-in. length.

Depth—4, 6, 8, 10, 12, 14 and 16 in. are standard. Double tapered cores taper from standard height at one end to 2 in. lower at the other.

Gauge—No. 26 gauge steel is standard material for all permanent cores, Nos. 22, 20 and 18 gauge for removable cores.

Weight

The weights of the floor cores vary from 1¾ lb. per lin. ft. for permanent floor cores 4 in. high, to 6 lb. per lin. ft. for 14-in. removable floor cores. The floor cores are shipped nested, which simplifies shipping and storage problems.

Engineering Service

Berloy Engineers experienced in designing this type of construction are at the service of architects ready to assist with layouts, suggestions and estimates.

A new Core Handbook with complete information will be sent promptly on request.

THE BUILDING PRODUCTS COMPANY

Concrete Form Contractors

National Distributors for Blaw-Knox Removable Steel Forms

TOLEDO, OHIO

Products and Service

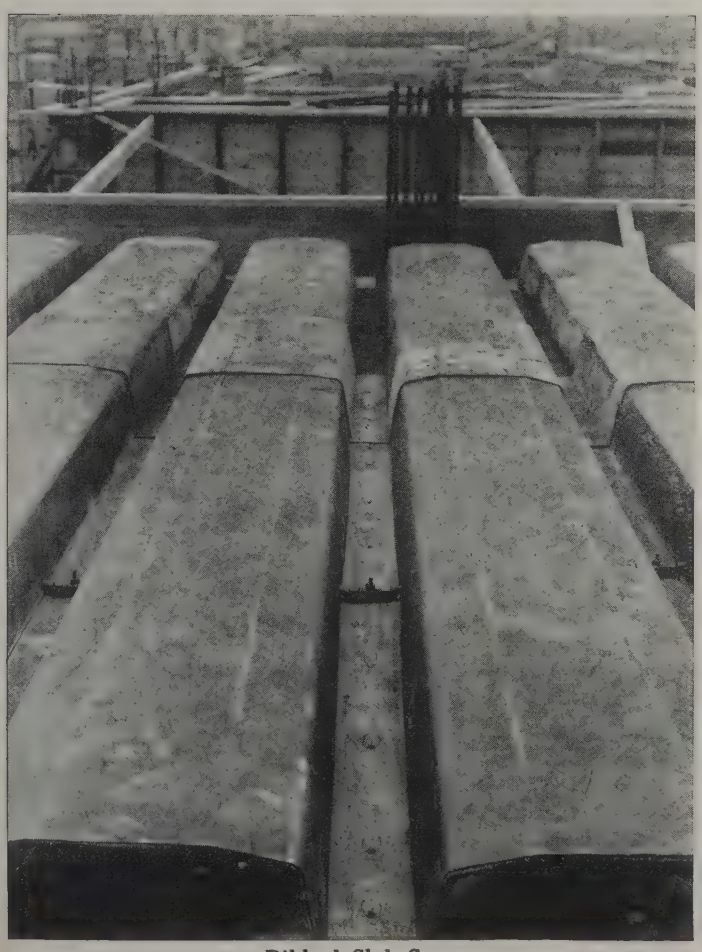
Removable Steel Forms for Ribbed Slab Concrete Floors; Removable Steel Forms for Flat Slab Concrete Floors; Steel Column Molds for Circular Concrete Columns; Heavy Gauge Steel Tile; and specially designed Steel Forms for any purpose that involves sufficient duplication.

A specialized Engineering Organization, competent to design and redesign structures involving the use of steel forms, co-operating completely with architects and contractors. Quotations will be furnished involving lease only, or entire work erected complete. An experienced and competent erection organization is available on short notice.

Ribbed Slab System

Used most economically in buildings requiring a light load such as hotels, apartments, office buildings, schools, etc. Steel soffits are used, insuring uniform width of joists, requiring a minimum quantity of lumber and a comparatively small erection force. Spreaders to support reinforcing bars in joists and hairpin hangers for fastening ceiling lath are provided. Forms are stripped promptly without disturbing shoring and each shore is super-imposed directly above shores underneath.

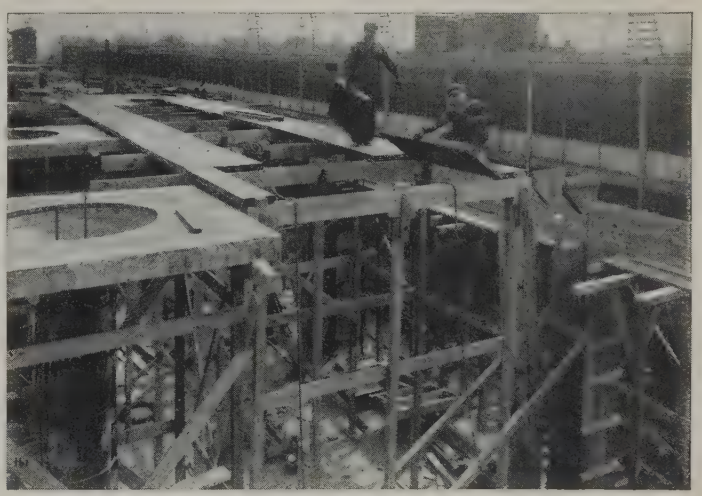
Pans are No. 14 gauge material; standard depths are 6, 8, 10 and 12 in. Joists are 5 in. wide, 25 in. center to center and adjustable for any span. Further details are described in our Ribbed Slab folder—sent free on request.



Ribbed Slab System

Flat Slab System

Used to advantage where a heavy floor load is involved, such as factories, warehouses, cold storage plants, etc. Steel panels are substituted for wood and a shoring system added which simplifies all operations; including erection, minimum quantity of lumber, constant repetition of similar operations, stripping without disturbing the shoring, super-imposing shores directly above those below, and employing unskilled labor. All these factors mean maximum safety and economy.



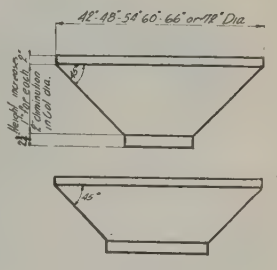
Flat Slab System

Steel panels are made of No. 14 gauge material properly reinforced. Wood forms shrink, warp and swell.

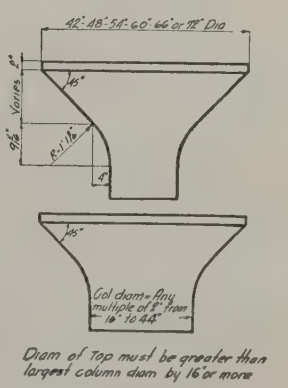
The same job can be done quicker, better and cheaper with Blaw-Knox Flat Slab Forms. Flat Slab folder sent on request.

Adjustable Circular Column Forms

Used most commonly with Flat Slab floor construction but also used without heads in beam and girder construction wherever a round column is desired. Adjustable in diameters of even inches and heads in multiples of 6 in. as shown on sketches; adjustable in height as sections telescope into each other. Available in two styles of heads. Column Mold folder, available on request, contains chart showing volume in column heads.



Plain Conical Head



Plain Bell Head

CONCRETE ENGINEERING COMPANY

Meyer Steelforms, Ceco Reinforcing Bars and Fireproofing Materials

GENERAL OFFICE

1141 North 11th Street, OMAHA, NEB.

OFFICES AND WAREHOUSES

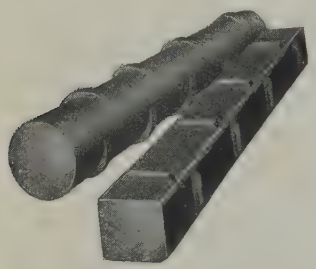
CHICAGO, ILL., First National Bank Building
CHICAGO, ILL., 1926 South 52nd Avenue
MILWAUKEE, WIS., Bartlett Building
KANSAS CITY, MO., Walsix Building
MINNEAPOLIS, MINN., Builders Exchange Building
LOS ANGELES, CAL., 1450 Mirasol Street
PITTSBURGH, PA., 1814 Murdock Avenue
HOUSTON, TEX., 2814 Pease Avenue
ST. LOUIS, MO., Louderman Building
DETROIT, MICH., Guarantee Trust Building
DES MOINES, IOWA, Hubbell Building
DALLAS, TEX., Construction Industries Building
SAN ANTONIO, TEX., Builders Exchange Building
OKLAHOMA CITY, OKLA., 319 West 9th Street

Products

CECO REINFORCING BARS; MEYER REMOVABLE FLANGE TYPE and ADJUSTABLE STEELFORMS for Concrete Joist Floor Construction; CECO EXPANDED METAL LATH; CECONOMY RIB LATH; CECO HOOK HANGERS.

Also manufacturers of Ceco Triangle Fabric, Welded Fabric, Round Column Forms, Column Spirals, Bar Chairs and Spacers, Road Strip, Furring Channels, Corner Beads, Base Beads; Meyer Adjustable Shores and Column Clamps.

Ceco AND MEYER
PRODUCTS TRADEMARKS



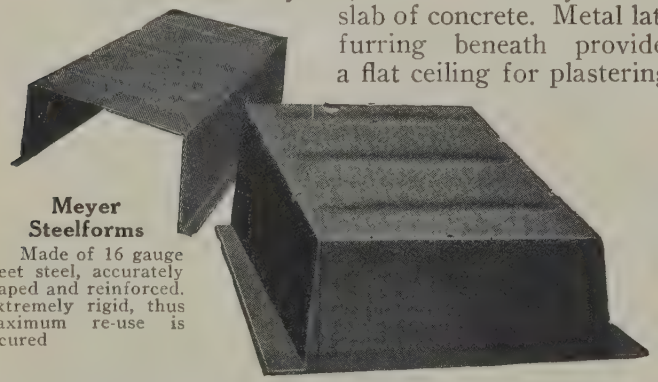
Reinforcing Bars

Ceco Reinforcing Bars

Rolled only from new billet steel. The deformations or lugs are placed at right angles to the axis of the bar, thus assuring maximum bonding value. Tested and approved by the Robert W. Hunt Company.

Description of Meyer Steelforms

Meyer Steelform Construction is a standard system that represents the highest type of concrete joist floor construction in present day use. It consists of rows of heavy gauge removable steel forms, separated by reinforced concrete joists, and covered by a thin slab of concrete. Metal lath furring beneath provides a flat ceiling for plastering.



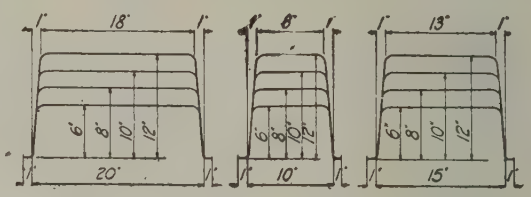
Meyer Steelforms
Made of 16 gauge sheet steel, accurately shaped and reinforced. Extremely rigid, thus maximum re-use is secured

Meyer Steelform Construction is most economical for buildings with lighter loads and longer spans, such as apartments and hotels, residences, schools, hospitals, office buildings, garages, light manufacturing buildings, etc. In this class of structure, dead weight of construction is a considerable factor in the total load, so that the saving in dead load effected by Meyer Steelform Construction affords a considerable saving in cost.

Meyer Steelforms are handled on a rental basis only. Ordinarily, the labor of installing and removing the steelforms by our skilled workmen is included with the rental charge. The economy in the re-use of Meyer Steelforms, on a rental basis, is readily apparent.

In building the formwork for the concrete joist floor, Meyer Steelforms are used as a mould for the joists and the intervening slabs; the load being carried by the joists in one direction to the supports. Continuous joists are produced by lapping the Intermediate Steelforms, and the ends of the rows of Intermediate Steelforms are closed with Endforms.

Meyer 20-in. Wide Flange Type Steelforms



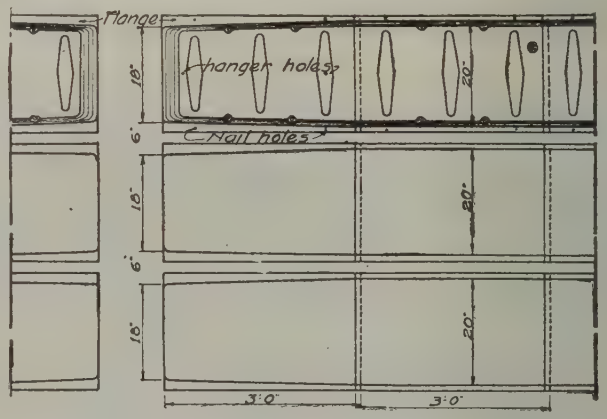
Standard Types Special Types

Meyer Standard Intermediate Steelforms furnished in 1, 2 and 3-ft. lengths. Meyer Special Intermediate Steelforms furnished only in 3-ft. lengths.

Meyer Straight Endforms furnished only in 1-ft. length, 10, 15 and 20 in. wide.

Single Tapered Endforms—Furnished in 3-ft. length. 6, 8, 10, 12 and 14 in. high and 20 in. wide at open end. Forms taper from 20-in. width at open end to 18-in. width at closed end. (See detail.)

Double Tapered Endforms—Furnished same sizes as single tapered except there is a reduction in depth of steelform of 3 in. from open end to closed end to form "T" on beam.



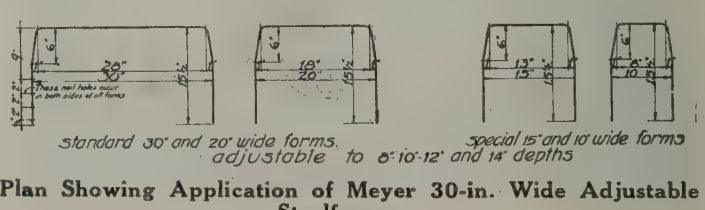
Plan Showing Application of Tapered Flange Type Endforms

Meyer 30-in. Wide Adjustable Type Steelforms

Meyer Adjustable Steelforms are made 30 in. wide and 16 in. in total height. There are no horizontal nailing flanges and the Steelforms are nailed to the sides of the wood joists, soffits instead of on top of same.

Of 14 gauge metal, and without stiffening impressions of any kind, Meyer Adjustable Steelforms are rendered absolutely unyielding and rigid by the use of small angles riveted to the underside of the form. Thus joists neat and cleancut in appearance and of uniform width are produced.

Meyer Adjustable Steelforms are particularly recommended for open ceiling work. The neat and cleancut appearance of the joists, their uniform width and alignment, the spacing of the joists at about 3 ft. on centers, are all pleasing to the eye and produce a workmanlike job.



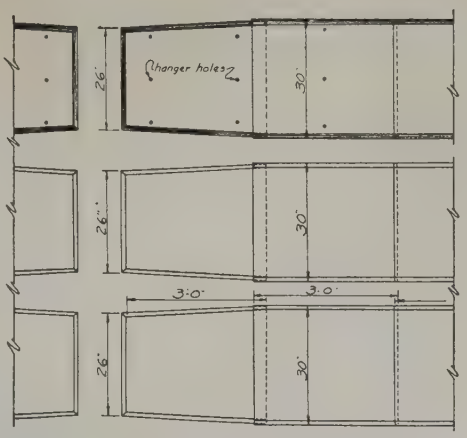
Plan Showing Application of Meyer 30-in. Wide Adjustable Steelforms

Continued on next page

Sizes of Meyer 30-in. Wide Adjustable Steelforms—

Standard Intermediates are furnished 30 in. wide and 1, 2 and 3-ft. lengths. Special intermediates are furnished 20, 15 and 10 in. wide.

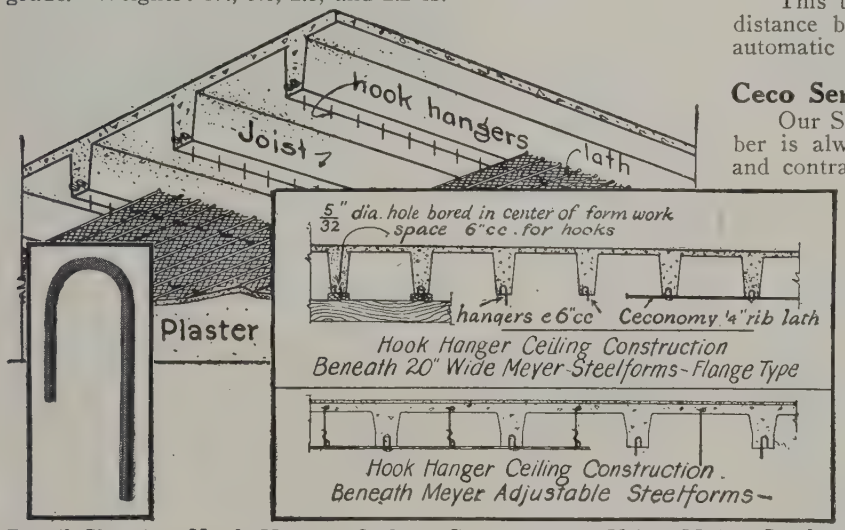
Straight Endforms are 1 ft. long. Tapered Endforms are 3 ft. long.



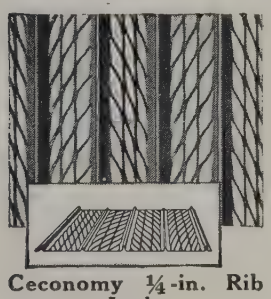
Plan Showing Application of 30-in. Wide Adjustable Steelforms

Ceco Metal Lath

Furnished in black iron, corrugated, galvanized, cut from galvanized sheets; also in copper iron alloy grade and in pure iron grade. Weights: 3.4, 3.0, 2.5, and 2.2 lb.



Detail Showing Hook Hanger Ceiling Construction, Using Meyer Steelforms, Ceconomy ¼-in. Rib Lath and Ceco Hook Hangers



Ceconomy ¼-in. Rib Lath

Ceconomy ¼-in. Rib Lath

This metal lath requires 20% less plaster than ordinary metal lath. It was designed as a result of the demand for a metal plastering base and a reinforcement; Ceconomy (1) prevents plaster cracks, (2) is fire resisting, (3) requires less plaster than other metal lath and (4) is absolutely rigid. Ribs ¼ in. deep spaced 1.2 in. on centers.

Ceco Hook Hanger Ceiling Construction

Hook hanger ceiling construction (above) involves the use of special Ceco Hook Hangers and a rib lath when used in connection with 20-in. wide Steelform Construction. When used in connection with 30-in. wide Steelform Construction the use of 10 gauge galvanized wire hangers and ¾-in. furring channels is also necessary to assure maximum rigidity. This construction provides a most economical lath ceiling, is strong and rigid, but must be brought up tight against the bottom of the joists. The elimination of channels, hangers, and pencil rods effects an economy in material and labor.

Ceco Hook Hangers are made of 10 gauge galvanized wire. Bent to form hook so as to give a 2-in. embedment in the concrete and a 1½-in. projection beneath the concrete. Parallel sides 1 in. apart.

Ceco ⅜-in. Rib Lath

Cut from open hearth steel; furnished painted. Also from pure iron or copper bearing steel. Ribs are ⅜ in. high and spaced 4 in. on centers. Erected with lath side out. No channels or rods necessary. Packed 9 sheets to bundle, nested and shipped uncrated.

Attached Ceilings

Our standard attached ceiling constructions used in connection with 20-in. wide and 30-in. wide Steelform Construction involve the use of galvanized wire hangers, steel furring channels, ¼-in. round steel pencil rods and metal lath.

Note: The use of ¼-in. Ceconomy Rib Lath spanning 24 in. on centers between the furring channels instead of the ¼-in. round pencil rods and flat lath is equally recommended.

This construction may be brought tight up against the bottom of the joists or suspended as much as 6 in. The ceiling is erected after the removal of the Steelforms, and can be leveled up, straight and true, despite any variation in the level of the floor construction without filling out with plaster afterwards. The concrete and plaster do not come in contact.

This type of ceiling construction may be dropped a short distance below the bottom of the joists in order to conceal automatic sprinkler pipes or other conduits.

Ceco Service

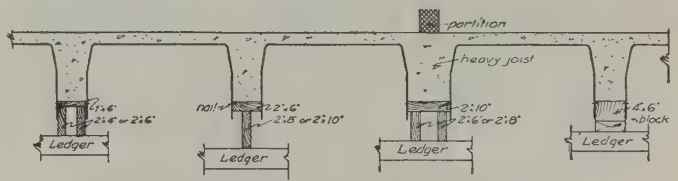
Our Sales Department is technically trained, and each member is always ready to assist consulting engineers, architects and contractors with layouts and estimates for the reinforced concrete portion of building work.

Shipping Facilities

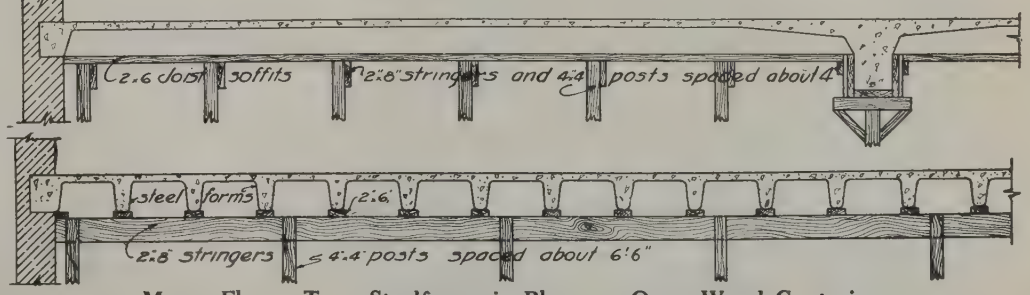
Complete stocks of all our products are maintained at all our warehouses listed on the preceding page. Meyer Steelforms are available at these points only. Prompt attention given every order large or small.

Handbooks

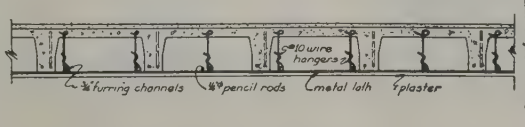
Handbooks describing all our products and their uses will be mailed on request. Much valuable information is contained in our latest edition, write for it. Please address our Omaha office.



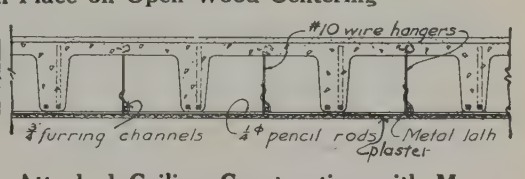
Formwork Detail for Meyer Adjustable Steelforms
Note simple centering required



Meyer Flange Type Steelforms in Place on Open Wood Centering



Attached Ceiling Construction with Meyer Adjustable Steelforms



Attached Ceiling Construction with Meyer Flange Type Steelforms

THE GOLDSMITH METAL LATH CO.

Manufacturers of the Shurebond Unit System of Metal Tile for Reinforced Concrete Slab Construction

GENERAL OFFICE AND FACTORY
CINCINNATI, OHIO

Products

THE SHUREBOND UNIT SYSTEM of METAL TILE.

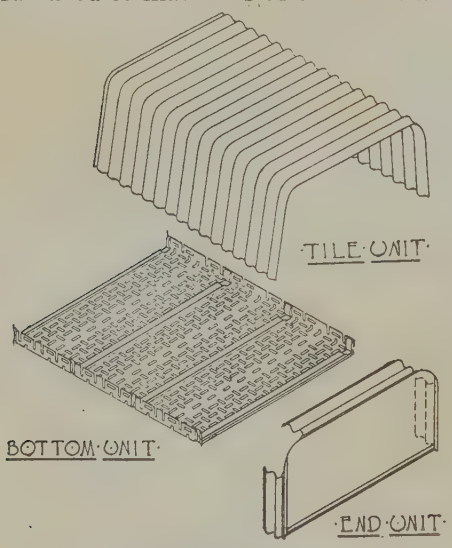
For Metal Lath, Inserts, Furring Channels, etc., see page B1696.

Services

Catalogues, specifications, dead loads, concrete quantities, instructions for placing and installing, and other information on request.

The Shurebond Unit System (Patented)

A system of concrete rib or joist construction, combining quality with economy of construction. Manufactured of materials of sufficient weight properly treated to produce not only lasting construction, but also sufficient strength to stand up without distortion while being installed and concreted. Particularly adapted to long spans. The type of slab construction to use for hotels, office and commercial buildings, loft buildings, school and institutional buildings, apartment buildings, garages, etc. A strictly reinforced concrete system that can be designed and figured.



Shurebond Tile, End and Lath Bottom Units

Shurebond bottom units are tacked to the forms.

Shurebond tile units are placed in lath bottom units—no nailing.

Shurebond end units wedge on tile units —no nailing

Advantages of the Shurebond Unit System

Less dead load to carry a given live load—saves reinforcing, concrete, and forming, reducing size of columns, girders and foundations.

Speed of construction—reduces contractor's overhead, carrying charges on the investment, and produces quicker revenue from the building.

Simplest type of forming necessary—open or skeleton forming.

Ease of erection—can be placed by one man, no stripping of metal pans, domes or forms, no wire hangers, no furring required.

Maximum strength and rigidity—special analysis heat treated steel used for tile units, eliminating sags and bends without planking while under construction.

Flat, level ceilings that are integral with the concrete—when stripping forms, can not pull down, thus eliminating refurring. Sufficient weight of lath bottom units to insure rigidity and long life. As easy to plaster as wood lath.

No nails to clip before plastering.

Perfect alignment — assuring concrete joists of uniform width throughout entire length, as tile can not shift or spread while concreting.

A hard dense concrete—no concrete leakage, absorption or honeycombing.

No breakage — less storage, hauling and handling.

Simplicity of conduit installation.

The American Furniture Mart, Chicago

The largest building in the world. Shurebond Patented Unit System used throughout—completed and ready for plastering at the rate of one floor per week

Savings Effected by the Shurebond Unit System

Maximum concrete displacement.
Reduced cost of wood forming.
Lower cost of installation.
Reduced cost of plastering.

Shurebond Unit System Sizes

Standard width 20 in. at base.

Standard length 2 ft. and 1 ft. covering surface.

Standard depth 4 to 16 in., inclusive, varying 1 in.

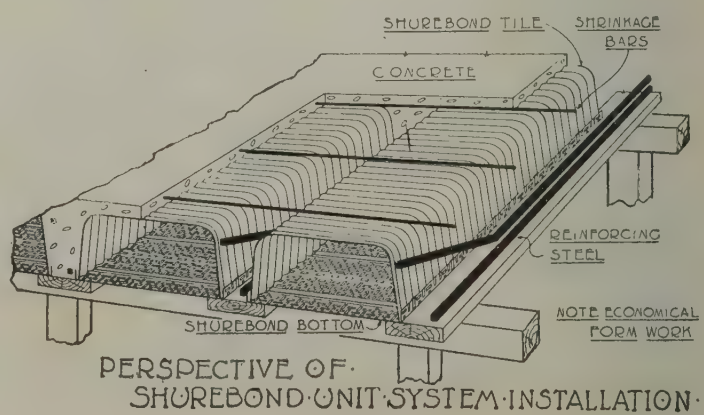
Beveled or tapered tile or both in 2-ft. lengths to any degree of bevel or taper within reasonable limits.

Flanged tile furnished where lath bottoms are not required.

Fill-in tile the same as above, but 12 in. wide at base.

Standard end units of sizes to fit various tile units.

While our standard width is 20 in., we make any width or depth of the Shurebond Unit System to meet any special proposition or any layout that an architect or engineer may consider economical.



PERSPECTIVE OF SHUREBOND UNIT SYSTEM INSTALLATION

GRID FLAT SLAB CORPORATION

1025 Massachusetts Avenue

BOSTON, MASS.

Grid System

New and economical flat slab form of construction for floors and roofs, made upon removable steel domes. This method is a two-way rib section of reinforced concrete acting to support a lighter floor slab. By cutting out all useless concrete between the ribs there is considerable concrete and reinforcing steel saved. This saving of concrete and steel cuts the dead weight very materially and permits for wider spans and column spacings—bays have been constructed up to 32 ft. square.

Calculations for Grid System—The calculations for the Grid Flat Slab are identical with those of the usual two-way flat slab. Standard specifications for concrete and reinforced concrete for flat slabs apply to Grid Flat Slabs.

These formulas are recommended for use where there are no definite building laws. Where architects or engineers design without set codes, the method taken with usual two-way flat slab designs can be taken with Grid Flat Slab.

Thickness of Slab and Depth of Dome to Be Used—The thickness of the Grid Slab and the depth of the dome required for any structure is determined by the weight to be carried and the span or spacing of the columns. The same method of determining the thickness of the ordinary flat slab should be employed. The rule is that the slab should be $\frac{1}{32}$ of the column span. The depth of the dome plus the thickness of the slab above should usually be at least 1 in. greater than the usual flat slab. The slab should never be less than 2 in. on top of the dome the depth depending on the concentrated load.

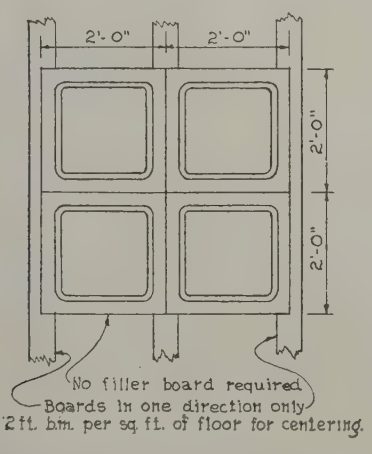
Steel Domes—The size of the removable steel domes is shown in the following illustration. Each 8-in. dome displaces 1½ cu. ft. of concrete.

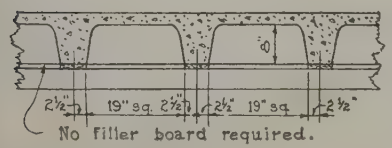
Wood Forms—The domes require support by narrow boards 2 ft. apart extending in *one direction only*. In the majority of designs the bottoms of the plinths are flush with the bottoms of the ribs, thus doing away with the expense and delay of forming dropped panels.

Placing Reinforcing Steel—*Reinforcing steel can not be misplaced or left out.* The steel is placed, one or two bars in the ribs and the steel man can not misplace it or leave it out, by mistake, without it being noticed.

Inserts and Electric Conduit—All inserts and conduits can be placed in the Grid Flat Slab the same as regular slab. Outlet boxes in ribs, large junction boxes in slab. Inserts can be placed as desired and held firmly in place with a small device. Floor drainers, if large, by leaving out a dome—extra concrete will support it.

Pouring of Concrete—The domes are No. 16 gauge steel. The tops are flat and stiff enough to support a runway to wheel concrete to point of placing. Screeds can be placed on domes to assure correct and equal thickness of concrete in placing.





Availability of Steel Domes—The steel domes for the Grid System are available in quantities large enough for any job and can be supplied on short notice.

Domes and System Patented—The steel domes for the Grid System as well as the type of construction are patented and patents owned by the GRID FLAT SLAB CORPORATION.

Service

The engineers of GRID FLAT SLAB CORPORATION will act as consulting engineers with architects and engineers on any Grid design and will furnish, place, oil and remove domes.

Roxbury Crossing Garage
EISENBERG & FEER, Architects
ROBT. J. GAUVREAU & Co., Contractor

Removable Domes in Place, Robert Gould Shaw School, Boston, Mass.
M. A. DYER Co., Architects
MATTHEW CUMMINGS Co., Contractors

John Bapst High School, Bangor, Me.
O'CONNELL & SHAW, Boston, Mass., Architects
RICHARD KENNEDY & Co., INC., Portland, Me., Contractors

ESTABLISHED 1899

EDWARD A. TUCKER COMPANY

Contracting Engineers for Fireproof Floor Systems and Concrete Reinforcement; Removable Metal Forms

Converse Building, 101 Milk Street

BOSTON, MASS.

REPRESENTATIVES IN HARTFORD and NEW HAVEN, CONN., ALBANY and UTICA, N. Y.

Products

DIAMOND DEFORMED BARS; SPIRALS.

FLOOR SYSTEMS: Metal Rib Long Span, Akme Flat Slab, Combination Tile.

Also, Marks System Gypsum Roof, Metal Frame Stirrup Units, Clips, Spacers, Chairs, Removable Metal Forms.

Services

This company offers, in connection with the sale of its floor systems, complete structural designs and plans; and the fact that the company is regularly retained as engineers by architects and contractors is a guarantee that the designs offered in the sales propositions will be conservative and reliable.

We lease our metal forms either with or without engineering services or sale of reinforcing material. Complete information showing application to any particular building furnished on request.

Reinforcement

Diamond bars—standard deformed bars rolled for us by the Jones & Laughlin Steel Corp., from new billet stock to standard specifications for reinforcing bars.

Shipments

Direct from the mill.

Mill Warehouse—from the most modern and completely equipped fabricating plant in the United States.

Boston Stock—warehouse at East Cambridge fully equipped with power machines for fabrication of all kinds, large stock, shipments at one day's notice.

Metal Rib Floors

Consist of reinforced concrete joists and slab, formed by removable metal pans or domes. This system reduces the waste of form material to the lowest point, saves on the amount of concrete and reinforcement, and is adapted to all classes of work. For garages, manufacturing plants and unfinished buildings, open joist construction is used. For schoolhouses, hospitals, etc., a metal lath ceiling is attached to the ribs, giving a level ceiling. Note this feature—lath is put up after all concrete work is done, thus avoiding the wavy ceiling effect, the rusting and breaking of lath through long exposure and the uncertainty of the quality of concrete obtained.

We supply forms in 31 and 20-in. widths.

For exposed ceilings, the 31-in. forms increase the diffusion of light and give a much more pleasing ceiling effect than the 20-in. spacing.

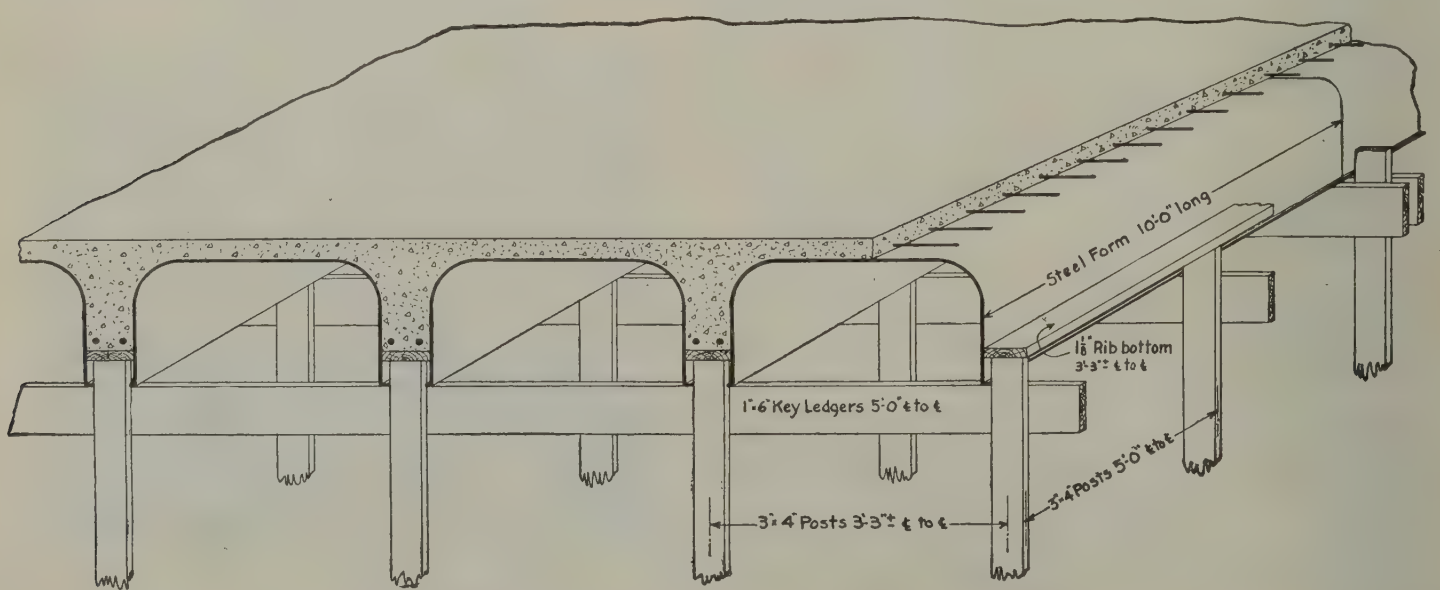
Metal forms are of No. 12 gauge (⅛ in. thick) and because of this thickness a form as rigid as wood centering is provided, giving also true alignment of the ribs. The standard lengths of 6, 8 and 10 ft., will support the loads with shores only at the ends, thus reducing requirements for shores to one for every 25 to 30 sq. ft.

The long lengths also mean few laps, reducing to one-third this labor item if joints are specified to be smoothed up.

Lumber for false work in Metal Rib construction, including waste, is reduced to one and one-quarter board feet per square foot, or a saving of three-quarters to one board feet as compared with usual pan systems; the number of pieces in the lumber for false work is one-half that of other systems.

The quality of the work and the speed and economy of the construction depend on using a heavy gauge form.

Architects are requested to refer to us in specifications to provide definitely for bids on Metal Rib System.



Metal Rib Floor Construction Showing Slab and Forms in Position

REPUBLIC FIREPROOFING COMPANY, INC.

Slagblok Fireproof Floor Construction

31 Union Square, NEW YORK, N. Y.
REPRESENTATIVES IN PRINCIPAL CITIES

Products

REPUBLIC SLAGBLOK FLOOR SYSTEM, consisting of Slagblok Units and Steel Bar Reinforcement for stone concrete fireproof floor construction.

Experience

We have furnished the material and service for the floor construction of more than one thousand buildings.

Engineering Service

Our engineers will appreciate the opportunity to co-operate with architects and consulting engineers as to the design and application of the Slagblok System. Estimates of cost gladly furnished. Working drawings for construction furnished with sale of Slagblok and reinforcement.

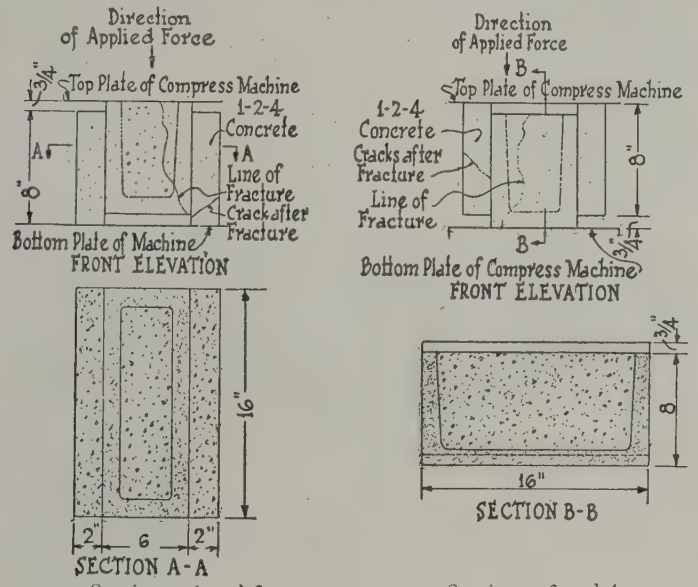
Slagblok System

The Republic Slagblok Floor System is designed according to established engineering practice. It is a system of floor construction using strength-increasing void-producing Slagblok units. It provides a soundproof fireproof floor having the maximum strength with the minimum dead weight and depth. Every element going into the Slagblok floors is of structural value, therefore the design is inherently economical.

Slagblok Units—These units are made of slag concrete in our shops under a special process by patented machinery and treated to have high compressive and bonding value. Every possible precaution is taken to insure an absolutely even and dependable product.

The unit is not a mere void producer; it is a properly designed compression unit, bonding perfectly with ribs and beams of material for which it has absolute affinity. It is legitimately used for stress in construction.

A bond test made by Haller Testing Laboratories proved perfect results as follows:



Specimens 1 and 2 Specimens 3 and 4

Methods of Testing

Republic Slagblok Bond Test

Test made by The Haller Testing Laboratories, Plainfield, N. J. Specimen 6 in. Republic Slagblok and poured 1:2:4 concrete. Age: Slagblok 28 days, concrete 14 days. Date of test: September 15, 1927

Identification	Specimen No. 1	Specimen No. 2	Specimen No. 3	Specimen No. 4
Bond area.....sq. in.	229.0	229.0	229.0	229.0
Maximum test load....lb.	78.500	57.500	86.000	62.000
Strength....lb. per sq. in.	*342.8	*251.0	*375.5	*270.7

*Note that the figures do not indicate the maximum bond stresses between the Slagblok and the poured concrete sides, but represent the existing bond stresses at the time when the specimens failed. As will be noted from the sketches, no cleavage whatsoever took place between the Slagblok and the poured concrete even for these extraordinarily high bond stresses.

On account of failure of the specimens in the poured concrete (see line of fracture in sketches) caused by combined moment and shear stresses, the maximum bond stresses could not be determined from these tests.

Structural Features—Slagblok construction saves structural steel or reinforced concrete framing. It offers the minimum depth of floor—resulting in reduced story heights or increased ceiling heights. It is recommended for any usual flat slab span.

Slagblok floor construction provides an equal section for compression to resist both positive and negative moments.

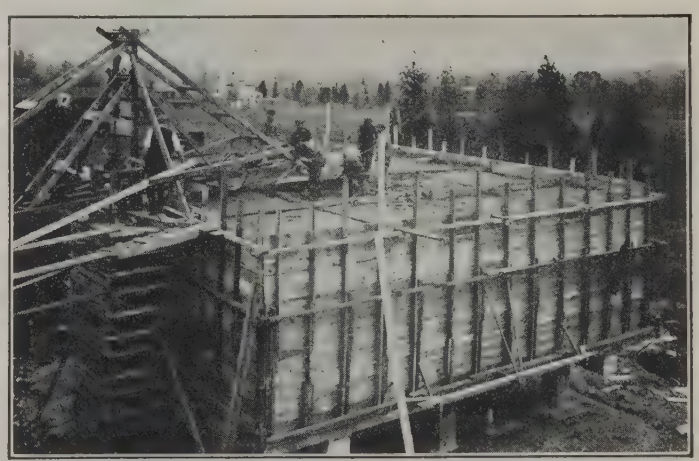
Slagblok units are completely closed when in place, preventing concrete entering the voids. Consequently, a minimum of concrete is used in construction and the dead weight of the Slagblok slabs is fixed irrespective of the consistency of the concrete poured into the ribs.

Slagblok ceilings do not warp or spring and plaster has a solid masonry base for application. They are also practically uniform in texture and color so that the plaster after application is even in color and highly satisfactory for decoration.

There is no metal to rust and disintegrate with Slagblok floors.

Load Deflection Test—This test was made by Columbia University Testing Laboratories, New York (illustrations below). The results were exceptional. The test panel was subjected to a maximum load corresponding to a uniformly distributed load of 840 lb. per sq. ft. at which load shear failure was produced adjacent to the supporting girders. Complete official report gladly sent on request.

Showing Arrangement of Slagblok and Reinforcement Before Pouring Concrete



The Test Panel Supporting a Load Corresponding to Approximately 800 Lb. per Sq. Ft.

Republic Slagblok Floor Test

Panel 31 ft. square over all, 22 ft. square inside of supporting girders. Slagblok units 8x16x16—20 in. on centers with 4-in. reinforced concrete ribs in two directions. No concrete top. Total test load 840 lb. per sq. ft. at failure

Approval—Slagblok construction has been approved by the building departments of New York, N. Y. (all boroughs); Washington, D. C.; Boston, Mass.; Hartford, New Haven and Bridgeport, Conn.; Albany, Syracuse and Rochester, N. Y.; Newark, N. J., and many others.

References

PROJECT	LOCATION	ARCHITECT
Office Building (17 stories)	New York, N. Y.	Necarsulmer & Lehlbach
Memorial Hospital	Syracuse, N. Y.	J. R. Pope & D. J. Baum
Nurses' Home	New York, N. Y.	R. D. Kohn & C. Butler
Hyde Park High School	Boston, Mass.	McLaughlin & Burr
News Building	Newark, N. J.	Henry D. Scudder, Jr.
Store & Office Building	Scarsdale, N. Y.	Schultze & Weaver
School Building	Princeton, N. J.	Ernest Sibley & L. C. Licht

THE WHITACRE ENGINEERING COMPANY

Schuster Hollow Tile Floors

706 Union Building
CLEVELAND, OHIO

228 North La Salle Street
CHICAGO, ILL.

PRINCIPAL AGENCIES

NEW YORK, N. Y., John T. McCoy, Inc., 551 Fifth Avenue
BALTIMORE, MD.. Van R. P. Saxe. Knickerbocker Building
KANSAS CITY, MO., A. I. Burnie, 1012 Baltimore Avenue
ROCHESTER, N. Y., American Clay & Cement Corp., 1175 Main Street, East
DALLAS, TEX., Fraser Brick Co.
DAVENPORT, IOWA, John Benedict Co.

Product

Schuster Hollow Tile Floors.

Description

Schuster hollow tile floor construction is a combination of hollow tile and concrete reinforced in two directions.

The tile are 12x12 special design clay blocks, capable of resisting shearing and compressive stresses. They are an integral part of the slab and are held securely in position by the key of concrete which is forced into the cells.

Each concrete joist between the rows of tile in each direction is reinforced with a straight bar, resisting positive moment; and, where continuity exists, with a short straight bar over the support, resisting negative moment.

No temperature bars are required. No concrete is required on top of the tile.

Structural Feature and Economy

Small dead loads permit the use of small beams, columns and footings. This effects a saving in concrete and reinforcement in these members as compared with other types of construction.

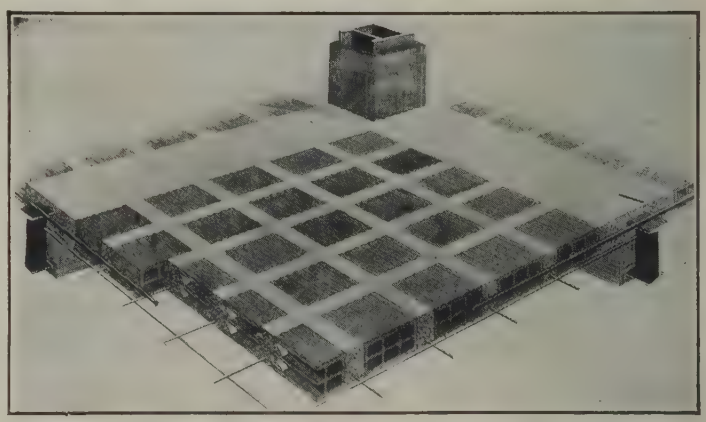
Tile used in shear and compression provides sufficient shearing area at the ends of each joist, and eliminates the top concrete required by other floor systems as compressive area to develop the reinforcement. The tile is not a mere filler adding useless dead weight but is a structural member of the slab.

Load distribution equal to that obtained with flat slab construction is secured. Heavy concentrated loads distribute themselves over two or more joists in each direction. This means that substantially there is no such thing as a concentrated load with Schuster hollow tile floors.

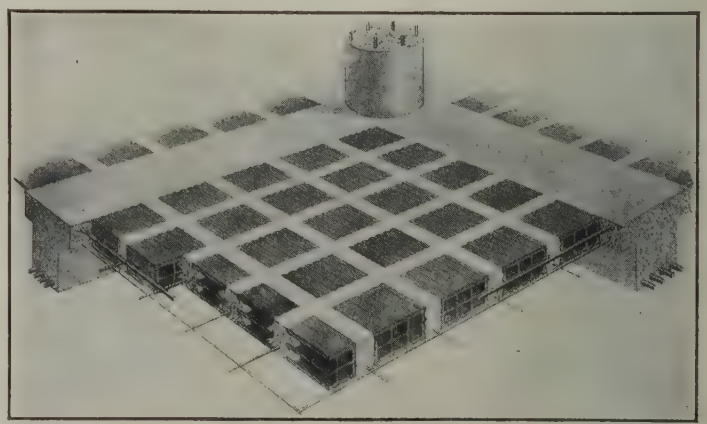
Slab thickness from 3 to 7 inches less in depth than that required by a one-way type of construction permits a total saving often amounting to an entire story height of the building. This means a material saving in masonry, pipes, conduits, stairs, etc.

Openings in the slab are easily handled. In many cases, special framing is unnecessary.

Plaster applied directly on the tile requires 2 coats, whereas plaster on mesh requires 3 coats. If an all-tile ceiling is desired, soffit tile are used.



Schuster Hollow Tile Floors with Structural Steel Beams and Columns



Schuster Hollow Tile Floors with Concrete Beams and Columns

Service

To aid architects and engineers in the design of Schuster hollow tile floors, an engineer will be sent to your office on request. He will be prepared to furnish complete design data, information regarding tests, and previous use of the system without any obligation being incurred on your part, and without expense to you.

Schuster hollow tile floors are a patented type of construction. We control the sale and use of the floors and our service to the architect and engineer consists in furnishing them with complete information necessary for the design, and furnishing the tile for the floors.

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street
CHICAGO, ILL.

Products

EXPANSION JOINTS; SATURATED FELT; GRAY FILLER; ASPHALT.

Also manufacturers of Bridge Flooring, Protection Course, Acoustical Board and Mouldings.

For Asphalt Roofing, Saturated Felt, Ridge Strips, Asbestos Cement Shingles, Slate Surfaced Shingles, Roof Cement and Oriental Roofing, see page A455.

For Wall Coping and Flashing Block, see page A557.

For Insulation, Roof Cement, Asphalt Paint and Industrial Flooring, see page B1996.

For Sewer Liners, Caulking Belts, Sewer Pipe Compound and Bitupack, see page C2737.

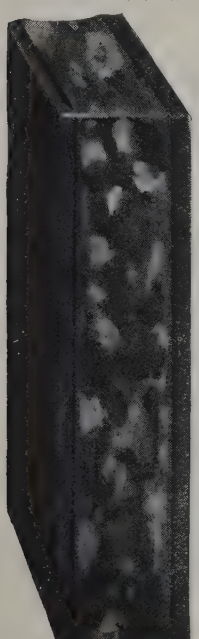
Servicised Reenforced Expansion Joints

These are prepared with an asphalt content ranging from 75 to 80 per cent, a fiber content approximately 15 per cent and a slight mineral content. They are manufactured strictly in accordance with Servicised processes, after years of careful research. The resilient, fibrated core aids in taking up the expansion and contraction of adjacent monolithic structures. The asphalts are refined in our own plant under careful supervision to avoid brittleness at freezing temperatures. The Servicised trade-mark is either on the crate or the sheet and protects the quality of the material.

Servicised Cork Seal Joint

This comprises a mixture of bituminous material and linear fiber surrounding and housing cork granules of sizable particles, locking them into place making this joint an exceedingly resilient expansion joint and one particularly designed for building purposes and where there is not an excessive amount of traffic.

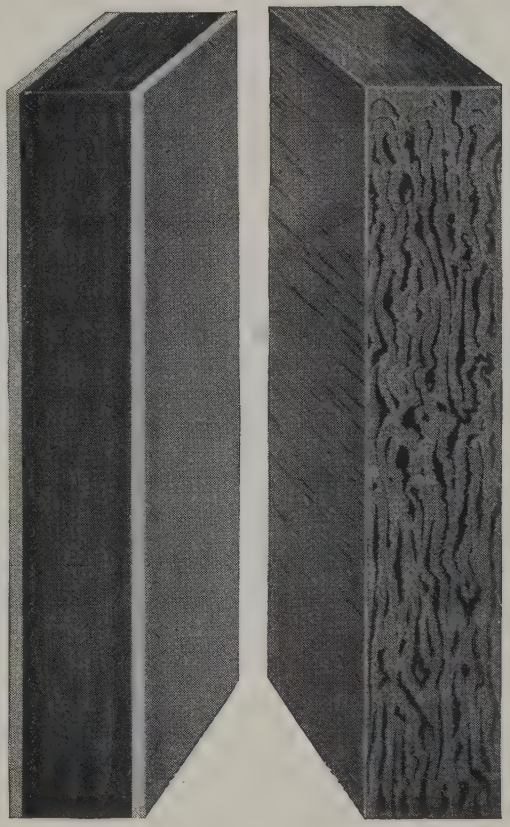
The ability of this joint to compress to 25 per cent of its volume and to react to its full volume is the result of one of the Servicised processes, attained through careful laboratory research. The Servicised label on this product stamps it strictly a Servicised quality product, fully protected in every way.



Servicised Cork Seal Joint

Servicised Gray Filler

This filler comprises a flowable mixture for the filling of cracks in cement floors, sidewalks, porticos, etc. It is particularly suitable for building purposes where crevices are to be filled in a flat surface. It is not adaptable for vertical surfaces. If such material is required, special mention should be made of such fact and the material can then be prepared to meet these requirements.



Servicised Type B Expansion Joint

This comprises a homogeneous mixture of irregularly overlapping mats of saturated fiber, with saturated linear fiber intermediate the mass. This joint has no felt sides but is finished with a pebbled surface, which enables the concrete to grip the sides. The effect of construction is that of a resilient mattress, and this also regulates the oozing or flow tendency, so that a mushroom is secured without excessive oozing which results in unsightly streaks at the expansion joint. Observation of Servicised Type B joint as now prepared will prove convincingly its superior quality, not only in its resiliency and powers to take up expansion and contraction, but in its ability to present a respectable appearance at the surface of the road without being flattened under the pressure of the traffic to unsightly ribbons 6 and 7 inches in width.

This Type has an asphalt content of approximately 75 per cent, a fiber content of approximately 15 per cent, and the balance consisting of inert and mineral matter. The Servicised label protects the quality of this material.

Servicised Type D Joint

This is a highly compressible dry fiber core having a high melting point asphalt surface penetration and coating. This material is particularly adapted for expansion and contraction where the space is to be filled for excessive expansion and contraction. It is likewise adapted to fit into places where the expansion joint is in danger of slipping through the crevices to the floor below. The elevations and depressions hold it in place, and this is strictly a Servicised departure. This type of material is suitable for insulation purposes, for lining around doors and windows, and is particularly free of moisture infiltration by reason of its thorough coating.

Servicised Saturated Felt

This comprises a high quality fiber content, fully saturated and well adapted to waterproofing and roofing purposes. The Servicised label on the saturated felt promptly identifies it as a Servicised product.

Servicised Asphalt

This is refined to a melting point between 250° and 260° with a penetration at 32° F. of 21° to 23° and at 115° F. from 35° to 40°.

This description of its quality should assure the user that he is securing a highly flexible, lasting material for roofing and waterproofing purposes.

Special asphalts furnished on request.

Expansion Joint Designed for Buildings, Stair Risers, Viaducts, Bridges, etc.

VAN RENSSELAER P. SAXE

CONSULTING ENGINEER

REPRESENTING STANDARD CONCRETE STEEL CO.

System "M"—Structural Steel Reinforcement

BALTIMORE, MD.

REPRESENTATIVES

NEW YORK, N. Y., C. W. Tilton, C. E., 156 E. 42nd Street and Guy B. Waite Co., 413 E. 31st Street
CHICAGO, ILL., Whitacre Engineering Co., 228 No. LaSalle Street
PHILADELPHIA, PA., Bradford Stetson, 21st Street and Hayes Avenue, Camden, N. J.
CLEVELAND, OHIO, Whitacre Engineering Co., 1836 Euclid Avenue
PITTSBURGH, PA., Victor Didier, 207 Fulton Building
RALEIGH, N. C., R. E. Ball, P. O. Box 880
TROY, N. Y., G. Saxton Thompson, 257 Broadway

System "M"—A Steel Construction at the Cost of Concrete

System "M" is a patented type of light structural steel designed to combine with concrete. It retains all of the best features of the standard structural steel skeleton, *at but a portion of its cost.* It overcomes all of the objections to the ordinary bar reinforced concrete design, yet loses none of its economic advantages .

A Development of Engineering Experience

System "M" construction was developed and patented by Guy B. Waite as head of the organization known as "Guy B. Waite and Associates," of New York City.

Van Rensselaer P. Saxe, C. E., representing the Standard Concrete Steel Company of Baltimore, Md., was a member of this association.

Guy B. Waite and associated engineers were engaged thirty-five years ago in the design and erection of structural steel for buildings. Fireproofing was then in its early development.

It was a natural step for these men to turn from the fireproofing of steel to the design of reinforced concrete, in which they were pioneers.

The first concrete building in Manhattan was designed and erected by them under the first permit granted by the Borough of Manhattan for this type of construction.

This wide experience, with a full appreciation of the merits and faults of both structural steel and bar reinforced concrete constructions, resulted in the development of System "M" *which retains the best points of both.* The economy and practical worth of System "M" has been demonstrated in several hundred buildings.

The Advantages of Structural Steel

Structural steel has the double advantage of *speed* and *safety* in construction and this regardless of weather conditions.

It is rapidly erected, tier upon tier, irrespective of the rest of the construction work which follows the steel skeleton. It is safe in the assurance that all of the steel is included and accurately placed. It is not subject to errors and omissions, nor dangers of inclement weather.

The ordinary structural steel design is, however, *very wasteful of steel.*

Bar Reinforced Concrete

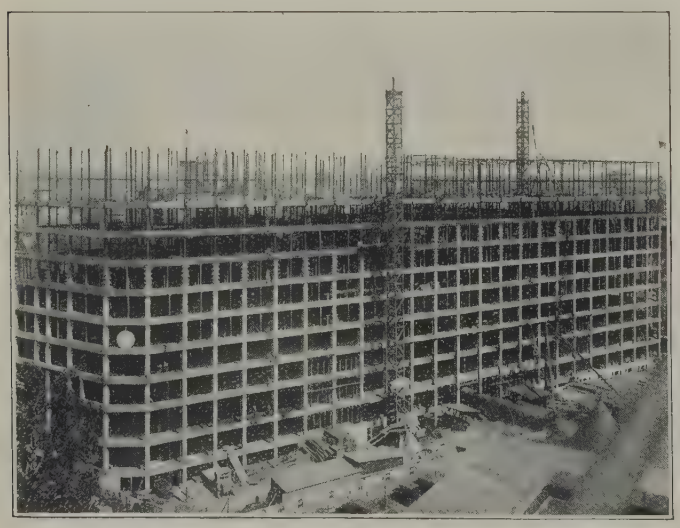
Experience has shown that bar reinforced concrete necessitates an intelligent, painstaking organization to overcome the *personal equation* and insure permanent, accurate locations of the steel reinforcement. The wood forms must precede the placing of steel and concrete.

Construction can proceed only as rapidly as the completion of the forms will permit, one story at a time, and not until the concrete of one story is poured and set can the forms for the story above be commenced.

So slow is this process at best, that in an endeavor to speed up the construction, it is but natural to rush both the placing of the complicated steel reinforcement and the pouring of the concrete. This tends towards carelessness, resulting in errors and omissions.

Weather conditions are an important factor.

Once the concrete is poured and set, corrections or changes are difficult if not impossible. Serious and costly accidents occur when, in attempting to save on centering lumber costs, forms are removed while the concrete is green. Bar reinforced concrete has one advantage, it is an economical construction—*economical if time required in construction is not considered.*



Skeleton

Finished

War Risk Bureau, Washington, D. C.
Wyatt & Nolting, Architects, Baltimore, Md.

System "M" was substituted, under the architects' recommendation, for the original structural steel design. Floor live loads varied from 50 to 300 pounds—all structural requirements of the original design were fulfilled. The saving was $180,000.00 in 1917

Continued on next page

System "M" An Economic Achievement

General—System "M" is a method of construction developed to overcome the objection to reinforced concrete and preserve the virtue of structural steel construction.

In practice, it substitutes a light structural steel member for the complicated mass of bars used in reinforced concrete.

A fabricated, light structural steel frame is erected similar to the standard steel skeleton construction, the floor members are, however, but about one-third as heavy. The structural steel members of this frame ultimately become the reinforcement in the construction.

Tests—System "M" has passed all of the standard test requirements for strength, fire and water. It meets all building code requirements of the City of New York. At the Columbia University laboratories it has received rigid scientific tests. It has passed successfully all State and individual loading tests wherever these have been required. *Copies of certified tests will be furnished on request.*

Design—System "M" is adapted to any design where standard structural steel can be used, with the advantage that it is more flexible. It has none of the limitations of bar reinforced concrete.

System "M" saves form 40% to 60% of steel (dependent on capacity and span) over the standard structural steel design.

A few steel sizes cover a wide variety of requirements. The small steel floor members (about one-third the weight used in standard structural steel design) are customarily carried in stock in sufficient quantities to assure prompt fabrication and delivery.

Owing to the reduced size of System "M" steel floor beams, the floor construction is monolithic as compared to that of standard structural steel design, where the fireproof floor slab is virtually cut in two by the depth of the heavier steel beam. System "M" floors act as horizontal trusses taking up and distributing vibrations, shocks and wind pressure (see typical comparative floor sections).

Since System "M" is a combination of structural steel and concrete in which each element complements and assists the other, by slight variations in the amount of concrete used the steel may be lightened or made heavier, thus increasing the factor of flexibility in design.

System "M" floor beams are in actual use with spans up to 50 ft. and carrying loads up to 1500 lb. per sq. ft.

System "M" floors are supported by built-up angle or channel columns, stiffened with concrete, designed to utilize the full unit working stresses of the steel. Where the size of this type of column is objectionable, the standard Bethlehem steel column may be substituted. Column connections may be either riveted or bolted—the wind-bracing is provided as in structural steel design.

Erection

System "M" is erected exactly like the standard structural steel skeleton and can therefore proceed safely *regardless of weather conditions.*

The light steel skeleton, preceding all other construction work above the foundation, is erected with the greatest degree of *speed and accuracy, maintaining correct lines and levels* for the work which follows.

The light structural members of System "M," as compared with standard structural steel design, require less and lighter erection equipment with the resultant economy in *cost* and *time* of erection.

References

System "M" has been successfully used in hundreds of buildings of note.

A complete list of these buildings, where located, and their architects, many of whom are nationally known, will be furnished for reference.

Engineering Service

A well organized engineering service is maintained to design and supervise the erection of System "M" construction. This service includes the making of complete structural plans, details and specifications, including design of the foundations, the checking of all shop drawings and details, supervising the erection, as the architect's representative.

The preliminary engineering service costs nothing. When a completed System "M" is used, then a royalty is charged, based on the square footage of the building.

System "M" Compared with Structural Steel

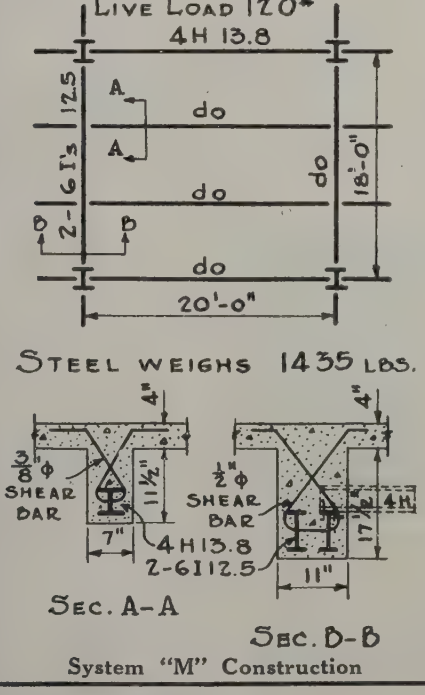
←≪ *Left.*

Section showing typical System "M" Floor Construction. Note small steel beam set low in concrete.

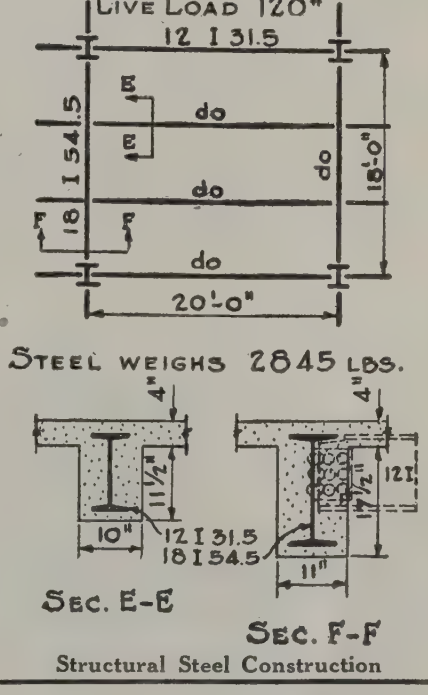
Right ≫→

Section showing typical Structural Steel Construction. Steel beam virtually cuts floor slab in two.

Note carefully the difference in the weight of steel required in these two typical plans carrying the same live load. System "M" floor slab is monolithic; tie rods are eliminated and the construction is absolutely fireproof. The fireproofing of standard structural steel, because of the difficulty of properly covering it with concrete, is often doubtful. Both Systems of Construction can be erected in the same time.



System "M" Construction



Structural Steel Construction

AMERICAN STEEL & WIRE COMPANY

Triangle Mesh and Electrically Welded Wire Fabric for Concrete Reinforcement

SALES OFFICES

CHICAGO, 208 So. La Salle Street
CLEVELAND, Rockefeller Building
DETROIT, Foot of First Street
CINCINNATI, Union Trust Building
MINNEAPOLIS—ST. PAUL, Merchants National Bank Building, St. Paul
ST. LOUIS, 506 Olive Street
KANSAS CITY, 417 Grand Avenue
OKLAHOMA CITY, First National Bank Building
BIRMINGHAM, Brown-Marx Building
MEMPHIS, Union and Planters Bank Building
DALLAS, Praetorian Building
DENVER, First National Bank Building
SALT LAKE CITY, Walker Bank Building
NEW YORK, 30 Church Street
BOSTON, Statler Building
PITTSBURGH, Frick Building
PHILADELPHIA, Widener Building
ATLANTA, 101 Marietta Street
WORCESTER, 94 Grove Street
BALTIMORE, 32 So. Charles Street
BUFFALO, 670 Ellicott Street
WILKES-BARRE, Miners Bank Building
*SAN FRANCISCO, Russ Building
*LOS ANGELES, 2087 E. Slauson Avenue
*PORTLAND, 777 Nicolai Street
*SEATTLE, 4th Avenue So., and Connecticut Street

EXPORT REPRESENTATIVES, United States Steel Products Company, 30 Church Street, New York

Products

Triangle Mesh and Electrically Welded Wire Fabrics for Concrete Reinforcement.

For Triangle Mesh, for Stucco Base, see page B1673; for Electrical Wires and Cables, see pages C3416-3423; for Wire Rope, see pages C3658-3661.

Uses

Triangle Mesh and Electrically Welded Wire Fabrics are used for the reinforcing of concrete floor and roof slabs, concrete walls and chimneys, arch construction, beams, columns, dams and retaining walls, water, sewer and culvert pipe, pavements and roadways, river revetment, silos, fireproofing steel framing, bridge floors, reservoirs, monolithic concrete sewers and stucco work.

Advantages of Wire Fabric Reinforcement

(1) Provides even distribution of steel.
(2) Reinforces in every direction.
(3) Tension or carrying members accurately spaced.
(4) Low cost of inspection.
(5) Properly distributes over a large area stresses due to concentrated load.
(6) Due to cold drawing, higher elastic limits and ultimate strengths with same quality of steel.
(7) Continuous action from one end of the structure to the other.
(8) Impossible to leave out or otherwise reduce the necessary steel if specific style number of fabric or area of steel is specified.
(9) Perfect mechanical bond.
(10) Easily handled and stored on the work.
(11) Minimum cost of installation.

Grade of Steel

A reduction of the required sectional area of steel is safely accomplished, within limits, by the use of a higher tensile strength steel. This high tensile strength may be secured by increasing the carbon content or by cold drawing of mild steel.

Cold drawing of mild steel produces a high ultimate strength and yield point, and the proportion of the yield point to the ultimate strength is increased to from 70 to 90%. Since the strength of a reinforced concrete structure, in so far as the reinforcement is concerned, depends on the yield point of the steel, the high yield point of cold drawn wire is of great importance.

Galvanizing

Triangle Mesh Reinforcement is furnished plain on orders unless otherwise specified.

American Electrically Welded Fabric is furnished plain or galvanized as ordered.

In general, the additional cost for galvanized fabric is not justified except in special cases where the steel will be inadequately protected, as in very thin slabs, etc.

Triangle Mesh Woven Wire Concrete Reinforcement

Triangle Mesh Fabric is made from cold drawn mild steel having an ultimate strength of 70,000 to 85,000 lb. per sq. in. The longitudinal members are spaced 4 in., the diagonal cross wires either 2, 4, or 8 in. It is the only design of wire fabric having cross wires that assist the longitudinals in carrying the load.

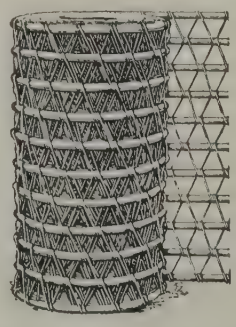


Fig. 1. Triangle Mesh Wire Fabric Reinforcement

*United States Steel Products Company.

Continued on next page

For the light styles of fabric, the longitudinals consist of 1 wire; for the medium styles, 2 wires laid parallel; and for the heavy styles, 3 wires stranded. The sizes of the wires and the number per longitudinal are varied to obtain the desired cross-sectional area of steel per foot of width. Stranded longitudinals are used to reduce the stiffness of the finished product without affecting the tensile strength.

TRIANGLE MESH WOVEN WIRE CONCRETE REINFORCEMENT

Style No.	Number and gauge of wires each, longitudinal, A. S. & W. Co.'s steel wire gauge	Sectional area longitudinals, sq. in. per ft. width	Effective sect. areas, sq. in. per ft. of fabric		Approx. weight, lb. per 100 sq. ft.
			Trans.	Longit.	
Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 4 in.					
032	1—No. 12 gauge	.026	.022	.032	22
040	1—No. 11 gauge	.034	.022	.040	25
049	1—No. 10 gauge	.043	.022	.049	28
058	1—No. 9 gauge	.052	.022	.058	32
068	1—No. 8 gauge	.062	.022	.068	35
080	1—No. 7 gauge	.074	.022	.080	40
093	1—No. 6 gauge	.087	.022	.093	45
107	1—No. 5 gauge	.101	.022	.107	50
126	1—No. 4 gauge	.120	.022	.126	57
146	1—No. 3 gauge	.140	.022	.146	65
153	1—¼ in.	.147	.022	.153	68
168	1—No. 2 gauge	.162	.022	.168	74
180	2—No. 6 gauge	.174	.022	.180	78
208	2—No. 5 gauge	.202	.022	.208	89
245	2—No. 4 gauge	.239	.022	.245	103
267	3—No. 6 gauge	.261	.022	.267	111
287	3—No. 5½ gauge	.281	.022	.287	119
309	3—No. 5 gauge	.303	.022	.309	128
336	3—No. 4½ gauge	.330	.022	.336	138
365	3—No. 4 gauge	.359	.022	.365	149
395	3—No. 3½ gauge	.389	.022	.395	160
Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 8 in.					
036P	1—No. 12 gauge	.026	.009	.036	17
044P	1—No. 11 gauge	.034	.009	.044	20
053P	1—No. 10 gauge	.043	.009	.053	24
062P	1—No. 9 gauge	.052	.009	.062	27
072P	1—No. 8 gauge	.062	.009	.072	31
084P	1—No. 7 gauge	.074	.009	.084	35
097P	1—No. 6 gauge	.087	.009	.097	40
Longitudinals Spaced 4 in. Cross Wires No. 12½ Gauge, Spaced 8 in.					
041R	1—No. 12 gauge	.026	.014	.041	21
049R	1—No. 11 gauge	.034	.014	.049	24
058R	1—No. 10 gauge	.043	.014	.058	28
067R	1—No. 9 gauge	.052	.014	.067	31
077R	1—No. 8 gauge	.062	.014	.077	35
089R	1—No. 7 gauge	.074	.014	.089	40
102R	1—No. 6 gauge	.087	.014	.102	44

Longitudinals Spaced 4 in. Cross Wires Nos. 14 and 12½ Gauge, Spaced 2 in.

(This material is used principally for cement gun work)

Style No.	Number of wires each, longitudinal	Gauge of wires each, longitudinal	Gauge of cross wires	Approx. weight, lb. per 100 sq. ft.
7A	1	12	14	31
6A	1	10	14	37
5A	1	8	14	44
4A	1	6	14	53
29A	1	12	12½	42
28A	1	10	12½	48
27A	1	8	12½	55
26A	1	6	12½	64

Rolls: Standard lengths 150, 200 and 300 ft.
Widths: Approximately 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 and 56 in.
Finish: Plain or galvanized.
Tensile strength: Standard, 70,000 to 85,000 lb. per sq. in.

Electrically Welded Wire Fabric Reinforcement

A square or rectangular mesh made from cold drawn steel wire electrically welded at the intersections of the transverse and longitudinal wires. Various combinations of spacings and sizes of wires can be furnished.

This material combines the same high quality of material and service that has given Triangle Mesh reinforcement its enviable reputation.

When embedded in concrete, this mesh yields the maximum of its steel strength.

AMERICAN ELECTRICALLY WELDED FABRIC

Spacing of wires, in.		Gauge number		Sect. area, sq. in. per ft.		Weight per 100 sq. ft., lb.
Longit.	Trans.	Longit.	Trans.	Longit.	Trans.	
2	16	1	7	.377	.018	140
2	16	2	8	.325	.015	119
2	16	3	8	.280	.015	104
2	16	4	9	.239	.013	89
2	16	5	10	.202	.011	75
2	16	6	10	.174	.011	65
2	16	7	11	.148	.009	55
3	16	1	7	.252	.018	96
3	16	2	8	.216	.015	83
3	16	3	8	.187	.015	72
3	16	4	9	.159	.013	61
3	16	5	10	.135	.011	52
3	16	6	10	.116	.011	45
3	16	7	11	.098	.009	38
3	16	8	12	.082	.007	32
4	16	3	8	.140	.015	56
4	16	4	9	.120	.013	48
4	16	5	10	.101	.011	40
4	16	6	10	.087	.011	35
4	16	7	11	.074	.009	30
4	12	8	12	.062	.009	26
4	12	9	12	.052	.009	22
4	12	10	12	.043	.009	19
4	12	12	12	.026	.009	13
4	12	5	5	.101	.034	48
4	12	6	6	.087	.029	42
4	12	7	7	.074	.025	35
4	12	8	8	.062	.021	30
6	12	0	6	.148	.029	65
6	12	2	2	.108	.054	59
6	12	3	3	.093	.047	51
6	12	4	4	.080	.040	44
6	12	5	5	.067	.034	37
6	12	6	6	.058	.029	32
6	12	7	7	.049	.025	27
6	8	12	12	.017	.013	11
6	6	0	0	.148	.148	107
6	6	1	1	.126	.126	91
6	6	2	2	.108	.108	78
6	6	3	3	.093	.093	68
6	6	4	4	.080	.080	58
6	6	5	5	.067	.067	49
6	6	6	6	.058	.058	42
6	6	7	7	.049	.049	36
6	6	8	8	.041	.041	30
6	6	9	9	.035	.035	25
6	6	10	10	.029	.029	21
6	6	12	12	.017	.017	13
4	4	4	4	.120	.120	85
4	4	6	6	.087	.087	62
4	4	8	8	.062	.062	44
4	4	10	10	.043	.043	31
4	4	12	12	.026	.026	19
4	4	14	14	.015	.015	11
3	3	10	10	.057	.057	41
3	3	12	12	.035	.035	25
2	2	10	10	.086	.086	60
2	2	12	12	.052	.052	37
2	2	14	14	.030	.030	21
2	4	12	12	.052	.026	28
2	4	14	14	.030	.015	16

Other styles can be furnished on application.
Rolls: Standard lengths 150, 200 and 300 ft. For No. 2 gauge wires and larger, flat sheets only.
Widths: Multiples of the spacing of longitudinal wires up to a maximum width which varies with the size and spacing of the longitudinals. Approximate maximums 56 to 72 in. for 2-in. spacing, 84 to 96 in. for 3 or 4-in. spacing, and 96 to 120 in. for 6-in. spacing.
Finish: Plain or galvanized.
Tensile Strength: Standard, 60,000 to 70,000 lb. per sq. in.; 70,000 to 80,000 lb. furnished when ordered.
Weights—All above weights are based on a width of 60 in. measured from center to center of the outside or selvage longitudinal wires.

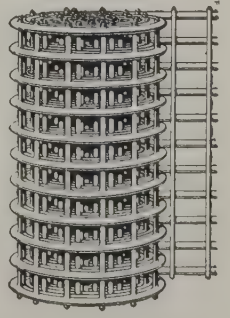


Fig. 2. Electrically Welded Wire Fabric Reinforcement

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AREA OF STEEL AND THICKNESS OF SLAB REQUIRED FOR GIVEN SPANS AND LOADS

Bending moment=$WL^2 \div 12$. Center of steel ¾ in. above bottom of slab.
Reinforcement in each case is sufficient for the live load shown plus the weight of the concrete slab. Any dead load of the floor exclusive of the concrete slab should be considered as part of the live load shown here.
Maximum stresses: Steel=18,000 lb., Concrete=700 lb.

Note: If not restricted by building code to a stress in the steel of 18,000 lb., a stress of 20,000 lb. can safely be used for wire mesh reinforcement. For a steel stress of 20,000 lb. reduce the areas of steel shown in the table by 10%.
After hundreds of tests of actual slabs made by the Testing Laboratory of Columbia University, the City of New York prepared a code covering slabs having spans of 8 ft. or less and decided on the use of an empirical formula that is equivalent to assuming a working stress in the steel in the standard formula for reinforced concrete design of approximately 32,000 lb. per sq. in. Millions of square feet of reinforced concrete floors have been built in accordance with this New York code.

Live load per sq. ft. lb.	Span of slab, center to center of supports, ft.-in.																				
	4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0	9-6	10-0	10-6	11-0	11-6	12-0	12-6	13-0	13-6	14-0	14-6
	Floor slab thickness and area of steel in sq. in. per foot width of slab required for spans and loads indicated																					
30	3" .027	3" .035	3" .043	3" .053	3" .064	3" .075	3" .086	3" .100	3" .116	3" .132	3" .148	3" .166	3½" .163	3½" .180	3½" .198	3½" .218	4" .216	4" .235	4" .255	4½" .255	4½" .276	4½" .297
40	3" .032	3" .040	3" .050	3" .061	3" .074	3" .087	3" .101	3" .117	3" .135	3" .153	3" .172	3½" .168	3½" .187	3½" .206	4" .205	4" .224	4" .245	4½" .245	4½" .266	4½" .288	5" .289	5" .311
50	4" .028	4" .035	4" .044	4" .054	4" .064	4" .076	4" .089	4" .102	4" .117	4" .133	4" .150	4" .168	4" .187	4" .208	4" .229	4" .251	4½" .250	4½" .273	4½" .295	5" .296	5" .320	5" .343
60	4" .030	4" .039	4" .049	4" .059	4" .071	4" .083	4" .098	4" .113	4" .130	4" .148	4" .166	4" .186	4" .207	4" .229	4" .253	4½" .251	4½" .275	4½" .300	5" .299	5" .324	5½" .326	5½" .351
80	4" .037	4" .047	4" .059	4" .071	4" .085	4" .100	4" .117	4" .135	4" .155	4" .176	4" .198	4" .223	4" .248	4½" .246	4½" .272	4½" .298	5" .297	5" .324	5½" .325	5½" .353	5½" .380	6" .382
100	4" .042	4" .054	4" .068	4" .083	4" .099	4" .117	4" .137	4" .158	4" .180	4" .205	4" .231	4" .259	4½" .257	4½" .285	5" .285	5" .313	5" .343	5½" .342	5½" .369	6" .373	6" .405	
125	4" .050	4" .064	4" .080	4" .097	4" .116	4" .137	4" .160	4" .185	4" .213	4" .242	4½" .241	4½" .270	4½" .302	5" .301	5" .333	5½" .333	5½" .365	6" .365	6" .399			
150	4" .058	4" .073	4" .092	4" .112	4" .135	4" .159	4" .185	4" .214	4" .245	4½" .246	4½" .277	5" .278	5" .310	5" .344	5½" .345	5½" .379	6" .382	6" .417				
175	4" .066	4" .083	4" .104	4" .127	4" .152	4" .180	4" .210	4" .243	4½" .244	4½" .278	5" .280	5" .314	5½" .317	5½" .352	6" .356	6" .391						
200	4" .073	4" .093	4" .116	4" .141	4" .170	4" .200	4" .234	4½" .237	4½" .272	5" .276	5" .312	5½" .316	5½" .352	6" .357	6" .394							
250	4" .088	4" .112	4" .140	4" .172	4" .205	4" .243	4½" .245	4½" .288	5" .292	5" .333	5½" .338	5½" .379	6" .386									
300	4" .103	4" .132	4" .165	4" .202	4" .242	4½" .249	4½" .292	5" .299	5" .343	5½" .350	6" .359	6" .403										

See tables on preceding page for styles of Triangle Mesh and American Electrically Welded Fabric that will give required areas.

Wire Fabric Reinforced Slabs

Supporting the Mesh Reinforcement—The correct location of the reinforcing mesh in the top portion of slabs over concrete beams can be easily and cheaply obtained by means of precast concrete blocks as shown in Fig. 3.

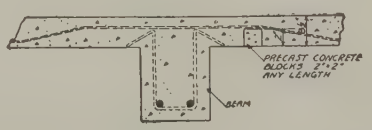

Fig. 3. Inexpensive Method of Supporting Wire Mesh Reinforcement Over Concrete Beams

Blocks should have a height about 1¼ or 1½ in. less than the full thickness of the slab. The length may be any convenient amount such as 1 or 2 ft. or such lengths as are readily formed by breaking long strips of the blocks. The mesh should be supported for at least one-third of its width. These blocks will stay in approximately correct position without any means of attachment to the reinforcing mesh or to the forms.

For short spans (about 8 ft. or less) these blocks will be required on one side only of the beams. For spans greater than 8 ft., use blocks on both sides.

Detailing Widths of Mesh—For estimating purposes where accuracy is unnecessary, provided the estimate is on the safe side, it is permissible to assume that the mesh required will equal in square feet the actual area of the floor slab. As a matter of fact, the amount of mesh needed will be less than that, and at the same time a more efficient and more economical layout is possible. In the first place, a 2-in. lap along the sides of the sheets of wire mesh reinforcement is sufficient to develop the full strength of the reinforcement; more

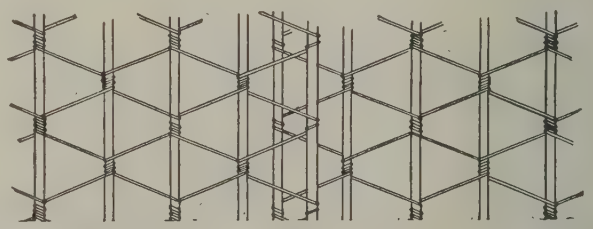

Fig. 4. Triangle Mesh Reinforcement As It Actually Appears with a Side Lap of 2 in.

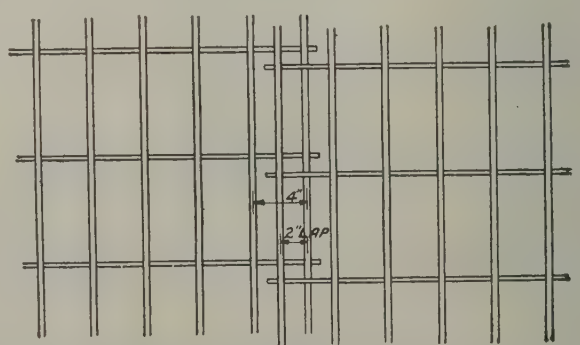

Fig. 5. Electrically Welded Fabric As It Actually Appears with a Side Lap of 2 in.

Continued on next page

than that is a waste of material. This 2-in. lap means a lap of the outside (or selvage) longitudinal wires and should not be assumed for those forms of mesh having a zigzag selvage edge.

A suggested detail for the amount and location of wire mesh reinforcement is shown in Fig. 6. Providing a short strip of light weight fabric is placed near the top of the slab over the girders with the main longitudinal wires at right angles to the direction of the girders, it is not only unnecessary but a waste of material to require that the main reinforcement of the slabs entirely cover the space between and over the girders. The distance between the center line of the girder and the edge of the reinforcing fabric can be any amount up to about 20 in. without reducing the strength of the structure.

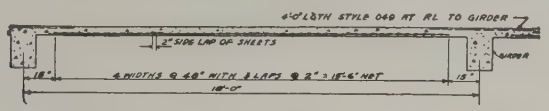

Fig. 6. Detailing Widths of Mesh and Showing Extra Strip of Mesh Over the Girders

Other Uses of Wire Mesh Reinforcement

Concrete Joist Floors—Fig. 7 shows a typical section of such a floor. Here is a 2 or 3-in. slab having a clear span between the supporting ribs of 23 in., that must not only act as part of the compression portion of the beams and resist temperature stresses, but in addition act as a support of the loads that may come upon the floor.

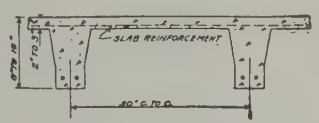

Fig. 7. Typical Section of Concrete Joist Floor

The most efficient type of reinforcement to take care of these various stresses is a fabricated mesh made from cold drawn high elastic limit wire with comparatively close spacing of members.

Top Layer of Concrete Finished Floors—It is often desirable for construction reasons to leave the ¾ or 1-in. top dressing until after the main part of the slab is completely hardened. In this case the slab should be thoroughly cleaned before applying the final course, and this course should be reinforced with wire mesh reinforcement to prevent destructive cracks.

Specify Style 032 Triangle Mesh or 4x4-in. mesh No. 12 by No. 12 gauge wires Electrically Welded wire fabric.

Basement and Other Floors that Rest Upon the Ground—As conditions vary with each job, it is impossible to make any definite suggestions regarding the proper weight of fabric to use, but millions of square feet of Style 049 Triangle Mesh have been successfully used for this purpose. Where heavy loads and questionable fill-foundations occur, it will be economy to use heavier mesh, such, for instance, as Style 153 Triangle Mesh or an equivalent weight of Electrically Welded wire fabric having spacings of wires that do not exceed 6 in.

Flat Slab Beamless Floors—Wire fabric reinforcement has been successfully used for this type of construction. It can be furnished in rolls or flat sheets.

This material is most desirable and it is highly recommended.

Cement Gun Work—Gunite (trade-name) is concrete applied by the cement gun process, which produces probably the densest and, therefore, the most waterproof concrete available by present known methods.

Gunite reinforced with wire fabric reinforcement has repaired successfully old crumbling bridge piers, tunnel linings and sea walls; old steel bridges, tanks and trusses; leaky reservoirs and irrigation ditches; even wooden structures that have been damaged by fire have been restored to usefulness by this method. And repair work is by no means the most important class of work produced. All kinds of new construction, especially those requiring waterproof qualities with light resulting weight, can be successfully executed.

Fireproofing of Steel Framing—Wrap all steel columns, girders and beams with Triangle Mesh, Style 032, or Electrically Welded fabric, 4x4-in. mesh, all No. 12 gauge wires.

Concrete Chimneys—Style 153 Triangle Mesh is standard for the circumferential reinforcement.

Stucco Reinforcement—See page B1673.

Concrete Sewers—The close spacing of members of Triangle Mesh is largely responsible for the successful results obtained with precast sewer pipe. The weight of fabric varies with the diameter of pipe, thickness of shell and depth of fill.

Concrete Driveways, Streets and Highways—Wire fabric reinforcement is essential to prevent destructive cracks. The purpose of the reinforcement is to increase the structural strength of the concrete slab and also to bind it together as a unit. The high tensile strength and the close spacing of members of a wire fabric show decided advantages for these purposes. The weight of wire fabric used in pavement has varied on account of varying conditions, but the average practice calls for 35 to 50 lb. per 100 cu. ft.

Suggested Specifications for Pavements—Reinforcement shall consist of steel wire fabric manufactured from cold drawn wire, finished members of which shall develop an ultimate tensile strength of at least 70,000 lb. per sq. in. and which shall bend cold 180° around a pin the diameter of which is equal to diameter of wire specimen without cracking on outside of bent portion.

All reinforcement shall be free from excessive rust, scale, paint or coating of any character which will tend to prevent proper bonding of the concrete.

The fabric reinforcement shall weigh not less than 40 lb. per 100 sq. ft.

The main or heavier wires of fabric shall be spaced not more than 6 in. apart. The secondary or lighter wires of fabric shall be spaced not more than 12 in. apart.

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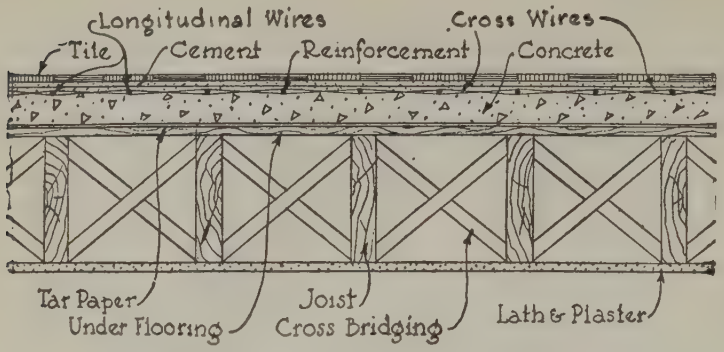
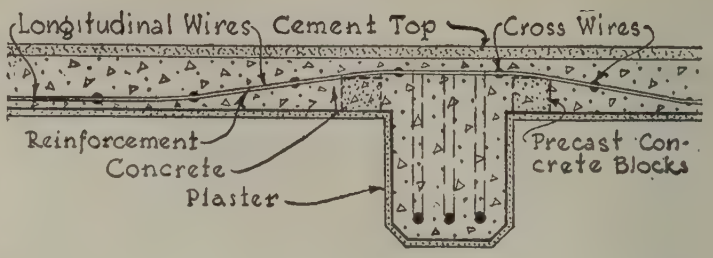
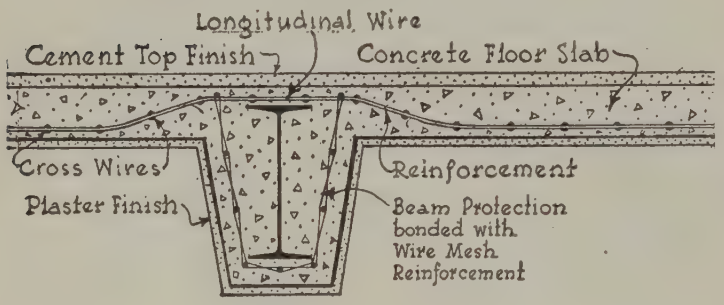


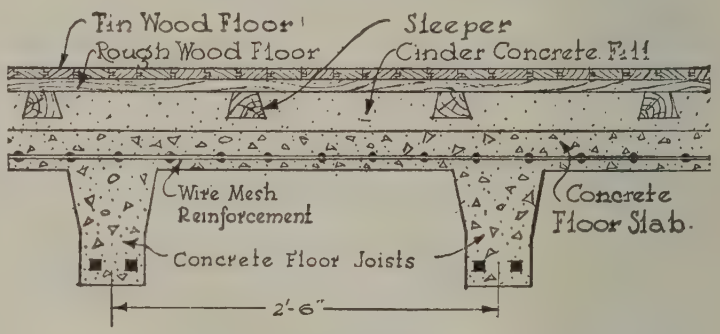
CONSTRUCTION FOR TILED FLOOR IN NEW BUILDINGS



TYPICAL FLOOR CONSTRUCTION WITH CONCRETE BEAMS.

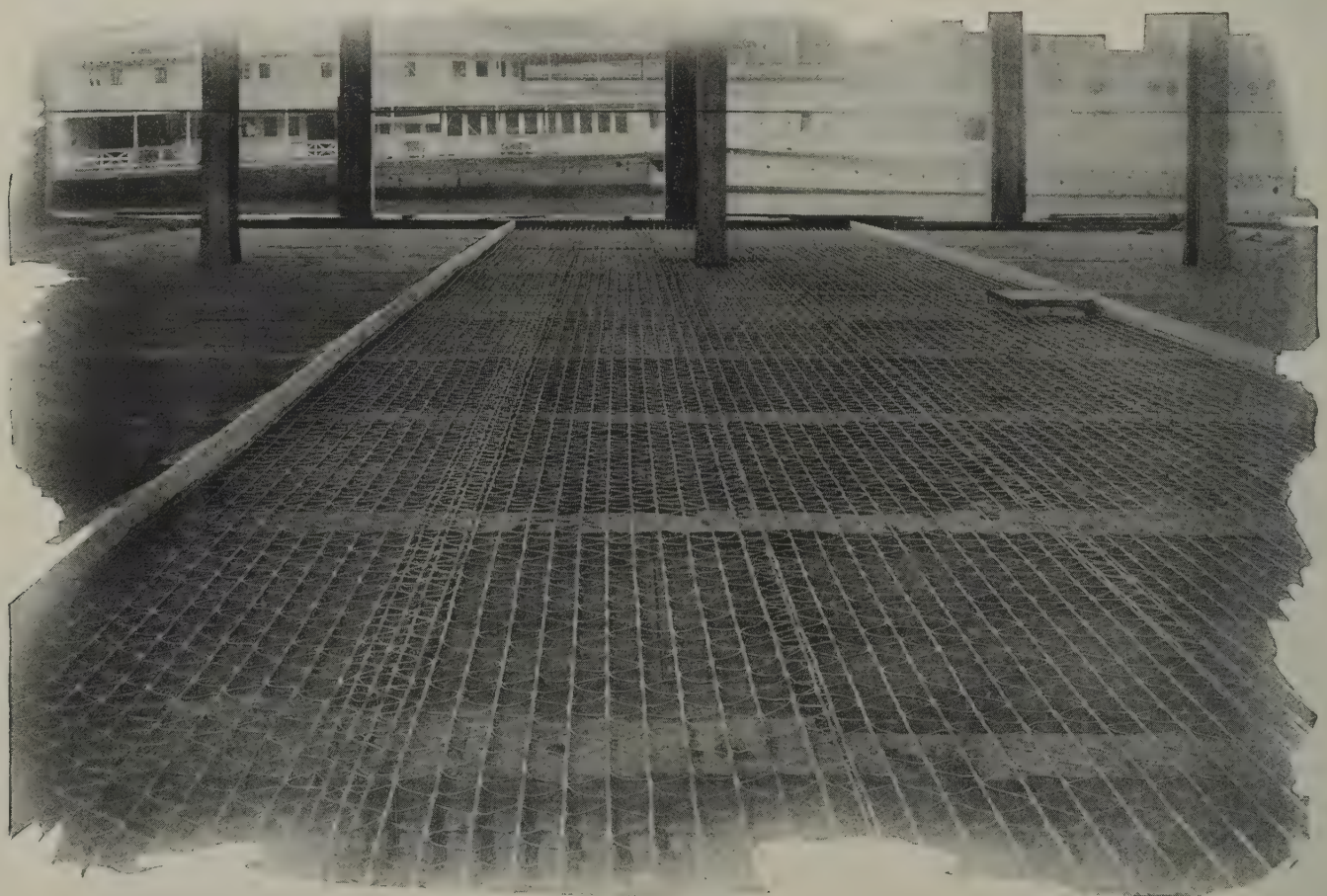


TYPICAL FLOOR CONSTRUCTION STEEL BEAMS FIREPROOFED.



TYPICAL FLOOR CONSTRUCTION WITH CONCRETE FLOOR JOISTS.

Triangle Mesh and Electrically Welded Fabric Used for Reinforcement of Concrete Floor Construction



Pier 42, North River, New York, N. Y., 56,000 Square Feet Triangle Mesh Reinforcement Used
Note the large area of reinforcement with its heavy stranded longitudinals. Excellent results obtained with minimum installation cost

BARTON STEEL CO.

(BARTON SPIDER-WEB SYSTEM, INC.)

Manufacturers of the Bar-Ton-Bar, a Reinforcing Bar; Angles, Bars, Flats and Shapes; Barton Pans, Barton Jumbo Pans; Concrete Reinforcing Accessories and Metal Lath

TELEPHONES
LAFAYETTE 4142, 4143, 4144

3426 Kedzie Avenue, CHICAGO, ILL.

Introducing Our New Billet and Rail Steel Mill

Products

CONCRETE REINFORCEMENT: Round and Square Bars and Collapsible Column Spirals.

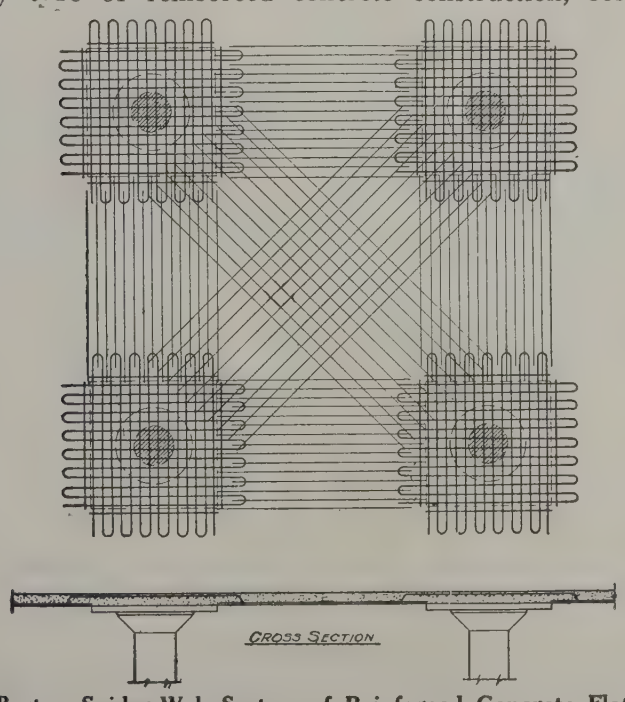
CONCRETE REINFORCEMENT DEVICES and ACCESSORIES: Combination High and Screed Chairs, Bar Chairs, Slab Bar Spacers, Joist Bar Spacers, Beam Bar Spacers, Concrete-to-brick Anchors, Concrete Inserts, Continuous Collapsible Stirrups; BARTON PAN (with integral lath) and BARTON LONG SPAN METAL LATH.

BARTON NAILING STRIP, a Combination Nailing Strip, Sleeper Anchor and Floor Screed.

Concrete Engineering Service

BARTON STEEL CO. is the owner of U. S. Patents No. 1,335,780 and 1,217,645 covering the broad use of combination and two and four-way belts of rods in reinforced concrete flat slab construction and permits only its authorized licensees to incorporate this system in their designs. Infringers will be prosecuted.

We also furnish complete engineering services for any type of reinforced concrete construction, for a nominal fee, whether or not the Barton Spider-Web System is used.



Barton Spider-Web System of Reinforced Concrete Flat Slab Construction

Barton Spider-Web System of Reinforced Concrete Flat Slab Construction

The combination of two-way and four-way belts of rods in reinforced concrete flat slab construction covered by the above mentioned patents is altogether distinctive.

We license architects and engineers to employ the Barton Spider-Web System in plans for a very nominal fee. We do not license contractors or material dealers. Correspondence invited.

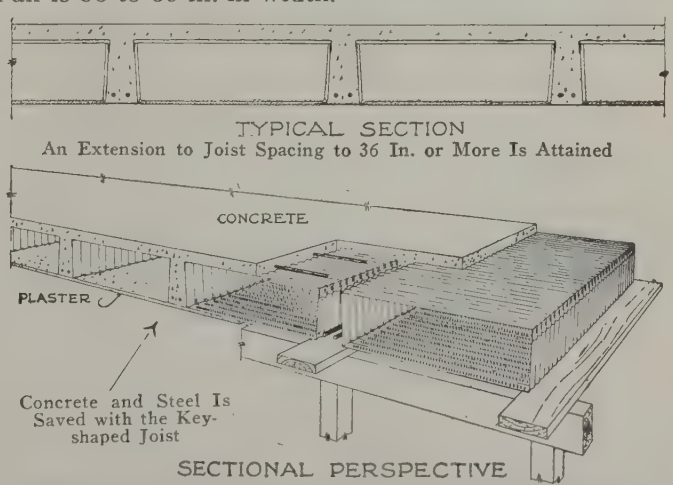
Description—The illustration shows the method of placing the reinforcing steel in the Barton Mat or Type A system. Factory-fabricated units (or mats) consist of continuous looped bars with ends bent down so as to regulate the exact height of the unit and to act as spacers for the lower bars. One such unit or mat is placed in each direction over the column head to take care of the negative stresses. Positive stresses at the center of span are taken care of by belts of rods extending from column to column, both directly and diagonally, covering the entire panel area and resting near bottom of slab. These rods are short and easy to handle.

Advantages—Insures maximum economy of design because it makes possible larger effective depths in the slab.

The Barton Spider-Web System results in a flat, level ceiling without the use of beams or girders. This permits light to be diffused over the entire ceiling and allows sprinkler heads to be economically spaced so as to save up to 25% of the cost of the sprinkler equipment. Trolley beams can be placed flat against the ceiling instead of being hung on beams and hangers.

Barton Pan and Barton Jumbo Pan for Reinforced Concrete Joist Construction

Barton Pan is 10 to 36 in. in width. Barton Jumbo Pan is 36 to 60 in. in width.



Barton Plan for Reinforced Concrete Joist Construction

Continued on next page

The Barton Pan combines joist, ceiling and floor construction. The bottom of the pan is formed into metal lath, the heaviest on the market, dipped after being punched and has special claws for holding plaster besides ordinary perforations. The Barton Pan is properly set—not inverted—instantly ready for plastering and floor finishing.

Advantages—Simple in erection, easy and time-saving in handling; insures stiffness and rigidity. Top easily removable for installing pipes, conduits, boxes and anchorage means.

No concrete is damaged in removing forms. Joists are always straight, shores can be removed speedily.

Watertight construction insures hard concrete. The Barton Pan saves time, labor and materials. Can be used in rows of any length.

Made from special hard steel sheets, with deep corrugations.

The outstanding feature of the Barton Pan is its reduction of dead load through its key-shaped joist as against the present wedge shape. By this means, the Barton Pan can save 20 to 27% of concrete required by ordinary removable and permanent pan construction and a resulting saving in steel.

Specifications of Pan Construction—The system of concrete floor and roof construction unless otherwise shown on the plans shall be a combination of concrete joists with the Barton Pan with integral lath, complete with end panels where required, manufactured by the Barton Steel Co.

All tile to be standard tile where possible, with approximate right angle—Barton Bend—at all angles.

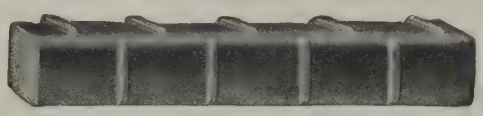
Tile shall lap adjacent tile and shall accurately fit into each other as provided. At the end of each row of tile, where rows join girders or walls, provide Barton End Units, locking same into the last corrugations, not stretched.

The lath formation shall be dipped in a good paint after being manufactured.

The Bar-Ton-Bar

Rolled from new billet stock open hearth steel and conform to the specifications of the Association of American Steel Manufacturers. Made in square and round deformed sections in sizes 3/8 to 1¼ in., the corners of the square bars being rounded to prevent splitting of the concrete.

Furnished cut to length and bent at mill or warehouse. Large stocks for immediate shipment.

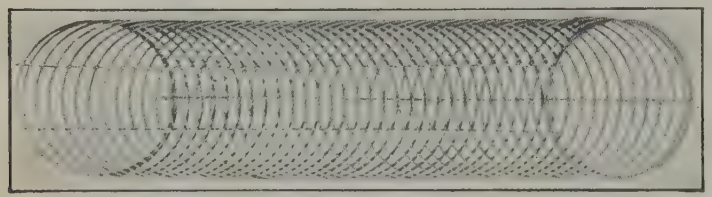


Square Deformed Bar

Round Deformed Bar

BAR-TON-BAR CONCRETE REINFORCEMENT BARS

Size, in.	Area, sq. in.		Weight per ft., lb.	
	Square	Round	Square	Round
3/8	.1420	.1115	.482	.379
1/2	.2525	.1982	.858	.674
5/8	.3945	.3098	1.341	1.054
3/4	.5681	.4462	1.932	1.517
7/8	.7912	.6073	2.629	2.064
1	1.0100	.7932	3.434	2.696
1 1/8	1.2782	1.0039	4.346	3.413
1 1/4	1.5781	1.2394	5.366	4 213



Barton Patented Collapsible Column Spiral

Coiled by machinery of special design (assuring uniformity of diameter) and assembled with the Barton patented link spacer.

Furnished in any length and in diameters of 10 to 38 in., inclusive; pitch, 1 to 4 in. Carried in stock; immediate shipments assured

Barton Continuous Collapsible Stirrups

Shop fabricated and ready for the forms. No individual stirrups, chairs or wire to be misplaced or lost on the job. Being one piece, it is easy to handle and requires little storage space.

Barton Continuous Collapsible Stirrup

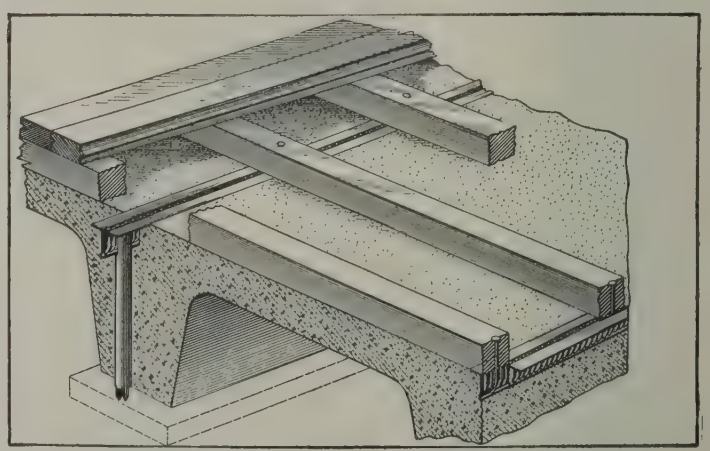
Individual stirrups properly spaced and joined with the Barton patented tie rod become continuous collapsible stirrups. When so connected, the individual stirrups can not shift or change spacing.

At regular intervals, stirrups, specially designed to form legs, are placed. These support the other stirrups and the reinforcing bars at the proper distance from the bottom of the form. Chairs are integral.

Barton Nailing Strip

A combination nailing strip, sleeper anchor and floor screed. This metal strip with its supporting unit (height in accordance with requirements) is simple to install. It is placed immediately after setting the metal forms and reinforcing steel and automatically acts as the screed for the concrete floor slab.

Floor sleepers may be anchored at any spacing desired by nailing to this strip. It may also be used where padding and carpet are placed directly above the concrete as in hotels and office buildings. When placed in joist, beam, wall and column forms, it may be used for the installation of suspended ceilings, metal lath and wall furring and as an anchoring device for various purposes. It makes possible the use of concrete lumber for fireproof partitions and other construction.



Barton Nailing Strip

Barton Combination High and Screed Chairs

Used for accurately locating and holding top reinforcing rods over column heads, over indirect bands in two-way flat slab construction and over beams and girders; also for supporting screeds in connection with floor slabs. Locking prong to hold bars in place, also wire and rail holes. Extra large seating area giving maximum strength. Sizes carried in stock from 3 to 9 in. high.

Continued on next page

Barton Bar Chairs

Furnished in place of the Barton combination high and screed chairs, where the bars over column heads are only 2 or 3 in. in height. Made of strip steel and furnished for exact height as called for on steel plans.

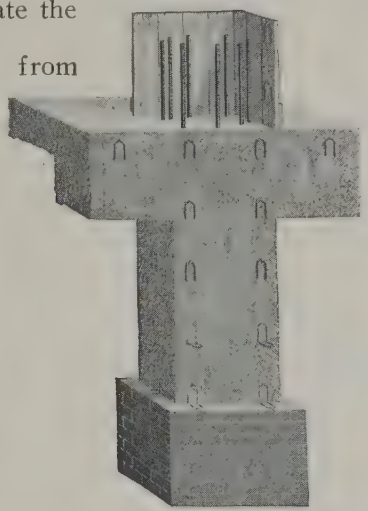
Barton Concrete-to-brick Anchors (Patented)

These devices are used for bonding brick veneer, stone, terra cotta or tile wainscoting to concrete surfaces. They are nailed to the inside of the form and left in place when the latter are removed.

Barton anchors are economical because no expensive drilling through forms is necessary to install them and because they do not mutilate the forms.

Immediate shipments from stock.

Anchor Nailed on Form Preparatory to Pouring of Concrete

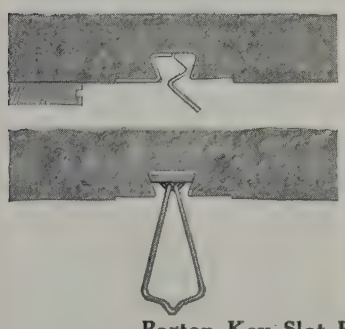


Anchors Left in Place Upon Removal of Forms

Barton Concrete-to-brick Anchors

Barton Key Slot Forms and Anchors (Patents Pending)

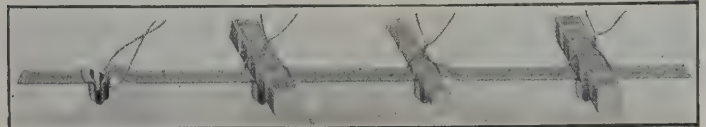
A system of metal forms that are removable from a key-shaped channel in concrete construction. With this system key-shaped anchors are inserted to fasten veneer of terra cotta, face brick, stone or any masonry to concrete after cement forms are removed.



Barton Key Slot Forms and Anchors

Barton Slab Bar Strip Spacer (Patented)

This strip spacer is well known and serves the same purpose as Barton slab bar spacer. It is made up special for each job.



Showing Bars Spaced, Supported and Tied on Barton Slab Bar Spacers

Barton Joist Bar Spacers

Designed to carry either one or two bars and are adaptable to any type of ribbed floor construction. Carried in stock and furnished in any width or height to meet the requirements. Made of strip steel, a combination of strength and durability.

Barton Beam Bar Spacers

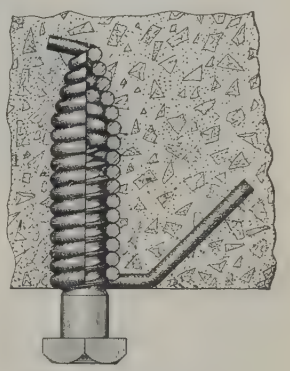
Made from strip steel with a large seating area for each bar. Will not tip. Carried in stock and furnished for exact height and width of beam and number of bars in each layer.

Barton Patented Concrete Inserts

Barton concrete inserts are used in concrete slabs, beams or columns for attaching shaft hangers, pipes, fixtures, sprinkler systems. etc. They are made of special drawn wire and are so coiled that the threads of standard lag bolts will mesh with them.

Their carrying capacity has been demonstrated by many years use and by Robert W. Hunt tests. They are the lowest priced inserts on the market because no unnecessary material is used in their construction.

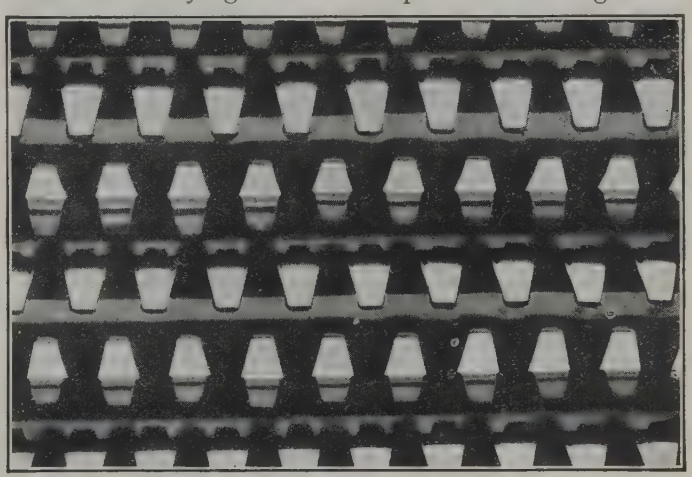
In ½, ⅝ and ¾-in. sizes, with or without lag bolts. Stocked for immediate shipment.



Barton Concrete Insert—Lag Bolt in Place

Barton Long Span Metal Lath

A new style of metal lath. The unique feature is that it is made from steel sheets, with deep corrugations. The sides of the corrugations are punched to form talons or claws lying within the depth of the corrugations.



Barton Long Span Double Lath

The outstanding characteristics of the lath are:

Strength: made from special hard material for ceiling work, it allows a spacing of channel supports of 36 in. or more.

A true surface and minimum thickness of finished plaster work, as the outer surface of the corrugations provides a *rigid* and *perfectly level* troweling surface.

Economy: because the inner or back surface of the corrugations prevents more plaster being forced through than is necessary for a good *key.*

A good key and *a good clinch,* from the formation of the talons or claws between corrugations.

Spanning 36-in. centers, it eliminates intermediate channels and pencil rods, saving this cost and the time and labor cost of their installation.

CONCRETE CLIP & WIRE CO.

Manufacturers of Wire and Flat Steel Products for Building Construction

536-548 East 133rd Street, NEW YORK, N. Y.

Products

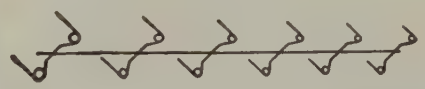
WIRE CLIP REINFORCEMENT for Concrete Fireproofing; HANGERS and HAIRPINS for Suspended Ceiling Construction; REINFORCING BAR CUTTERS and BENDERS; FORM SPACERS; CORNER BEAD; BASE BEAD.

Also Steel and Galvanized Mortar Boxes, Special Tools, Bridle Irons, Wall Ties and Ashlar Anchors.

Wire Clip Reinforcement

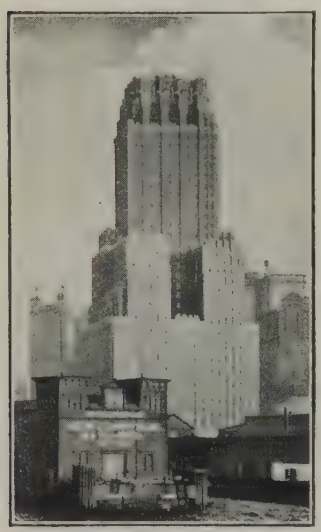
In order to prevent concrete fireproofing from cracking and falling off, wire clips, providing the necessary reinforcements, are attached to the bottom of structural steel members. They are manufactured in several styles and the choice of styles is a matter of personal preference. The Economy Type Clip is approved and used by well known architects as the pictures of installations on these pages indicate. Many years experience has proved to these architects that a clip must be designed with the longitudinal wire up close to the structural member so that concrete with an aggregate will flow easily.

Economy Clips—The Economy Clip (Fig. 52) is made of 12 gauge material. The longitudinal member is 5 ft. long and six clips are electrically welded to it 11½ in. apart. It is important that no air space or pockets be left between the soffit and the structural member. In the Economy Clip the longitudinal wire is not held away from the member where it will impede the flow of concrete but is held close to the underside in order that the soffit can be poured solidly without air pockets. The loops of the clips extend down 1¼ in. under the flange, reinforcing the soffit corners. On wide flanges, it is necessary and advisable to use two longitudinal members. The free ends of the loops bend up over the lower flange and are long enough to take care of all the new sizes of Carnegie and Bethlehem sections. Economy Clips are made to take care of any flange from 3 in. up to the largest girder size. Sizes vary by inches.



Economy Clips Welded to Spacing Wire

Fig. 52. Economy Clip



New York Telephone Company Building, New York, N. Y.
Architect—McKENZIE, VOORHEES & GMELIN
General Contractor—MARC EIDLITZ & SON, INC.
Fireproofing Contractor—SENN HERRICK CORP.

5 East 57th Street Building, New York, N. Y.
Architect—EMERY ROTH
General Contractor—DWIGHT P. ROBINSON CO.
Fireproofing Contractor—KUNTZ FIREPROOFING CORP.

Columbia Presbyterian Medical Center, New York, N. Y.
Architect—JAMES GAMBLE ROGERS
General Contractor—MARC EIDLITZ & SON, INC.
Fireproofing Contractor—A. & G. PIERCE CO.

Fred. F. French Building, New York, N. Y.
Architect—FRED F. FRENCH CO.
General Contractor—FRED F. FRENCH CO.
Fireproofing Contractor—CONCRETE ARCH CO.

Savoy-Plaza Hotel, New York, N. Y.
Architect—McKIM, MEAD & WHITE
General Contractor—GEORGE A. FULLER CO.
Fireproofing Contractor—R. E. CARRICK CO.

Continued on next page

Fig. 51. Master Clip

Fig. 53. Individual Clip

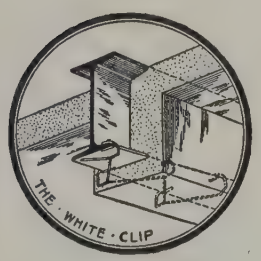
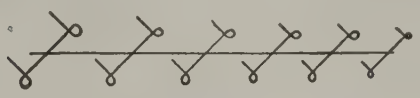


Fig. 54

Master Clips—The Master Clip (Fig. 51) has the loops extending beyond the edges of flange of the structural member, thereby providing the reinforcing loops at the outside corners.

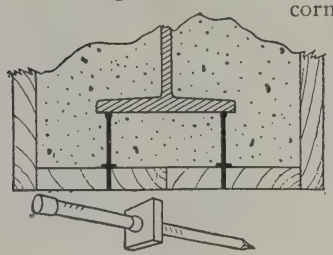


Master Clips Welded to Spacing Wire

Sizes—Both Master and Economy Clips are generally furnished electrically welded, 11½ in. apart, to a longitudinal spacing wire 5 ft. long; and packed 50 lengths (250 ft.) per bundle. This spacing may be varied to meet special conditions.

Wire wall ties, either the Economy type, Master, or the clip shown in Fig. 53 may be furnished individually without being welded to a spacing wire. In this form they are used as concrete and *brick wall ties.*

White Clip—The White Clip (Fig. 54) is furnished in straight lengths and is zigzagged across the beam flange very much like lacing up a shoe. The advantages of this clip are that it grips the flange very tightly, as each clip pulls hard on its neighbors; the flow of concrete is assisted by the diagonal direction of the wires. The clips proper extend beyond the flange reinforcing the corners of the soffit.



Economy Form Spacer

Economy Form Spacers

These are furnished to accurately space forms, giving an equal thickness of fireproofing at all points with a minimum of field labor.

Made in sizes 1½, 1¾, 2, 2½ and 3 in.

Economy Corner Bead—Rail Type

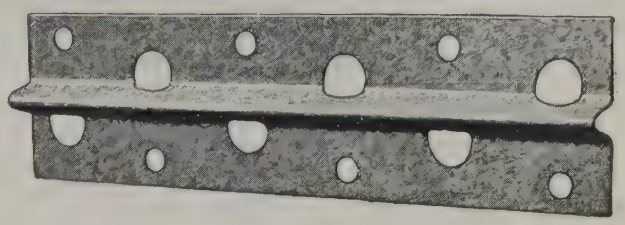
Made from 24 gauge tight coat galvanized sheets (non-rusting).

Stock lengths: 6 ft., 7 ft., 7 ft. 6 in., 8 ft., 8 ft. 6 in., 9 ft., 9 ft. 6 in., 10 ft., 11 ft. 12 ft.

Packed 25 pieces per bundle.
Weight: 150 lb. per 1000 ft.
Clips for nailing furnished—one per foot plus.

Economy Straight Point Base Bead

Made from 24 gauge tight coat galvanized sheets (non-rusting).



Stock length: 10 ft.
Weight: 190 lb. per 1000 ft.
Packed 12 pieces per bundle.

Paramount Building
New York, N. Y.
Architect—C. W. & Geo. L. Rapp
General Contractor—Thompson Starrett Co.
Fireproofing Contractor—Standard Arch Co.

No. 2 Park Avenue Building,
New York, N. Y.
Architect—Buchman & Kahn
General Contractor—Shroder & Koppel, Inc.
Fireproofing Contractor—Kilar Construction Co.

New York Central Building, New York, N. Y.
Architect—Warren & Wetmore
General Contractor—James Stewart & Co., Inc.
Fireproofing Contractor—J. Kresse Co.

CONCRETE STEEL COMPANY

42 Broadway
NEW YORK, N. Y.

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Products

CONCRETE REINFORCEMENT BARS; COLLAPSIBLE COLUMN REINFORCEMENT; CONCRETE REINFORCEMENT DEVICES, including SUPPORTING, SPACING and TYING DEVICES for holding bars in place in forms; WIRE SOFFIT CLIPS; WALL ANCHORS and TIES; CONCRETE INSERTS; CURB BARS; SHEET LATH; EXPANDED METAL LATH (Plain and Self-furring); EXPANDED METAL REINFORCEMENT; RIB LATH; HOT ROLLED and COLD FORMED CHANNELS; CORNER BEADS; BASE BEADS; WIRE DEVICES.

For Havemeyer Truss, see page A664.

Engineering Departments

Experienced and efficient engineering departments are maintained in our district sales offices and will lend every assistance in solving all concrete reinforcement problems.

Havemeyer Concrete Reinforcement Bars

These deformed bars (Figs. 1 and 2) are rolled in square and round sections, with the deformations running longitudinally and entering directly into the tensile strength of the bar, no metal being used for the mechanical bond only. At all points they have constant uniform area of cross section exactly equal to the cross-sectional area of a plain bar of same size. Thus the purchaser secures all the advantages of a deformed bar with the same weight as a plain bar. He does not have to pay extra for the weight of the lugs.

As the projections and depressions are rolled longitudinally, there are no sharp angles to start a fracture when bar is bent. Tests prove the very superior bending qualities of Havemeyer bars.

Specifications for Steel—Havemeyer bars are rolled to any desired standard specification from new billet steel at mills which do not re-roll rails. This eliminates all possibility of substitution of inferior metal.

Shop Bending and Fabricating—Our warehouses are equipped for accurately bending and fabricating bars. This service eliminates a bending gang and bending machines on the job. Our warehouse charges for bending are less than it would cost the contractor if he did the work himself. Furthermore, shop bending assures the architect that every bar is bent accurately.

Fabricated units can be made up in our warehouses by using Havemeyer Beam-Saddles, Bar-Tys, etc., assuring proper spacing and placing of bars.

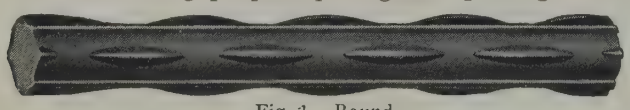


Fig. 1. Round

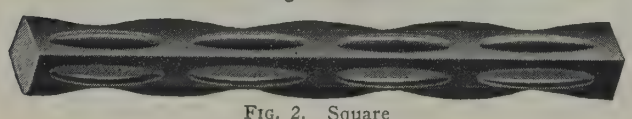


FIG. 2. Square

Havemeyer Concrete Reinforcement Bars

HAVEMEYER CONCRETE REINFORCEMENT BARS
Ten Standardized Sizes Carried in Stock

Size .....in.	1¼ sq.	1⅛ sq.	1 sq.	1 rd.	⅞ rd.	¾ rd.	⅝ rd.	½ sq.	½ rd.	⅜ rd.
Areas ....sq. in.	1.563	1.266	1.000	.785	.601	.442	.307	.250	.196	.110
Wght. per ft..lb.	5.313	4.303	3.400	2.670	2.044	1.502	1.043	.850	.668	.376
Mill extra for size per 100 lb. ...	Base	Base	Base	Base	Base	Base	10c	20c	20c	40c

Havemeyer deformed bars have a uniform area of cross section and the same weight per foot as plain bars.

Above standardized sizes recommended by the War Industry Board and adopted by the American Concrete Institute and by the Distributors of Reinforcing Bars.

Collapsible Column Reinforcement

Havemeyer Collapsible Column Spiral—Wire is accurately coiled to proper diameter and correctly spaced with a rigid spacer. Shipped collapsed, ready to be opened up and placed in the form.

Havemeyer Collapsible Columns — Havemeyer bars used for longitudinal members and for bands, the latter being attached to longitudinal members by Bar-Tys. Shipped collapsed for convenience in shipping and handling. Readily opened and set in place. These can be fabricated in our warehouses or by the contractor on the job. The use of Bar-Tys constitutes the cheapest method of assembling column steel.

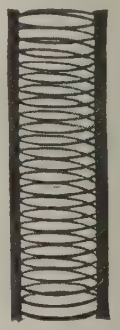


Fig. 3. Collapsible Spiral

Fig. 4. Collapsible Column

Securo Bar-Spacers for Supporting, Spacing and Holding Slab Reinforcing Bars

Made from hoop steel. Locking prongs and legs self-contained. Facilitate inspection—a missing bar is detected by its absence from the chair seat.

Standard height from underside of bar to form, ½, ¾ and 1 in. Minimum spacing between bars, 3 in. Booklet No. A8.

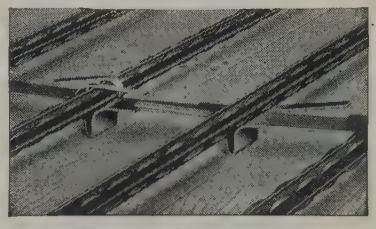


Fig. 5. Bar-Spacer

Havemeyer Bar-Tys for Tying Together Reinforcing Bars at Intersections

Used for tying together bars in walls, bent-up bars to supporting rods in slab, tying stirrups to beam bars, for fabricating columns, etc. More quickly attached than soft wire and much more secure.

Made from high grade spring steel wire in various sizes to accommodate any combination of bars.

Carried in stock.

Booklet No. A4.

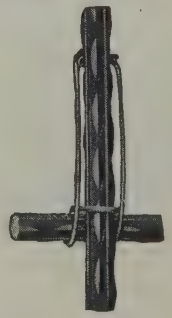


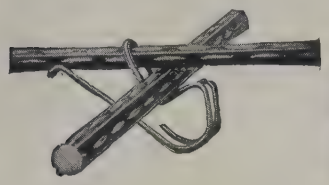
Fig. 6. Bar-Ty

Continued on next page

Havemeyer Ty-Chairs for Tying and Supporting Slab Reinforcing Bars

Quick, simple and economical. Made from high grade spring steel wire.

Standard distance from underside of bar to forms, 1 in.; special, ¾ to 2 in. Made in various sizes to accommodate any combination of bars used. Carried in stock. Booklet No. A4.



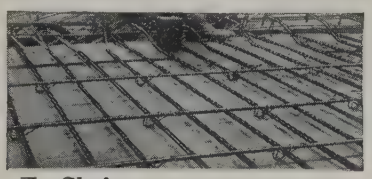


Fig. 7. Ty-Chair

One Ty-Chair used at each intersection on large bars and at every third intersection on small bars

Havemeyer Hy-Chairs for Supporting Head Rods Over Columns and Bent-up Bars in Slabs

Cheaper and better than concrete blocks. Made from pressed steel, beaded for strength and punched with locking prong and nailing holes.

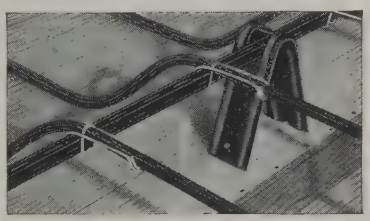


Fig. 8. Hy-Chair

Shipped nested. Easily carried and quickly distributed. Maximum size bar, ¾ in. Range in height from 1½ to 8½ in. Provided with nailing holes to insure retaining position in forms when concrete is poured. Booklet No. A8.

Havemeyer Easel-Chairs for Supporting and Spacing Two Bars in a Joist

Used in terra cotta and steel tile construction. Made from high grade spring steel wire. Spring of locking arm securely holds bars in place. Single easel-chairs support one bar and both arms lock on the bar; double easel-chairs support two bars, one arm locking on one bar and the other arm on the opposite.

Standard distance from underside of bar to forms, 1 in.; special, ¾ to 2 in. Carried in stock. Booklet No. A4.

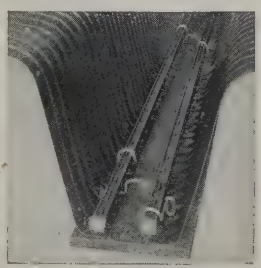


Fig. 9. Easel-Chair

Havemeyer Beam-Saddles and Separators for Supporting, Spacing and Holding Reinforcing Bars in Beams, Girders, Lintels, etc.

Saddles space and support lower layer of bars; separators space and support the upper layer.

Standard height from under side of bar to forms, 1½ and 2 in. Made ½ in. short of beam widths. Standard clear distance between layers, 1 in. Made from hoop steel. Locking prongs hold bars in position. Booklet No. A8.

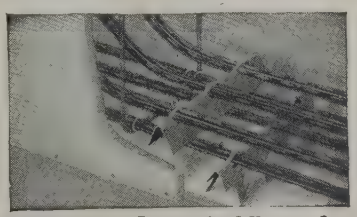


Fig. 10. Beam-Saddle and Separator

Havemeyer Round Nose Curb Bars

Staggered and flared anchors act as reinforcement. Absence of continuous web permits accurate and even bending without kinking. Stocked in 10 and 12-ft. lengths, galvanized. Booklet No. A6.

Fig. 11. Round Nose Curb Bar

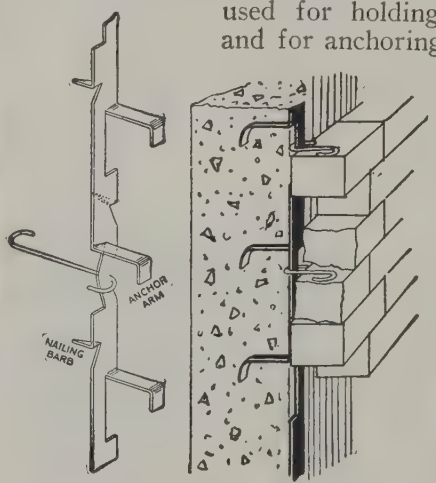
Havemeyer Angle Nose Curb Bars

We also make angle nose curb bars for stair nosings and platform edges. Booklet No. A6.

Security Anchor and Wall-Tys

Used especially for bonding brick veneer, stone, terra-cotta or tile wainscoting to concrete surfaces. Also used for holding metal lath ceilings and for anchoring floor screeds.

Anchor is made from hoop steel; Tys from steel spring wire. Standard length of anchors is 8 ft.



Anchor Showing Nailing Barb, Anchor Arms and S-hooks

Anchor Embedded in Concrete Wall Holding Brick Veneer

Inserting a Wall-Ty Through Loop in Anchor

Fig. 12. Applications of Security Anchor and Wall-Tys

No. 3 No. 5

Fig. 13. Dayton Adjustable-Inserts

Concrete Inserts

Dayton Adjustable-Inserts—Made from highest grade malleable iron, cast in one piece with keyhole slot for adjustment.

No. 3 is for ¼ to ⅞-in. standard bolts; No. 5 for ⅜ to ¾-in. standard bolts, inclusive. Carried in stock. Booklet No. A7.

Havemeyer "Y" Socket-Inserts—Made from highest grade malleable iron. Broad nailing base with four *nailing* holes insures against displacement. Accommodate ⅜ to ¾-in. bolts with standard thread, both inclusive. Carried in stock. Booklet No. A7.

Fig. 14. "Y" Socket-Insert

Havemeyer Slotted-Inserts—Made from high grade pressed steel. Standard lengths, 12, 18, 24, 36 in. Accommodate ½, ⅝ and ¾-in. bolts; ⅞-in. bolt special. Have 6 nailing holes. Closed slot and removable end caps prevent seepage of concrete to inside. Can be used singly, or, with end caps removed, can be placed end to end for a continuous run. Carried in stock. Booklet No. A7.

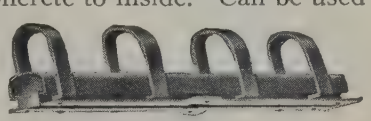


Fig. 15. Slotted-Insert

Continued on next page

Havemeyer Metal Lath

An ideal base for ceilings, walls, partitions and exterior stucco work. A stiff heavy product made of

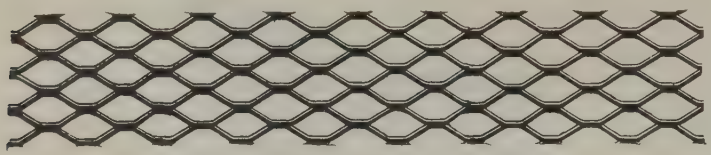


Fig. 16. Havemeyer Flat Lath

steel, plain or galvanized, or of pure iron, especially well suited for overcoating or long spans.

WEIGHTS OF HAVEMEYER LATH

2.2 lb. per sq. yd.	*3.00 lb. per sq. yd.
*2.5 lb. per sq. yd.	*3.40 lb. per sq. yd.

*Asterisk indicates weights that are standard.
All sheets are 24x96 in.; 1⅓ sq. yd. per sheet; 9 sheets per bundle: 16 sq. yd. per bundle.

Flat-Rib Metal Lath

Has reinforcing ribs ½ in. wide, 1¾ in. apart center to center. A rigid, flat, strong lath, permitting wide spacing of studs, joists or channels, saving both labor and material.

Sheets are square and there is no loss in laps. They permit scratching in of the mortar and doubling back from same scaffold, practically two-coat work; a decided economy in both mortar and labor.

Weights per yard: painted, 2.75, 3.0, 3.4 and 4.0 lb.; galvanized, 3.6 lb. Sheets are 24x96 in., 9 sheets to the bundle, covering 16 sq. yds.

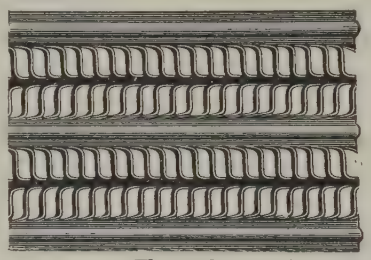


Fig. 17. Flat-Rib Metal Lath

Havemeyer ¾-in. Rib Lath

For roof construction, partitions, floor slabs, outside walls, etc.

Havemeyer Expanded Metal

Sizes with large diamonds are used for reinforcing, especially for culverts, sewers, bridges, tanks, etc. Smaller diamonds for machinery guards, enclosures, railings, lockers, stucco, etc. Furnished in full range of sizes from 3x7 in. to ½x1¾ in.

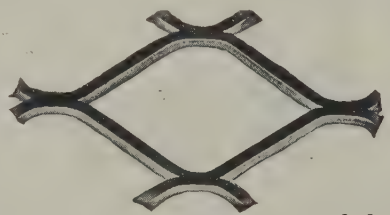


Fig. 18. Havemeyer Expanded Metal

Havemeyer Channels, Angles, Flats

Hot Rolled—Furnished in any size on short notice.

Cold Formed—For suspended ceilings, furring, columns, false beams, cornice work, or for solid or hollow partitions. Stock lengths, 12, 14, 16, 18 and 20 ft.

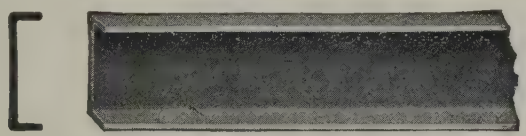


Fig. 19. Havemeyer Cold Formed Channel

STANDARD SIZES HAVEMEYER CHANNELS

Gauge No.	16	16	16	16
Width ....in.	¾	1	1½	2
Flange ....in.	⅜	⅜	⅜	⅜
Weight per 1000 ft....lb.	276	332	456	580

Wire Mesh

A. S. and W. Triangle and Electric Weld; stock or mill shipments.

Havemeyer Corner Beads

Wing Bead—No. 26 gauge special analysis galvanized sheet. Stock lengths, 6, 7, 8, 9, 10 and 12 ft.; 10 pieces to bundle; weight, 200 lb. per 1000 ft.

Curved Point Base Screed—Forms a permanent ground for plastering and secures a sanitary base with precisely true lines. Fabricated from tightcoat galvanized open-hearth sheets. Lengths 10 and 12 ft. Weight 195 lb., crated, per 1000 ft.

Bull Nose Bead—No. 28 gauge galvanized steel, ¾-in. radius. Lengths, 6, 7, 8, 9 and 10 ft.; weight, 245 lb. per 1000 ft. Also furnished No. 26 gauge, 290 lb. per 1000 ft.

Base Bead

For cement base No. 26 gauge galvanized sheets. 12 pieces per bundle; weight, 140 lb. per 1000 ft.

Expansion Corner Beads

Made of tightcoat, galvanized, open-hearth steel. Takes much less time to erect than other types.

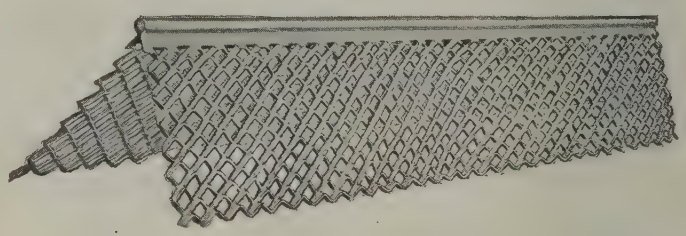


Fig. 20. Expansion Corner Beads

Furnished in 6, 7, 8, 9, 10 and 12-ft. lengths. Weight per 1000 ft., 240 lb.

Also cut from pure copper or zinc for exterior use with stucco.

Expansion Bull Nose Bead

Weight: No. 26 gauge, 375 lb.; No. 24 gauge, 470 lb.

Expansion Trim

Information furnished on request.

Havemeyer ⅜-in. Rib Lath

An exceptionally stiff metal lath—A labor and material saver, therefore a money saver.

Sheets are 24x96 in.; ribs spaced 4.8 in. center to center; ribs ⅜ in. high. Rapid erection results from using a smooth sheet. Economy results from perfect fit of interlocking ribs along sides and ends, from reduced number of fastenings to supports, and from saving in material by spacing supports further apart without sacrificing stiffness of plaster.

Fig. 21. Havemeyer ⅜-in. Rib Lath

MAXIMUM SPANS RIB LATH

Weight lb. per sq. yd.	Ceilings		Partitions	
	Steel furring, in.	Wood joists, in.	Steel studs, in.	Wood Studs, in.
4.0	30	36	36	40
3.4	24	30	30	36
3.0	19	24	24	30
2.75	16	19½	19½	24

Wire Devices

Our wire shops are prepared to manufacture, on short notice, any type of wire device required for the installation of suspended ceilings or for securing lath. Tie wire staples, etc., carried in stock.

THE CONSOLIDATED EXPANDED METAL COMPANIES

Steelcrete Building
WHEELING, W. VA.

BRANCHES

ATLANTA, GA., 232-40 Marietta Street
BOSTON, MASS., 137 Washington Street, Somerville
BUFFALO, N. Y., 50 Wecker Avenue
CHICAGO, ILL., 2531 Arthington Street
CLEVELAND, OHIO, 10706 Quebec Avenue
DETROIT, MICH., Dime Bank Building
NEW YORK, N. Y., 103 Park Avenue
PHILADELPHIA, PA., 1075 Germantown Avenue
PITTSBURGH, PA., Oliver Building
ST. PAUL, MINN., 1429 Marshall Avenue
ST. LOUIS, MO., St. Louis Bank Building & Equipment Co., Ninth and Sidney Streets
FOREIGN SALES OFFICE, 152 West 42nd Street, NEW YORK, N. Y.

Products

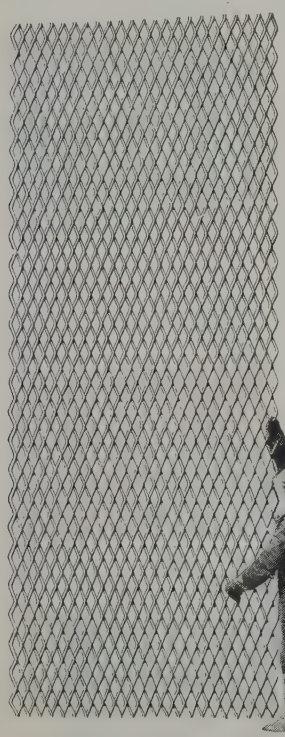
Concrete Reinforcement; Machine Guard Mesh; Materials for Window Guards.

For "Steelcrete" Expanded Metal for the construction of Armored Vaults, see pages A1338-1339; for "Steelcrete" Metal Lath, see page B1693.

Steelcrete Concrete Reinforcement

Steelcrete Concrete Reinforcement is an expanded metal product—*not welded*. It is cold drawn from a solid sheet of steel and has a guaranteed elastic limit 60% higher than commercial medium steel. It costs less "in place" than materials having considerably lower reinforcing values.

The reinforcing efficiency of Steelcrete Mesh has been tested time and time again. The Holland Vehicular Tunnel is a splendid example. This great "driveway" under the Hudson River is reinforced below water entirely with Steelcrete.



Steelcrete Concrete Reinforcement comes in large flat sheets which are easily placed. It is adaptable to various shapes of construction, being supplied in weights which are especially suitable for floors, tunnels, tanks, culverts, retaining walls, conduits and sewers.

Concrete Floors Laid on the Ground

In the construction of the Quartermaster's Terminal and Arsenals, Edgewood, Md., over a *million* square feet of floors were laid using Steelcrete Reinforcing Mesh.

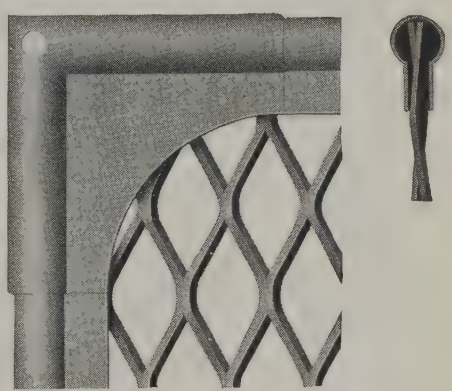
Steelcrete Reinforced Concrete Floor Slabs are a definite source of economy both in original cost and last cost. Wherever concrete floors are to be laid, it is good business to specify Steelcrete.

Steelcrete Frame Bar and Accessories for Framing Steelcrete Diamond Mesh

Steelcrete Diamond Mesh Fabric, Underwriter's Inspected, in small size diamond meshes suitable for window guards and shop partitions, is obtainable in large flat sheets.

This Company also produces a heavy tube shaped section known as Steelcrete Frame Bar, which is suitable for framing Steelcrete Mesh, making a strong, attractive panel frame; also accessories for joining frame bar at corners; other accessories for quickly attaching the guards to the building structure. All are illustrated in "Steelcrete Industrial Mesh Hand Book." Materials are furnished either plain or galvanized as required.

The Consolidated Expanded Metal Companies furnish materials only. Finished guards can be obtained through a hundred or more authorized guard contractors conveniently located throughout the United States. Name of the nearest contractor making this type of window guard furnished on request. Let us send a complete set of specifications, and sample of Steelcrete to your desk for inspection.



Materials

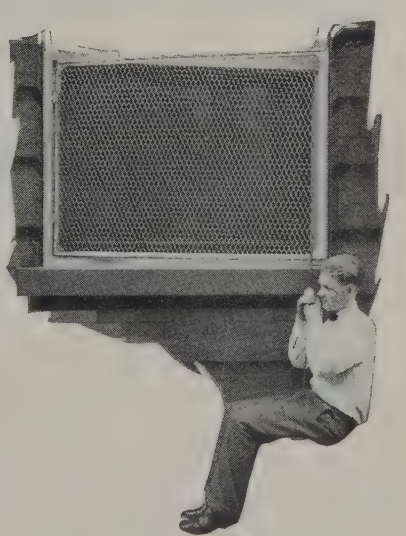
Underwriters' Steelcrete and Steelcrete accessories are obtainable from our nearest branch warehouse. Send for catalogue. State whether you are interested in finished guards or materials for making same.

Booklets

"Steelcrete Industrial Mesh Hand Book"—Complete data on Steelcrete and accessories for industrial uses including window guards and machine guards.

"Steelcrete Frame Bar Catalogue"—Complete information including specifications on frame bar window guards for those interested in finished guards only.

"Time Tested Products" — General catalogue.



FOUNDED 1850

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

Jones & Laughlin Building, PITTSBURGH, PA.

DISTRICT SALES OFFICES

BOSTON, MASS., 131 State Street
Telephone, Hubbard 5151
BUFFALO, N. Y., White Building
Telephone, Seneca 0268
CHICAGO, ILL., 111 W. Washington Street
Telephone, Franklin 2522
CINCINNATI, OHIO, Union Trust Co. Building
Telephone, Main 2324
CLEVELAND, OHIO, Union Trust Building
Telephone, Main 7866
DALLAS, TEXAS, Construction Industries Building
Telephones, 2-6810, L.D.700
DENVER, COLO., First National Bank Building
Telephone, Main 2449
DETROIT, MICH., Penobscot Building
Telephone, Randolph 4912
ERIE, PA., Erie Trust Building
Telephone, C54146
LOS ANGELES, CAL., Spring Arcade Building
Telephone, Van Dyke 4454
MEMPHIS, TENN., 1 Auction Street
Telephone, 64836
MILWAUKEE, WIS., First National Bank Building
Telephone, Broadway 4418
MINNEAPOLIS, MINN., Plymouth Building
Telephone, Atlantic 5048
NEW YORK, N. Y., 165 Broadway
Telephone, Cortlandt 7513
PHILADELPHIA, PA., Commercial Trust Building
Telephone, Rittenhouse 0750
PITTSBURGH, PA., Jones & Laughlin Building
Telephone, Court 3240
ST. LOUIS, MO., Boatmen's Bank Building
Telephone, Garfield 4075
SAN FRANCISCO, CAL., Standard Oil Building
Telephone, Douglas 1776
WASHINGTON, D. C., Woodward Building
Telephone, Main 2293

WAREHOUSES

CHICAGO, ILL.—Telephone, Virginia 1600
MEMPHIS, TENN.—Telephone, 64836
CINCINNATI, OHIO—Telephone, Main 2324
PITTSBURGH, PA.—Telephone, Hemlock 1000

Products

J & L Bars for Concrete Reinforcement.

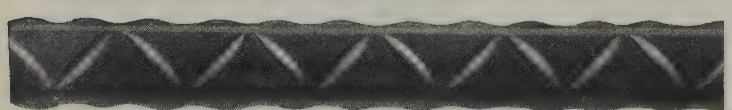
Also J & L Structural Shapes and Fabricated Structural Work, Columns, Girders, Trusses, Plate Work, Tanks, Mill and Factory Buildings; J & L Steel Piling; J & L Wire Products.

For J & L Junior Beams, see pages A667-669; for J & L Light Weight Channels for Stair Stringers and Other Uses, see page A739; for J & L Tubular Products, see pages C2720-2721.

Description—Concrete Reinforcement Bars

J & L Diamond Bars are rolled from new billet steel and are tested to standard specifications. Each has uniform cross section, without offset, carrying the stresses evenly. Ribs are clean cut and accurate, balancing each other in two opposite spirals. The ribs run at angles of 45°, giving maximum areas to resist slipping. There are no sharp edges or corners, thereby assuring intimate and thorough contact with the concrete. Sizes are easily identified, round sections for the standard round equivalents. gothic sections for the standard square equivalents.

& L Round Equivalent Deformed



J & L Square Equivalent Deformed

STANDARD SIZES

Size, in.	Area, sq. in.	Weight per ft.
* ¼ round	.049	.167
⅜ round	.110	.376
½ round	.196	.668
½ square	.250	.850
⅝ round	.307	1.043
¾ round	.442	1.502
⅞ round	.601	2.044
1 round	.785	2.670
1 square	1.000	3.400
1⅛ square	1.266	4.303
1¼ square	1.563	5.313

*Furnished in plain round.

Column Spirals

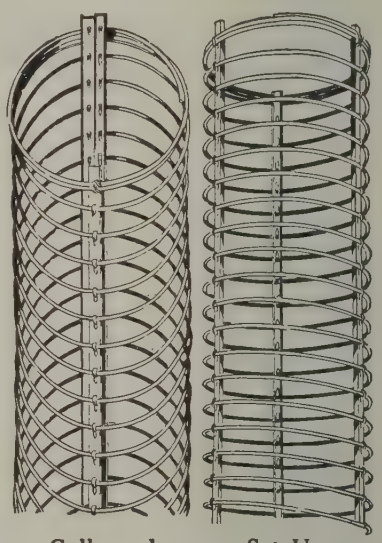
Spirals are fabricated with two or more channel spacers as desired. This permits the spirals to be shipped collapsed ready to set in forms.

A complete stock of standard sizes is carried in both hot rolled and cold drawn wire.

Quick shipment assured.

STANDARD SIZES SPIRAL WIRE

Size, in., plain round	Area, sq. in.	Wt., per ft., lb.
¼	.049	.167
⅜	.110	.376
½	.196	.668
⅝	.307	1.043



Collapsed Set Up

Warehouse Service

We carry large stocks of reinforcing bars, so that unusual requirements, as well as those of ordinary nature, are taken care of promptly.

We are in a position to cut and bend bars in accordance with bar lists and bending details as submitted.

Bar Bending Bay, J & L Concrete Reinforcement Bar Warehouse, Pittsburgh, Pa.

KALMAN STEEL COMPANY

Manufacturers of Concrete Reinforcement Products

CHICAGO, ILL.

ATLANTA, GA. CHARLOTTE, N. C. DETROIT, MICH. MINNEAPOLIS, MINN. PHILADELPHIA, PA.
BALTIMORE, MD. CHICAGO, ILL. HOUSTON, TEX. NEW YORK, N. Y. PITTSBURGH, PA.
BOSTON, MASS. COLUMBUS, OHIO KANSAS CITY, MO. NEWARK, N. J. ST. PAUL, MINN.
BUFFALO, N. Y. DAYTON, OHIO MILWAUKEE, WIS. NILES, OHIO SYRACUSE, N. Y.
WASHINGTON, D. C. YOUNGSTOWN, OHIO

EXPORT OFFICE: NEW YORK, N. Y.

Products

CORRUGATED BARS for concrete reinforcement; complete line of CONCRETE ACCESSORIES including SPACERS, CHAIRS, INSERTS, SLEEPER ANCHORS; STEEL TILE: COLUMN FORMS and SPIRALS, WIRE FABRIC.

Also other related products.

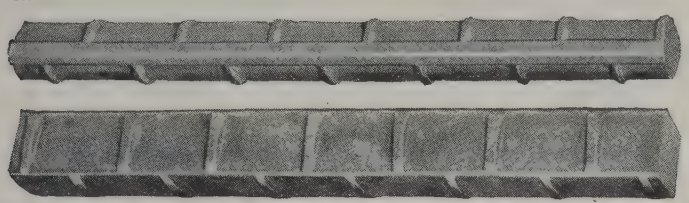
For Steel Joists and Accessories, see page A670; for Steel Buck and Bead, see page A1063; for Metal Lath and Lathing Products, see pages B1698-1699.

Corrugated Bars

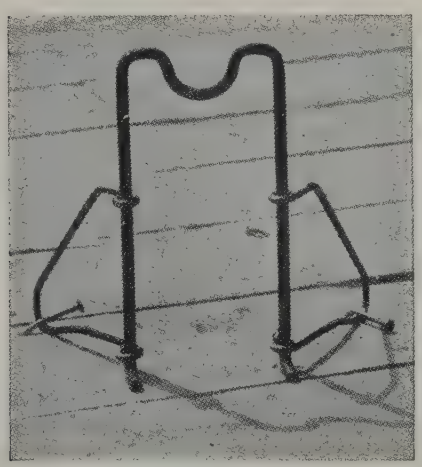
Deformed bars of highest grade steel, rolled from new billets, exclusively, in square and round sections in accordance with the following schedule:

STANDARD SIZES CORRUGATED BARS

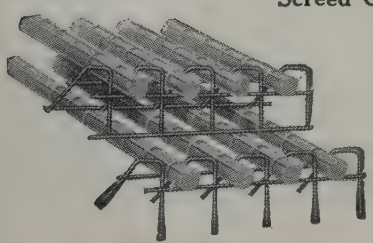
Round			Square		
Size, in.	Net area, sq. in.	Weight per ft., lb.	Size, in.	Net area, sq. in.	Weight per ft. lb.
⅜	.11	.38	½	.25	.86
½	.19	.66	1	1.00	3.43
⅝	.30	1.05	1⅛	1.26	4.34
¾	.44	1.52	1¼	1.55	5.35
⅞	.60	2.06			
1	.78	2.69			



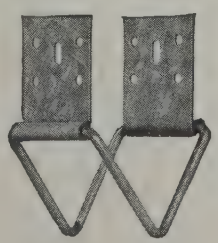
Round and Square Corrugated Bars



Screed Chair



Beam Chairs



Sleeper Anchor

Removable Tile

Kalman Removable Steel Tile are used in forming reinforced concrete ribbed slabs in buildings. Because of the large investment involved, the tile are leased instead of sold to the contractor and are erected by our field organization, the Corr Service Erection Co.

Kalman Removable Steel Tile actually save time, labor, and money. The tile are kept in perfect condition, cleaned, and re-formed after every job. Complete information can be had on request.

Column Forms

Adjustable metal forms strongly and simply made. They produce true round columns with accurate and graceful profiles where the flared head merges with the shaft. Kalman Column Forms are furnished to contractors on a lease and erection basis.

Column Form

Bar Supports and Spacers

Kalman offers a complete line of bar supports and spacers to aid in the accurate and economical setting of reinforcing steel. These products include the new Kalman High Chair (for use with either tees or bars), beam chairs, rib chairs, bar chairs, beam bolsters, bar clips, and several types of slab spacers.

The New Kalman Slab Spacer (Clip Type)

This spacer above is representative of the efficiency for which Kalman accessories are designed. The legs of the spacer are spaced exactly as specified. On each leg is a strong wire spring clamp. The steel setter drops the bar over each leg—stepping on each bar as they go—with the result that the bar is automatically forced into the spring clamp and locked against movement in any direction. Such efficiency means new setting speed, new spacing accuracy, and new low costs.

Other Products

In addition to the line of bar supports and spacers, Kalman offers the new screed chair, adjustable and hanger inserts, and sleeper anchors. Write for bulletins on these various products.

Engineering Service

Expert engineering service is one of the most valuable features of the KALMAN STEEL COMPANY Service. At all district sales offices expert help is available on matters of estimate, design, and detail of reinforced concrete structures of all types, together with reliable advice concerning the use and purposes of all Kalman products.

MITCHELL-TAPPEN COMPANY

Standardized Metal Caging ("SMC")

15 John Street, NEW YORK, N. Y.

REPRESENTATIVES

AKRON, OHIO, Hardware & Supply Co., 475 So. High Street
BALTIMORE, MD., J. Bayward Emblck, 813 American Building
BOSTON, MASS., Robert B. Campbell, 49 Ellery Street
CHICAGO, ILL., Quality Building Products Co., 660 Builders Building
DETROIT, MICH., E. W. Nicklin Co., General Motors Building
GREENVILLE, S. C., R. P. Sweeny Co.
MIAMI, FLA., Brandt-Smith Co., 415 Miami Bank & Trust Building
MONTREAL, QUE., C. G. Porter & Co., 503 New Berks Building
SAN FRANCISCO, CALIF., Badt-Falk & Co., 346 Calle Building
PITTSBURGH, PA., Pittsburgh Building Specialties Co., Jones Law Building
TORONTO, ONT., H. A. J. Aldington, 43 Adelaide Street, W.
UTICA, N. Y., H. H. Frey, 1612 Holland Avenue

Standardized Metal Caging (Pat. Dec. 15, 1914)

"SMC," for fireproofing steel structures. A wire basket or cage (see illustration) which firmly grips beam flange extending below and beyond flange, permanently locking concrete protection to steel, thereby providing a continuous strengthening skeleton at a *pre-determined or fixed offset distance from the flange.*

Application of Standardized Metal Casing

End wire of section is caught over end of beam, and workman easily holds and pulls out section, which automatically locks to the structural member. Stretch out after applying

"SMC" cannot "bunch"; it pulls out like a camera bellows, maintaining equal spacing of about 5 in. under middle of beam. It clasps flange tightly at edges leaving a clear space for flow of concrete under flange. When used on girders, columns or deep beams, additional wires of special shape (see HS below) may be used to reinforce the side protection or haunches.

Exclusive features shown in illustration. "SMC" comes to job ready to use and can be easily applied by inexperienced labor.

"SMC" is shipped in collapsed sections about 4 ft. long, each containing 250 clamps, and is easy and inexpensive to handle. Such a section of size A, B, or C when pulled out, is sufficient to cover about 120 ft. of beam flange; 30 pieces of substitute material 4 ft. long or 120 pieces 1 ft. long would have to be handled for the same length of beam, and then would only provide a more or less unsatisfactory substitute.

SIZES OF "SMC" FOR COLUMNS

S. M. C. No.	Size of jaw opening	Width of flange	H Columns Caging for both flanges	Clamps per 100 lin. ft.
A	7⅜"x⅝"	4" – 5" 6" – 6½"	4", 5" 6", 8" H 23.5 to 34.5 lb.	400 450
B	10¼"x ⅞"	8" – 8¼"	10" 33.5 to 47.5 lb. 12" 40.5 to 55 lb. 14" 43 to 58.5 lb. 8" 32 to 62.5 lb.	440
B-1	10¼"x1 1/16"	8¼"– 8½"	8" 67.5 to 91 lb.	450
C	13" x ⅞"	10" –10⅛"	10" 49.5 to 77.5 lb. 12" 52.5 to 70 lb. 14" 55 to 73.5 lb.	420
C-1	13" x1½"	10⅛"–10¾"	10" 83.5 to 136.5 lb.	420
11	14⅝"x1⅛"	12" –12¼"	12" 65.5 to 119.5 lb. 14" 69 to 90 lb.	610
11-2	14⅝"x1¾"	12¼"–12¾"	12" 126.5 to 190 lb.	624
12	16⅜"x1⅛"	13¾"–14⅝"	14" 84 to 139 lb.	610
12-2	16⅜"x1⅞"	14¼"–14⅝"	14" 147 to 228.5 lb.	650
12-3	16⅜"x2¼"	14⅝"–15"	14" 237 to 288.5 lb.	702

Channel Material

5¼"x⅝"	1.92"	6" channel, H. S. size 14"	277
	2.09"	7" channel, H. S. size 14"	286
Can be used on all channels	2.26"	8" channel, H. S. size 14"	294
	2.43"	9" channel, H. S. size 14"	303
	2.60"	10" channel, H. S. size 18"	313
	2.94"	12" channel, H. S. size 18"	329
	3.40"	15" channel, H. S. size 21"	333

Note: On large beams use one haunch stiffener with each clamp. On large columns use one haunch with each two clamps.
All sizes in stock.

SIZES OF "SMC" FOR BEAMS

S.M.C. No.	Size of jaw opening	Width of beam flange	For Use on Standard Beams	For Use on Carnegie Beams	For Use on Bethlehem Beams and Girders	Clamps per 100 lin. ft.
A	7⅜"x⅝" Use on flanges up to 6⅛" x ⅝" thick	3 "– 3½" 3½"– 4 " 4 "– 4½" 4½"– 5 " 5 "– 5½" 5½"– 6 " 6 "– 6¼"	4" 5" 6" 7" 15.3–17.5–20 lb. 8" 18.4–20.5–23–25 lb. 9" 21.8–25 lb. 9" 30–35 lb. 10" 22.4–25.4–30–35–40 12" 27.9–31.8–35–40.8–50 lb. 12" 60 lb. 15" 37.8–42.9–45–50–55 lb 15" 60.8–75. 18" 46–48.2–55–60–65–70	4" 13.8 lb. 5" 18.9 lb. 8" 18–21 lb. 9" 21–25 lb. 6" 20–22.5–27.5. 9" 21. 10" 23–30. 15" 35 16" 38 lb.	8" B 17.5–19.5. 9" B 20.5–24 lb. 10" B 23.5–28.5 lb.	182 190 200 206 214 222 235
B	10¼"x⅞" Use on flanges from 6" to 9" wide x 1 1/16" thick	6⅛"– 6½" 6½"– 7 " 7 "– 7½" 7½"– 8 " 8 "– 8½" 8½"– 9 "	15" 70–81.3 lb. 18" 48.2–70. 20" 65.4–75 21" 57.5–60.4 lb. 18" 75–80–85–90 lb. 20" 81.4–100 lb. 24" 69.5–75–79.9–85–90–95–100 lb. 24" 105.9–110–115 lb. 27" 83 lb. 21" 60.4 lb. 24" 74.2 lb. 27" 90 lb. 2–8s" 25.5 lb	9" 29–32–35 lb. 11" 25 lb. 13" 30 lb. 8" 24–27–30 lb. 12" 28–32–34–36. 14" 33–42 lb. 16" 40–43–45–50 lb. 18" 47–51–52–58 lb. 8" 31–60. 10" 31–42. 12" 40–50. 14" 48–58 16" 58–63–68. 21" 58–60–64–70 lb. 24" 70 9" 38–43–48 lb. 18" 67–72–78 lb.	12" B 28.5–48.5 lb. 15" B 38.5–41–46 lb. 15" B 54.5–64–71.5 lb. 18" B 49–52–54.5–59 lb. 20" B 59.5–64.5–69. 8" BG 31–37 9" BG 36–38.5 lb. 18" B 64.5–69–74 lb. 20" B 73–82 22" B 58–73. 24" B 73.5–84.5 9" BG 36–43.5 lb. 10" BG 41.5–50	190 200 206 214 222 235
B-1	10¼"x1 1/16"	8 "– 9 "		9" 66–72–78–84–90 lb. 21" 92 lb.		235
C	13"x⅞" Use on flanges 9 to 11¾" x 1/16" thick	9 "–10 " 10 "–10½" 10½"–11 " 11 "–11½" 11½"–11¾"	2– 9s" 21.8–25–30 lb. 2– 9s" 35 lb. 2–10s" 25.4 lb. 2–10s" 30–40 lb. 2–12s" 31.8–35–40.8–45 lb. 2–12s" 50–55 lb.	10" 49–56–63. 21" 80. 24" 76–94. 27" 91–101 10" 70–77–84 lb. 12" 75–83–91. 14" 61–68–75 lb. 10" 92 lb. 12" 100 lb.	24" B 84.5–104.5. 26" B 91 lb. 28" B 112. 12" BG 51.5–76.5 lb. 30" B 121. 15" BG 69–74–80.5 lb. 2–9s" B 20.5. 15" BG 94–105–111 18" BG 80–99. 16" BG 74.5–94	200 206 215 222 235
CS	13"x1⅛"	9½"–11 "		27" 112 lb. 30" 115–125–135 lb.		215
11	14⅝"x1⅛" Flanges 11¾" to 13⅜" wide up to 1 1/16" thick	11¾"–12¼" 12¼"–12½" 12½"–12¾" 12¾"–13 " 13 "–13⅜"	2–15s" 42.9–55 lb. 2–15s" 60 lb. 2–18s" 55 lb. 2–15s" 2–20s" 65.4–70. 2–18s" 60–75	10" 100–108 lb. 12" 110–120. 14" 85–95–105 lb. 16" 76–90. 18" 86–93–100. 24" 100–110–120 lb. 10" 116 lb. 10" 124 lb. 12" 130–140 lb. 10" 132 lb. 21" 104–112–120 lb. 10" 140 lb.	15" BG 135–147. 36" B 147–173 20" BG 107–120. 2–20s" B 23.5 lb. 24" BG 107–128. 2–12" B 28.5 lb. 20" BG 135–149 lb. 2–12s" B 36.5. 24" BG 132–148 lb.	305 212 325 340 364
12	16⅜"x1⅛" Flanges 13½" to 15¼" wide up to 1 1/16" thick	13½"–13¾" 13¾"–14¼" 14¼"–14¾" 14¾"–15¼"	2–20s" 75 lb. 2–20s" 81.4–85–90 lb. 2–18s" 2–20s" 95–100. 2–24s"	14" 115–125–135 lb. 16" 100–107–115 lb. 24" 130–160. 27" 145–160 lb.	26" BG 144–160. 2–15s" B 38.5 lb. 28" BG 145–175 lb. 2–15s" B 54.5 lb. 30" BG 180–200 lb.	302 312 340 370
12-1	16½"x1 1/16"	13¾"–14¼" 14¼"–14½" 14½"–14¾"		12" 150 lb. 27" 175–190. 30" 180–200–220–240 12" 160 lb. 12" 170–180 lb.	Note: "S" after size indicates special.	312 325 340
12-2	16½"x1 1/16"	14 "–14¼" 14¼"–14½" 14¾"–15 "		12" 190 lb. 12" 200–210 lb. 12" 220–230 lb.		312 325 355
13 S	18¼"x1 1/16" 18¼"x1 1/16" 18¼"x2 1/16"	15¼"–15½" 15½"–15¾" 15¾"–16 "		14" 131–145–155–165 lb. 15" 175–185–195 lb. 15" 205–215–225–235 lb. 16" 245–255 lb. 16" 265–275–285–295–305 lb.	33" BG 202–230. 36" BG 231–260	312 312 312

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Concrete Reinforcements and Forms

EXECUTIVE OFFICES AND PLANT

YOUNGSTOWN, OHIO

For Branch Offices, see Local Telephone Directory

Products

REINFORCING STEEL, KAHN TRUSSED BARS; RIB BARS; COLUMN HOOPING; STEEL FLORETYLES; CONCRETE INSERTS.

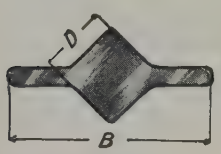
Also Curb Bars; Contraction Joints; Steel Road Forms; Welded Steel Fabric.

For other Truscon Products, see pages in this edition as follows:

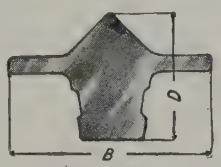
Steel Roof Decks, page A213.
Steel Joists, page A674.
Steel Doors, pages A986-987.
Steel Windows, pages A1299-1303.
Metal Lath, pages B1704-1705.

Kahn Trussed Bars

Open hearth steel, concrete beam, girder, floor and arch reinforcement. Unit bars with 45° rigid diagonals formed from flanges on the main body producing 12 to 30% stronger beams than loose stirrups; save steel in design and labor in installation; increases safety, fireproofness and shockproofness.



Section Kahn Trussed Bar



Section Kahn Trussed Bar

Rib Bars

Carried in stock in warehouses in various cities, furnished straight or bent as ordered.

Square Rib Bar

Round Rib Bar

Truscon Collapsible Column Hooping

Shipped in the form of flat, circular coils of exact diameter and accurately spaced by means of special spacers. Coils spring automatically into complete hooped column on cutting the fastening wires. Rib bars are ordinarily used as vertical reinforcement in conjunction with column hooping.

Diameter of coils: 9 to 36 in. Pitch: 1½, 2, 2½, and 3 in.

Truscon Floretyle Construction

Truscon Floretyle construction consists of rows of specially formed steel Floretyles separated by reinforced concrete joists and covered with a thin layer of concrete.

Ribbed Floretyles—Are manufactured in powerful presses operated with multiple dies which insure accuracy and uniformity. Deep stiffening ribs across the top give exceptional rigidity. Rib adjacent to one end is omitted, to readily obtain adjustment in the length of the row. The corrugated sides, rounded corners and corrugated flanges along the bottom edge add to the stiffness and prevent deformation.

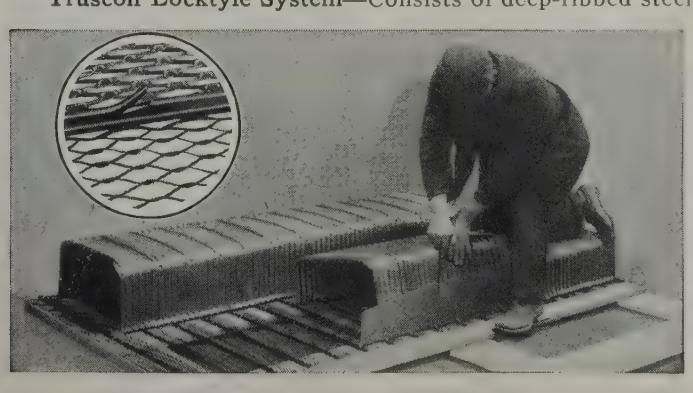
Truscon Locktyle System—Consists of deep-ribbed steel Floretyle whose flanges are locked into prongs of ribs of Truscon Locktyle Lath.

Is easily and speedily erected, saves in concrete and plastering cost and insures true and straight concrete joists with positive attachment of the ceiling in reinforced concrete construction. It insures constant width of concrete joists, making unnecessary the use of any spacers, and saves all expensive nailing of the steel Floretyle to the form boards.

Truscon Floretyle Construction, with Cantilever End Tyles—Used at the ends of the rows, provide the width of concrete joists adjacent to the supports necessary to take advantage of the greater economy obtained by increasing the negative bending moments and decreasing the positive bending moments. Shearing stresses are also more economically handled than by the use of loose stirrups. Cantilever Floretyle can be used either with ⅜-in. Hy-Rib ceiling or with Locktyle Lath.

Truscon Floretyle Construction with Removable Floretyles—Is economical in buildings comprised of several typical floors laid out in oblong panels, with long spans and not requiring a plastered ceiling. These Floretyles are usually leased to the contractor for the duration of the job. They are made of 16 gauge steel, so designed as to be readily removable, extremely sturdy and very economical. Ribs across the top add to rigidity and eliminate excessive crowning, which is wasteful of concrete. Furnished either with straight sides or with a ⅜-in. flange along the bottom edge.

Properties of Removable Floretyles—Heights: 6, 8, 10, 12, and 14 in. Approximate width at base: 20 in. Standard lengths (nominal): 3 ft. Actual length is 1 in. greater, to allow for end laps.



Placing Floretyles in Locktyle Construction
Inset shows close-up of lath prong

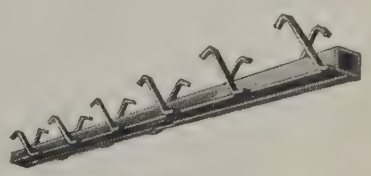
Truscon Wydespan Construction

Requires less concrete and less wasteful timber centering. Joist spacing is approximately 4 or 5 ft. and a top slab of only 2½ in. is recommended.

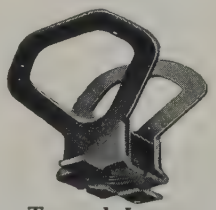
Properties of Truscon Wydespan Forms—Manufactured from 16 gauge steel. Height: 16 in. only—but adaptable for 5 to 15-in. depths of floors.* Approximte width at base: 40 and 52 in. Standard length (nominal); 12 in. Actual length 2 in. longer to allow for end laps.

Truscon Slotted Inserts

Used in concrete slabs, beams or columns for attaching shaft hangers, fixtures, sprinkler systems, etc. Obviate expensive drilling into concrete in finished building. Built into concrete during construction by fastening to wood centering. Standard lengths 12, 18, 24, 36, 48 and 60 in. For ½, ⅝, and ¾-in. bolts.



Slotted Insert



Tapped Insert

Truscon Tapped Inserts

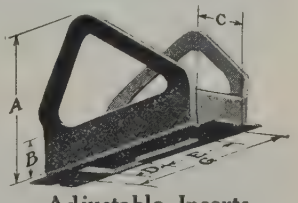
Made of highest quality pressed steel; furnished tapped for ½, ⅝ and ¾-in. bolts or ⅜-in. pipe.

Used where exact location of attachment is known. This insert is especially designed for plumbers who require one which will accommodate pipe rather than standard bolts.

Adjustable Inserts

DIMENSIONS OF TRUSCON ADJUSTABLE INSERTS (INCHES)

Size	A	B	C	D	E	G
½	2 3/8	¾	⅞	1 3/16	1 5/16	3
⅝	2 5/8	1	1 1/8	1	1 7/8	4
¾	2 3/4	1	1 1/4	1 5/16	1 11/16	5



Adjustable Inserts

*Forms are provided with nailholes to permit raising or lowering them on the centering to secure any desired depth floor and joist within the above limits.

JOSEPH T. RYERSON & SON INC.

ESTABLISHED 1842

Reinforcing Steel, Metal Lath, Steel Sash and Steel Products

GENERAL OFFICES

CHICAGO, ILL.

PLANTS

CHICAGO, ILL. ST. LOUIS, MO. DETROIT, MICH. BOSTON, MASS. JERSEY CITY, N. J.
MILWAUKEE, WIS. CINCINNATI, OHIO CLEVELAND, OHIO BUFFALO, N. Y.

REPRESENTATION IN

DENVER, COLO. MINNEAPOLIS, MINN. NEW YORK, N. Y. LOS ANGELES, CAL.
NEWARK, N. J. SAN FRANCISCO, CAL. TULSA, OKLA.

Products

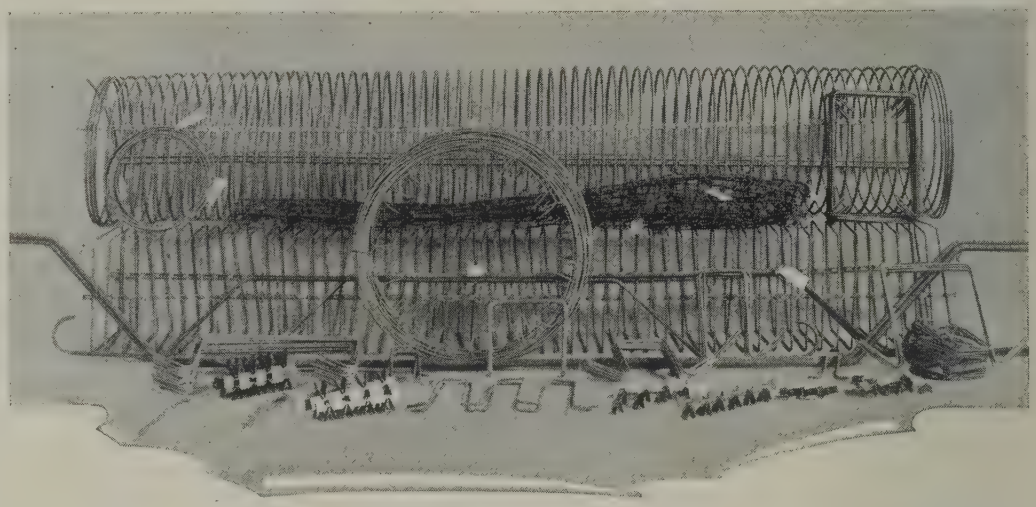
CONCRETE REINFORCING MATERIALS, including: Plain and Deformed Reinforcing Bars, Triangle Wire Mesh, Electrically Welded Rectangular Mesh, Column Spirals, Continuous Wire Mesh Stirrups, Beam Wrapping, Fabricated Units, Road Center Strips, Wire Rods, Wire, Furring Channels and Angles, Miscellaneous Reinforcing Accessories, such as Bar Chairs, Bar Spacers, Bar Ties, Inserts, etc.

EXPANDED METAL PRODUCTS, including: Expanded Metal Lath, Ryex Expanded Metal Reinforcing, Corner Beads, Metal Picture Mouldings, Base Screed, Base Grounds, Rib Lath.

SAFETY TREADS AND PLATES, including: Mason Safety Treads, Firmtread Floor Plates and Treads, Sheet Steel Subtreads and Risers.

IRON AND STEEL PRODUCTS, including: Bars, Bar Shapes, Structurals, Rails, Plates, Sheets, Boiler Tubes and Fittings, Shafting, Chain, Rivets, Bolts, Nails, Refined Iron, Alloy Steel, Tool Steel, etc.

SMALL TOOLS.

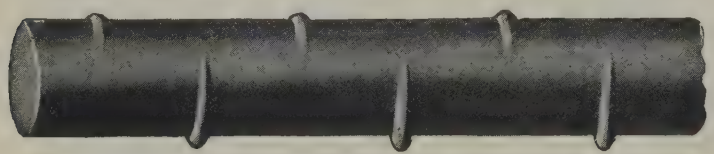


A Few Ryerson Reinforcing Products

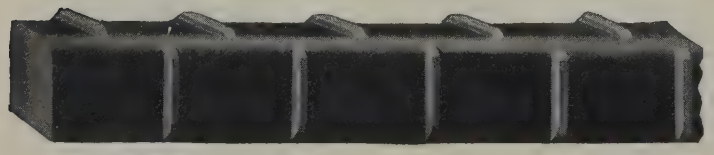
Bars

At our eight warehouse plants located throughout the country, we carry a complete stock of plain and deformed bars, both round and square. These bars are rolled from new billet stock, conforming to standard specifications of the American Society for Testing Materials, Serial Designation A-15-14. Bars, of structural, intermediate and hard grade, are carried in stock in lengths up to 60 ft.

Round deformed bars are carried in the following diameters: 3/8, 1/2, 5/8, 3/4, 7/8 and 1 in. Square deformed bars are carried in the following sizes: 1/2, 1, 1 1/8 and 1 1/4 in.



Ryerson Round Deformed Reinforcing Bar



Ryerson Square Deformed Reinforcing Bar

Bending and Fabricating

We have the most up-to-date machinery and other equipment for fabricating, and can bend bars to any shape required for beam, joist and slab rods, stirrups, ties, hoops, etc.

Spirals and Continuous Hooping

On our spiral machines we manufacture spirals for round columns, continuous uniform hooping for square and rectangular columns, and continuous single unit stirrups for beams and girders. Spirals are made from new first quality wire rod in sizes from $\frac{3}{16}$ to $\frac{9}{16}$ in., inclusive.

Both round and square hooping can be collapsed for shipment.

Triangle Wire Mesh Reinforcement

We always carry on hand a large stock of triangle wire mesh for slab reinforcement. This material is carried in rolls in standard gauges and sizes of mesh and can be shipped at once. Electrically welded rectangular mesh, is also in stock, or can be shipped direct from factory.

Road Strips and Highway Construction Material

We furnish completely fabricated material for reinforcing roads, culverts and bridges, including metal road strips and all necessary reinforcing fabrics, supports and spacers.

Accessories

In addition to bars and spirals, we carry complete stocks of all accessories such as beam, joist and slab bar spacers, bar and screed chairs, bar ties, wire, etc., also wire fabric and expanded metal for reinforcing roadways and for floor slabs, concrete pipe, etc., angles, channels

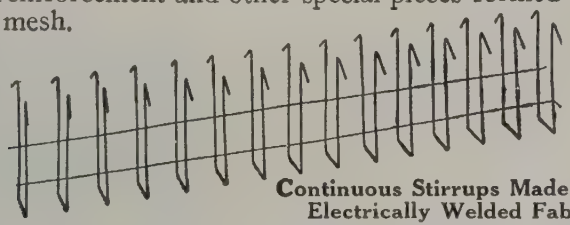
Continued on next page

and pencil rods for suspended ceilings, furring and similar purposes.

Continuous Wire Mesh Stirrups

Continuous wire mesh stirrups are formed on our specially constructed power machines, thus insuring accurate bending and perfect alignment. Continuous stirrups save time and money in the job, eliminating slow and tedious hand tying of bars and individual stirrups. Over 30,000 of these continuous stirrups were used in the construction of the Palmer House in Chicago.

We are also equipped to furnish beam wrapping, step reinforcement and other special pieces formed from wire mesh.



Continuous Stirrups Made from Electrically Welded Fabric

Ryex Expanded Metal Reinforcing

We are prepared to furnish from stock, expanded metal in meshes varying from ½x1¼ in. to 3x8 in. and in a wide range of standard sizes. Special meshes and sizes delivered promptly, direct from the factory.

Metal Lath, Plastering Channels, etc.

We are in a position to furnish all the steel requirements for plastering. This service includes expanded metal lath, rib lath, scotch lath, corner bead, bullnose corner bead, picture mould, curved point base screed, base grounds, hot rolled channels, cold formed channels, pencil rods, angles, tees, flats, wire, etc.

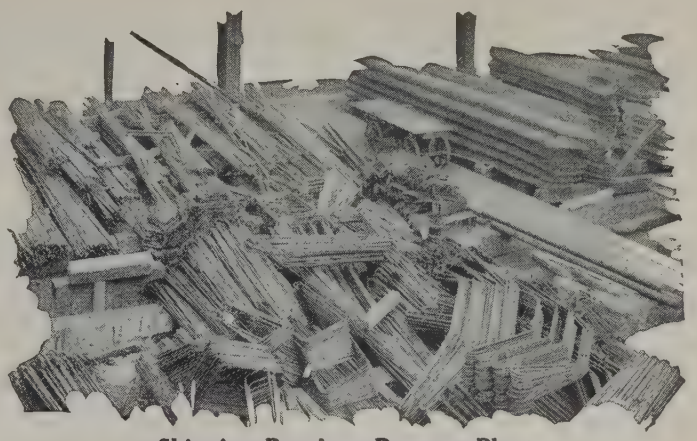
¾-in. Rib Lath
Deep ribs and strong mesh eliminate the need of wood forms

Immediate deliveries from our warehouse stocks or direct from factories in Chicago and the East.

Welded Steel Windows

Standard industrial units can be furnished at once from stock, either with or without ventilators. These windows are made of rolled sections, electrically welded at all intersections, giving the frame great rigidity and strength.

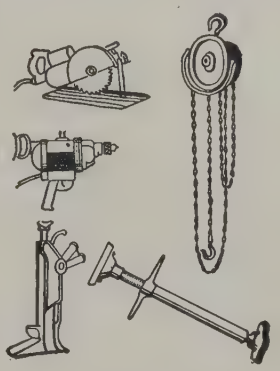
Continuous top hung windows with mechanical operators and architectural projected windows can be furnished to meet almost any requirement. Send your plans for prices and complete description of our complete service.



Shipping Bay in a Ryerson Plant
Reinforcing materials ready for loading

Small Tools

Prompt service on all the hundred and one small tools needed for construction work is another feature of our complete service to builders. Every tool is backed by the Ryerson Guarantee. If you haven't our tool catalogue and price list, write and we will mail them at once.

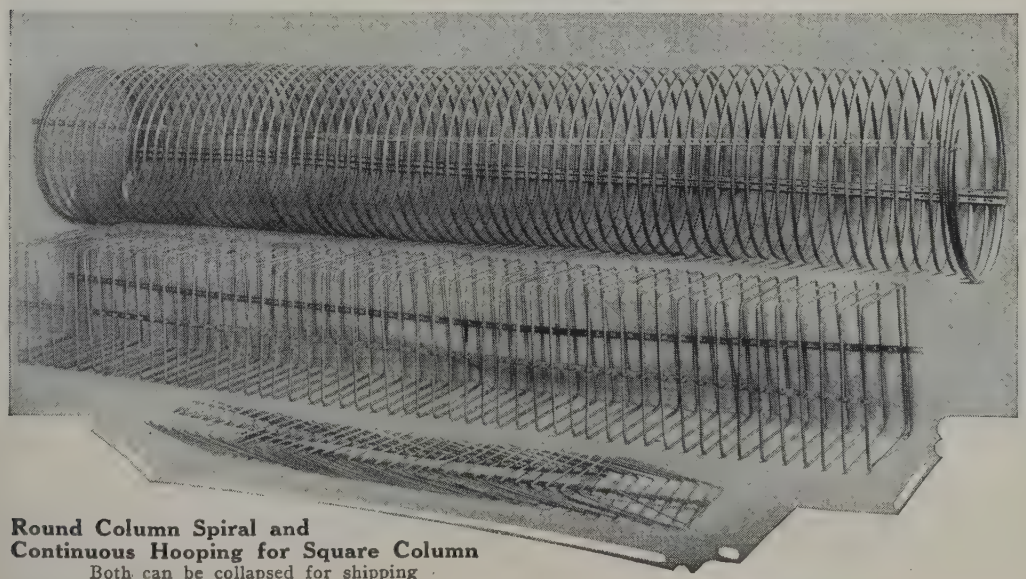


Portable electric saws, electric drills, trench braces, jacks, hoists, furnaces, reamers, rivet forges, riveting hammers, electric hammers, clamps, grinders, punches, shears, drift pins, etc., are a few of the items available.

Delivery

Our large stocks of bars and other material enable us to make exceptionally quick delivery on reinforcing material—all cut, bent, bundled and tagged ready for the forms. By use of special aluminum tags with stamped, raised letters and numerals, the identification marks showing the location in the building of each bundle can not be obliterated. These tags are not subject to rust. Specially designed 40-ft. trailers for tractors, with steel adjustable skids, enable us to haul the longest material and unload with a minimum of effort and without distortion or damage to the material. All of our Steel-Service Plants have private switch tracks connecting with trunk line railroads, affording exceptional service on freight shipments.

This Tag Identifies Each Piece



Round Column Spiral and Continuous Hooping for Square Column
Both can be collapsed for shipping

Ryerson Steel-Service

In addition to reinforcing materials we carry all kinds of steel products at each of our plants, thus giving the contractor a convenient source upon which to draw for such other steel as he may require on a job.

Bars	Babbitt
Shapes	Wire
Structurals	Turnbuckles
Rails	Corrugated roofing and siding
Shafting	Stair treads
Plates	Firmtread plates
Sheets	Boiler tubes and fittings
Rivets	Refined iron, etc.
Bolts	
Chain	

WICKWIRE SPENCER STEEL COMPANY

Electrically Welded Wire Fabric for Concrete Reinforcement

GENERAL OFFICES
41 East 42nd Street
NEW YORK, N. Y.

OFFICES AND WAREHOUSES
WORCESTER, MASS. BUFFALO, N. Y. DETROIT, MICH. CLEVELAND, OHIO CHICAGO, ILL.
LOS ANGELES, CAL. ATLANTA, GA. SAN FRANCISCO, CAL. SEATTLE, WASH.

Product

CLINTON ELECTRICALLY WELDED WIRE FABRIC for Concrete Reinforcement.

For Wire Lath, see pages B1674-1677; for Metal Grilles, see page C3345.

Clinton Electrically Welded Wire Fabric

Scope of Use—Clinton welded wire, a mesh reinforcement, is especially suited for floors, roofs, walls, roads, sidewalks, sewers, reservoirs, levees and all kinds of slab construction.

The material is used to special advantage in all kinds of work involving the covering or protection of steel with concrete, as in buildings, bridges, subways and tunnels.

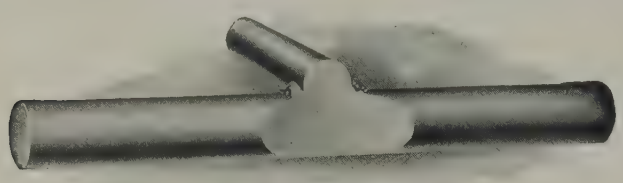
Material—Clinton electrically welded wire fabric is a wire mesh made up of a series of parallel longitudinal wires, spaced certain distances apart and held at intervals by means of transverse wires arranged at right angles to the longitudinal ones, and securely welded to them at the points of intersection by a patented electrical process.

Wire—Clinton electrically welded wire fabric is fabricated from a special grade of good quality steel wire, possessing such strength, elasticity, and ductility as to render it especially suited to structural use.

The wire will develop an average ultimate strength of 70,000 to 80,000 lbs., with a maximum, in some cases, of 85,000 lbs. per sq. in.

Innumerable tests and investigations which have been made upon welded wire during the past 15 years have proved that the process of welding does not in any way lessen the tensile strength of the longitudinal wires. Specimens when tested, whether they break at or between the welds, will invariably show the full tensile strength of the longitudinal wire when compared with the strength of the plain wire before welding.

Electric Weld—In Clinton welded wire the transverse wires are welded to the longitudinal wires by means of an electric current. They are not in any way secured by winding, or by loops or clips, and for this reason the casual observer sometimes concludes that the wires are merely soldered together. This idea is wrong. The connection is made by an absolute and perfect weld, in which the two wires are actually fused into one homogeneous section.



The Clinton Electric Weld

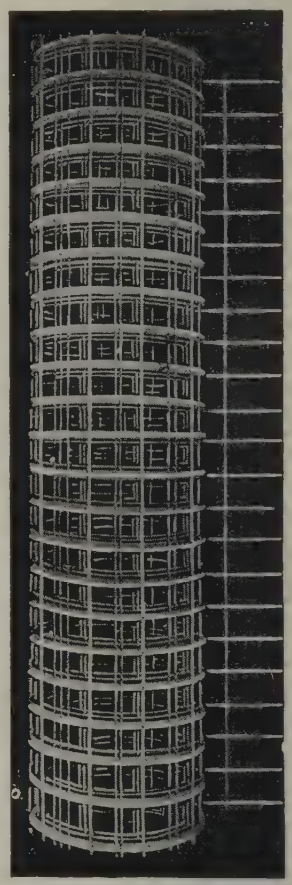
In this view the two wires have been cut through at their point of union, revealing a perfectly smooth surface. It is a perfect weld; the two wires are actually fused together

A great number of tests have been made upon the welded connections, and it has been shown that the shearing strength of the weld in many cases actually exceeds the tensile strength of the longitudinal wire.

Rectangular Mesh—Clinton welded wire is rectangular or square mesh. There are no zigzag or diagonal members in the material.

When used as reinforcement in floor slabs, the longitudinal members are thus located in the line of tension; while the transverse or secondary members, arranged at right angles to them, afford a most efficient means of distributing concentrated loads in a direction perpendicular to the main reinforcing members.

In floor slabs, designed and estimated on the basis of distributed loads, this is a most important factor in enabling a slab to receive a very heavy load on a small area. Clinton welded wire fabric, affording, as it does, an efficient transverse as well as longitudinal reinforcement, prevents cracking due to changes in temperature and provides a perfect network of steel which knits and binds the concrete together, reinforcing it securely in all directions.



Roll of Clinton Electrically Welded Wire, 48-in. Width

Shipped also in sheets if desired

Perfect Bond—There is perfect adhesion of concrete to this fabric, because it has no clips or wrapped wires to prevent free flow of the aggregate when it is being poured; therefore, no voids exist in the completed work. Transverse strands, which are of much heavier gauge than can be used in any other wire fabric, are securely welded to longitudinal strands at right angles to the latter, and provide absolute anchorage against movement of the fabric when subjected to strain.

Unbroken Continuity—By using Clinton welded wire in floor slabs it is possible to obtain a perfect continuity from span to span without any lapping or splicing of the members.

Fabric is delivered in rolls, and may be laid in continuous sheets up to 200 ft. in length. The result is no waste, no lapped ends, no weak points.

Continued on next page

Economy and Accuracy of Installation—The use of welded wire eliminates all cost and trouble involved in the spacing and wiring of loose members. Spacing is established by machinery, and it is impossible for the relative position of various members to become changed in the slightest degree.

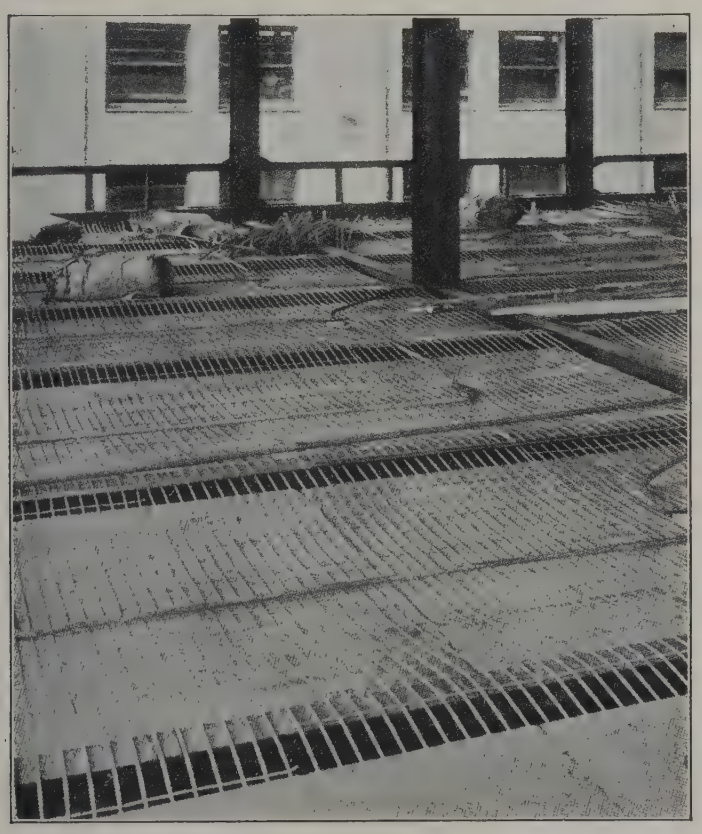
The fact that great quantities of material can be laid accurately in a very short time by unskilled labor, with absolute assurances that every strand of wire is in its proper position, renders welded wire the safest, simplest and most economical reinforcing material for all kinds of slab construction.

Finish—Unless otherwise ordered, Clinton electrically welded fabrics are furnished made with plain steel longitudinal and transverse strands. The price is lower than for fabrics galvanized throughout, the difference being controlled by the market price of spelter used in the galvanizing process.

Galvanizing—Clinton electrically welded fabrics are also made from steel wire, which is thoroughly galvanized before being welded. Galvanizing affords protection against the development of rust if the material is exposed to the weather by reason of delays in its use in the work, or if the concrete is of inferior quality and contains elements injurious to steel, or is so porous as to permit the entrance of moisture or destructive gases.

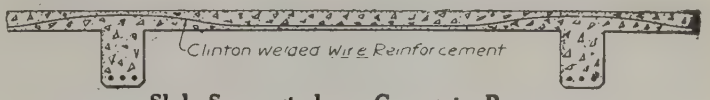
Reinforced Concrete Slab Tables

The tables following the illustrations of the arches are based on accepted formulæ. The loads given at heads of the varying tables cover customary roof and floor loads, and are the safe applied load in addition to the weight of the slab. No allowance, therefore, need be made for the weight of the slab. The tables have been compiled on a basis of a maximum compression in concrete of 650 lbs. per sq. in. with a maximum tension in the steel of 20,000 lbs. per sq. in.; spans being considered as continuous, i. e., $M=\frac{W1^2}{12}$

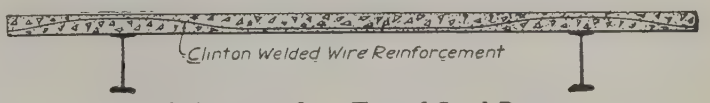


French Building, Fifth Avenue, New York, N. Y.

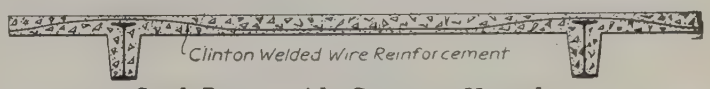
View during construction of floor, showing Clinton electrically welded wire in position, ready for pouring concrete; entire floor reinforced with drawn steel wire (the best known material for tensile reinforcement); every unit accurately spaced and securely held in its proper position—an unbroken continuity of reinforcement from one side of the building to the other



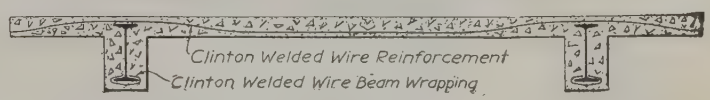
Slab Supported on Concrete Beams



Slab Supported on Top of Steel Beams



Steel Beams with Concrete Haunches



Steel Beams with Complete Concrete Fireproofing

REINFORCED CONCRETE SLAB TABLES

Reissued April 1, 1922

Table I. Applied Load 50 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	.....	.....	.....	.....
4½	¾	.....	.....	4 x 12 8&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	.....	.....	.....
5	1	.....	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	.....	.....
6	1	.....	.....	.....	4 x 16 7&11	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8
7	1	.....	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8
8	1¼	.....	.....	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 5&10	2 x 1 4&9

Table II. Applied Load 75 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	.....	.....	.....	.....	.....
4½	¾	.....	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....
5	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	.....	.....	.....
6	1	.....	.....	4 x 12 8&12	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	.....
7	1	.....	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 6&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8
8	1¼	.....	.....	.....	.....	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8

Table III. Applied Load 100 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
4½	¾	.....	4 x 12 8&12	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....
5	1	.....	.....	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....
6	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....
7	1	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 3&8	2 x 16 3&8	2 x 16 1&7
8	1¼	.....	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8

Continued on next page

REINFORCED CONCRETE SLAB TABLES (Continued)

Table IV. Applied Load 125 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	2 x 16 0&6
8	1¼	.....	.....	.....	.....	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7

Table V. Applied Load 150 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....
8	1¼	.....	.....	.....	.....	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6

Table VI. Applied Load 175 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 7&11	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 5&10	2 x 16 5&10	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 6&10	4 x 16 4&9	2 x 16 6&10	2 x 16 4&9	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....	.....
6	1	.....	.....	4 x 16 5&10	3 x 16 5&10	2 x 16 6&10	2 x 16 4&9	2 x 16 3&8	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 6&10	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....
8	1¼	.....	.....	.....	.....	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....

Table VII. Applied Load 200 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....	.....
6	1	.....	.....	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 0&6	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6	.....

Table VIII. Applied Load 225 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 6&10	4 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 7&11	4 x 16 4&9	3 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 4&9	2 x 16 1&7	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3 x 16 6&10	3 x 16 4&9	3 x 16 2&8	2 x 16 3&8	2 x 16 1&7	.....	.....	.....	.....
7	1	.....	.....	.....	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 4&9	3 x 16 2&8	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....	.....

REINFORCED CONCRETE SLAB TABLES (Continued)

Table IX. Applied Load 250 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
5	1	.....	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	2 x 16 1&7	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....	.....

Note: Values in all these tables indicate size of mesh and gauge of wires in Clinton fabric. Thus, 4x16, 7&11 indicates a fabric having No. 7 gauge longitudinal wires on 4-in. centers welded to No. 11 gauge transverse wires on 16-in. centers.

Reinforcements below and to left of zigzag lines may also be safely used in cinder concrete without exceeding 300 lbs. per sq. in. compression in the concrete. In using cinder concrete, applied loads as given may be increased 3½ lbs. for each inch thickness of slab.

Wire

Size of Wire—The fabrics listed below are suggested as combinations which may be used to special advantage. While all of these fabrics are not actually carried in stock, the majority of them may usually be obtained upon short notice. When only a small quantity is desired it is sometimes less expensive to use a stock grade, even though it possesses greater strength than the work requires.

The longitudinal or transverse strands may be of Nos. 0 to 13 inclusive, Washburn & Moen gauge wire. When the same size of wire is not required in both members of the fabric, the heavier size can be placed longitudinally or transversely, as may be specified, but there should not be a difference exceeding 6 numbers on heavy grades, or 5 numbers in light grades, between the longitudinal and transverse strands.

PROPERTIES OF WIRE AND SECTIONAL AREA OF FABRICS

Size per W. & M. gauge	Diam. of 1 wire, in.	Sectional area of 1 wire, sq. in.	Weight per lin. ft. of 1 wire, lbs.	Sectional area (sq. in.) of longitudinal wires only in 1 ft. of fabric width when spaced as shown below — 2 in.	3 in.	4 in.	5 in.	6 in.
No. 0	.3065	.07378	.2506	.4426	.2951	.2213	.1770	.1475
No. 1	.2830	.06290	.2136	.3774	.2516	.1887	.1509	.1258
No. 2	.2625	.05411	.1838	.3246	.2164	.1623	.1298	.1082
No. 3	.2437	.04664	.1584	.2798	.1865	.1399	.1119	.0932
No. 4	.2253	.03986	.1354	.2391	.1594	.1195	.0956	.0797
No. 5	.2070	.03365	.1143	.2019	.1346	.1009	.0807	.0673
No. 6	.1920	.02895	.0983	.1737	.1158	.0868	.0694	.0579
No. 7	.1770	.02460	.0835	.1476	.0984	.0738	.0590	.0492
No. 8	.1620	.02061	.0700	.1236	.0824	.0618	.0494	.0412
No. 9	.1483	.01727	.0586	.1036	.0691	.0518	.0414	.0345
No. 10	.1350	.01431	.0486	.0858	.0572	.0429	.0343	.0286
No. 11	.1205	.01140	.0387	.0684	.0456	.0342	.0273	.0228
No. 12	.1055	.00874	.0296	.0524	.0349	.0262	.0209	.0174

Spacing of Longitudinal Wires—The longitudinal wires may be spaced on centers of 2 in., or more in steps of 1 in. The distance between centers of outside longitudinal wires can not exceed 100 in.

Spacing of Transverse Wires—The transverse wires can be spaced on centers of 2 to 10 in., inclusive, in steps of 1 in., and on centers of 10 to 18 in., inclusive, in steps of 2 in. They must project at least ½ in. beyond the outside longitudinals and may, if required, be extended to a maximum length of 102 in.

Rolls and Sheets—Special lengths of rolls or sheets, as may be required, can be made to order. Rolls may be of any desired length not exceeding 400 ft. in the light grades, depending upon the weight and convenience in handling. Sheets should not exceed 20x7½ ft. if shipped in box cars, or 32x8 ft. if shipped on flat cars.

Continued on next page

Special Designs in New York, N. Y.

In the city of New York the allowable capacities of floor slabs are no longer based on tested approvals, but may now be determined by a newly devised method of computation which applies to flat slabs of either stone or cinder concrete when cast between steel beams, and only when the span of slab does not exceed 8 ft. For these conditions a minimum thickness of 4 in. is required.

While 4 in. is thus fixed as the minimum thickness of slab, still, a 4-in. thickness may be used on any span up to 8 ft., and for any load which does not exceed the computed capacity of the slab; the actual capacity in any case being determined by the thickness of slab, the conditions of continuity, and the amount and kind of reinforcement used.

Because of the unaccountable strength of short span slabs as shown by actual tests, the city of New York has adopted an empirical formula to be used in designing slabs of 8-ft. span and less when confined between steel beams.

The tables below have been computed by this formula for the conditions of continuous wire mesh reinforcement.

SLAB REINFORCEMENT UNDER NEW YORK, N. Y., CODE

Sectional area of steel reinforcement required, square inches per foot in width, for concrete arches of various spans based on Clinton Electrically Welded Fabric

Total load in lb. per sq. ft. including weight of slab	Spans, in feet and inches																
	4–0	4–3	4–6	4–9	5–0	5–3	5–6	5–9	6–0	6–3	6–6	6–9	7–0	7–3	7–6	7–9	8–0
4-inch Cinder Concrete Slab, 1-2-5 Mixture																	
100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.074	.087
125	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.087	.101	.101
150	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.120
175	.043	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140
200	.043	.052	.052	.062	.062	.074	.074	.087	.101	.101	.120	.120	.140	.140	.147	.162	.162
225	.052	.052	.062	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.147	.162	.174	.202
250	.052	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.174	.202	.202
275	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239
300	.062	.074	.074	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259
325	.074	.074	.087	.101	.101	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280
350	.074	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.280
375	.074	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.302	.302
400	.087	.101	.101	.120	.140	.140	.162	.174	.202	.202	.239	.239	.259	.280	.280	.302	.330
425	.087	.101	.120	.120	.140	.147	.162	.202	.202	.239	.239	.259	.259	.280	.302	.330	.359
450	.101	.101	.120	.140	.147	.162	.174	.202	.239	.239	.239	.259	.280	.302	.330	.359	.389
4-inch Stone or Gravel Concrete Slab, 1-2-4 Mixture or Equal																	
100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.062	.062	.062	.074
125	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.087
150	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120
175	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140
200	.043	.043	.043	.052	.052	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140
225	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.120	.120	.120	.140	.140	.147	.162
250	.043	.052	.062	.062	.074	.074	.087	.101	.101	.120	.120	.140	.140	.147	.162	.162	.174
275	.052	.062	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202
300	.052	.062	.074	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239
325	.062	.062	.074	.087	.101	.101	.120	.120	.140	.140	.162	.162	.174	.202	.202	.239	.239
350	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259
375	.074	.074	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280
400	.087	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.280
425	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.259	.280	.302
450	.087	.087	.101	.120	.140	.140	.147	.162	.202	.202	.239	.239	.259	.259	.280	.302	.330

STANDARD SIZES—CLINTON WELDED FABRIC

Style No.	Spacing of wires, in.		Size wires W & M gauge		Sec. area of steel sq. in. per ft. width		Weight per 100 sq. ft. lbs.	Standard, rolls, in.		Style No.	Spacing of wires, in.		Size wires W & M gauge		Sec. area of steel sq. in. per ft. width		Weight per 100 sq. ft., lbs.	Standard, rolls, in.	
	Longi-tudinal	Trans-verse	Longi-tudinal	Trans-verse	Longi-tudinal	Trans-verse		Widths	Length		Longi-tudinal	Trans-verse	Longi-tudinal	Trans-verse	Longi-tudinal	Trans-verse		Width	Length
*216–28	2	16	2	8	.325	.015	119.4	48 and 60	150	412–77	4	12	7	7	.074	.025	35.4	72	200
*216–38	2	16	3	8	.280	.015	103.6	48 and 60	150	412–88	4	12	8	8	.062	.021	29.6	72	200
*216–49	2	16	4	9	.239	.013	88.5	48 and 60	150										
*216–510	2	16	5	10	.202	.011	74.6	48 and 60	150	*59–1212	5	9	12	12	.021	.012	11.8	100	400
*216–610	2	16	6	10	.174	.011	64.7	48 and 60	200										
										612–06	6	12	0	6	.148	.029	65.3	72	†
*316–28	3	16	2	8	.217	.015	82.6	48 and 84	150	612–33	6	12	3	3	.093	.047	51.2	72	200
*316–38	3	16	3	8	.187	.015	72.0	48 and 84	150	612–44	6	12	4	4	.080	.040	43.8	72	200
*316–49	3	16	4	9	.160	.013	61.4	48 and 84	150	612–55	6	12	5	5	.067	.034	37.0	72	200
*316–510	3	16	5	10	.135	.011	51.8	48 and 84	150	612–66	6	12	6	6	.058	.029	31.8	72	200
*316–610	3	16	6	10	.116	.011	45.1	48 and 84	200	612–77	6	12	7	7	.049	.025	27.0	72	200
*416–38	4	16	3	8	.140	.015	56.1	48 and 84	150	22–1010	2	2	10	10	.086	.086	60.3	56	200
*416–49	4	16	4	9	.120	.013	47.9	48 and 84	150	*22–1212	2	2	12	12	.052	.052	36.8	56	300
*416–510	4	16	5	10	.101	.011	40.4	48 and 84	200										
*416–610	4	16	6	10	.087	.011	35.2	48 and 84	200	44–44	4	4	4	4	.120	.120	85.3	84	150
*416–711	4	16	7	11	.074	.009	29.7	48 and 84	200	44–66	4	4	6	6	.087	.087	61.9	84	150
										44–88	4	4	8	8	.062	.062	44.1	84	200
*412–812	4	12	8	12	.062	.009	25.5	48 and 84	200										
*412–912	4	12	9	12	.052	.009	21.8	48 and 84	200	66–44	6	6	4	4	.080	.080	57.8	84	200
*412–1012	4	12	10	12	.043	.009	18.6	48 and 100	300	66–55	6	6	5	5	.067	.067	48.8	84	200
*412–1212	4	12	12	12	.026	.009	12.6	48 and 100	400	*66–66	6	6	6	6	.058	.058	42.0	84	200
										66–77	6	6	7	7	.049	.049	35.7	84	200
412–55	4	12	5	5	.101	.034	48.4	48 and 72	200	*66–88	6	6	8	8	.041	.041	30.0	84	200
412–66	4	12	6	6	.087	.029	41.6	48 and 72	200	*66–1010	6	6	10	10	.029	.029	20.7	96	300

*Denotes sizes ordinarily carried in stock. †Shipped only in flat sheets.

UNION STEEL PRODUCTS COMPANY

Continuous Chair Stirrups, Reed Soffit Clips, Continuous Sleeper Spacing Anchors

ALBION, MICH.

BRANCH OFFICE: CHICAGO, ILL., 1148 Builders Building—Telephone, Randolph 6635
EASTERN FACTORY, ALBERT OLIVER & SON, 711 East 140th Street, New York, N. Y.—Telephone, Ludlow 2202

Products

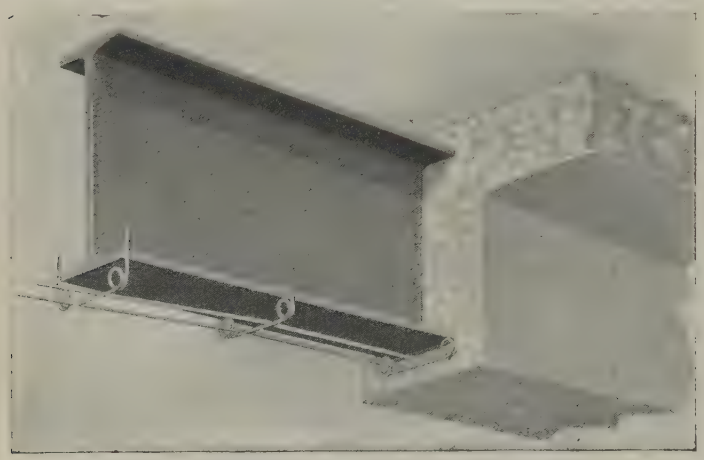
REED SOFFIT CLIPS.
CONTINUOUS SLEEPER SPACING ANCHORS.
CONTINUOUS CHAIR STIRRUPS.

Reed Soffit Clips

Fireproofing reinforcement for steel beams, columns, etc. Welded, pre-spaced and assembled.

Fireproofing around steel beams, girders, channels and columns under best current practice, requires some form of reinforcing clip, uniformly spaced. Reed Clips accomplish this and offer three further advantages:

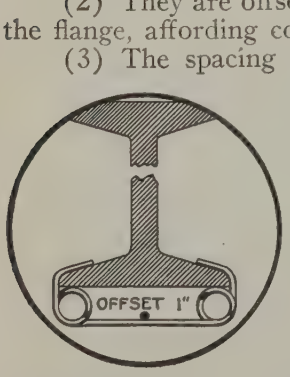
(1) They are welded to continuous spacing strips, and therefore can be quickly placed.



Uniformly Reinforced Beam Soffits

(2) They are offset by the patented loop 1 in. from the flange, affording complete lateral reinforcement.

(3) The spacing strips are offset from the beam providing longitudinal reinforcement.



Clips are spaced 12 in. apart, and made of No. 12 galvanized wire throughout. Manufactured and stocked in 5-ft. lengths; all widths from 3 to 30 in., varying by inches. Projections beyond loop vary from 2½ to 6 in., depending on width.

Specifications—Wrapping for reinforcing concrete fireproofing of all steel column flanges and soffits of all-steel beams, girders and channels to be of welded wire type, constructed so reinforcing wires are offset 1 in. from face of flange and firmly clamped to steel members, such as the Reed Clips made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., and ALBERT OLIVER & SON, 711 East 140th Street, Bronx, N. Y., or similar construction.

Continuous Chair Stirrups

Concrete beam and joist reinforcement. Pre-spaced, shop assembled, welded stirrup units.

Individual stirrups exactly spaced are held rigidly in assembly by three longitudinal wires welded at each intersection. Chairs and side spacers are welded on end and center stirrups of each unit. Made of new billet steel only.

Steel setters place these stirrups in forms ten times as fast as setting single stirrups. No chairs required. No shifting when concrete is poured. Hand wiring to reinforcing rods practically eliminated.

Made in accordance with the framing plans and reinforcing steel schedules in any length, width, depth or spacing. Correct number of stirrups and exact spacing assured.

Setting 13 Joist Stirrups in Form in One Operation

Specifications—Beams and joist stirrups to be pre-spaced and welded to gether in a complete unit, with chairs and stirrup spacer incorporated in stirrups, of size, type and spacings as called for on plans, and as made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., or similar construction.

Continuous Sleeper Spacing Anchors

Sleeper anchors, pre-spaced on longitudinal grouping member. Shop assembled units.

Non-tangling design provides units easily handled and placed with maximum saving of time. No measuring nor templates needed. Correct spacing assured. The long rod lies flush with the surface, anchor loops embedded in the concrete. The sleeper is placed in the cradle between each pair of anchors, and loops are bent vertical against the sleeper with an ordinary claw hammer. With the same tool nails are driven through eyes of the anchors into the sleeper.

Specifications—Sleeper anchors to be of group type composed of several pre-spaced wire clips rigidly connected together, of size and spacing as called for on plans and as made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., and ALBERT OLIVER & SON, New York, N. Y.

Showing Complete Operation with Union Continuous Sleeper Anchors

ACKERMAN-JOHNSON CO.

Expansive Screw Anchors, Expansion Bolts, Concrete Inserts

625 West Jackson Boulevard
CHICAGO, ILL.

Products

ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR; EXPANSION BOLTS; CONCRETE INSERTS. U. S. Patents: April 27, 1915, December 21, 1915, April 4, 1916, May 14, 1918; others pending. Patented in Canada, Great Britain, France, Belgium; others pending.

Ackerman-Johnson Expansive Screw Anchor

Adaptability—For attaching objects to hard materials, as concrete, brick, stone, tile, marble, etc.

Description and Operation—Consists of a doubly tapered internally threaded cone made of brass, iron or steel (Fig. 1), within a lead composition ductile sleeve (Fig. 2). These are assembled at the factory, the sleeve being forced on the cone to a normal position as at Fig. 3.

Fig. 1

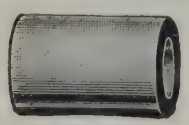


Fig. 2

Fig. 3

Ackerman-Johnson Expansive Screw Anchor

When installed as illustrated, the sleeve is driven farther toward base of the cone and is expanded generally to any degree required to swedge tightly against the sides of hole, effecting perfect holding contact throughout the length and circumference of the anchor. Thus consolidated with the wall material, the anchor provides a machine threaded hole the same as an ordinary tapped hole in a machine part. Any object may then be attached with a standard screw or bolt of suitable diameter.

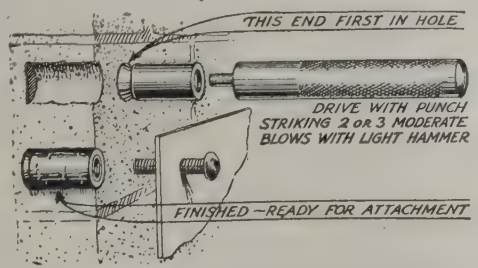


Fig. 4. Manner of Installing Anchor
The piloted setting punch supplied without charge with all anchors

The heavier the load attached, the more forcible becomes the expansion, causing the anchor to resist effort to pull it out far beyond the tensile strength of any screw or bolt.

Distinctive Advantages—Time saving through the use of Ackerman-Johnson anchors compared with old methods more than compensates their total cost.

They save much of drilling cost, requiring least depth for any stated load. They are installed instantly, without the aid of the screw, and before the fixture is lifted into position to be fastened. Their margin of safety is equal to that of steel bolts of correlating size.

They necessitate the least displacement of wall material and consequently less injury to buildings. They effect the neatest possible workmanship.

Sizes—The size of anchor is designated as the size of the bolt or screw to be used. Example: For No. 10-24 screw, use No. 10-24 anchor; for ⅜-in. bolts use ⅜-in. anchor.

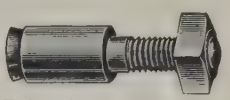
SIZES, EXPANSIVE SCREW ANCHORS

Screw or bolt size, in.	Threads per in.	Minimum dimension of holes required, in.		Specify anchor Size No.
		Diam.	Depth	
6	32	¼	⅜	6-32
8	32	5/16	½	8-32
10	24	⅜	5/8	10-24
12	24	7/16	¾	12-24
¼	20	½	⅞	¼-20
5/16	18	5/8	1	5/16-18
⅜	16	¾	1¼	⅜-16
7/16	14	⅞	1½	7/16-14
½	13	⅞	1½	½-13
5/8	11	1⅛	2	5/8-11

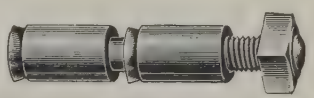
Packed 50 or 100 in box.

Stud Type Expansion Bolts

So great is the holding power of this anchorage, that when set in strong stone or concrete with only its one primary sleeve expanded, the bolt shank can be pulled in two, without the anchorage yielding.



Bolt with Primary Expansive Sleeve Only



Bolt with Primary and One Secondary Expansive Unit

Secondary Expansive Units—Made up of an expansive sleeve and a slip steel cone, giving additional anchorage equal to the primary unit. Calculate the minimum depth of holes for setting at twice the diameter of hole drilled.

Sectional View Showing Bolt with Primary Expansion Sleeve, One Iron Spacing Sleeve, and One Secondary Expansive Unit

Fig. 5. Stud Type Expansion Bolt

Diam. of bolt, at thread ..... in.	¼	⅜	½	⅝	¾
Diam. for hole ... in.	⅜	9/16	¾	1	1⅛
Length of bolt .. in.	1¼	1¾	2½	3½	5
	1½	2	3	4	6
	1¾	2½	3½	5	7½
	2	3	4	6	9
	2½	3½	4½	7½	10
	3	4	5	9	12
	3½	4½	6	10½	15
	4	....	7	12	18
	....	....	8	15	....

Concrete Inserts

Ackerman-Johnson concrete inserts for moulding into the concrete when poured, afford minimum displacement of the concrete and maximum speed in setting. Can be furnished for all sizes of screws and bolts up to ⅝-in. diameter.

We invite requests for full information concerning inserts.

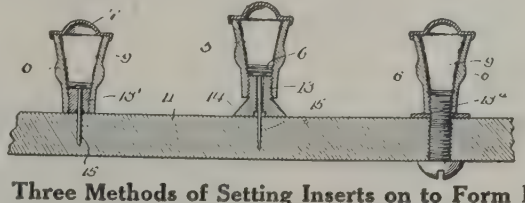


Fig. 6. Three Methods of Setting Inserts on to Form Lumber

Users of Ackerman-Johnson Products

Extensively adopted by leading contractors, manufacturers, railroads, shipyards, government departments and public utility companies.

ANKYRA MANUFACTURING CO.

Manufacturers of Expansion Bolts

149 Berkley Street, Wayne Junction
PHILADELPHIA, PA.

Product

ANKYRA ANKOR (Expansion) BOLTS.

TRADE-MARK
(Reg. U. S. Pat. Off.)

Purpose

To provide a means of holding fixtures to *any* wall, whether hollow or solid, and so holding them that they shall never come loose.

Uses

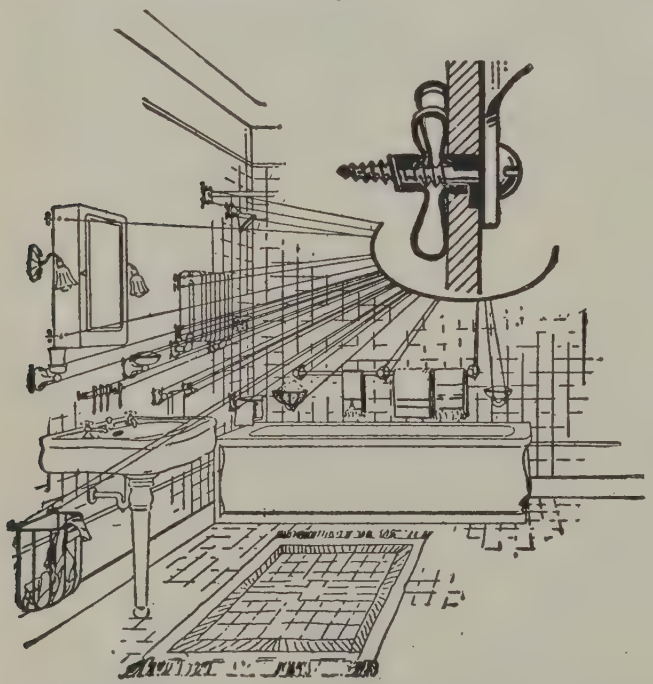
The uses for Ankyra Ankor Bolts are too many to permit of more than a description of typical cases.

Ankyra Ankor Bolts will fasten fixtures to lath and plaster, hollow tile, glazed tile, expanded metal lath, compoboard, sheet metal, brick or concrete walls—in fact they may be used in any sort of wall with assurance that the fixture will "stay put," and yet that it may be removed and replaced at will, if alterations or renewals are necessary.

The illustrations show some uses; but a booklet giving detailed information will be mailed on request.

Other Advantages

Unlike wooden or lead plugs which are prone to loosen quickly because they dry out or are so soft that the threads wear out rapidly, Ankyra Ankor Bolts remain in the wall—rivet themselves in it—and, being made of steel, last indefinitely.



ANKYRA BOLTS USED FOR HOLDING FIXTURES IN BATHROOM

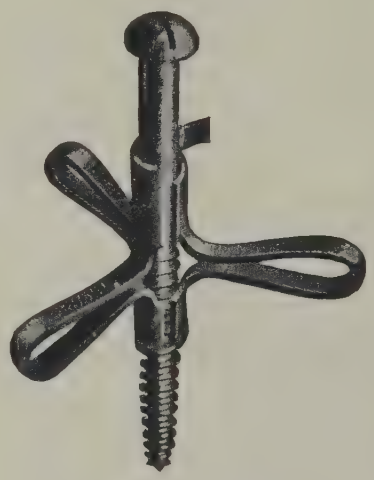
Tests show that Ankyra Ankor Bolts will support a greater load than can be carried on any hollow wall regularly used on standard construction.

(1) The Ankyra sleeve is a self-riveting wing nut.

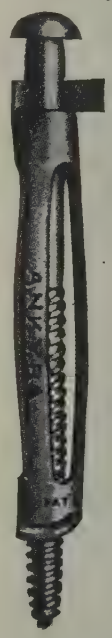
(2) Ankyras can be installed so quickly that the labor and time saved is an exceedingly important factor. Contractors and plumbers have reported that they saved as much as 90% over ordinary methods.

(3) Ankyras obviate the necessity of sounding for studding or making previous provision during construction for the location of fixtures.

(4) The fixture may be removed by taking out screw, but Ankyra nut will not drop down inside of wall as it is an integral part of sleeve or bolt.



ANKYRA BOLT EXPANDED
Note wood screw
Self-riveting; self-adjusting



ANKYRA BOLT WITH
WOOD SCREW
BEFORE EXPANSION

(5) Ordinary standard wood screws are used with Ankyra and may be selected to match other hardware.

(6) Ankyras will hold until the wall itself gives way.

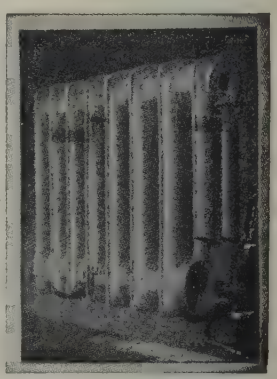
(7) The alignment of grounds can be controlled regardless of irregularities in the face of the wall.

(8) Ankyras are easily and quickly installed.

(9) The solution to many especially vexing problems.

Fastening wall radiators to nearly any kind of wall, but more particularly to tile walls, is usually a ticklish proposition. Ankyras hold the radiator hooks firmly to any kind of wall and are easy to install, as well as permanent.

Bathroom fixtures—especially in public places—break loose with annoying and expensive frequency. The remedy lies in Ankyras which not only hold permanently, but can be used without fear of cracking or breaking the tile.



WALL RADIATOR
PLACED ON TILE
WALL

References

Hundreds of thousands Ankyra Ankor Bolts have been used in many of the largest and best known buildings in this country and Canada. Among them are:

The Woolworth, Metropolitan, Equitable and Widener Buildings; Massachusetts Institute of Technology; the Ritz-Carlton, Bellevue-Stratford and Marlborough-Blenheim Hotels; Detroit Free Library.

O. L. DOWNING & CO.

Manufacturers of Concrete Hanger Inserts

4021 Burwood Avenue

SOUTH NORWOOD, OHIO

Products

HINGE TYPE CAST IRON INSERT.
ADJUSTABLE CONCRETE HANGER INSERT.
CAST IRON INSERT, D TYPE HANGER.

Hinge Type Cast Iron Insert

The Hinge Type Insert differs from other types of inserts in that *it leaves no hole exposed in the ceiling.*

The housing is made with a thin layer of cast iron on the bottom, which is easily broken out for the insertion of the steel plates and bolt head or can be supplied with this layer removed. This insert is made for shafting hangers using ⅜, ½, ⅝ and ¾-in. bolts. Plates 1-D take care of ¾ and ⅜-in. bolts; plates 2-D, ½ and ⅝-in. bolts. The housing is made to prevent bolts from turning when tightening nuts. After being inserted the bolt and plates cannot be jarred out.

This makes one of the strongest types of hangers due to the sturdy, durable construction of the plates and fitting snugly into the housing with the bolt head pulling down on all sides.

Adjustable Concrete Hanger Inserts

These hanger inserts are ideal for automatic sprinkler equipment, heating and plumbing work. They permit both lateral and vertical adjustments, but cannot shift unless readjusted by hand.

This insert is made with two housings:

No. 1 Housing—Used for large sized pipe. Plates can be tapped from ⅛ to ⅞-in. machine threads or ⅛ to ¾-in. pipe threads.

No. 2 Housing—Used for small pipes, air ducts, electric conduits or partitions. Three lines of pipe can be attached to this housing. Plate ⅜ is tapped for ⅜-in. machine threads and is made of malleable iron.

Plates—Are made in the following sizes:

1-A—Tapped ⅜, $\frac{7}{16}$, ½, ⅝-in. standard machine threads.

1-B—Made for ⅜ and $\frac{7}{16}$-in. bolt heads.

2-A—Tapped ⅛, ⅜, $\frac{7}{16}$, ½, ⅝-in. standard machine threads.

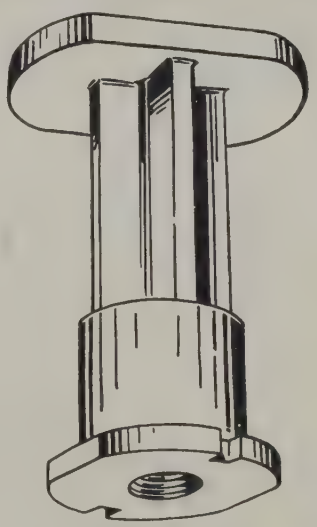
2-B—Tapped ⅛, ¼, ⅜-in. pipe threads.

5-A—Tapped ¾ and ⅞-in. standard machine threads.

5-A—Tapped ½ and ¾-in. pipe threads.

Cast Iron Inserts, D Type Hanger

This type is used for all kinds of pipe work and machinery. It is fastened to forms with nails, screws or bolts. These hangers are tapped for ⅜, ½, ⅝, ¾ and ⅞-in. standard machine threads and ¼, ⅜, ½ and ¾-in. pipe threads.



D Type Hanger Insert

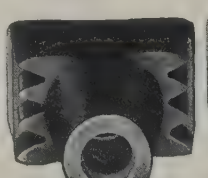


Plate 1A and 1B

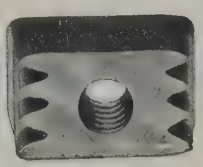


Plate 2A and 2B

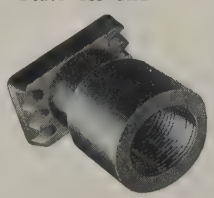
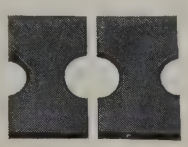


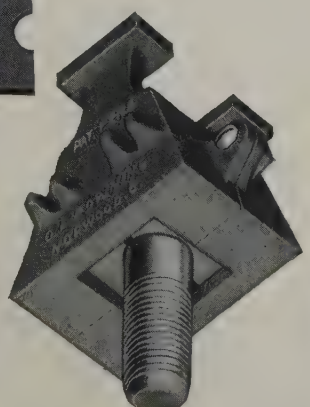
Plate 5A

Plate ⅜



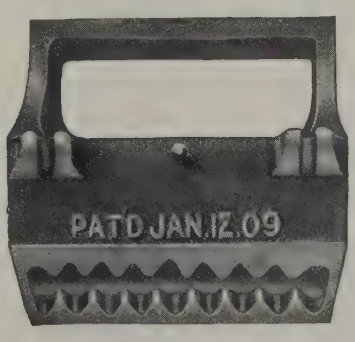
Plates

Showing Covered Surface

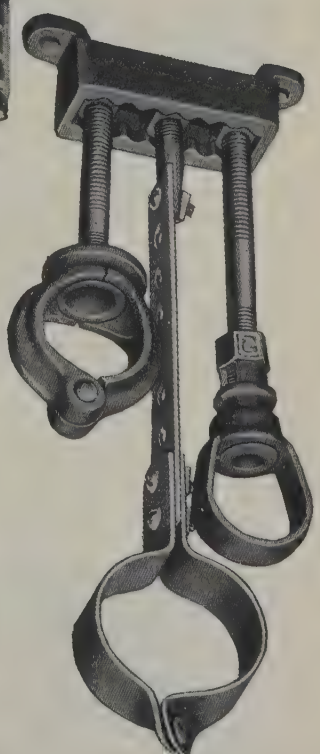


Bolts and Plates Inserted

Hinge Type Cast Iron Insert



Housing No. 1



Housing No. 2

Adjustable Concrete Hanger Insert

KOHLER DIE & SPECIALTY CO.

Concrete Inserts, Steel Bridging, and Metal Specialties

DEKALB, ILL.

CHICAGO REPRESENTATIVE: W. L. Harrison, 1148 Builders Building

Products

Adjustable or Slotted Concrete Inserts, Loop Type and Stem Type; Threaded Concrete Inserts, Cast Type and Pressed Steel Type; Continuous Steel Bridging.

Adjustable or Slotted Inserts

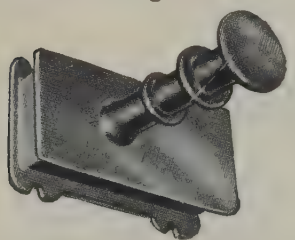
Loop Type

Loop Type—The loop type adjustable insert, intended for use in thin slab construction, is proving more popular now than the stem type and is meeting every requirement. It is one of the best designed and most practical inserts on the market. This insert is so formed that the concrete flows freely around it. There are no sharp corners and in the finished work less surface is exposed in the ceiling after the forms are removed than with any other type which is a very desirable feature. The size of the chamber in both the loop type and stem type permits of the use of either the nut or the head of the bolt.

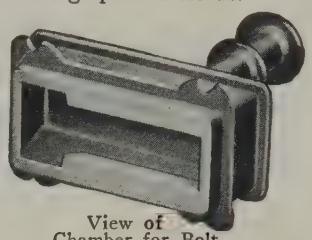
Prong Type—The loop type insert is also made with prongs projecting approximately ¾ in. on the front and also on the back of the loop for the purpose of securing additional anchorage in the concrete. This type was designed principally for supporting shelf angles and is proving popular and satisfactory in every detail. It is also exceedingly valuable in ceiling work in those places where unusual strength is required.

Prices and discounts on the prong type adjustable inserts will be quoted on application.

Stem Type—Made with a corrugated stem that extends up into the compression area of the concrete, the correct place to hang the load. The tapering ribbed base is so shaped that it gives the greatest possible supporting strength to the concrete member. The greater the load on the Collings insert the tighter the concrete grips and holds.



Note Corrugated Stem and Tapering Base with Flange at Top



View of Chamber for Bolt

Collings Insert
(Patented March 26, 1918)

ADJUSTABLE INSERTS—SIZES, WEIGHTS AND LIST PRICES

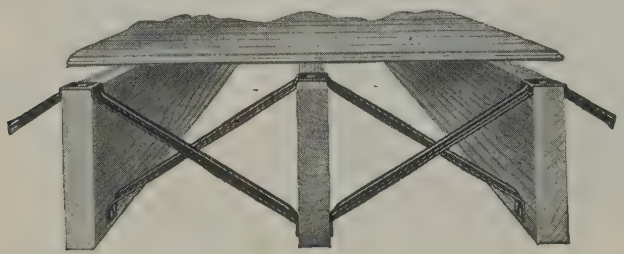
	Size bolt	Height	Weight per 100	List price
Stem type	½ in.	3⅝ in.	76 lbs.	16c each
	⅝ in.	3¾ in.	90 lbs.	19c each
	¾ in.	4 in.	115 lbs.	23c each
Loop type	½ in.	2 7/16 in.	45 lbs.	13c each
	⅝ in.	2 13/16 in.	63 lbs.	16c each
	¾ in.	3 1/16 in.	81 lbs.	20c each

Discounts will be quoted on application.

JH Continuous Steel Bridging

A new type of steel bridging that offers a simple yet scientific system for producing a safe, rigid, and permanent floor bridging with real economy. Its construction is such as to make it both a tension as well as a compression bridging.

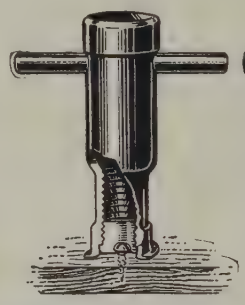
Write for circular and full information of this bridging system that meets every modern building requirement and is necessary wherever wood joists are used.



Kohler Threaded Concrete Inserts

Advantages—The Kohler Threaded Concrete Inserts are now supplied either with the screw point or with nailing lugs at the base for use in place of the screw points, as illustrated.

Pressed Steel Insert
Construction of ⅜ and ½-in. sizes



Steel Insert in Form, with Screw Point in Place
Construction of ⅝-in. size

Insert without Screw
Construction of ⅝-in. size

This screw point makes it possible to set the insert accurately and quickly in the form. A blow with a hammer and a couple of turns with the hand sets this screw down so that the insert is held secure in a vertical position ready for the concrete to be poured. After the work is finished the forms are easily pulled away from the screws, which are then quickly removed, leaving the insert free for the threaded bolt.

Cast Insert with Screw Point

Exact Size of Screw Point Used in ⅝-in. Insert
(Patented Feb. 27, 1912)

Cast Insert with Nailing Lugs

The cast threaded inserts with the nailing lugs at the base are preferred in many places instead of the screw points. They are quickly set and the cost is less.

THREADED INSERTS—SIZES, WEIGHTS, AND LIST PRICE

Size bolt	Height	Weight per 100	List price
Pressed Steel Threaded Inserts			
⅜ in.	2½ in.	8 lbs.	10c each
½ in.	3 in.	13½ lbs.	13c each
⅝ in.	3¼ in.	42 lbs.	17c each
Cast Threaded Inserts with Screw Points			
⅜ in.	2⅜ in.	23 lbs.	13c each
½ in.	3¼ in.	45 lbs.	15c each
⅝ in.	3½ in.	75 lbs.	19c each
¾ in.	3⅝ in.	85 lbs.	22c each
⅞ in.	3¾ in.	110 lbs.	28c each
Cast Threaded Inserts with Nailing Lugs without Screw Points			
½ in.	3¼ in.	45 lbs.	13c each
⅝ in.	3 7/16 in.	66 lbs.	17c each
¾ in.	3⅝ in.	72 lbs.	20c each

List prices are subject to discount which will be quoted on application.

Economy—These inserts, regularly spaced in the ceilings, floors or walls of reinforced concrete buildings mean a saving of time and heavy expense in attaching or rearranging shafting, piping or other interior equipment. A necessity in concrete construction.

RAIL-TRUING INSERT CO.

Insurance Exchange Building, DETROIT, MICH.

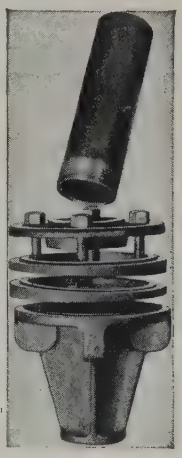
Product

RAIL-TRU INSERTS for anchoring pipe rails to concrete.

Rail-Tru Inserts

Concrete forms ordinarily warp and any insert attached to the form for location is thrown out of true. With the insert out of true, it is impossible to make railing line up without shims. Rail-Tru Inserts solve the problem of anchoring pipe railing in concrete securely and in a vertical position. The turning of one or both of the beveled adjustment rings before or after the rail is in place causes the pipe railing to immediately assume a vertical position.

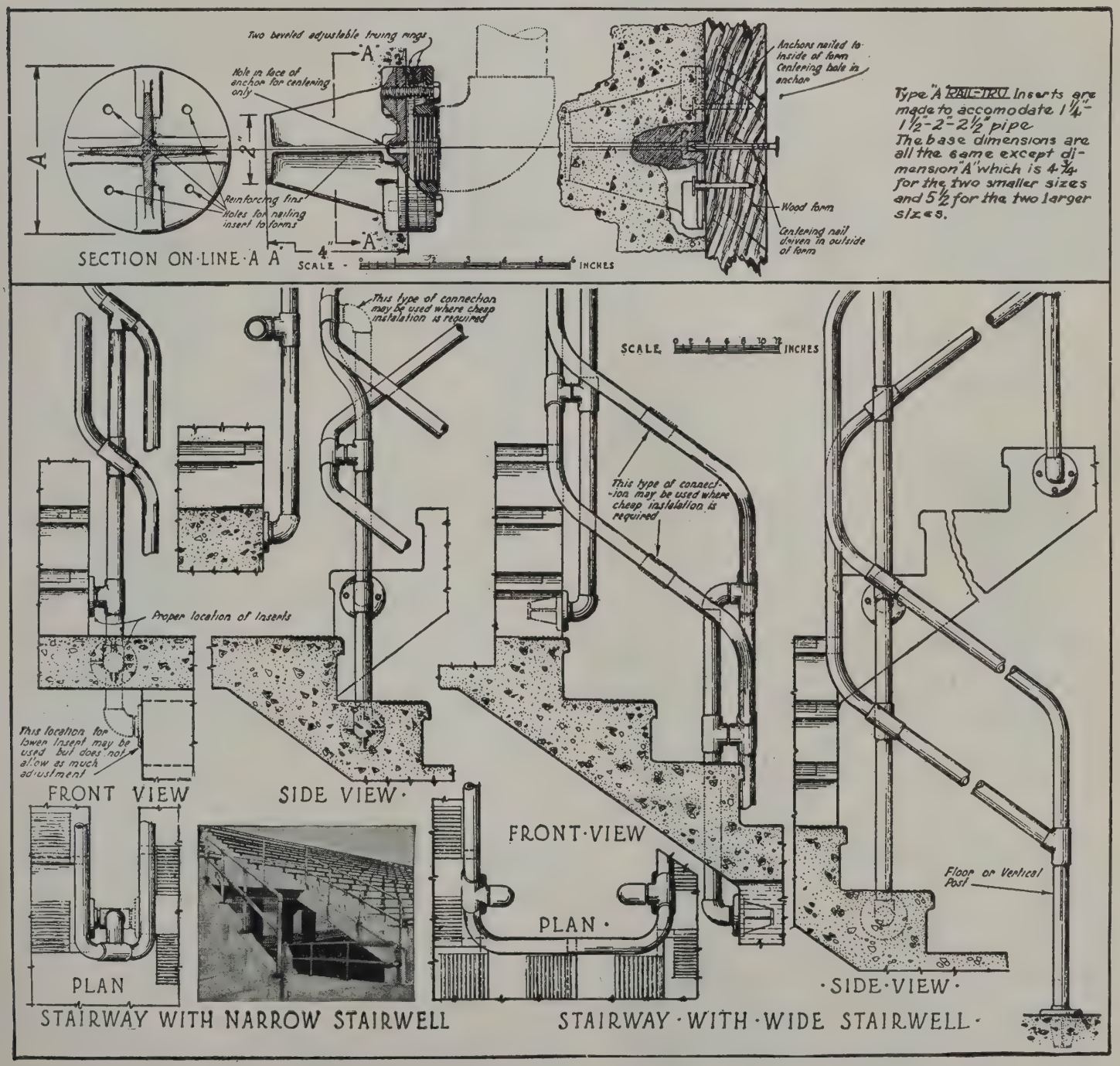
Rail-Tru Inserts are self-centering—cutting of forms is unnecessary. Center point is located by driving a nail through the form. The nail fits into the centering hole in the face of the insert which can then be "back-nailed" to the form. Rail-Tru Inserts do away with the need of shims which work out, expansion bolts which do not always hold the flanges securely, and pipe sleeve calking which is very uncertain at best. Once placed, Rail-Tru Inserts are shockproof; as solid as the concrete itself, because they are anchored.



Rail-Tru Insert Assembly

Specifications

Railing supports for all concrete stairs, ramps, platforms, area and retaining walls or wherever shown, shall be anchored with Rail-Tru adjustable self-centering inserts, as manufactured by the RAIL-TRUING INSERT CO., Detroit, Mich. All inserts shall have approved means of adjusting to true vertical position. The use of split pipe, sleeves and other devices requiring expansion bolts, shims or calking for anchoring and plumbing rail supports shall not be permitted.



Detail of Rail-Tru Insert, Adjustable and Self-centering (Patented)

SECURITY INSERT COMPANY

Ceiling Sockets for Concrete Work

145 West Oxford Street
PHILADELPHIA, PA.

Product

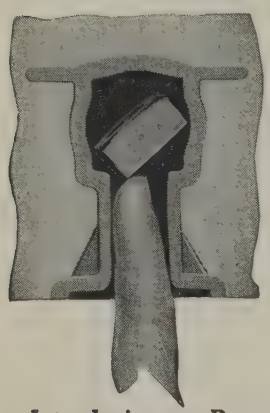
THE SECURITY INSERT, or CEILING SOCKET, for Concrete Work.

The Security Insert

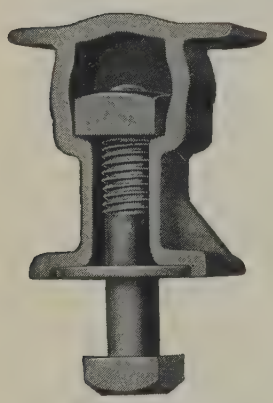
The Security Insert solves in a practical way the problem of the hanging of machinery or fixtures from the ceilings or walls of factories, warehouses and other buildings of concrete construction.

Its design is the result of most careful and exhaustive study. The practicability of the Security Insert is proven because it is being specified repeatedly.

The illustrations show the ease of installation and many other commendable features of this socket, such as the absence of any fixed thread, the ease and flexibility of placement of bolt and nut, the strength of design, maximum grip in the concrete, etc.



Introducing or Removing Nut



Bolt and Nut in Position

Eleven Reasons for Specifying the Security Insert

The design, construction, and application of the Security Insert embody many superior features of which the following are the most important:

(1) The sturdy design of the Security Insert enables it to carry, with a factor of safety, the safe load of the bolt.

(2) The nut being placed up in the concrete, the strain is not entirely dependent on the casting, but is reinforced by the concrete itself.

(3) It has no fixed thread to become rusty or damaged.

(4) In place of fixed thread a standard steel nut (the strongest thread possible) is placed in the insert when ready to use.

(5) This nut is renewable at any time.

(6) A stud or a bolt may be used, whichever is more convenient for the work.

(7) The Security Insert may be nailed to the form, thus avoiding waste of time and lumber, and the large flat base assures its remaining upright during pouring.

(8) A unique and convenient way to install the Security Insert is the use of a machine cut wood block as shown in the illustration. This block fits into the rectangular shank of the insert which is merely set down over it. With this method there are no nails left protruding from the ceiling to be clipped off. The resultant savings reduce the cost per insert set in place.

(9) It is desirable to place inserts in all parts of concrete buildings, even offices, storerooms, etc., for they provide easy means for fastening partitions, etc. A unique and exclusive feature of the Security Insert is that the holes may be concealed by means of a cardboard disk which fits the washer recess and can be painted.

(10) Once placed, the Security Insert is always ready for use. There is nothing in the socket to get out of order or deteriorate.

(11) The Security Insert has been found to be the most practical means for providing safe, permanent anchorage for any loads from the lightest partition to the heaviest crane.

Cross Section Showing Machined Wood Block for Setting up Insert

Safety

Above all, the Security Insert is safe. Even with vibrating loads the nut and bolt are secure. Besides, the Security Insert will carry with a factor of safety the safe load of the bolt.

Insert Nailed to Form

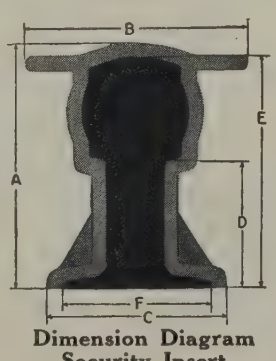
Indorsed by Builders Everywhere

Many of the finest industrial buildings in the United States are equipped with Security Inserts.

A list of prominent installations will be sent on request.

TABLE OF MEASUREMENTS

Size of bolt, in.	A in.	B in.	C in.	D in.	E in.	F in.
3/8	2 1/4	1 3/4	1 9/16	1 3/8	2 5/32	1 3/64
1/2	2 3/4	2	1 7/8	1 5/8	2 5/8	1 7/16
5/8	3	2 3/4	2 1/4	1 21/32	2 7/8	1 27/32
3/4	3	3	2 1/2	1 7/16	2 7/8	2 1/16
3/4	4	3	2 1/2	2 7/16	3 7/8	2 1/16
7/8	4	3	2 3/4	2 3/16	3 57/64	2 11/32



Dimension Diagram Security Insert

STRENGTH OF BOLTS
Assumed Tensile Strength 60,000 lb. per Sq. In.

Size of bolt.....in.	3/8	1/2	5/8	3/4	7/8
Ultimate strength.....lb.	4,100	7,600	12,100	18,100	25,200
Safe load factor 5.....	820	1,520	2,420	3,620	5,040

WEIGHTS AND PRICES

Made for the following size bolts.....in.	3/8	1/2	5/8	3/4 x 3	3/4 x 4	7/8
Shipping weight, 100 inserts.....lb.	40	70	110	140	170	185
List price.....each	11c	13c	17c	21c	25c	30c

Discounts and prices of wood blocks on application.

STERLING FOUNDRY CO.

Manufacturers of Concrete Inserts, Traps and Building Specialties

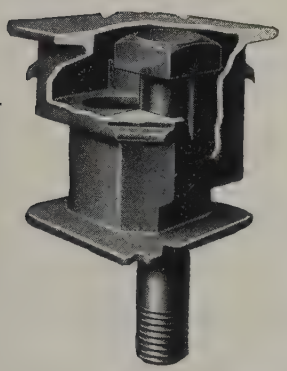
88 Estews Street, STERLING, ILL.

Products

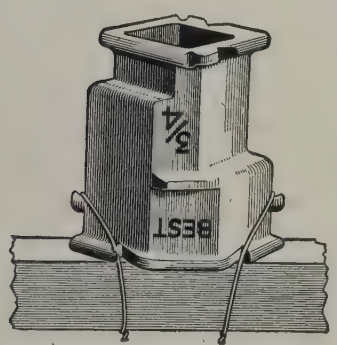
The "Best" Concrete Insert (patented); Barrett Backwater Traps and Dunstan Stench Traps (patented).

Also "Star" Coal Chute (patented), Foundation Gratings; Flue Thimbles; Back Pressure and Bell Trap Floor Drains; Cistern and Coalhole Covers and Rings; Patent Glass Door Fuel Chutes; Stud Sockets; Clean-out Doors; Chimney Caps; Revolving Chimney Tops; Adjustable Ventilators.

Insert Showing Bolt in Position



Insert with Wall Broken Showing Bolt Ready to Be Pushed Over Into the Seat Socket



Insert Showing Method of Attaching to Reinforcing Rod to Hold in Horizontal Position

"Best" Concrete Insert

It is very simple and compact in design; strong and rigid in construction and one of the quickest in action (placing or removing bolt) on the market. To place bolt in insert, bolt is held in vertical position. In an instant with a slight hook motion, the head or nut of the bolt is seated in a wrench-shaped socket. (See illustration.)

Design—The design of the "Best" Concrete Insert permits either the head of the bolt or the nut to be placed in the insert, the wrench-shaped socket being large enough to take the nut, but small enough to give a "viselike" grip to the head of the bolt. The form and depth of the seat socket holds the bolt securely while the nut is being turned on or off.

With this insert there is no possibility of a nut becoming rusted in or the thread being "jimmed" so that the bolt cannot be taken out of the insert.

Ordinarily, it is better practice to put the head of the bolt in the insert and allow the nut to be on the outside where it can be seen and can be tightened if it works loose.

SIZES, HEIGHTS AND WEIGHTS "BEST" CONCRETE INSERTS

Size bolt, in.	Height, in.	Weight each, lb.
⅜	2¼	.44
½	2⅝	.75
⅝	2⅞	1.00
¾	3	1.37
⅞	3⅝	1.75

Ask for prices and sample insert (state size).

Dunstan Patented Stench Traps

Designed for use in all places where surface traps are required to prevent the escape of foul odors and poisonous gases from the sewer. The different styles are constructed to meet the different requirements of cellars, stables, laundries, etc. All stock traps are made of good cast iron of suitable thickness with heavier flanges and grates for additional strength.

The trap consists of three pieces—body, grate and sealing bowl. The sealing bowl rests on three ribs in the body and may be very easily lifted out and cleaned. The grate is made with a cone which extends into the sealing bowl sufficiently deep to make a perfect seal. The external flange of the grate rests evenly and firmly on the bottom of the top seal in body which is also a water seal.

Style "A"—Is made for cementing in bell of 4-in. sewer pipe. It is used in shallow places where other traps could not be used.

Top flange, in.	Height, in.	Outlet, in.
8½x8½	4	4

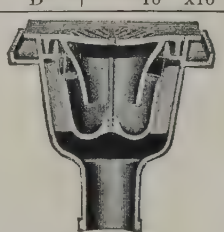
Style "B"—Is made with side outlet and is especially designed for places where there is little fall to the main sewer and the drain either comes in at the side or near floor. The nozzle is sufficiently long to allow for calking into soil pipe or for cementing into sewer pipe.

Top flange, in.	Height, in.	Outlet, in.
8½x 8½	5½	2
8½x 8½	5½	3
11 x11	7	4

Styles "C" and "D"—Style C has a standard size long nozzle for calking in iron soil pipe. 2-in. trap with round flange is often used in hotel sinks. 4-in. trap is largely used in basements.

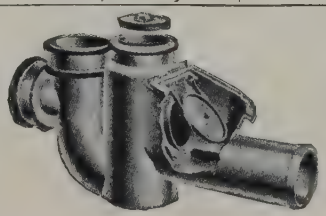
Style D, for lower floor, is a large heavy trap with full size nozzle and ample grate area for handling large quantities of water.

Size	Top flange, in.	Height, in.	Outlet, in.
C	8½x 8½	7½	2
C	11 x11	9½	4
D	14 x14	12½	4
D	16 x16	14½	6



Style "E"—Style E, for upper floors, is the same as Style D, except that it is provided with an extra lower flange to prevent water leaking through the ceiling, and is made especially for upper cement and asphalt floors.

Flange, in.	Height, in.	Outlet, in.
Top, 12x12 } Lower, 15x15 }	12½	4
Top, 15x15 } Lower, 17x17 }	14	6



Barrett Backwater Trap

This is a plain cast iron, accessible backwater trap with brass gate valve made for pipe with diameters 4, 5, 6, 8 and 10 in.

STAR EXPANSION BOLT CO.

141 Cedar Street
NEW YORK, N. Y.

BRANCH OFFICES CARRYING COMPLETE STOCK

ATLANTA, GA., 238 Trinity Avenue, S. W.
BOSTON, MASS., 120 High Street
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LOS ANGELES, CALIF., 168 So. Central Avenue
SEATTLE, WASH., 67 Columbia Street
PHILADELPHIA, PA., 154 No. Seventh Street
ST. LOUIS, MO., 820 No. First Street
SAN FRANCISCO, CALIF., 121 Second Avenue

FACTORY: BAYONNE, N. J.

Products

Manufacturers of EXPANSION BOLTS and other Anchorage Devices, of all kinds, together with the necessary drills and tools for placing or replacing.

Dryvin Expansion Shields

The Dryvin is an expansion shield of a new design. It is made of hot dip galvanized steel with a flanged top to hold the work, and flanged bottom to hold the soft metal wrap or expansion member. Hot dip galvanized nails of the correct size are furnished with all shields. The top flange carries the load, the nail merely expands the metal.

A hole of the same size as the Dryvin to be used is first drilled in the concrete, brick or stone. The fixture to be erected is placed in position and the Dryvin inserted in the hole. A nail is then dropped into the Dryvin and is driven home by a few light taps of a hammer. This expands the soft metal wrap, bonding it into every irregularity of the hole, and at the same time locks the lower flange into the hole, making it impossible for the shield to turn or work loose. The hammer taps should be as light as possible so that the lead will have an opportunity to flow and completely fill the hole.

Advantages—There are several advantages and much is saved in the use of Dryvins. The cost amounts to an average saving of 30%; the ease of drilling saves 25%; time saved in installation amounts to between 40 and 50%. Although fastenings made with Dryvins withstand tremendous pull, the shields may be easily removed when desired with a special extractor tool made by the manufacturer, or with a carpenter's claw hammer. By this means the nail is drawn out and Dryvin removed.

Uses—Because of the advantages, convenience and inexpensiveness, Dryvins are used extensively by electrical, plumbing and building contractors, public service corporations, industrial plants, telephone companies, etc.

DRYVIN EXPANSION SHIELDS

*Size, in.	†Working load, lb.	Ship. wt., lb. per 100
3/16 x 7/8	130	1.2
3/16 x 1 1/4	150	1.6
1/4 x 1	200	2 1/4
1/4 x 1 1/4	300	2 3/4
1/4 x 1 1/2	350	3 1/2
5/16 x 1 1/4	400	4 1/2
5/16 x 2 1/4	500	6 1/4
5/16 x 2 3/4	500	8
3/8 x 2	700	10 1/2
3/8 x 3 1/4	700	13 1/2
1/2 x 2 1/4	1200	18
1/2 x 3 1/2	1200	25

*Diam. and length of shield, not nail. Diam. is also proper size of drill required.
†Figured with factor of safety in accordance with modern engineering practice.

Tampin Expansion Shields

This shield has three component parts assembled into a single unit: a conical nut with two projecting fins, a special alloy lead sleeve, and a brass plated steel split ring. A machine screw or bolt is used to fasten the fixture to the shield.

The two fins on the nut prevent it from turning in the lead when tightening the bolt. The special alloy lead of the sleeve, when expanded, enters all irregularities of the hole and will not yield under a heavy load. The split ring, an exclusive feature, easily passes over the end of the nut, forcing the lead down the cone toward the bottom of the hole where the expansion should be and is the greatest. This also insures uniform radial expansion on the cylindrical part of the nut.

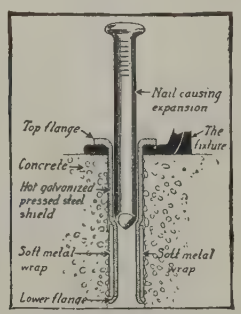
A hole of proper size is first drilled in the masonry. The Tampin is then placed on the pilot of a spring Tampin setting tool and inserted in the hole, with the conical nut at the bottom. A few light hammer blows on the Tampin tool will expand the shield in its permanent position. The fixture is then placed and the bolt inserted and turned down. The bolt does not expand the shield; it merely holds the fixture in place. The pilot of the Tampin tool passes clear through the shield and is held there by a spring during the expansion. Prevents dust from entering threads and gives clear passage for the bolt to the bottom of the hole. It recedes in the handle of the Tampin tool while the shield is being driven down in place.

TAMPIN EXPANSION SHIELDS

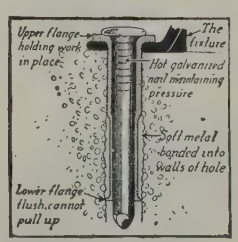
Size of bolt or screw	Min. dim. of hole req'd., in.		*Working load, lb.	†Ship. wt., lb. per 100
	Diam.	Depth		
6-32	5/16	1/2	75	1 1/2
8-32	5/16	1/2	100	1 1/2
10-24	3/8	5/8	200	2
12-24	1/2	7/8	300	5
1/4	1/2	7/8	400	5
5/16	5/8	1	500	7 1/2
3/8	3/4	1 1/4	800	14
7/16	7/8	1 1/2	1000	19
1/2	7/8	1 1/2	1200	19
5/8	1	2	1500	24

*Working loads figured with a factor of safety in accordance with modern engineering practice.
†Includes one setting tool.

Dryvin Shield

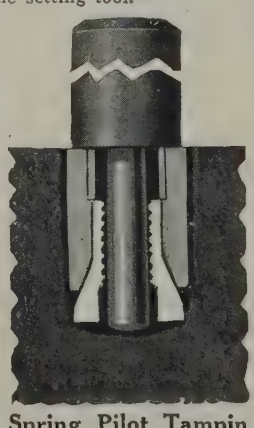


Before the Nail Is Driven Home

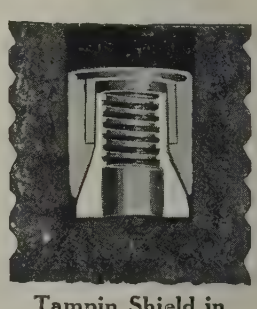


After the Nail Is Driven Home

Tampin Expansion Shield



Spring Pilot Tampin Tool Ready to Expand Tampin Shield



Tampin Shield in Position After Expansion

Continued on next page

Loxin Expansion Shields

Hot galvanized, single machine bolt type. Designed to hold in loose as well as tight holes. As the bolt is turned down, the expansion segments at the bottom expand. This brings the grip at the bottom of the hole which prevents slipping. Loxin shields carry a great load and are easy to install.

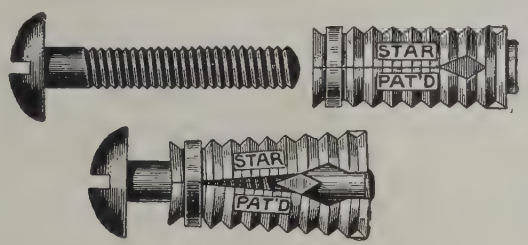
LOXIN EXPANSION SHIELDS

Bolt diam., in.	Shield length, in.	Outside diam. and drill req'd., in.	Ship. wt., lb. per 100
¼	1¼	½	3½
5/16	1½	5/8	6¼
5/16	2	5/8	8
3/8	1½	5/8	6
3/8	2	5/8	8
7/16	2½	7/8	18
½	2	7/8	14
½	2½	7/8	18
5/8	2½	1	24
5/8	3	1	26
¾	3½	1⅛	37

Star Malleable Iron Chair Shields

Simple in operation as may be seen in the illustration. The two shield units are held firmly together at one end by a ring, forming virtually one piece of metal. They will stand almost unlimited rough treatment without parting. Should concrete around shield crush, fastening can be made secure again by tightening expansion with screwdriver or wrench.

Made ¼-in. size only. Especially suited for theater seats.



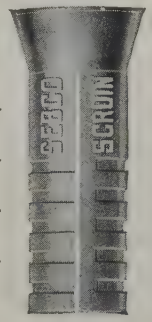
Scruin Lead Screw Anchors

These are anchors of a new design which give greater holding power and require a smaller installation hole for the corresponding size screw. Each size anchor accommodates more sizes of screws than other types of anchors. The holding power in average conditions of masonry is higher in the short length for Nos. 8 and 14 sizes, but in the case of plaster wall or other soft surfaced masonry, the use of the long length is recommended.

SCRUIN LEAD SCREW ANCHORS

*Screw size and length of anchor	Fractional screw size, in.	Outside diam. and drill req'd., in.	Ship. wt., lb. per 100
6, 8, 10 x ¾	1/8-3/16	¼	1¾
6, 8, 10 x 1½	1/8-3/16	¼	2¼
10, 12, 14 x 1	3/16-¼	5/16	2½
10, 12, 14 x 1½	3/16-¼	5/16	3½
16, 18 x 1	5/16	3/8	4
16, 18 x 1½	5/16	3/8	5
20, 22, 24 x 1¾	3/8	7/16	8

*Order by screw number and length of anchor.



Sebco Toggle Bolts

Ideal fastenings for lath, plaster, hollow tile, pressed boards, hollow metal or sheet steel. Channel construction permits toggle head to fold closely over bolt and pass through small hole. The toggle head is set off-center to fall quickly into position. Sebco Toggles bear on extreme ends, which avoids breaking edges of brittle material.

Made in four types: Nos. 1, 3, 5R and 5F. No. 1 is a pinched head toggle in which the head of the bolt is fastened to the toggle head and a nut is used to make the fastening. No. 3 is commonly known as "plumber's toggle." It has a No. 5 head with threaded rod and capnut. No. 5R has a channel shaped head set off-center, and a round headed bolt. No. 5F is the same as No. 5R except that the bolt is flat headed.

All Sebco toggles have National Standard threads, not stove bolt threads.

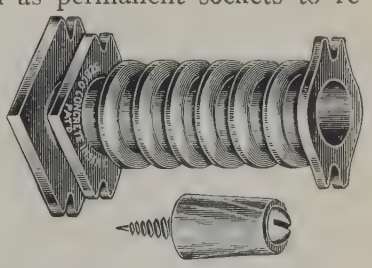
SEBCO TOGGLE BOLTS

Diam. and length of screw, in.	Drill size req'd., in.	Ship. wt., lb. per 100
No. 5R or 5F		
1/8 x 2	5/16	1¾
1/8 x 3	5/16	2½
1/8 x 4	5/16	2¾
No. 1		
5/32 x 3	½	4
5/32 x 4	½	4½
No. 1—*3—5R or 5F		
*3/16 x 3	½	5
*3/16 x 4	½	6
3/16 x 5	½	6½
3/16 x 6	½	7½
¼ x 3	¾	8
*¼ x 4	¾	9
¼ x 5	¾	10
¼ x 6	¾	11
No. 1 or 5R		
5/16 x 3	⅞	13½
5/16 x 4	⅞	15½
5/16 x 6	⅞	20
3/8 x 3	⅞	19
3/8 x 4	⅞	22½
3/8 x 6	⅞	27
No. 1		
½ x 3	⅞	25½
½ x 4	⅞	34½
½ x 6	⅞	43½
No. 5 Toggle Heads Only		
⅛	¾	1½
5/16	½	2½
¼	¾	3
5/16	⅞	9
3/8	⅞	9

*No. 3 toggles made in three sizes only.

Sebco Concrete Inserts

Here is a practical means of providing threaded holes in concrete walls, ceilings and floors for possible future use. Sebco Concrete Inserts are fastened to the form before concrete is poured. When forms are removed, the inserts remain as permanent sockets to receive standard machine bolts whenever desired.



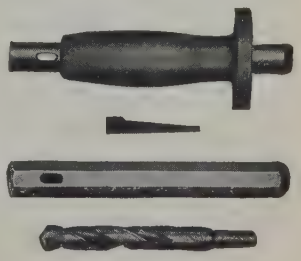
SEBCO CONCRETE INSERTS

Bolt diam., in.	Length of insert, in.	Ship. wt., lb. per 100
¼	1½	10
⅜	2	17
½	2½	25
⅝	2½	36
¾	3	55

Hamrtwist Drill Points, Hand Chuck and Holder

These drills are made of special steel alloy to stand hard use in masonry drilling. Furnished in 1/16-in. sizes from 3/16 to ⅝ in. Fast and easy cutting, automatically clean dust from holes, long life, easily resharpened, hold original diameter, will not jam. Hand chuck to fit all drills regularly furnished.

An improved type of drill holder is made with a protecting shield and rubber grip that prevents hitting and stinging the hand. Knockout pin furnished with each holder and chuck.



THE BLASTEEL MANUFACTURING COMPANY

Floor Clips, Floor Joiners and Bindings for Applied Coverings

GENERAL OFFICE
KANSAS CITY, MO.

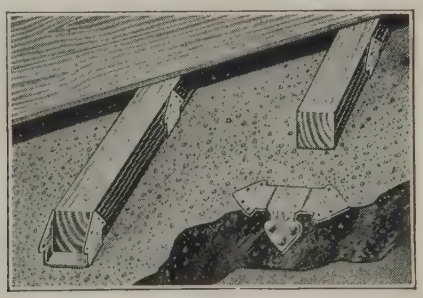
AGENTS IN PRINCIPAL CITIES

Spearpoint Floor Clips

For anchoring wood floors to concrete.

(1) Save cost of material and labor for a concrete fill.

(2) Reduce dead weight 18,000 lb. per 1000 sq. ft. of floor area.



(3) Spearpoint clips are made of 20 gauge rust resisting metal and give an absolutely firm floor. The two shoulders and three bosses on each flange that inserts in the concrete maintain solid and permanent anchorage.

(4) They provide a dry air space which safeguards sleepers and floor from rotting. This space also acts as insulator and sound deadener.

(5) Conduits, pipes, etc., may be placed on top of slab and under finished floor.

(6) Sleepers can be laid approximately twice as fast as when a fill is used.

(7) Spearpoints save time and labor in placing as the spearshaped flanges are easily and quickly inserted in the concrete.

(8) Spearpoints lie flat until the sleepers are to be laid, giving free use of floor slab.

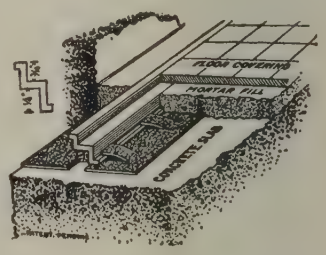
(9) Spearpoints have sufficient width to permit abutting ends of sleepers to join within the clip, leaving no loose ends to warp or squeak.

(10) Spearpoints are made for 2, 3 and 4-in. sleepers. The Spearpoint Standard is used for ordinary floor construction and the Spearpoint Giant for extra heavy requirements.

(11) Economical and easy to set. Simple instructions accompany each shipment.

Recessed Brass Binding Bar

For use where an offset is provided in concrete or terrazzo for linoleum or other applied floor covering in public buildings, schoolrooms, hospitals; in corridors, around elevator mats at floor landings, etc.



By extending a cement or terrazzo border a few inches from the wall in rooms or corridors, the Recessed Brass Binding Bar forms the offset for the applied covering and makes a perfect abutment of the two materials, leaving no opportunity for the collection of germs or dirt and at the same time making an ornamental border for the finished floor.

(1) This bar forms the offset for receiving the applied floor covering.

(2) It makes a close, perfect abutment of the two floor materials on the same level, with an ornamental polished brass strip in evidence.

(3) Gives a straight binding edge for the applied covering.

(4) Protects the border material against chipping or crumbling.

(5) Makes a smooth, level base for the covering that brings its surface even with the top of the bar and outside border.

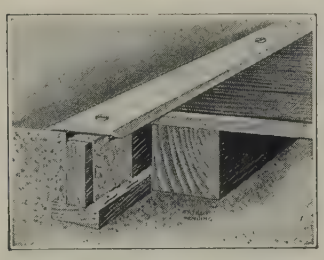
(6) Serves also as a dividing bar between the two fills, preventing cracks from the inside field extending into the border material.

(7) Top of bar serves as a screed for finishing border material to proper level.

(8) Shoulder of bar is also a screed for striking off the inside fill.

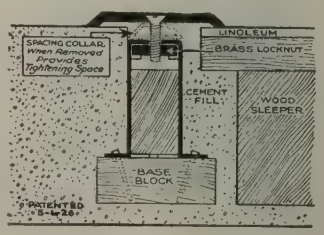
(9) Base plates spaced along the bar support it in an upright position, and give the bars secure anchorage and perfect alignment.

The Recessed Brass Binding Bar is made to accommodate either $\frac{3}{16}$ or $\frac{1}{4}$-in. flooring and 6 m.m. or 4.76 m.m. metric system. Base anchors supplied with bars.



Ankortite Floor Joiner

The Ankortite is a securely anchored and attractive joiner for abutting floors. It consists of a threshold plate attached to an assembled base, within which is provided a tightening space to take up the shrinkage and wear that occurs in floors, and eliminates forever any looseness or rattle of the threshold plate.



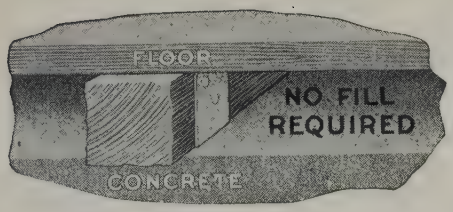
The plate is furnished in brass, bronze or galvanized steel, either arched or flat, in standard widths of $2\frac{1}{4}$ and 3 in., or any desired width may be used. Shipped completely assembled, made up to specified lengths, ready for placing. The Ankortite costs no more than the average threshold plate and is simple and easy to install.

THE BULL DOG FLOOR CLIP CO.

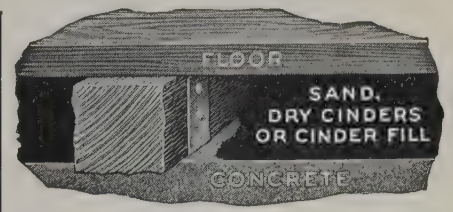
108 North First Avenue, WINTERSET, IOWA

135 BRANCH REPRESENTATIVES AND 20 CONVENIENT DISTRIBUTING PLANTS

LOCAL REPRESENTATIVE



Bull Dog Standard without a Fill



Bull Dog Junior Where Fill Is Required

Product

BULL DOG FLOOR CLIP for anchoring Wood Floors to Concrete.

Advantages of Bull Dog Floor Clips

(1) Save 5¢ per sq. ft. by eliminating the cost of material and labor for a concrete fill.

(2) Can be placed for ½¢ or less each, and sleepers can be laid 50% faster than if anchored by a fill material.

(3) Reduce dead weight 18,000 lb. per 1000 sq. ft. of floor area.

(4) Give a perfectly firm, level floor. Solid bed and anchor overcome all possibility of floor buckling, doming, or squeaking.

(5) Provide a dry air space which prevents strips or finished floor from rotting. No drumhead or hollow sound is produced by this air space.

(6) Permit conduits and pipes to be placed on top of slab right under finished floor.

(7) Where a fill is considered necessary, Bull Dog Floor Clips save considerable in construction costs when used with any standard fill. Use of Bull Dog Junior Clip is recommended for a still greater saving in construction costs.

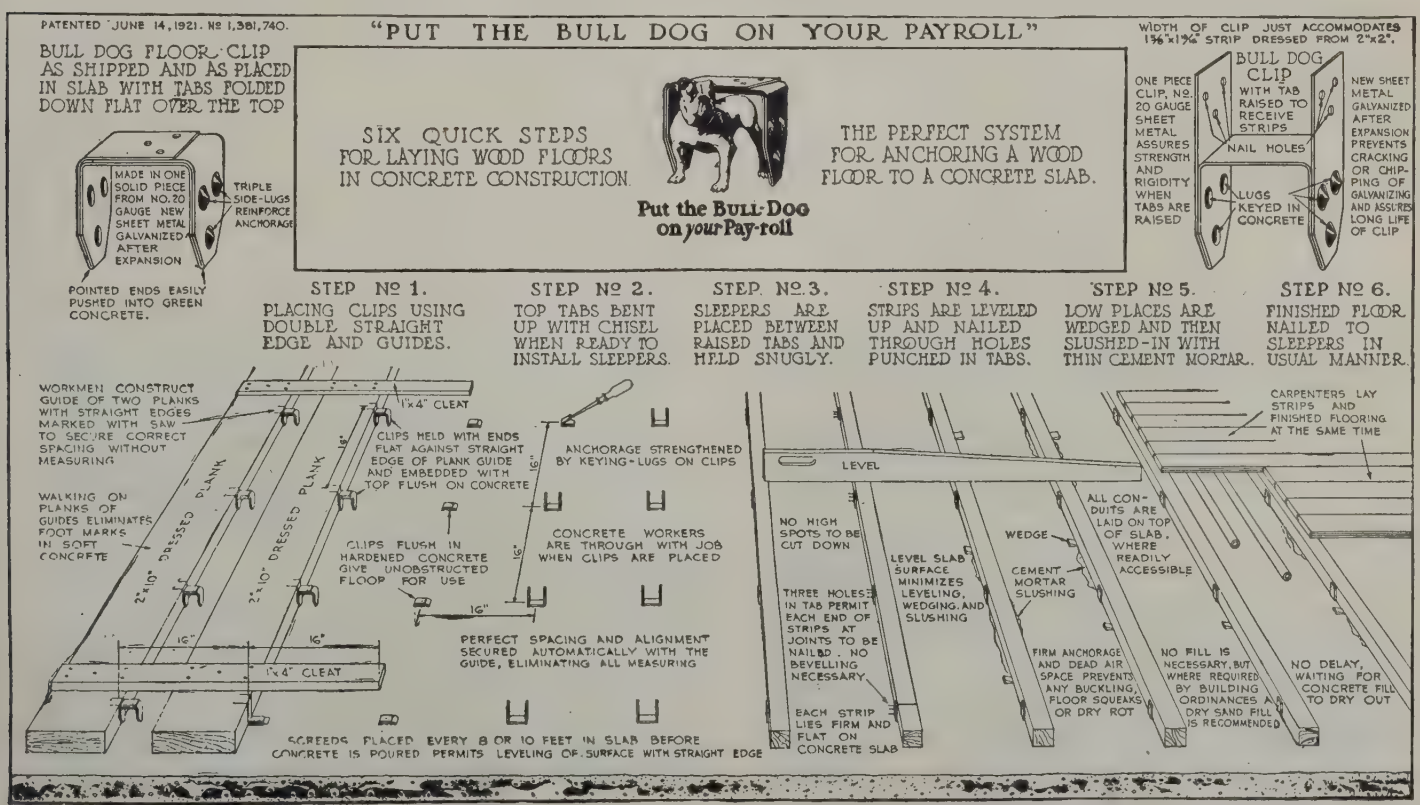
Bull Dog Junior (*Reg. U. S. Pat. Office*)

For floors where ordinances require a fill, or where a light clip is desired, the Bull Dog Junior effects a still greater saving in anchoring wood floors to concrete. It is one-half the width of the regular Bull Dog Clip and is made in three sizes for 2, 3 and 4-in. sleepers. When the Junior Clip is used in conjunction with a fill, we suggest spacing 16 in. and 2½ ft. which requires about 300 clips per 1000 sq. ft. of slab at a cost, including installation, of $9.00. This cost is more than offset in the time and expense of bracing the strips, beveling and shimming sleepers, and a large saving in expense of fill which can be made of any cheap, inexpensive mix, sand or cinders. Samples of each of the three sizes will be promptly furnished any interested architect or contractor.

Nails Now Furnished without Charge

A sufficient quantity of the correct size nails is packed in each case of Bull Dog Clips shipped. This assures the use of the right size nails and saves the user their cost.

Users of Bull Dog Floor Clips are protected by reissue Patent 15881, July 29, 1924; Process Patent 15387430, May 19, 1925



BULL-DOG FLOOR CLIPS — INSTALLATION DATA.

AMERICAN CEMENT TILE MFG. CO.

INCORPORATED FEBRUARY, 1902

Manufacturers of Cementile Roofing

Oliver Building, PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
PHILADELPHIA, PA., 1827 Arch Street
BIRMINGHAM, ALA., 2700 North 23rd Street
ATLANTA, GA., 1007 Candler Building

WORKS: WAMPUM, PA.; LINCOLN, N. J.; BIRMINGHAM, ALA.

Products

Manufacturers of BONANZA "CEMENTILE"—a reinforced cement tile roofing.

BONANZA CEMENTILE
TRADE-MARK

Description of Bonanza "Cementile"

Bonanza "Cementile" are very large, light, steel reinforced cement roofing tile furnished in three distinct types; namely, Interlocking, Flat, and Channel, besides such necessary fittings as ridge tile of various types, skylight or glass insert tile, flashing tile, collar tile, etc., all factory made and cured—a specialized product, brought to its highest state of development.

The tile are laid directly on open steel roof purlins (which are spaced on a span suitable for the type of tile selected).

In no case is sheathing or other base support required. This eliminates excessive weight and insures greatest economy in design of the supporting structure.

All in all, Bonanza "Cementile" roofs are roofs of economy and quality, speedily laid, with guaranteed results backed by our established reputation as manufacturing and contracting engineers over a period exceeding 25 years.

Bonanza Interlocking "Cementile" are designed for pitched roofs. Laid directly on purlins spaced approximately 4 ft. apart, they are fireproof and waterproof, the finished surface having a particularly pleasing red Spanish tile effect. Like Bonanza Flat "Cementile" and Bonanza Channel "Cementile" they are very strong and light.

Bonanza Flat and Bonanza Channel "Cementile" are designed for flat roof construction, or for pitched roofs where it is desired to waterproof with composition covering. These tile are laid directly on purlins; the 1½-in. Bonanza Flat "Cementile" for standard spacing of 5 ft., and the Bonanza Channel "Cementile" standard 8-ft. spans, are a combination of tremendous strength and lightness that eliminates all form work and assures speed in erection with positive results.

Advantages of Bonanza "Cementile"

Economy—Being laid directly on the roof purlins, the absence of roof boarding, nailing strips and other forms of fastenings makes the initial cost reasonable. Maintenance charges are eliminated, thus making the first cost usually the last.

Weight—These tile are designed along economical lines, reducing the dead load on the steel structure to a minimum.

Strength—In conformity with the standard purlin spacing, Bonanza "Cementile" roofs will sustain such roof loads as are usually encountered. Breaking load tests made at Columbia University for the New York Building Department, showed as high as 350 lb. per sq. ft. under a uniformly distributed load on the standard spacing.

Adaptability—Bonanza "Cementile" will be found suitable for any type of roof construction and of any size.

Erection—An experienced and capable field force insures absolute satisfaction. "Cementile" roofs can be laid regardless of temperature or climatic conditions, thus eliminating delays.

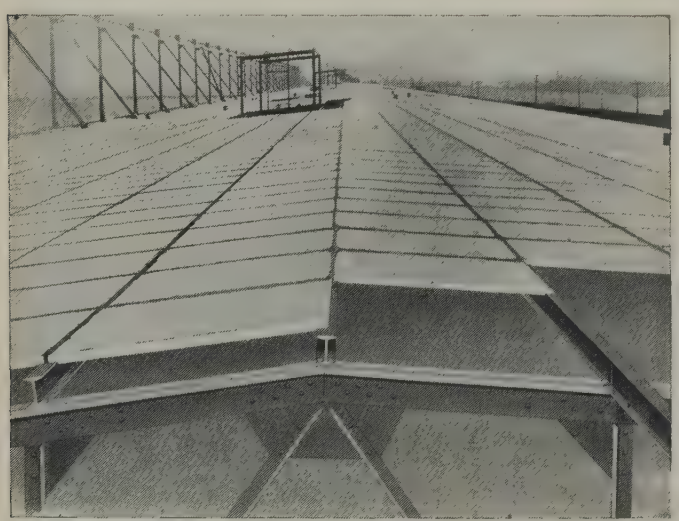
Weatherproof and Fireproof—Bonanza "Cementile" are impervious to water and the elements, are proof against fire, and are everlasting under ordinary conditions.

Interlocking "Cementile"

Designed for pitched roofs, forming in itself a finished, watertight and fireproof covering.

Standard tile is 26 in. wide by 52 in. long (24x48 in. exposed surface) and 1 in. thick, properly reinforced with a galvanized steel fabric. It develops an ultimate breaking load capacity of 350 lb. per sq. ft.

The tile are made up as single units with no loose connections. The side "roll" of one tile overlaps the "rabbet" of the adjacent tile. All joints are properly sealed with "Lastik" Cement. A 4-in. lap is provided on each row of tile by the row above, which is staggered.



Lehigh Valley R. R. Co. Pier Shed, Jersey City, N. J.
110,000 sq. ft. of Bonanza Flat "Cementile" ready for waterproof covering

Watertown Arsenal, Watertown, Mass.
Finished Bonanza Interlocking "Cementile" Roof with Bonanza Glass Insert "Cementile." This is part of a total installation of ten buildings with an area of 470,000 sq. ft.

Continued on next page

The tile are hooked in place on purlin flanges by means of a continuous 1-in. offset at top of each tile. The Bonanza Wire Glass Insert Interlocking "Cementile," which interchange with the standard tile, provide any lighting effect demanded.

Guaranteed to carry a uniformly distributed load of 250 lb. per sq. ft. over a 4-ft. span.

DIMENSIONS AND WEIGHTS OF INTERLOCKING "CEMENTILE"

Size of tile	26x52 in.
Thickness of tile	1 in.
Surface exposed	24x48 in.
Weight per sq. ft.	14 lb.
Weight per sq. ft. of finished roofing	16 lb.
Number of tile per square of roof (100 sq. ft.)	12½

Roof Design—Minimum pitch desirable for slope of roof is ⅕, which is 4⅛ in. to 1 ft.

In order to arrive at the proper purlin spacing always start at the eaves; then use standard spacing of 3 ft. 10 in. to 4 ft. ½ in., as conditions call for. Any short spacing should be placed at the ridge; should this spacing be less than 1 ft. 4 in., special 60-in. tile should be used at the eaves. Steel channel purlins should be provided, held in alignment by sag rods.

Flat "Cementile"

Designed for both flat and pitched roofs; the application of a standard composition roofing is required to make roof watertight.

Standard Bonanza Flat "Cementile" are *1½ in. thick, 24 in. wide, and 60 in. long,* and are always carried in stock for immediate shipment. Where necessary, special tile are made to order for spacing over or under 60 in.

Ends have an offset which is laid on flange of I-beam purlins, after which joints are properly pointed, preparatory to application of composition roofing. Bonanza Flat "Cementile" are properly reinforced.

Guaranteed to carry a uniformly distributed load of 200 lb. per sq. ft. over a span of 5 ft.

DIMENSIONS AND WEIGHTS OF FLAT "CEMENTILE"

Thickness of tile	1½ in.
Size of standard tile	24x60 in.
Surface exposed	24x60 in.
Weight per sq. ft.	17 lb.
Weight per square of roof	1700 lb.

Channel "Cementile"

Designed to meet the demands of the present tendency to use extra wide spans in flat roof construction. Also used extensively on sawtooth roofs.

Standard Bonanza Channel "Cementile" is *18 in. wide and 96 in. long;* channels are 1⅜ in. thick at flanges and 1 in. thick at web. Special tile are made to order for spans over or under 96 in.

Ends are laid directly on flange of I-beam purlins, joints are then properly pointed and entire roof deck covered with some form of composition roofing. Bonanza Channel "Cementile" are properly reinforced.

DIMENSIONS AND WEIGHTS OF CHANNEL "CEMENTILE"

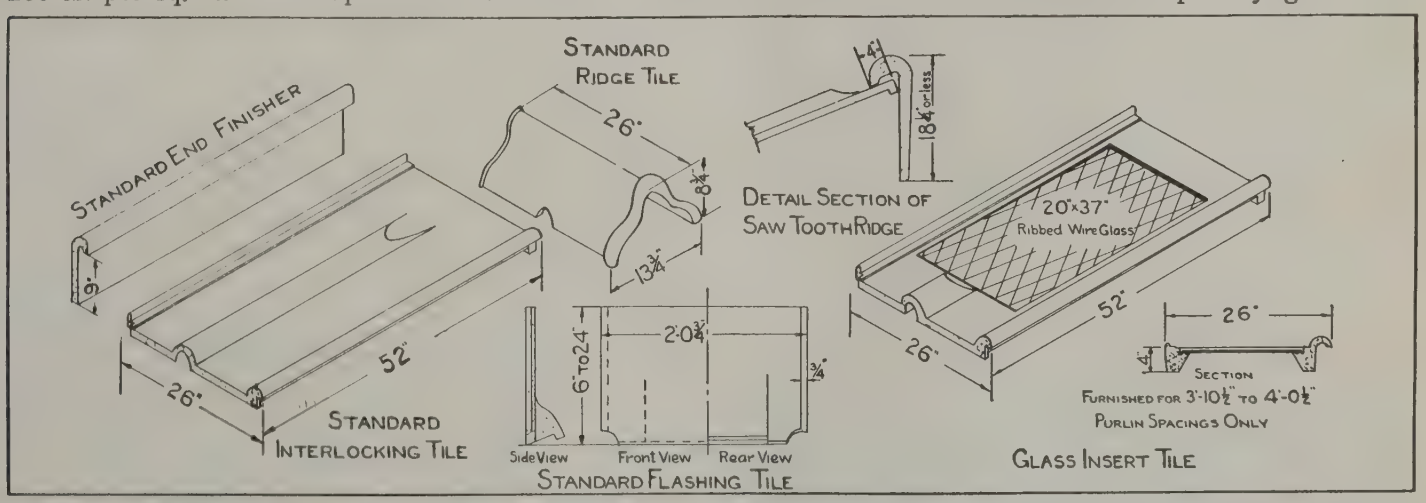
Depth of tile	3½ in.
Thickness of tile	Flanges 1⅜ in., web 1 in.
Size of standard tile	18x96 in.
Surface exposed	18x96 in.
Weight per sq. ft.	19 lb.
Weight per square of roof	1900 lb.

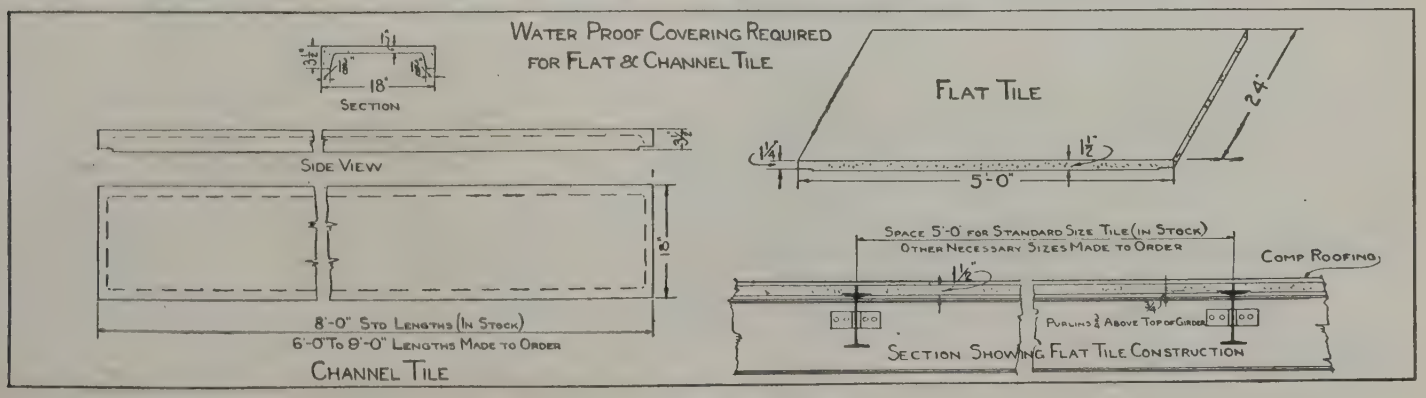
Service

Our engineering department renders free service to owners, engineers, architects and contractors whenever desired. Send your problems and preliminary plans during the early stages of the work. Our experience of 25 years allows us to offer suggestions as to the most economical purlin layout. Upon receipt of preliminary or finished drawings, either approximate or definite proposals will be furnished, as may be desired.

Bonanza "Cementile" roofs are erected preferably by experienced and efficient crews maintained by the company.

All materials and workmanship fully guaranteed.





ANCHOR FIREPROOFING COMPANY

101 Park Avenue
NEW YORK, N. Y.

2210 Park Avenue
DETROIT, MICH.

101 Marietta Street
ATLANTA, GA.

Products and Services

The furnishing and erection complete in the building of:

Afco Reinforced Gypsum Nailing Roof Tile.

Afco Combination Plaster Board Gypsum Roofs.

Afco Suspension System Gypsum Floors and Roofs.

Gypsum Tile Partitions.

Construction Service

All above constructions are installed in the building by our own organization consisting of country-wide crews of mechanics, especially trained in these types of work and available anywhere on short notice. Immediate service, correct and rapid installation are assured.

Engineering Service

A complete engineering department is at your service for consultation and assistance in design and construction. Architects' specification folders covering any of above and giving complete design information, and details will be sent upon request.

Afco Reinforced Gypsum Nailing Tile

Description—Solid precast, lengths of 30 in. by widths of 12 in., thickness of 3 or 4 in., consisting of calcined gypsum and wood fibre reinforced with electrically welded galvanized wire mesh. The wood strips are anchored in the tile and beveled to give additional security. These strips provide a positive nail-holding base to which the slate or ornamental tile may be nailed direct or to wood cross sleepers attached as shown in cut below. We recommend the use of cross sleepers. This tile provides an absolutely positive nailing base even under excessive moisture and circumvents the trouble previously encountered in ordinary types of plain gypsum roof tile, which possesses little nail-holding power when dry and practically none when damp.

Steel Framing—Owing to the light weight of Afco Gypsum Nailing Tile, 16 lb. per sq. ft., a material economy in structural steel framing is permitted.

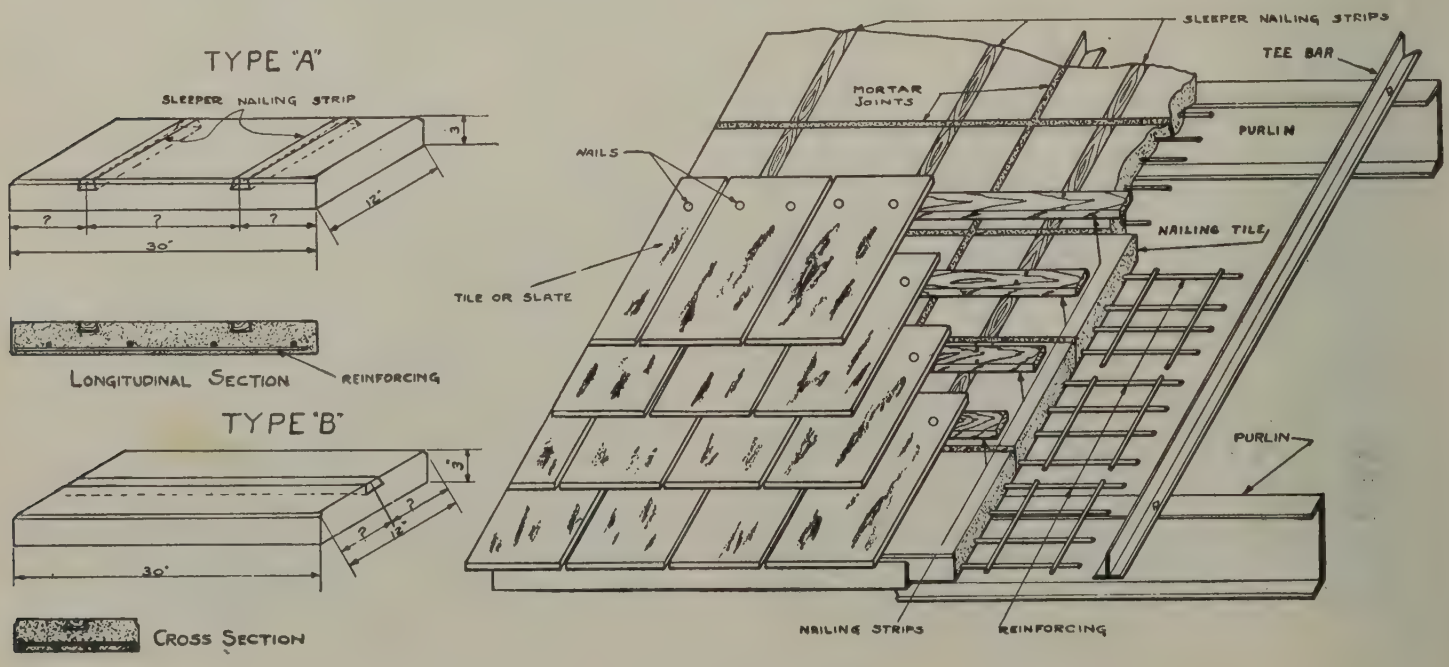
Insulation—Gypsum has the lowest conductivity of any structural fireproof building material, and heat penetration in summer and heat loss in winter are reduced to a minimum.

Strength—The Detroit Testing Laboratory reports show that Afco Nailing Tile develops strength withstanding ultimate uniform loads of from 488 to 520 lb. per sq. ft. or, using the factor of safety of 4, safe working loads of from 122 to 130 lb. per sq. ft.

Specifications—All roofs, as shown on plans, unless otherwise noted, shall be constructed of 3x12x30 in. solid Afco Gypsum Nailing Tile. Tee irons (see schedule for proper sizes) shall be laid directly on and securely fastened to the purlins. Tee irons shall be spaced 30¾ in. on centers and shall be furnished and erected by this contractor. The tile shall be laid tightly together on tee irons without mortar and after placing tile, all joints shall be filled with gypsum mortar mixed in accordance with the manufacturer's specifications. The entire surface shall be left true and even for installation of finish roof covering.

TEE IRONS REQUIRED FOR VARIOUS PURLIN SPANS

Purlin span	Size of tee	Weight
Up to 5 ft. 3 in.	2¼x2¼x¼ in.	4.1 lb.
5 ft. 3 in. to 6 ft. 0 in.	2¼x2¼x$\frac{5}{16}$ in.	4.9 lb.
6 ft. 0 in. to 6 ft. 6 in.	2½x2½x$\frac{5}{16}$ in.	5.5 lb.
6 ft. 6 in. to 8 ft. 0 in.	3 x3 x$\frac{5}{16}$ in.	6.7 lb.



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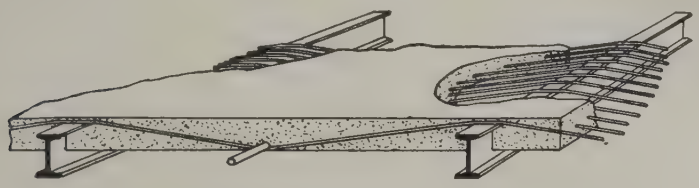
Afco Suspension System Gypsum Floors and Roofs

Description—This construction employs a principle of proven value and is practical for any type of building. Load is carried by cables in suspension, gypsum fill being used only to hold the cables rigidly in place. Cable section is constant, variations in purlin spacing and in floor or roof loads being provided for by cable spacing. Compressive strength of gypsum is disregarded and cable stresses are figured by standard formulae.

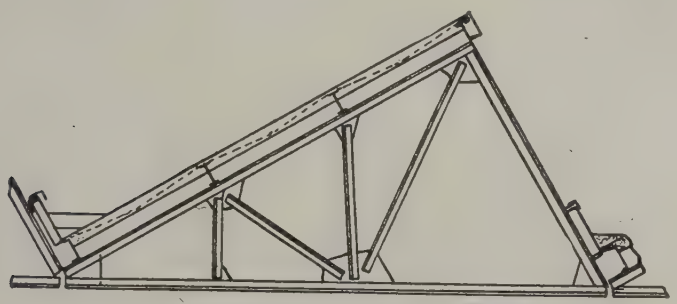


Rapid Erection—Fill sets in 15 minutes and the centering, which is of simple type wood form construction, may be removed within an hour. Other trades follow immediately with their work.

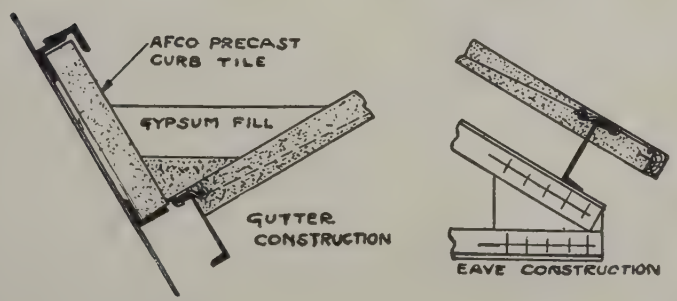
Insulation—Fill, principally calcined gypsum, eliminates condensation on undersurface, provides against heat loss in winter and penetration of heat in summer.

Economy—Light weight permits economy in structural steel, insulation qualities reduce amount of heating equipment required and cost of operating same.

End Bay Bracing—To take cable tension which exerts a pull on the end bay beams, it is necessary to include light truss bracing in structural steel contract. Our architect's folder gives full information—sent on request.



TYPICAL SAWTOOTH CONSTRUCTION



TYPICAL FLOOR CONSTRUCTION

Afco Combination Plaster Board Gypsum Roofs

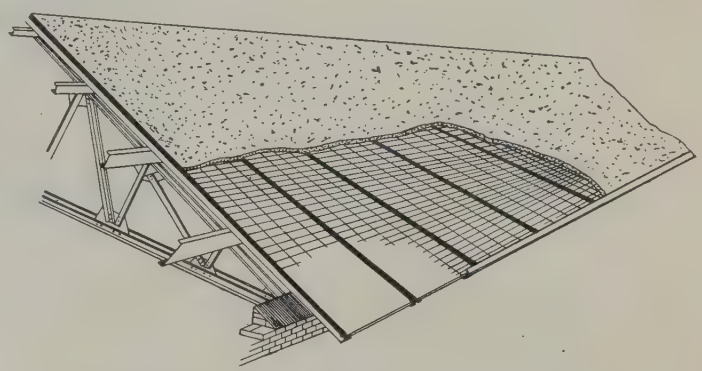
Description—Construction consists of subpurlins, either tee irons or light rail sections, spaced 32½ in. on centers, and clipped to main purlins. Heavy duty ½-in. plaster board is laid on and supported by bottom flanges of rails. Galvanized electrically welded reinforcing mesh of No. 11 main wires on 4-in. centers, and No. 12 spacer wires on 8-in. centers, is laid on top of the plaster board. Fill, consisting of standard gypsum mix, is poured, screeded and troweled to an even surface to receive waterproof covering. It is suitable for roofs with a pitch not greater than 45°.

Economy—This construction makes a definite saving in structural steel, due to its light weight. Insulating value of the roof reduces initial cost of heating equipment and reduces fuel bills.

Appearance—Undersurface presents true and uniform paneled appearance, showing neither form marks nor nailheads, and may be plastered or decorated in any color scheme, if desired.

Rapid Erection—These roof decks can be poured as fast as steel and masonry walls are completed. They set in 15 minutes and finish roof covering may be applied immediately.

Insulation—Same advantages as other roof types on this and preceding page.



Fireproofing—The construction comprises only materials whose fire-resisting qualities have long been established.

Strength—Columbia University tests of Afco Plaster Board Gypsum Decks reveal strengths that afford a factor of safety far in excess of standard practice—this factor of safety being much greater than that of the ordinary design of the structural steel framework of the building.

Undersurface of American Can Co. Warehouse, Brooklyn, N. Y.
TURNER CONSTRUCTION CO., General Contractors

CERTAIN-TEED PRODUCTS CORPORATION

GYPSUM DIVISION

Manufacturers of Gypsum Reinforced Roof Tile

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752
For Plants, see page B1752

Product

CERTAIN-TEED GYPSUM REINFORCED ROOF TILE.

Index to Products Listed Under Other Classifications

For Asbestos Shingles, see pages A474-475.
For Asphalt Shingles, see page A479.
For Built-up Roofing, see pages A448-451.
For Decorative Panels (Asbestos), see pages C3770-3771.
For Gypsum Lath, see pages B1726-1727.

TRADE-MARK

For Gypsum Partition Tile, see pages A422-423.
For Gypsum Plasters, see pages B1752-1758.
For Gypsum Wall Board, see pages B1618-1619.
For Fibre and Insulating Boards, see pages B1594-1595.
For Linoleum, see pages B1926-1928.
For Paint and Varnish, see pages B2044-2046.
For Roll Roofing and Building Paper, see page A433.

CERTAIN-TEED GYPSUM REINFORCED ROOF TILE

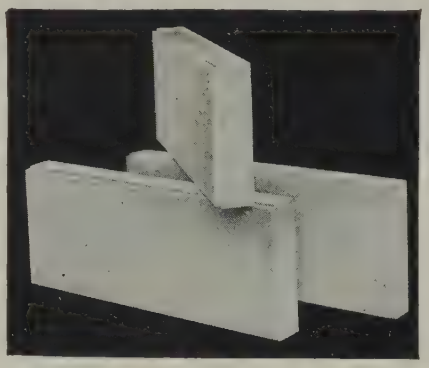
Certain-teed roof tile are made from a special gypsum stucco, reinforced with electrically welded galvanized, steel mats, designed to carry full required roof load. They are precast or factory moulded and therefore assure uniformity in mix, accuracy in size and weight.

Certain-teed roof tile are classed as short span tile. They are made in two sizes, 12 in. wide by 30 in. long and 3 in. thick, solid and 4 in. thick, hollow.

They are cast in a special form to provide a groove for sealing with mortar. *See illustration.*

Certain-teed roof tile can be erected at all seasons of the year. They can be adapted to any architectural design and can be covered with any kind of roofing. They are readily adapted to curved roofs, hip and valley construction and other intricate designs, as they are easily cut to fit.

Due to their high insulating qualities they greatly reduce heat losses, permit savings in cost and maintenance of heating equipment. Due to their insulating properties, they tend to prevent condensation. They are not affected by the action of sulphurous fumes. They are light in weight when compared with other materials used in roof construction.



Certain-teed Gypsum Reinforced Roof Tile

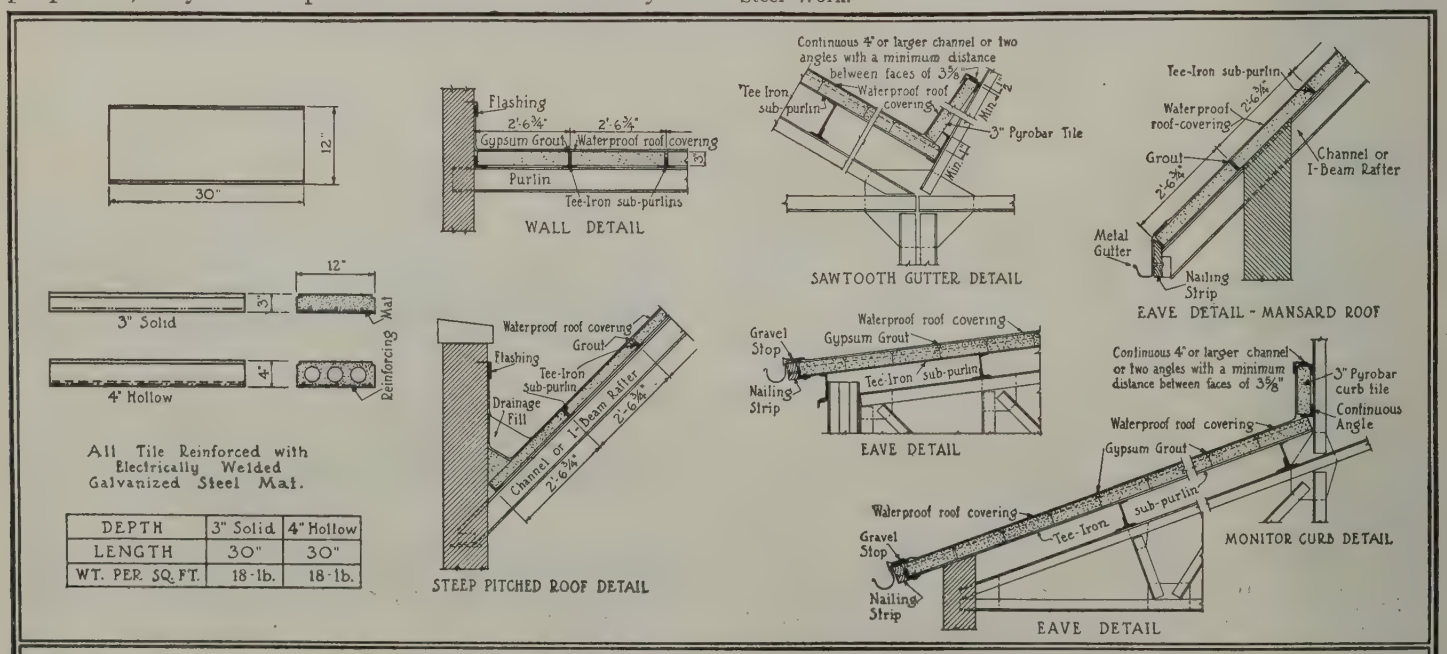
Certain-teed roof tile require sub-purlins, usually tee irons or standard A.S.C.E. light rail sections. The tile are placed on tee iron sub-purlins spaced 30¾ in. on centers or light rails spaced 31¾ in. on centers.

Specifications for Certain-teed Roof Tile

All roofs indicated on the drawings unless otherwise noted shall be constructed of Certain-teed Gypsum Reinforced Solid (or Hollow) Roof Tile, 3 (or 4) in. thick, as manufactured by the CERTAIN-TEED PRODUCTS CORPORATION; laid on sub-purlins (or, light rail sections) of the size and spacing indicated on the drawings.

Installation—All Gypsum Roof Tile shall be placed on supports without mortar with sides closely fitted and ends, bearing not less than ¾ in. on all sub-purlins. All top surface joints only, shall be thoroughly pointed with gypsum mortar composed of one (1) part unfibred gypsum cement plaster and two (2) parts clean, sharp sand. All steel work will be furnished and erected by the steel contractor.

Note: All steel work should be included in the Specifications for Steel Work.



DETAILS SHOWING TYPICAL APPLICATIONS OF CERTAIN-TEED GYPSUM ROOF TILE

JOHNS-MANVILLE CORPORATION

EXECUTIVE OFFICES

292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see page A15

Products

TRANSITE CORRUGATED ASBESTOS.

For other Johns-Manville Products, see pages in this edition as follows:

Acoustical Treatment .....page A15
Waterproofing and Dampproofing.....page A79
Rigid Asbestos Shingles.....page A478
Specification (Built-up) Roofing.....page A452
Pipe Coverings and Insulations.....page B1672
Asbestos Ebony and Electrical Products.....page C3413

Also Packings for all purposes; Floorings; Refractory Cements and Furnace Linings; Asbestos Wood; Insulating Lumber; Asbestos Products of all kinds.

Transite Corrugated Asbestos

Transite Corrugated Asbestos Roofing and Siding is made of asbestos fibres and portland cement united under great hydraulic pressure into a dense unlaminated monolithic sheet of great strength and rigidity. Transite cannot burn or rust. It will not rot, split, crack, or curl, and is immune to alkali or other corrosive fumes. Paint is not required as a preservative. It can be readily punched, drilled, or sawed, and is fastened with bolts, nails, or screws as required.

Johns-Manville Transite Corrugated Asbestos Roofing and Siding, standard thickness, may be used over purlin spacings up to 48 in. on centers, or over sheathing. The sheets may be laid on any slope from 2 in. per ft. up. Transite Corrugated Asbestos is furnished in sheets 42 in. wide, 4, 5, 6, 7, 8, and 8½ ft. long. One square weighs approximately 510 lb. laid.

The type of fasteners used depends upon the type, shape, size, and position of the purlins or girts. Fasteners are located at the top of the corrugation, and are provided with washers. The head of the fastener is then covered with asbestos roof putty.

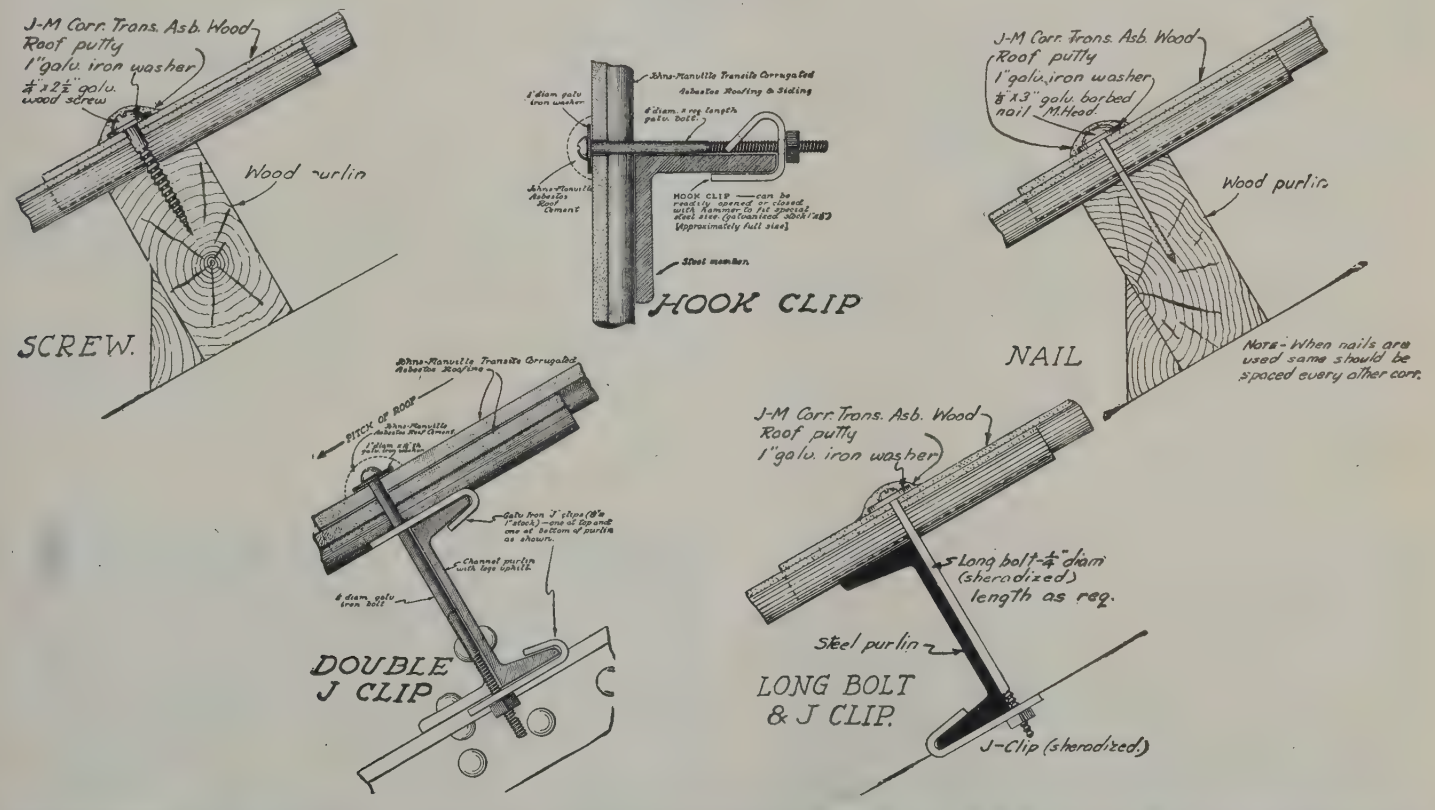
Transite Corrugated Roofing and Siding is also furnished in extra heavy thickness for specially wide purlin spacings.

JOHNS-MANVILLE CORPORATION also furnishes Transite Flat in all thicknesses from ⅛ to 2 in. (thicker on special order). Ridge rolls, louvre blades, ventilators, ducts, and special moulded shapes, are also made of Transite.

Johns-Manville Service

Architects are urged to avail themselves of the free service of Johns-Manville's Architects' Service Section and engineers for assistance on all problems. If you do not have a copy of our details and specifications on Transite Asbestos Lumber, write for one.

Fasteners



Fleischman Co. Pier, Peekskill, N. Y., Covered with Transite Corrugated Asbestos Roofing and Siding

FEDERAL CEMENT TILE COMPANY

Precast Concrete Roof Slabs and Cribbing Units

608 South Dearborn Street

CHICAGO, ILL.

Federal Interlocking Tile for Pitched Roofs

Form a complete waterproof roof, entirely eliminating all composition covering.

Their attractive red color enhances the appearance of the building.

Federal Glass Tile

When used in combination with Federal Interlocking Tile for top lighting, these tile form an ideal "daylight roof." Can be so distributed as to admit light over entire floor space, or concentrated on any technical or exacting operation. Glass is embedded in concrete during manufacture in such manner as to prevent cracking of the glass.

Federal Flat and Channel Deck Slabs

Designed for flat and pitched roofs. These types require some form of composition covering. Their light weight and long span effect a structural steel saving, and they eliminate costly labor and materials incidental to roofs poured or plastered on the job.

Federal Cork Insulated Slabs

Afford a splendid super-insulation. The cork is entirely encased on all sides with impervious concrete.

Federal Nailing Concrete Slabs

Form a concrete deck to which can be readily nailed slate, small tile or other ornamental roofing. Made of fireproof and waterproof concrete.

The Roof for Permanence

Federal Tile are made of the most indestructible of all materials—reinforced stone-concrete. They are not affected by heat, cold, ice, snow, fire, water, acid fumes, gases, or any other destructive forces. They actually grow stronger with age. Laid directly on structural steel, they make a light weight, fireproof construction. They require no painting, repairing or other maintenance. They last as long as the structure. The tile are properly reinforced and tied together with wire mesh to carry a load well above the building code requirements of the larger cities. The unit system, with plastic cement at the joints, makes every slab free to come and go with vibration, contraction and expansion. Federal Cement Tile provide the lowest cost permanent roof obtainable today.

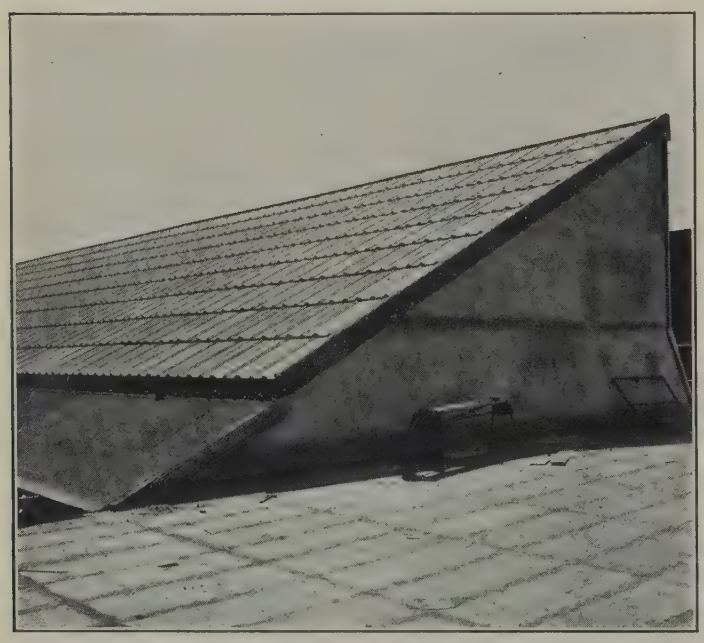
A list of representative installations will be furnished on request.

Service and Structural Details

All Federal roofs are installed and fully guaranteed by the manufacturer. Federal engineers are structural experts and will assist architects and engineers in obtaining the most economical layout of both steel and tile. This service involves no charge or obligation.

Federal 2-Piece Concrete Cribbing

These precast, reinforced concrete units are ideal construction for industrial, highway and railroad retaining walls. They form an attractive, stable wall at exceptionally low cost.



Federal Interlocking and Flat Slabs on Ford Motor Co. Assembly Plant, Memphis, Tenn.

Federal Channel Slabs Forming Roof Deck and Ceiling on Union Station Concourse, Chicago

Continued on next page

Standard Specifications

General—All tile to carry approximately 250 lb. per sq. ft. breaking load, uniformly distributed when resting on supports spaced the same as the purlins. No cracked or broken tile or tile with broken corners or warped tile will be permitted to be placed in the roof. All tile to be as nearly perfect as good workmanship will permit.

All tile to be natural water and air cured under cover where a constant temperature is maintained of not less than 65° F.

This contractor shall make up and submit for approval precast slab details based on the steel fabricator's shop drawings as well as the architect's design drawings, before starting manufacture of material.

All tile are to be erected by the manufacturer furnishing the material in a thorough workmanlike manner.

Interlocking Tile—The pitched roof is to be Precast Reinforced Concrete Tile, Interlocking Type, with the necessary trimmings, to make a complete and satisfactory job.

All tile to be composed of an approved brand of portland cement and the highest grade of washed torpedo sand, in a mixture of 1 part of cement to 3 parts of sand accurately graded, thoroughly mixed, and mechanically tamped and kneaded, so as to obtain the greatest possible density and watertightness. Each slab is to be reinforced with a sheet of galvanized cold drawn wire mesh, the longitudinal wires spaced not more than 2 in. apart and cross wires woven around the longitudinal wires.

The sheet of mesh reinforcing shall be mechanically straightened before being placed in the slab so that it can be accurately centered in a plane and be protected by ½ in. of dense, impervious concrete.

The exposed surface of the tile to present a permanent red color and this color, a mixture of iron oxide and cement, to penetrate the top half of the slab. The top surface to be thoroughly troweled, giving same a smooth and uniform finish.

The longitudinal joints to be of plastic made with a high grade oil cement and a weather cap coat of highest grade elastic compound. The joint to conform to detail shown on the drawings.

The lap or cross joint to be formed of a high grade oil cement. Butter the upper end of each course of tile as laid, then install course above producing a squeeze joint at overlap.

Special tile to be furnished where necessary; these tile to be detailed and manufactured to interlock and fit in with adjacent tile without field cutting.

Glass Tile—Top lighting shall be provided by Precast Reinforced Concrete Tile with Glass Inserts. Locate as shown on the drawings. These tile are to be made so as to be interchangeable with the standard 52-in. interlocking tile.

The mix, material and workmanship of these tile shall be the same as the standard interlocking tile. A sheet of ¼-in. wire glass 21x35 in. is to be embedded in the concrete during the process of manufacture of the tile, thus becoming an integral part thereof.

The four edges of the glass are to be triple dipped in a special asphalt compound, forming a cushion on all four sides, to allow for expansion and contraction.

A condensation gutter and weep hole formed in the concrete at the lower edge of glass is to be an integral part of the glass tile.

Flat Slabs—The flat roof decks and gutters are to be Precast Reinforced Concrete Flat Slabs, 24 in. wide, of a length to fit purlin spacing and not less than 1⅝ in. thick for the standard 5-ft. slabs, composed of an approved brand of portland cement and the highest grade washed torpedo sand in a mixture of 1 part of cement to 3 parts of sand accurately graded, thoroughly mixed, tamped and kneaded so as to obtain the greatest possible density.

Each slab is to be reinforced with a sheet of cold drawn wire mesh, the longitudinal wires of which shall be spaced not more than 2 in. apart and cross wires woven around the longitudinal wires.

The under side of the tile shall present a smooth surface free from cracks or form marks, and shall be of a uniform natural gray cement color.

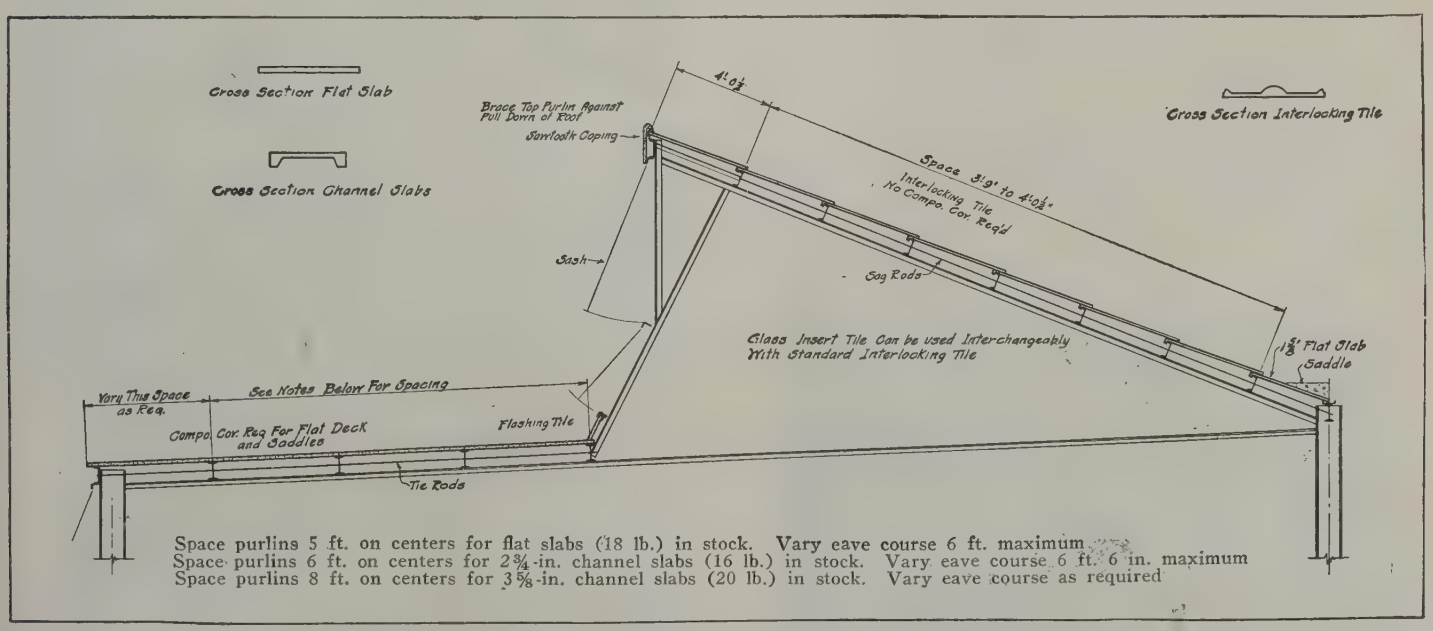
All joints of the flat slabs are to be cemented on the upper side with an approved brand of asphaltic cement and present a smooth surface ready for the application of the composition covering.

Channel Slabs—The flat roof decks are to be Precast Reinforced Concrete Channel Slabs 24 in. wide and 2¾ in. deep for spans up to 6 ft. 6 in. and 18 in. wide and 3⅝ in. deep for longer spans. The web thickness is to be a full inch, composed of an approved brand of portland cement and the highest grade of washed torpedo sand in a mixture of 1 part of cement to 3½ parts of sand accurately graded, thoroughly mixed, and vibrated so as to obtain the greatest possible density. Each leg is to be reinforced with one deformed bar accurately centered so as to have at least ½ in. of dense, impervious concrete on all sides. The web of the slab is to be reinforced with a sheet of triangular cold drawn wire mesh accurately centered.

All joints of the channel slabs are to be cemented on the upper side with an approved brand of asphaltic cement and present a smooth surface ready for the application of the composition covering.

The Federal Blue Print Book "Roof Standards"

The Federal Blue Print Book "Roof Standards," containing 28 pages of details of roof construction, will be sent on request. The drawing below is a typical illustration.



Combination Flat Slab and Interlocking Tile on Inverted Monitor Roof

STRUCTURAL GYPSUM CORPORATION

Manufacturers and Erectors of Gypsum Floors and Roofs

LINDEN, N. J.

BRANCH OFFICES

BALTIMORE, MD., 407 Munsey Building
BOSTON, MASS., 65 Franklin Street
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CLEVELAND, OHIO, 705 Fidelity Building
NEWARK, N. J., 28 Hill Street
NEW YORK, N. Y., 535 Fifth Avenue
PHILADELPHIA, PA., 1507 Fox Building
PITTSBURGH, PA., 602 Chamber of Commerce Building
SCRANTON, PA., Board of Trade Building
SYRACUSE, N. Y., 216 E. Washington Street

FACTORIES: AKRON, N. Y. AND LINDEN, N. J.

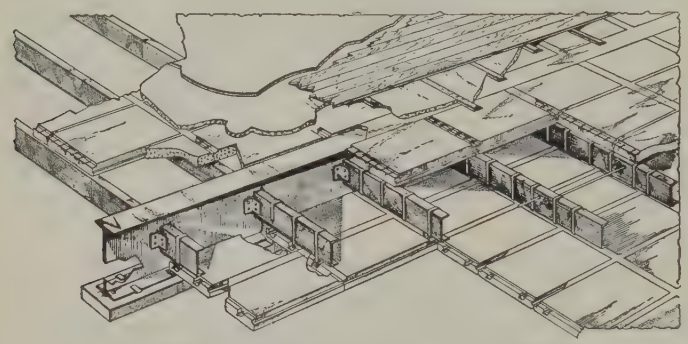
Product

Manufacturers and erectors of "Gypsteel" Pre-cast and Poured-in-place Floors and Roofs.

"Gypsteel" Gypsum Partition Tile.

"Gypsteel" Pre-cast Floors (Patented)

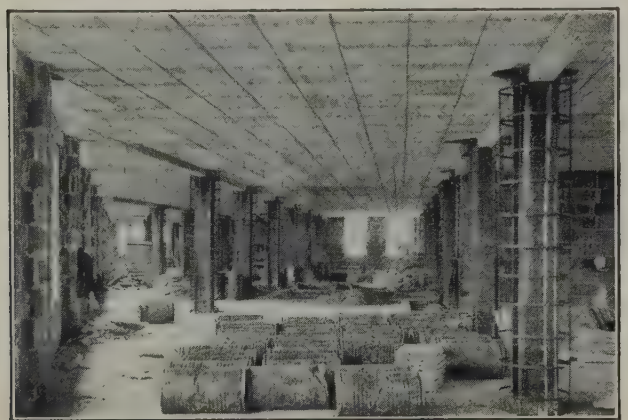
"Gypsteel" pre-cast floors economically combine the calculable strength of structural steel with the unequalled fire protection and lightness of gypsum. This floor construction consists of *standard sections of rolled steel channels,* spaced 30 in. on centers, on which are laid pre-cast gypsum floor slabs 2½ in. thick, and from which are suspended ceiling slabs of the same material, 2 in. thick.



"Gypsteel" Pre-cast Floor Construction

The channels, being of structural steel, are designed for the required loads in accordance with the usual practice, and may be used for any spans between supporting girders or walls up to 24 ft. They are supported at girders by means of standard web connections. Channels are *not coped,* but are framed with their top flanges 2 in. below the top flanges of the girder.

Where columns and girders are not required, these channels may be supported by the exterior and interior walls, their ends being built into the walls as the latter are erected.

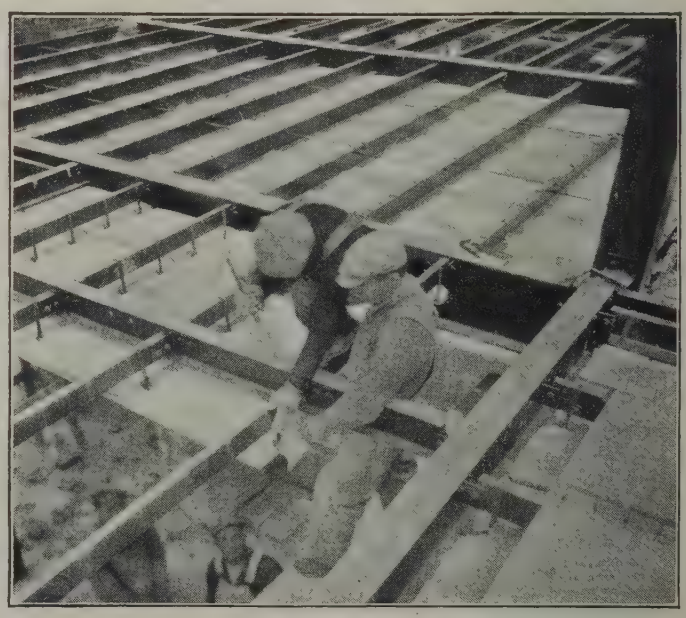


Ceiling Slabs Grouted and Ready for Plaster

Ceiling Slabs—The ceilings consist of "Gypsteel" pre-cast slabs 2 in. thick, 2 ft. 6 in. in length and 2 ft. in width, composed of the highest grade, scientifically calcined gypsum, with which is incorporated a small percentage of binder that imparts to the slab a peculiar toughness and elasticity. These slabs perform the double function of providing a flat ceiling underneath and completely *fireproofing* the channels.

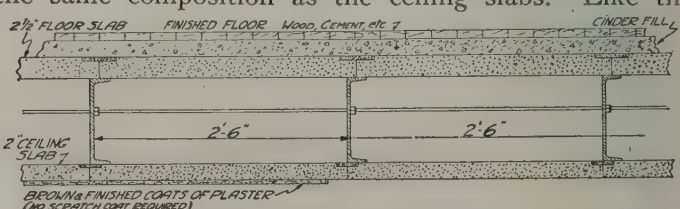
The ceiling slabs are reinforced with steel bars running lengthwise through the slabs and projecting from either end. When erected, these projecting bars pass through slots in heavy steel hangers clamped to the top flanges of the channels, suspending the slabs and yet holding them tightly against the soffits of the channels. Generous slots are formed where the slabs abut each other, at both sides and ends, by means of rabbets. The slots are filled solidly with gypsum grout, completely sealing them and preventing the passage of any heat through the joints.

The ceiling is then immediately ready for brown and finish coats of plaster—*no scratch coat being necessary* as required for metal lath and other materials.



Erection of "Gypsteel" Ceiling Slabs
Grouting to follow

Floor Slabs—"Gypsteel" floor slabs are made of the same composition as the ceiling slabs. Like the



Cross Section "Gypsteel" Pre-cast Floor Construction

Continued on next page

latter, they are pre-moulded at the factory and shipped to the job ready to erect. They are 2½ in. thick, 2 ft. in width and 2 ft. 6 in. in length.

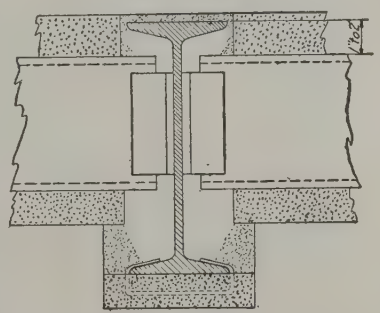
The slabs are reinforced with $\frac{3}{16}$-in. cold drawn wire rods (uniformly and accurately located in accordance with accepted engineering formulae), which emerge from the ends of the slab within ½ in. of the top surface, projecting about 2½ in.

When these slabs are set in place upon the steel channels, the projecting ends of the opposite rods in abutting slabs are tied together by a mechanical device which draws them up taut at these connections, *making the reinforcement continuous.*

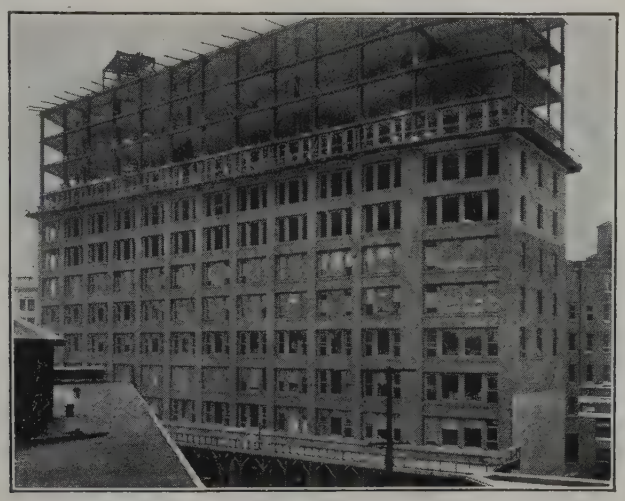
Erecting "Gypsteel" Pre-cast Floor Slabs

As the ends of the slabs are rabbetted where the rods emerge, these ties lie in a depression which is filled with a gypsum grout, firmly embedding the ties and smoothed off flush with the top surface of the slabs. The floor is then ready to receive the finish as desired.

Girder Fireproofing—Where the floor channels are supported by girders, the projecting webs and flanges of the latter are fireproofed by means of "Gypsteel" pre-cast soffit-slabs, 2 in. in thickness. These slabs have embedded in them ¾x⅛-in. flats, the ends of which project through the upper surfaces and are clamped over the girder flanges. Plastic gypsum is then poured in the space between top surfaces of the soffit-slabs and adjacent ceiling slabs. This fill is troweled off square and flush with outside edges of soffit-slabs.



Cross Section at Girder, "Gypsteel" Pre-cast Floor Construction, Showing Girder Fireproofing in Place



"Gypsteel" Pre-cast Floor, Sibley, Lindsay & Curr Department Store, Rochester, N. Y.
J. Foster Warner, Architect

Principal Advantages of "Gypsteel" Pre-cast Floors

Economy—They are the most economical type of first class fireproof floor construction which can be employed.

Strength—Their load carrying capacity is accurately calculated upon the strength of the supporting rolled steel channels, spaced 30 in. on centers. The ability of the "Gypsteel" pre-cast floor slabs to transmit the load to these channels was conclusively proven by tests conducted by Columbia University Testing Laboratory for the Bureau of Buildings, New York City, in which *concentrated loads* were applied by machine at the *third points* of one of the 2 ft. 6-in. spans for the full width of the slab. Failure did not occur until the load had reached *1482 lb. per sq. ft.,* equal, approximately, to 2000 lb. per sq. ft. uniformly distributed. These floors may, therefore, be safely designed for total loads up to 250 lb. per sq. ft. *with a factor of safety of 6 on the third-point loading,* or a factor of safety of approximately 8, based upon a uniform loading.

Fire Resistance—"Gypsteel" pre-cast floors have successfully passed the standard fire, load and water tests required by the principal cities of the United States for first class fireproof floor construction.

Lightness—"Gypsteel" pre-cast floor construction (including channels) is usually not only lower in first cost than any other type of fireproof floor with flat ceiling underneath for a given span and load, but its extreme lightness in weight invariably permits of a substantial saving in the tonnage of girders and columns.

TABULATION OF DEAD LOADS

	Lb. per sq. ft.
Channels (average)	5
"Gypsteel" floor slabs	12
"Gypsteel" ceiling slabs	9
2-in. cinder fill	10
Wood floor	4
Plastering (no scratch coat)	4
Total	44

Note: If cement finish instead of wood floor is used add 8 lb. per sq. ft.

Time Saving—The "Gypsteel" floor and ceiling slabs, being in standard sizes, are carried in stock at the factory and arrive at the job dry and ready to erect. There is *no formwork.* As the slabs are dry when set, the *ceiling could be plastered the same day,* if desired. And as there is *no water* entering into the construction (except the small amount used in the grouting), there is *no drying out to delay the finishing of the building.*

"Gypsteel" Long Span Pre-cast Roofs (Patented)

"Gypsteel" pre-cast roof construction is designed upon the suspension-bridge principle. It is, in effect, a monolithic roof after the erection is completed. The slabs are moulded in steel forms, into which the steel cables are placed and put into uniform deflection and tension by means of deflection rods restrained at the sides of the moulds. The cables are securely anchored to the moulds at points beyond the ends of the slabs, being removed from this anchorage when the gypsum has set, each cable emerging from the ends of the slab within ½ in. of the top surface, and projecting about 2 in.

When the slabs are set in place on the purlins, with their ends abutting, the projecting ends of the oppo-

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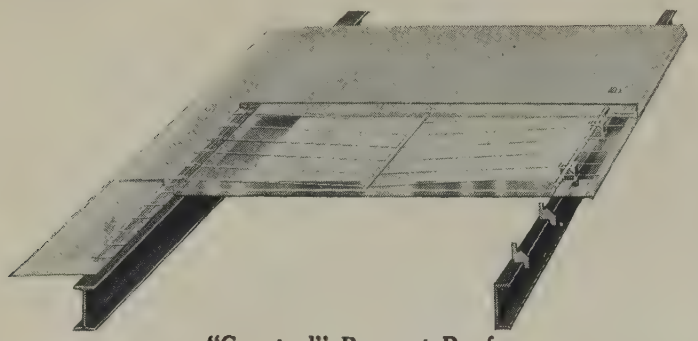
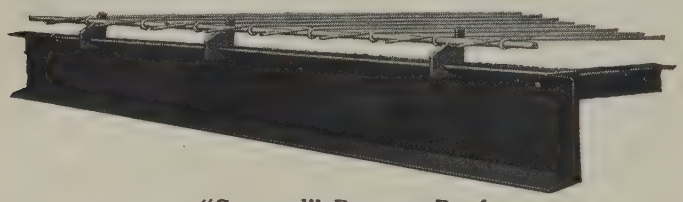


"Gypsteel" Pre-cast Roof
Details of design, cable ties, anchorage, grouted end and side joints and anchor slots

site cables in each slab are tied together by a mechanical device which draws them up taut at the connections; and as the ends of the slabs are rabbetted where the



"Gypsteel" Pre-cast Roof
Showing perfect mechanical anchorage of steel in slabs to the steel framework of building, independent of the gypsum

cables emerge, the ties lie in a depression filled with a gypsum grout, firmly embedding the ties and troweled off flush with the top surface of the slab.

Innumerable load tests which have been made on "Gypsteel" pre-cast roof construction have shown in every instance, that it will develop more than the factor of safety of 4 upon which the supporting steel cables are designed, the cable ties holding firmly until the ultimate strength of the steel in tension has been reached.

SAFE TOTAL LOADS PER SQUARE FOOT, PRE-CAST ROOF CONSTRUCTION

Slab width, in.	Cable spac. in.	Number cables per slab	Distance between supports center to center, ft.-in.												
			4–0	4–3	4–6	4–9	5–0	5–3	5–6	5–9	6–0	6–3	6–6	6–9	7–0
24	4	6	136	122	108	98	88	80	72	66	61				
	3.43	7	159	142	126	114	102	93	84	78	72				
21	4.2	5									59	54	50	46	
	3.5	6									70	64	59	55	
	3	7									82	76	70	65	
	2.62	8									94	87	80	74	
18	3.6	5												54	50
	3	6												65	60
	2.57	7												76	70

$W = 1152\ Td \div bL\sqrt{L^2 + 16d^2}$ where W = safe load in lbs. per sq. ft. T = cable strength = 0.0274 (area of $\frac{3}{16}$-in. cold drawn steel-wire rods) × 20,000 (unit working stress) = 552 lb.; d = deflection of wires in inches; b = cable spacing in inches and L = clear span in inches.

Slab thickness in all cases, 3 in., weight 14 lb. per sq. ft.

Note: While this table is not extended beyond the usual range of roof loads, slabs will be designed and furnished for any greater load capacities which may be desired, in order to meet special conditions. This is accomplished by decreasing the cable spacing for any given span.

"Gypsteel" Pre-cast Roof, Porter Street Pier, Philadelphia, Pa.

Advantages of "Gypsteel" Roof Construction

Economical First Cost—Its extreme lightness in weight and adaptability to wide purlin spacings effect substantial savings in the total steel tonnage of the purlins, trusses and columns, making it the most economical of any first class type of roof construction.

Saving in Heating—The "Gypsteel" composition used in the slabs is a most remarkable non-conductor of heat. It thus minimizes heat loss through the roof, *reducing the consumption of coal annually,* and effecting a further saving in the initial cost of the heating plant.

Preventing Condensation—"Gypsteel" roof construction pre-insures against the forming of condensation on the underside of the roof; and as the full depth of the slab (3 in. minimum) *passes over the tops of the purlins,* it also thoroughly insulates the supporting steel work.

Time Saving—"Gypsteel" pre-cast slabs are manufactured at the factory. Being ready for shipment when the erection of the steel work begins, the speed of installation is limited only by the progress of the steel erection ahead of it, and the slabs being dry the waterproofing follows the slab erectors just as closely.

Elasticity—"Gypsteel" successfully resists the most severe vibrations without cracking.

Corrosionproof—"Gypsteel" composition has been proved by more than 20 years' experience to be a perfect preservative of the incased steel against corrosion.

Close-up View of Cable Ties, "Gypsteel" Pre-cast Roof
Note that grouting is used on the side as well as end joints giving in effect when finished a monolithic gypsum slab

Non-expansive—"Gypsteel" roofs will neither expand nor contract, and are therefore free from cracks, spalling and internal stresses which frequently occur from this cause in concrete and other similar materials.

Attractive Appearance of the Underside of "Gypsteel" Long Span Roof Slabs, Senior-Junior High School, Harrisburg, Pa.
C. Howard Lloyd, Architect

Continued on next page

Attractive Appearance—"Gypsteel" roofs give a much more attractive appearance underneath than any other type of roof remaining unplastered, since the slabs are factory moulded on rubber mats, leaving a smooth, even surface underneath.

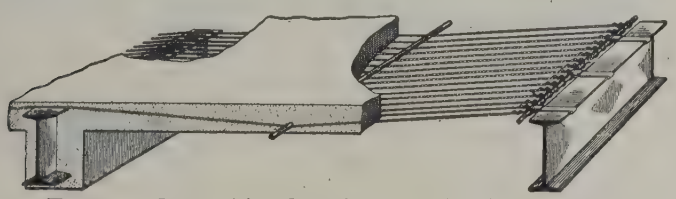
Replacement of Old Roofs—*The replacement of old roofs is readily accomplished by the use of "Gypsteel" pre-cast construction with a minimum of annoyance to the work in process below. Its lightness in most cases renders increased steel work unnecessary over that which would be required for the support of wood, etc.*

Poured-in-place Construction

Where flat ceilings are not required and floor or roof beams may be spaced not to exceed 8 ft. on centers, "Gypsteel" poured-in-place floor and roof construction combines the highest degree of fire resistance with economy. Its lightness (12 to 16 lb. per sq. ft.) permits of a substantial saving in the tonnage of steel.

The design of "Gypsteel" poured-in-place construction is based upon the *principle of the suspension bridge.* Cables of cold drawn steel wire are spaced from 1 to 3 in. apart (depending upon the spans and loads) and are securely anchored at both ends of a series of beams by means of bars and anchors of a section of metal sufficiently heavy to develop the ultimate strength of the cables in tension.

The cables are put into uniform deflection and tension between each pair of beams by means of continuous steel deflection rods.



Type 2. Poured-in-place "Gypsteel" Floor or Roof

"Gypsteel" composition is then poured-in-place between the beams, upon wood forms or centering, and is brought to a level surface about ½ in. above the top flanges of the purlins. It is then ready to receive the fill and finished floor on top. The projecting webs and flanges of the beams and girders are also incased in the same composition poured at same time as the floor slab.

This "Gypsteel" composition consists of the highest grade, scientifically calcined gypsum with which is incorporated wood fiber or chips to serve as a binder and impart to the slab its peculiar toughness and elasticity.

The strength of a "Gypsteel" poured-in-place floor or roof can be proved by accepted engineering formulae, as the desired live and dead *load capacity* of the slab *is calculated upon the structural value of the securely anchored steel cables, in suspension,* under a factor of safety of 4.

Installation

"Gypsteel" construction is installed by our own field organization under competent foremen and superintendents of many years' experience.

When desired, however, contracts will be taken for furnishing "Gypsteel" pre-cast slabs f.o.b. cars factory, with freight allowed to destination—we loaning one of our experienced working foremen to the contractor or owner to supervise the erection, for which no charge is made other than his actual time and expenses.

Estimates and Designs

Complete proposals for furnishing and installing "Gypsteel" floors and roofs will be promptly furnished on request. When it can be done conveniently, we suggest sending plans to our nearest sales office. This permits our Engineering Department to go over all of the details of the steel design and incorporate in our proposal an estimate of the total tonnage of steel which can be saved by reason of the lightness in weight of "Gypsteel."

Where plans have not yet been drawn, our Engineering Department will gladly co-operate in the preparation of the steel design to develop the maximum economy by the use of "Gypsteel" construction. This service is gratis, and imposes no obligation whatsoever upon the architect, engineer or owner.

"Gypsteel" Gypsum-Partition-Tile

Gypsum partition and furring tile, and column covering, is manufactured at the new plant of the Structural Gypsum Corporation, Linden, N. J.

Continuous machine methods are used, assuring a product of uniformity in size, strength, density and weight. An entirely new process (patented) permits of calcining gypsum of a consistently higher analysis than is generally required or used.

Specifications, tables of weights and sizes, comparative weights of Gypsteel partition tile and clay tile, and other pertinent data will be furnished upon request.

Bulletins

Complete bulletins, containing full designing details, will be gladly sent on request.

References

The following is a brief list of representative "Gypsteel" installations:

Floors

Bryant Park Building, New York, N. Y., York and Sawyer, Architects
Christopher Columbus School, Binghamton, N. Y., Tiffany & Kaley, Architects
First National Bank, Easton, Pa., Hoggson Bros., New York, N. Y., Architects
Hotel Stratfield (Addition), Bridgeport, Conn., Monks & Johnson, Boston, Mass., Architects
Hotel Suburban, East Orange, N. J., E. V. & C. F. Warren, Newark, N. J., Architects
Plymouth County Hospital, South Hanson, Mass., J. Wm. Beals Sons, Architects
Mt. Mercy Hospital, Buffalo, N. Y., Henry L. Spann, Architect
Museum of Natural Sciences, Buffalo, N. Y., Eisenwein & Johnson, Architects
Nurses' Home, Fordham Hospital, New York, N. Y., Starrett & VanVleck, Architects
St. Bonaventure College Dormitory, Allegheny, N. Y., Oakley & Schallmo, Architects
Saks & Co.—Herald Square, Department Store (Addition), New York, N. Y., Starrett & Van Vleck, Architects
Sibley, Lindsay & Curr, Department Store (Addition), Rochester, N. Y., J. Foster Warner, Architect
State & City Bank & Trust Company, Richmond, Va., Clinton & Russell, New York, N. Y., Architects

Roofs

American Radiator Co.	24 contracts
American Car & Foundry Co.	17 contracts
American Cyanamid Company	7 contracts
Atmospheric Nitrogen Corporation	5 contracts
Bethlehem Steel Corporation	29 contracts
General Electric Co.	13 contracts
International Nickel Company	3 contracts
International Paper Co.	11 contracts
New Convention Hall, Atlantic City, N. J.	
Pennsylvania Railroad Company	4 contracts
United Gas Improvement Co.	7 contracts
U. S. War and Navy Departments	23 contracts
Western Electric Co.	5 contracts
Youngstown Sheet & Tube Co.	14 contracts

UNITED STATES GYPSUM COMPANY

Manufacturers and Erectors of Pyrobar Reinforced Roof Tile, Floor and Ceiling Tile, Sheetrock-Pyrofill and Pyrofill Monolithic Construction

300 West Adams Street, CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 17 State Street
BUFFALO, N. Y., 620 Ellicott Square Building
BOSTON, MASS., 100 Boylston Street
WASHINGTON, D. C., 604 Lenox Building
BALTIMORE, MD., 1008 American Building
PHILADELPHIA, PA., 1500 Walnut Street
PITTSBURGH, PA., 917 Bessemer Building
CLEVELAND, OHIO, 942 Hanna Building
ATLANTA, GA., 1130 Chandler Building
DALLAS, TEX., 1310 Santa Fe Building
CINCINNATI, OHIO, Atlas Bank Building
DETROIT, MICH., 1418 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 402 Thorpe Building
ST. LOUIS, MO., Syndicate Trust Building
KANSAS CITY, MO., 234 Lathrop Building
OMAHA, NEB., 1407 W. O. W. Building
DENVER, COLO., 603 Denham Building
LOS ANGELES, CAL., 1105 Edwards & Wildey Building
SAN FRANCISCO, CAL., 765 Bryan Street

Products

Manufacturers and erectors of PYROBAR REINFORCED ROOF TILE (made of "Structolite") for roof decks; PYROBAR INTERLOCKING STRUCTURAL FLOOR TILE; PRE-CAST CEILING TILE; SHEETROCK-PYROFILL ROOF CONSTRUCTION; PYROFILL MONOLITHIC FLOOR and ROOF CONSTRUCTION.

For Acoustical Plaster, see page A23.
For Sound Insulation, see pages A24-25.
For Partitions and Furring Tile; Beam and Column Covering, see pages A182-187.
For Structolite Tile; Structolite Cement, see page A432.
For Fireproof Wallboard, see page B1621.
For Fireproof Sheathing, see page B1624.
For Dry Fill Insulation, see page B1668.
For Fireproof Lath, see page B1731.
For Gypsum Plasters and Finishes, see pages B1763-1765.
For Colored Finish Plaster, see page B1770.
For Exterior Stucco, see page B1780.
For Plastic Paint, see page B2135.

Service

Our mills, located at advantageous points throughout the country insure prompt delivery and economic distribution. We control the materials and construction from mine to building, thus guaranteeing satisfaction.

An Engineering and Construction Department is maintained to assist engineers and architects in designs and estimates. It is advisable to consult us when laying out your roof and floor steel. Without obligation we will gladly submit bids on Pyrobar or Pyrofill roofs for new or re-proofing jobs, for Pyrobar and Pyrofill floors, or placing an insulation deck on your present roof.

Gypsum Roof and Floor Construction

Description—We have several types of gypsum constructions for floors and roofs, which divide into two general forms—precast Pyrobar roof tile, floor tile and ceiling tile; and poured-in-place Pyrofill floor and roof construction.

Pyrobar roof tile are made of "Structolite," an especially prepared dense structural gypsum, reinforced with electrically welded, galvanized steel mats. Manufactured in two general types; long span hollow and short span, either solid or hollow.

Pyrofill consists of gypsum stucco to which has been added as a binder or aggregate, a small percentage of fibre, usually soft wood shavings. The two general types of Pyrofill construction are: (1) Sheetrock-Pyrofill construction which is poured on permanent Sheetrock forms or centering, resting on light rail or other steel framing and reinforced with a welded wire mat. (2) Pyrofill Monolithic construction, which is poured on wood forming similar to that used for concrete construction, and reinforced as a suspension system with twisted wire cables.

Pyrobar structural floor tile are made of Structolite, and reinforced to take the floor loads. The ceiling tile are provided with means of positive anchorage to the floor joists above, affording complete fire protection to the steel joists.

Sheetrock-Pyrofill Roof Construction

Sheetrock-Pyrofill construction can be economically used on practically any sized structure and is well adapted to small variations in purlin spacing. By increasing the size of the rail subpurlins, spans to 12 ft. 6 in. or even greater may be accommodated, spanning directly between trusses if desired. For ordinary framing conditions, however, a span of 6 to 8 ft. will be found the most economical.

Sheetrock-Pyrofill construction particularly well adapts itself to the decking of auditoriums, garages, theaters, gymnasiums, industrial plants—in fact, any steel framed building where a light weight, highly insulative roof deck with a finished ceiling effect is desired.

Sheetrock-Pyrofill Roof Deck, Curtiss-Robertson Aircraft Co., Anglum, Mo.
J. S. ALBERICI, Architect

Drainage fill may be constructed of Pyrofill, if desired. Curbs may be either pre-cast or poured-in-place.

The Sheetrock-Pyrofill construction consists of a reinforced gypsum slab poured on a permanent Sheetrock form. ⅜-in. Sheetrock, in lengths equal to the purlin spacing, is supported on the bottom flange of the light rail or T-iron subpurlins, which are spaced 32½ in. on center and clipped to the roof purlins. A gypsum slab of required thickness, reinforced with a continuous, electrically welded steel fabric, is poured directly on the Sheetrock. All joints being concealed by the purlins, the underside of this roof has more the appearance of a finished ceiling than a roof deck.

Advantages—***Light Weight***—Gypsum is 50% lighter than concrete, per square foot of surface for equal thickness, which results in considerable saving in steel framing, supporting members and other material throughout the building.

Fireproof—The value of a fireproof roof deck cannot be over-emphasized. It will prevent transmission through the roof of fire from adjacent buildings. The fireproof qualities of gypsum as a building material have been established definitely by many tests made in the Underwriters' Laboratories, Inc., and by the bureaus of building in many of the larger cities.

Durability—The durability of gypsum has been established through many years of use. It is not affected by chemical action of smoke or deteriorating action of fumes from sulphurous acid. Thus, the maintenance cost is reduced to a minimum.

Insulation—Gypsum has the highest insulation value of any cementaceous structural building material. On account of its low conductivity, the undersurface of gypsum roof decks remains at practically the same temperature as the interior of the building, regardless of outside temperatures. This tends to eliminate sweating or dripping, and condensation under moist air conditions.

We will be pleased to furnish you, upon request, authentic test data showing conductivity values and heat losses through Pyrobar and Pyrofill Gypsum Roof Decks, and comparative values for other types of roof constructions.

We have also prepared charts and tables that will be of material assistance to the designer and engineer in figuring the amount of insulation required for the conditions in his building.

Continued on next page

Ease of Erection—The simplicity of this construction permits of rapid erection, thereby reducing construction costs, and also permitting earlier occupancy of the building. No waiting for slabs to cure or forms to be removed. This system eliminates the end bay bracing required for the poured suspension system. Drainage fill may be constructed of Pyrofill, if desired. Curbs may be either precast or poured-in-place.

RAIL SIZES FOR PURLIN SPANS UP TO 12 FT. 6 IN.
With fiber stress not exceeding 18,000 lb. per sq. in.
Note: 50 lb. per sq. ft. total load — B.M. = W.L./10

Span at main purlins	Size of rail, lb.	Wt. of rail per sq. ft. of roof, lb.	*Min. thickness of slab, in.	Wt. of slab including rail, lb.
Up to 6′0″	8	1.00	2½	11.50
6′0″ to 8′6″	12	1.50	2½	12.00
8′6″ to 10′8″	16	2.00	2½	12.50
10′8″ to 12′8″	20	2.50	3	15.00

*Includes thickness of Sheetrock.

Specifications for Sheetrock-Pyrofill Roof Deck

Unless otherwise shown or noted, all roof slabs shall be of the thickness shown on plans and shall be constructed according to the UNITED STATES GYPSUM COMPANY'S system of Sheetrock-Pyrofill roof construction. This contractor shall provide all Sheetrock, subpurlins, reinforcing material, Pyrofill and all labor required for this work. Light rails or T-iron subpurlins shall be laid and fastened to the main purlins by clips. The subpurlins shall be so spaced as to accommodate the size of Sheetrock used, and shall be figured to carry the total live and dead loads. The Sheetrock shall be provided in lengths equal to the main purlin spacing with no cross members or joints showing. The Sheetrock shall be laid on and supported by the bottom flange of the subpurlins, and on the boards shall be laid an electrically welded, continuous, galvanized steel fabric of the proper sectional area to carry the specified roof load. The main wires of this fabric shall run at right angles to the subpurlins.

The Pyrofill composition used shall consist of a uniform mixture of calcined gypsum and water into which is stirred not over 12% by weight of wood planer shavings and shall be poured directly on the Sheetrock to the required thickness and screeded to as smooth a surface as practicable to receive the waterproof roof covering.

If the underside of the slab is to be painted, or otherwise decorated, such work shall not be done until the waterproof roof covering has been applied, and the slab is thoroughly dry.

All openings in slabs for down-spouts, soil pipes, vents, etc., shall be accurately located by the purchaser before the slab is poured. Curbs above and below monitor or sawtooth sash shall be constructed of Sheetrock-Pyrofill or Pyrobar precast tile, the latter reinforced when carrying roof load or drainage fills.

End walls of monitors, saw-tooth skylights, "A" frames, etc., may be constructed of Pyrobar curb tile (3x15x30 in. non-reinforced).

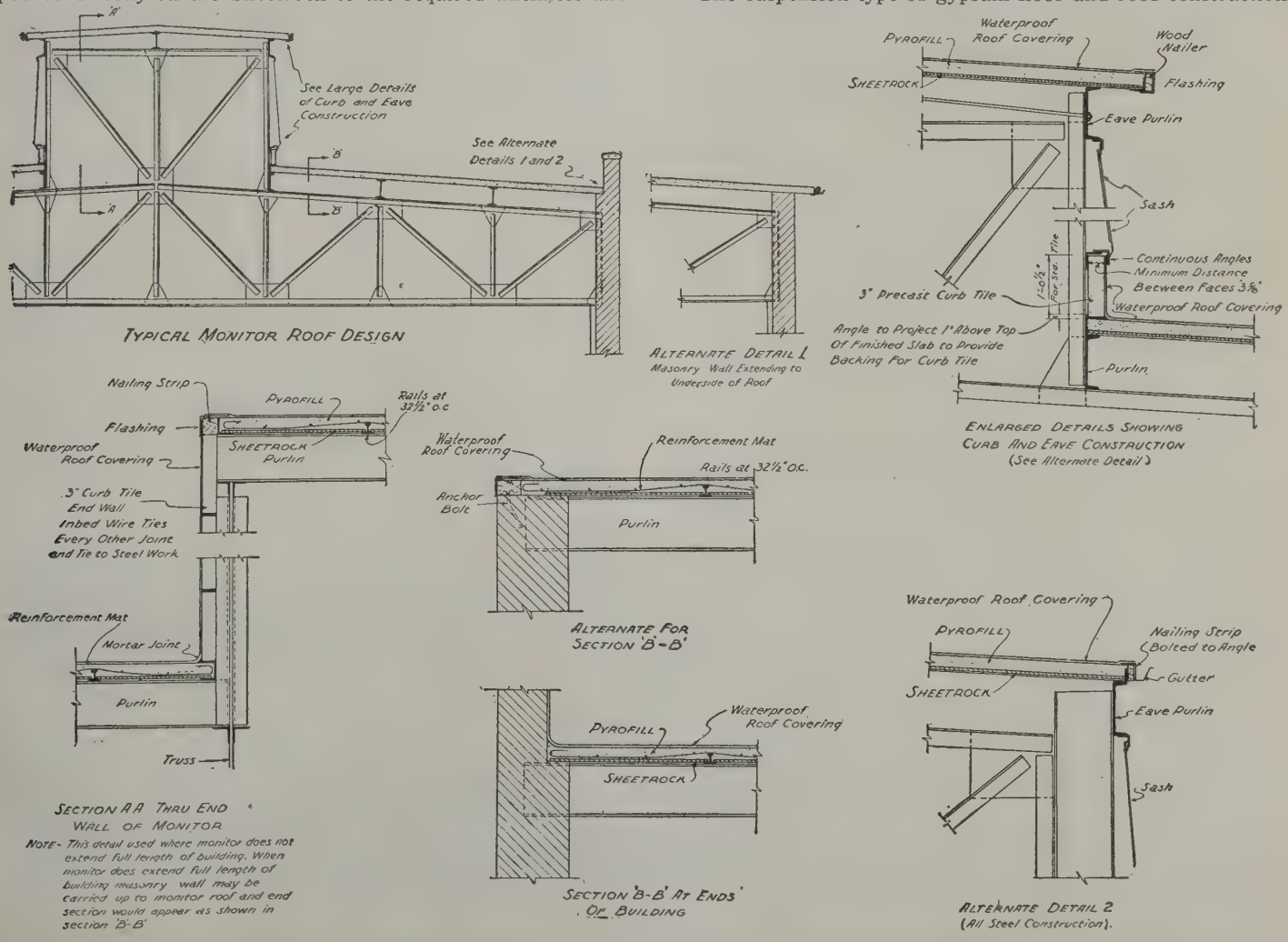
The waterproof roof covering shall be applied by the roofing contractor as soon as possible after the slab is erected, preferably within 20 days.

Pyrofill Monolithic Roof and Floor Construction

With this type of construction the load is carried entirely by steel wire cables. These cables are anchored at both ends to the steel framing, and are brought into tension in the center of each span, between the purlins, by means of rods fastened to the wood forming. The gypsum composition acts mainly as a filler to transmit the load to the "catenary" thus formed. The spacing of the cables varies from 1 to 3 in. and the depth of slab from 3 to 5 in. to meet the requirements of load and span. 3 in. for roofs and 4 in. for floors are the generally used depths of slabs, and the most economical spacing of suporting purlins is from 5 to 7 ft. on centers. The weight of the slab is 4 lbs. per sq. ft. per inch of thickness—i.e. a 3 in. slab weighs 12 lbs. per sq. ft., and a 4 in. slab weighs 16 lbs. per sq. ft.

Wood forming is used for the slabs and, if desired, forms may also be built around the supporting beams and girders to give monolithic fireproofing of the steel with the gypsum composition. (See also Pyrobar Beam and Girder Fireproofing on page A431.) Forms are built of dressed and matched lumber and, due to the light weight of gypsum, do not require the extensive shoring needed for concrete forming, but are hung and braced from steel framing.

The suspension type of gypsum floor and roof construction



CONSTRUCTION·DETAILS· SHOWING·TYPICAL·DESIGNS·OF·SHEETROCK·PYROFILL·ROOF·CONSTRUCTION

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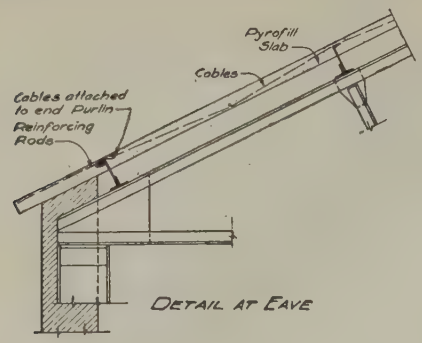
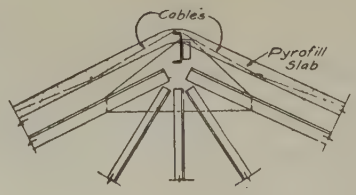
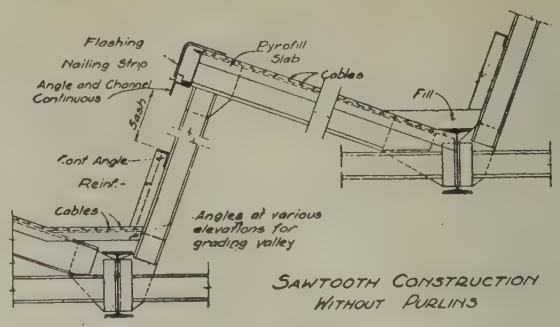


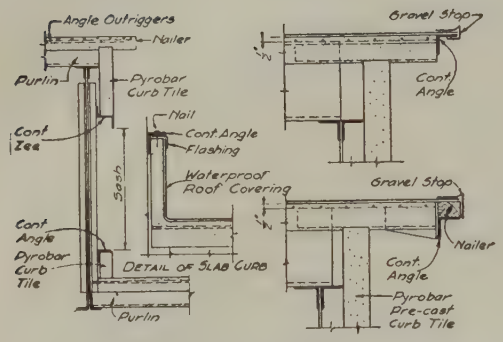
DETAIL AT EAVE



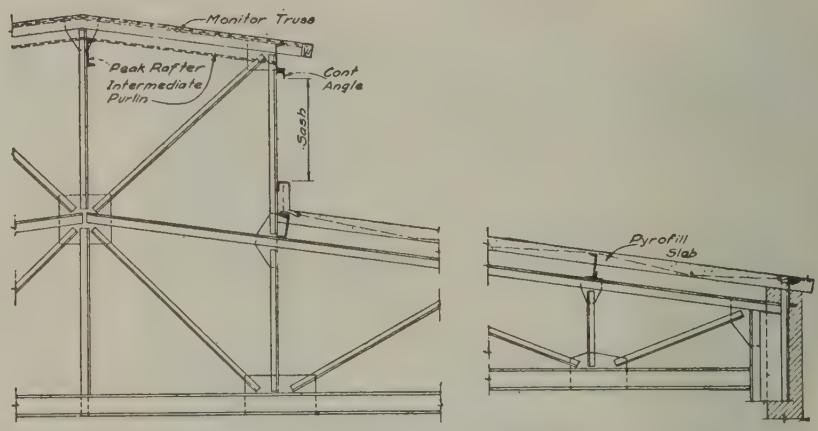
DETAIL AT RIDGE



SAWTOOTH CONSTRUCTION WITHOUT PURLINS



MONITOR DETAILS



TYPICAL MONITOR CONSTRUCTION

CONSTRUCTION·DETAILS·SHOWING·TYPICAL·DESIGNS·OF·MONOLITHIC·ROOF·CONSTRUCTION

has been in use for over 30 years under various names. With the supporting steel encased in gypsum, this construction enjoys the highest insurance rating and is recommended for buildings with combustible contents where insurance rates will be a factor.

The Pyrofill monolithic system best adapts itself to floor slabs of multistory steel framed office, hotel and similar buildings, where light weight is a factor, and to the roof decks of large industrial plants, especially in paper mills or wet process plants where a very low over-all conductivity must be maintained.

Specifications for Pyrofill Monolithic Roofs and Floors

Unless otherwise shown, all slabs shall be constructed of poured gypsum in accordance with the system of the UNITED STATES GYPSUM COMPANY known as Pyrofill Monolithic Slab construction. This contractor shall provide necessary forms, reinforcing cables, Pyrofill and all labor required for his work.

Forms—The forms shall be made in a workmanlike manner, of suitable material, and shall be carefully leveled up so as to insure a uniform depth of slab. Forms shall be cleaned before each re-use, and shall be wet down immediately before placing the Pyrofill.

Reinforcing—Reinforcing shall consist of galvanized steel cables made by twisting two No. 12 wires. These cables shall be calculated to take the entire slab load and shall be fastened at their ends in such manner as to develop the full strength required. In no case shall the stress in the cables exceed 20,000 lbs. per sq. in., or more than 20% of the ultimate strength. The spacing of these cables and the depth of slabs shall conform to the standards of the UNITED STATES GYPSUM COMPANY. The cables shall be drawn tight and fastened to suitable anchors and brought to uniform tension. Care shall be used in placing the tension rods to see that the cables shall not be brought closer than ½ in. to the under surface of the slab. After cables are in place all workmen of this and other contractors shall be prohibited from walking thereon.

Composition—The Pyrofill composition used shall consist of a uniform mixture of calcined gypsum and water into which is stirred not over 15% by weight, of wood planer shavings. The top surface of the slab shall be screeded to as smooth a surface as practical to receive the waterproof covering. If the underside of the slab is to be plastered, such work shall not be done until the waterproof covering has been applied. If the underside of the slab is to be painted, such work shall not be done until the waterproof covering has been applied and the slab is thoroughly dry.

Curbs, etc.—All curb walls, ends of monitors, etc., shall be constructed of 3-in. Pyrobar Curb Tile neatly laid up in gypsum mortar, or of poured construction similar to roof slabs.

Openings—The steel contractor shall provide steel framing around all openings more than 12 in. in diameter, and such steel bracing as is required to take the horizontal pull of cables where anchored, such as at end bays of buildings, and at all openings. All openings for down-spouts, soil pipes, vents, etc., shall be accurately located by the purchaser before the slab is poured.

Covering—The waterproof covering shall be applied within 20 days after completion of roof slab. Plank runways shall be laid on the slab before any wheeling whatever is done. Plank supports shall be laid from purlin to purlin to take any heavy or concentrated loads which may be applied to the slab.

Insert in steel specifications: Steel contractor shall submit drawings to the UNITED STATES GYPSUM COMPANY for checking, to insure that all details are properly taken care of.

Pyrobar Reinforced Roof Tile

Advantages—This type of roof tile construction has all the advantages of a poured-in-place gypsum roof and is highly recommended where a precast type of roof deck is desired. It provides a flat light reflecting under surface, and the units are of convenient size to erect. The tile can be erected by the purchaser if he so desires.

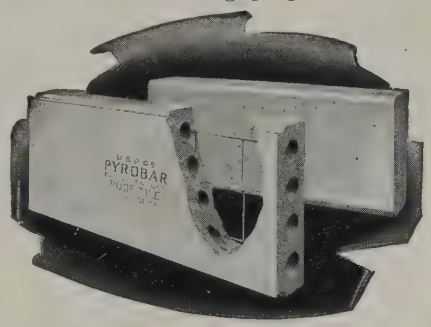
Short Span Roof Tile on U. S. G. Bulb Tee before Grouting of Joints and Application of Roof Covering

Continued on next page

Pyrobar Short Span Roof Tile

All short span roof tile are manufactured 12 in. wide and 30 in. long, and in thickness either of 3-in. solid or 4-in. hollow. The 3-in. solid is recommended particularly for nailing purposes because its design assures maximum penetration and therefore, maximum nail-holding power. The 4-in. hollow fills all requirements for a light weight tile of high insulation value on which a built-up roof covering is to be applied. The hollow tile is not recommended for nailing purposes.

Short span, or 30-in. roof tile, require subpurlin supports, usually tees, such as the United States Gypsum Company Bulb Tee section, or light structural shapes such as I-beams or channels.



Short Span Pyrobar Roof Tile

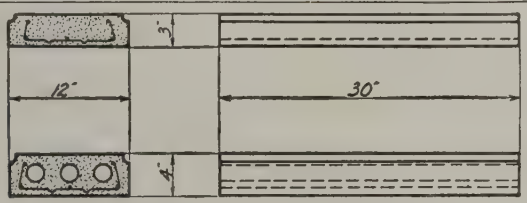
This type of construction is by far the most flexible of any precast system. It can be used with economy on any type of factory, industrial building, power plant, school, etc., and, in addition, is particularly well adapted to steep pitched roofs, or roofs that are badly cut up with dormers, hips, valleys and difficult intersections.

Curb or walls for monitors and sawtooth sash are built of 3-in. solid Pyrobar curb tile.

Cinder Pyrofill drainage system may be used when drainage fill is required over Pyrobar precast roof tile.

DIMENSIONS AND WEIGHT

	Solid	Hollow
Depth	3″	4″
Length	30″	30″
Weight, sq. ft.	15 lb.	15 lb.



30-in. Pyrobar Roof Tile

DESIGNING DATA

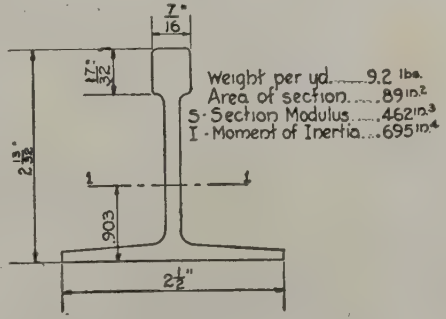
Spans for various sub-purlins spaced 30¾ in. on centers

Total load of 50 lbs. per sq. ft. — $M = \frac{WL}{10}$

Span	5 ft. 10 in.	6 ft. 8 in.	7 ft. 4 in.	8 ft.
Size tee	2¼x2¼—4.1 lb.	2¼x2¼—4.9 lb.	2½x2½—5.5 lb.	2½x2½—6.4 lb.
U. S. G. Bulb Tee—3.1 Lb.				

United States Gypsum Bulb Tee Section

This section has been developed by us primarily for use with Short Span Pyrobar roof tile, as a more economical subpurlin, taking the place of standard tees. It has a wide flange providing ample bearing for the tile, and its design is such that it has considerable less sectional area than a standard tee of equal load bearing capacity. We are prepared to furnish this section erected in place, in connection with our installations of Short Span Pyrobar tile for roofs. If desired, it can be sold in connection with your installations of this tile.

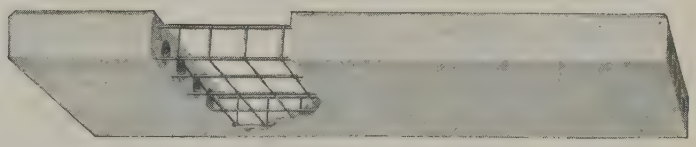


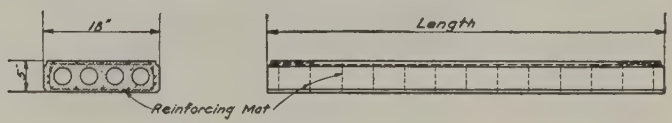
Section of U. S. G. Bulb Tee

Pyrobar Long Span Hollow Roof Tile

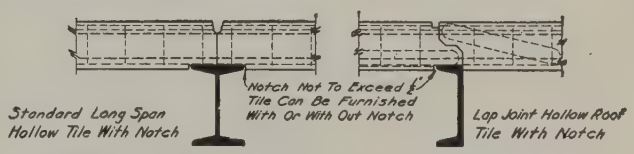
This type of tile is manufactured in lengths 4 ft. to 6 ft. 6 in. and in depths 5 in. and 6 in. The tile are laid directly on the steel purlins or wood framing, and are manufactured to suit the steel layout. The tile are furnished either with or without a lap joint depending on the bearing afforded. Lap joint tile should be used whenever channel purlins are used.

Short Span Roof Tile Applied to Steel Roof
Showing framing around dormers





LONG SPAN HOLLOW TILE



Details of Pyrobar Long Span Hollow Roof Tile

Specifications for Pyrobar Roof Tile

Short Span Roof Tile—*Roofs*—All roofs as shown on drawings, unless otherwise noted, shall be constructed of Pyrobar 3 in. solid (4 in. hollow) roof tile, as manufactured and erected by the United States Gypsum Company, laid on U. S. Gypsum 9.2 lb. Bulb Tee Subpurlins, as indicated on the drawings.

Erection—Tile to be placed directly on supports, without mortar, and with sides tight together, with full bearing on the subpurlins. All joints on top surface only of roof are to be pointed with Gypsum mortar composed of one part unfibred gypsum cement plaster and not more than two parts of clean sharp sand. Bulb Tee subpurlins are to be furnished and erected by the United States Gypsum Company spaced 2 ft. 6¾ in. o. c. and fastened to the main purlins by clips bolted to the subpurlins.

Note: Where it is desired to nail composition or a shingle roofing, copper or tin sheathings, or other light roof coverings directly to the Pyrobar roof deck, we recommend 3-in. solid Pyrobar and a square cut nail, having not less than 1½-in. penetration into the tile. For rough slate, Spanish tile, etc., a square cut nail having not less than 2-in. penetration into the tile is recommended. On roofs with extreme pitch, or where extra heavy slate or tile roofing is used, special means of fastening should be considered. If desired we can furnish a short span tile with nailing strips embedded flush with the surface.

Note: When desired the Bulb Tee subpurlins and clips can be furnished and fabricated by the United States Gypsum Company and included in the steel contractor's specifications for erection.

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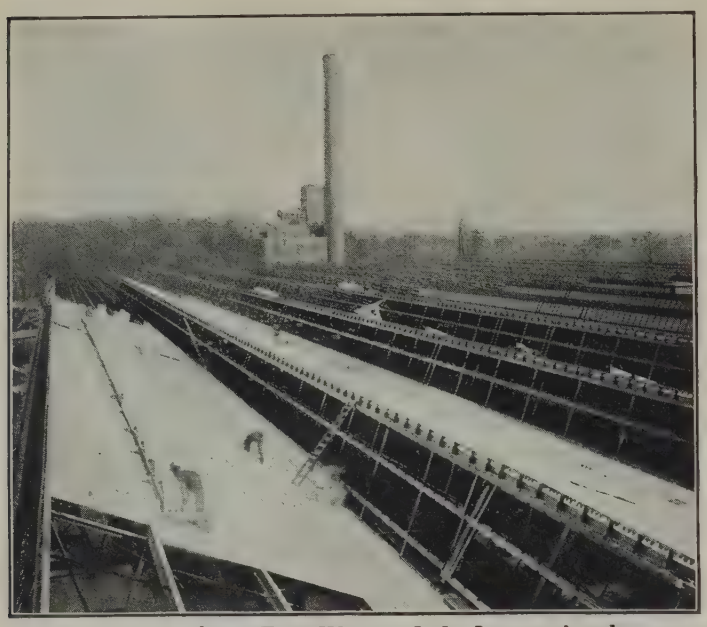


Tractor Plant, Fort Wayne, Ind., International Harvester Company
DAY AND ZIMMERMAN, Architects
160,000 sq. ft. Long Span Hollow Pyrobar Roof Tile Used in 1923; 150,000 sq. ft. additional in 1928

Curbs, End Walls—Curbs under monitor and sawtooth sash, and end walls of monitors, etc., shall be constructed of 3 in. solid Pyrobar curb tile (or gutter tile), set in gypsum mortar, joints to be well bedded and struck. Steel contractor to provide sufficient steel framing for proper support and anchoring.

Completion and Covering—All Pyrobar Roof Decks to be left with as smooth a finish as practical to receive the roofing contractor's covering, which shall be applied within 20 days after completion of the roof deck.

Long Span Hollow Tile—*Roofs*—All roofs as shown on drawings, unless otherwise noted, shall be constructed of Pyrobar (state thickness) Long Span Hollow Roof Tile as manufactured and erected by the UNITED STATES GYPSUM COMPANY.

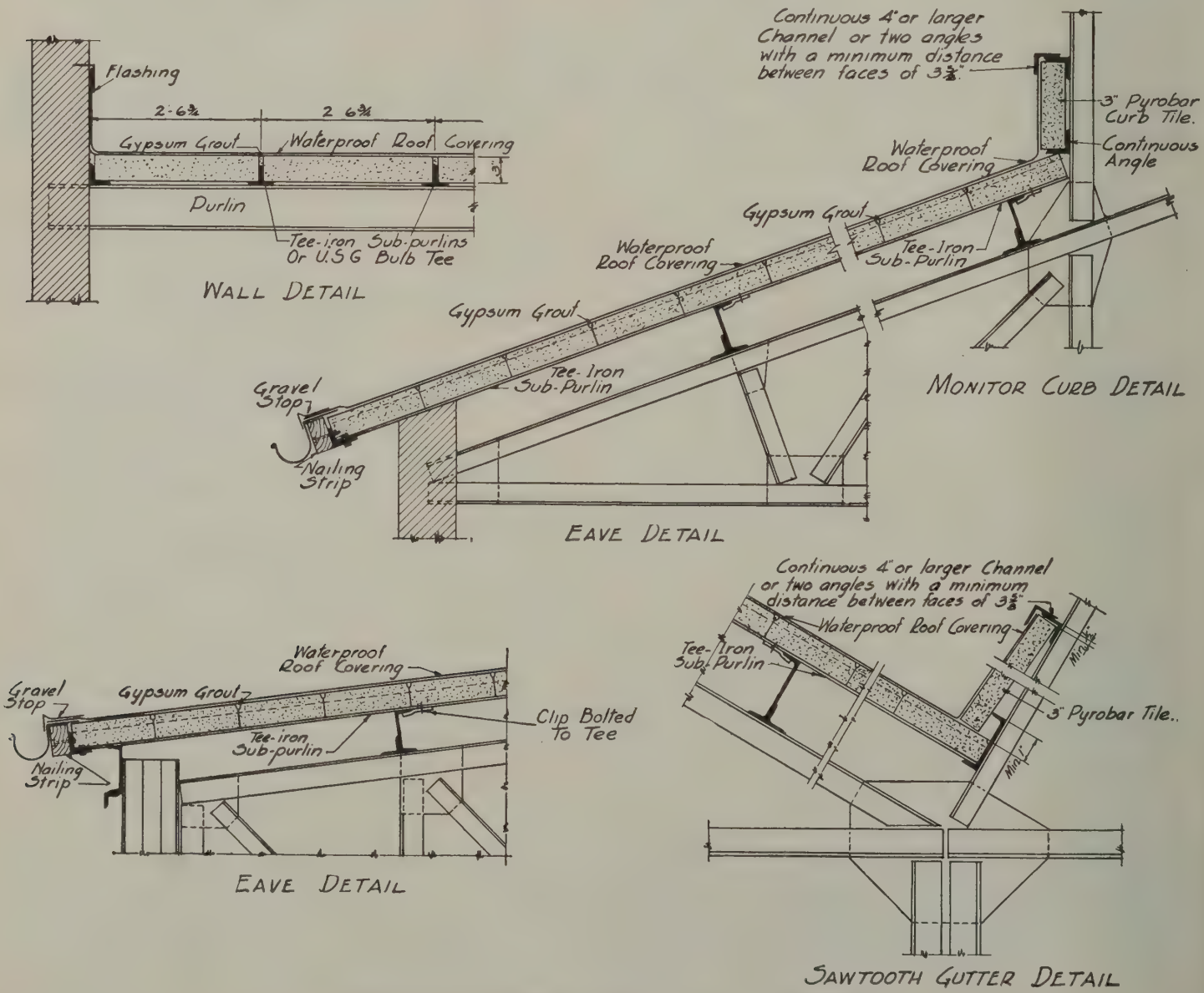
Erection—Tile are to be placed directly on roof supports without mortar and with sides tight together bearing at each end upon purlins to be not less than 1¼ in. All purlins to be drawn into true alignment with sag rods by the structural steel contractor before any tile are placed. All joints on top surface only of roof are to be pointed with gypsum mortar, composed of one part unfibred gypsum cement plaster, and not more than two parts of clean, sharp sand.

End walls, curbs, completion and covering same as under Short Span.

PURLIN TABLE FOR LONG SPAN HOLLOW TYPE TILE OR 30-IN. TILE ON TEES

Total uniform dead load of 50 lb. per sq. ft.

	PURLIN SPAN	8'0"		10'0"		12'0"		14'0"		16'0"		18'0"		20'0"		22'0"		24'0"	
	SHAPE	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C
SLAB-SPAN	4'0" DEPTH INS.	3	4	4	4	4	5	5	6	5	7	6	7	7	8	7	9	8	10
	WT PER FT. LB.	5.7	5.4	7.7	5.4	7.7	6.7	10	8.2	10	9.8	12.5	9.8	15.3	11.5	15.3	13.4	18.4	15.3
	5'0" DEPTH-INS.	3	4	4	5	5	6	5	7	6	7	7	8	7	9	8	10	8	10
	WT. PER FT LB.	5.7	5.4	7.7	6.7	10	8.2	10	9.8	12.5	9.8	15.3	11.5	15.3	13.4	18.4	15.3	18.4	15.3
	6'0" DEPTH-INS.	4	4	4	5	5	6	6	7	6	8	7	9	8	10	8	10	9	12
	WT. PER FT. LB.	7.7	5.4	7.7	6.7	10	8.2	12.5	9.8	12.5	11.5	15.3	13.4	18.4	15.3	18.4	15.3	21.8	20.7
	6'6" DEPTH INS	4	4	4	5	5	6	6	7	6	8	7	9	8	10	8	10	9	12
	WT. PER FT LB	7.7	5.4	7.7	6.7	10	8.2	12.5	9.8	12.5	11.5	15.3	13.4	18.4	15.3	18.4	15.3	21.8	20.7



Details of Short Span Pyrobar Roof Tile Application

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Pyrobar Interlocking Structural Floor Tile and Ceiling Tile

Floor tile—These are precast units of gypsum, 2½ in. thick and 18 in. wide, by 32 in. long. They are made to fit standard joist spacing of 30 in. The size of the units and their weight of 12½ lb. per sq. ft. assures quick erection. Provision can be made for any type of floor finish over these tile.

Ceiling Tile—These are precast units of gypsum, 2 in. thick and 18 in. wide, by 30 in. long. The smooth undersurface will save in plastering as only two coats are required. The method of erection provides a positive attachment to the floor joists and absolute protection to steel framing and floor above. The large units weigh only 9 lb. per sq. ft. and are rapidly erected.

These units can be used in combination with Pyrobar Shoe Tile to provide complete protection for beams and girders.

Advantages—This construction has been developed to provide a lightweight floor and ceiling construction that is fireproof and will thoroughly protect the steel joists. It is especially adaptable to buildings where floor loads are light, such as apartments, hotels, schools, office buildings, theaters, and is designed for use in connection with junior beams, standard channels, and metal joists.

The fireproof qualities of gypsum tile have been successfully demonstrated by numerous tests made at the Underwriters Laboratories, Inc., and the Bureau of Standards. These tile have a low coefficient of conductivity and are of sufficient thickness to afford complete protection to the steel. The expansion and contraction of Pyrobar tile under fire is practically negligible, never being great enough to cause buckling or bulging.

Pyrobar Interlocking Floor Tile are designed to develop the full strength of the supporting steel. They will safely carry a uniformly distributed load of 150 lb. per sq. ft. with a factor of safety of 6, which is more than ample to take care of loads in buildings of the types mentioned.

Specifications Interlocking Tile

General—All floor and ceiling slabs, except where shown or noted otherwise, shall consist of the Interlocking Precast Structural Floor Tile and Precast Ceiling Tile as manufactured by the United States Gypsum Company. They shall be erected in place by the manufacturer.

Floor Tile—Floor tile shall be Pyrobar Interlocking Structural Floor Tile of 2½ in. thickness as shown on the plans, 32 in. in length, and 18 in. wide, properly reinforced.

Ceiling Tile—Ceiling tile shall be Pyrobar Precast Ceiling Tile, 2 in. thick, 18 in. wide, and 30 in. in length, reinforced with provision for proper anchorage to the under side of the floor joists.

Beam and Girder Fireproofing—Beams and girders projecting below the floor joists shall be covered with precast Pyrobar beam and girder fireproofing as manufactured by the United States Gypsum Company.

Roof Construction—Pyrobar Structural Interlocking Floor Tile and Ceiling Tile shall be used for the roof construction, same as specified for floor construction.

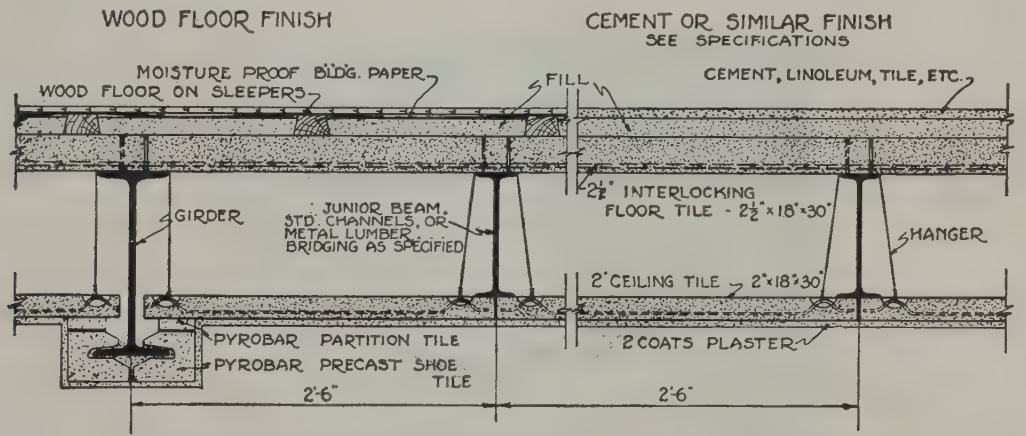
Note: Where roof framing is so designed as to call for spans greater than 30 in. roof slabs shall consist of 30 in. short span tile, 3 in. solid, with T-iron subpurlins spaced 30¾ in. on center, or Sheetrock Pyrofill Roof Construction, with a total slab thickness of 2½ in. Roof slabs (either of the above type), including T-irons (or rail) subpurlins shall be furnished and erected by the United States Gypsum Company.

Floor Finishes—Wood floor finish, where indicated on the plans, shall be laid on nailing strips, as specified under "Carpentry."

(Note to Architect)—Above to be placed in Carpenters' Specifications.

Cement, marble, tile, linoleum, rubber, carpet, and similar wearing surfaces shall be applied in accordance with the manufacturer's specifications over a suitable fill and topping.

Plastering—Gypsum Plaster (two coats) shall be applied directly to the undersurface of the ceiling tile.



Details of Pyrobar Interlocking Structural Floor and Ceiling Tile

Laying Pyrobar Interlocking Structural Floor Tile
Note Pyrobar Ceiling Tile below

THE AEROCRETE CORPORATION OF AMERICA

Promoters of Aerated Concrete

51 East 42nd Street

NEW YORK, N. Y.

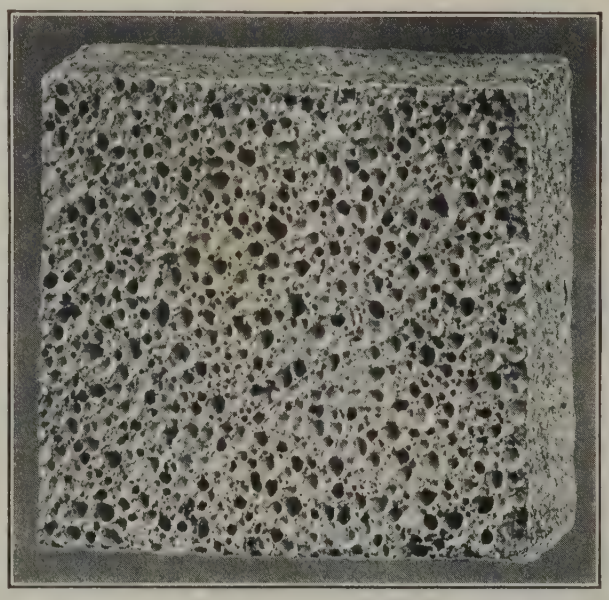
The above office will furnish information on request regarding promotion and manufacturing companies throughout the United States, Canada, South America, Europe and Australia

Aerocrete

Aerocrete is an aerated or expanded concrete made through a combined process of hydration and aeration. It is made from cement, fine aggregates, water, and in addition, to produce aeration, a specially prepared powder.

Properties

Proportions of mix as well as degree of aeration may be varied within wide limits, and properties will vary accordingly. Weight may be from 30 to 80 lb. per cu. ft., ultimate compressive stress from 200 to 800 lb. per sq. in. On account of aeration both heat and sound insulation values are exceedingly high. Adhesion to steel and masonry is excellent and impermeability for structural grades the same as for common concrete. Fireproofing qualities depend upon the quality of cement and aggregates; generally slightly superior to common concrete. Can be worked with most woodworking tools the same as common lumber.



Aerocrete Block Showing Actual Size Air Cells

Manufacture

Aerocrete is mixed and placed in the same manner as ordinary high grade concrete. The expansion is timed to take place in the forms and before initial set.

Aerocrete may be pre-cast or cast in the field—it may be cast in bulk or in individual forms. When Aerocrete is to be under heavy stress in bending, reinforcement may be added—steel bars for tension and concrete for compression. Any masonry finish products and even glass may be attached and perfectly bonded to Aerocrete.

Application

Structural Aerocrete—High compressive strength, specially waterproofed (if required), medium insulation. Used for:

(a) Building blocks with or without specially finished surfaces.

(b) Building bricks with or without special waterproofing; to be used with ordinary bricks for increased heat insulation.

(c) Complete pre-cast panels, with reinforcement and finish, and with steel window and door frames cast in place in the Aerocrete.

(d) Complete field-cast one and two-story residential walls, with reinforcement, finish, steel windows and doors, to be cast flat, raised and hoisted into position.

(e) Reinforced Aerocrete floor and roof planks, with or without concrete finish, cast in 2½ to 6-in. thicknesses in 8 to 12-in. widths for 3 to 12-ft. spans.

(f) Field-cast reinforced Aerocrete floor and roof slabs, with or without concrete finish in spans up to 12 ft.

(g) Reinforced pre-cast Aerocrete lintels, stairways and other specialties, with or without special finish.

(h) Aerocrete filler blocks for reinforced concrete joist construction with or without special top or bottom concrete finish for compression.

Fireproof and Insulating Aerocrete—Medium compressive strength, high insulation, specially waterproofed if necessary. Used for:

(a) Field-cast Aerocrete fireproofing for structural steel beams, girders and columns.

(b) Pre-cast Aerocrete fireproofing blocks, with or without reinforcement, assembled and grouted in the field.

(c) Partition blocks from 2½ in. up. Cost to place and plaster is low on account of very accurate dimensions and excellent bond.

(d) Furring blocks to prevent heat losses and condensation. Specially useful for the tropics. Heat loss for 3-in. block only .311 B.t.u. per hour per sq. ft. per degree F.

(e) Floor fill—with or without sleepers. Extremely light and highly insulating. This grade not to be recommended as a nailing concrete, but holds sleepers to perfection.

(f) Firestop blocks 4x8x14 in. to be used at floor levels of frame buildings.

(g) Cold storage insulation: Aerocrete for cold storage insulation can also be made with structural grade properties.

Cost of Aerocrete

Unit cost, obviously, varies with locality, availability of raw materials, labor conditions, extent of transportation necessary, and climatic conditions. It is generally below cost of concrete. For consistent use of Aerocrete even a high unit cost results in low over-all cost. This is due to a combination of properties seldom found in one material and resulting in simplified design and omission of supplementary materials and processes.

For tall steel frame structures as well as small residences—and anything between these extremes—the combination of distinct structural properties, exceedingly low weight, high insulating value, unusual fire resistance, adaptability and simplicity of erection result, therefore, in simple, ideal designs, simple and rapid methods of erection, elimination of troublesome and costly finishing processes, and, as a result of all this, an unusually low total cost.

Owners, architects, engineers, contractors and others interested in promotion of good engineering are invited to consult us regarding general development of Aerocrete as well as specific problems.

PORETE MFG. CO.

Manufacturers of Lightweight Concrete Products

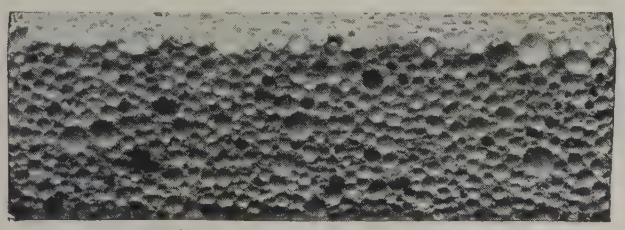
346 Riverside Avenue
NEWARK, N. J.

Product

PRECAST PORETE SLABS for roofs and floors.
RIB STEEL ROOFS and FLOORS.
PORETE-NAILFILL NAILING CONCRETE.
Also Cast-in-place Floor-fill and Fireproofing of Steel Beams.
Porete is covered by United States patents.

What Porete Is

Porete is portland cement concrete of uniformly honeycombed structure and combines the durability of concrete with the lightness of wood. It is made of portland cement and sand only. Porete is made of a very rich cement mix and the reinforcing metal is thoroughly coated and protected against corrosion.



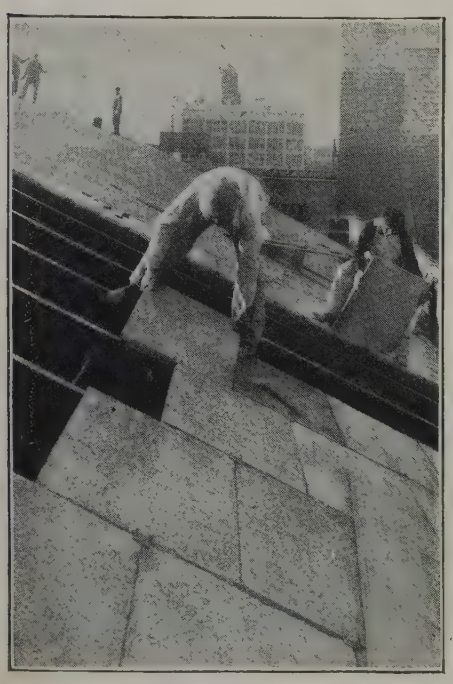
Full Size Structure of Porete

Porete has about one-third the weight of solid concrete.

On account of the air cells which it contains, it is a good heat and sound insulator and a better fire resisting material than solid concrete, because of its low heat conductivity. Its permanency is equivalent to that of concrete and its strength improves with age.

Porete Roofs—2 ft. 8-in. Span

Porete roof slabs, 24x32x1¼ in. thick, are laid on steel purlins at 2 ft. 8-in. centers and are fastened to them with heavy metal clips. After all the slabs are laid, a thin cement grout is worked into the rough surface and this roof deck is then ready for the waterproofing which is ordinarily a tar and felt roof.



Laying Porete Slabs

Porete for Steep Roofs, Used as a Base for Slate, Tile or Metal Roofing—Where slate, tile or metal roofing has to be nailed up, the Porete slabs are covered with ½ in. of Porete Nail Finish. This is a mixture of portland cement and sand with a fibrous fireproof mineral material. This finish forms a tough resilient sheet which becomes integral with the Porete, greatly adding to its initial strength.

Advantages—Porete roof slabs are a factory controlled product, accurately reinforced. In combination with a cement finish, which is applied in the field, they make a lighter fireproof roof than any other material. Porete roofs can be adapted to any roof design, flat or slanting. They are easily erected—even in cold weather.

They weigh only 7 lb. per sq. ft., which is one-half as much as any other fireproof roof. A Porete roof will carry a live load of over 50 lb. per sq. ft. with a factor of safety of five. Buildings covered with Porete will cost less to heat, because Porete is a good heat insulating material.

Porete roof decks present a clean smooth stone finish on the underside. Due to their light weight there is a saving in the steel of the supporting trusses, especially on the larger spans.

CHANNEL PURLINS FOR PORETE-SLAB ROOF

Purlins Spaced 2'-8" c.c.
Weight per Sq. Ft. of Purlins 3 lbs + Porete 7 lbs + Waterproofing 5 lbs. = 15 lbs. Total

Live Load 30 lbs. per Sq. Ft. Total 45 lbs. per Sq. Ft.					Live Load 40 lbs. per Sq. Ft. Total 55 lbs. per Sq. Ft.				
Span in Feet	Section Modulus Required	Section	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof	Span in Feet	Section Modulus Required	Section	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof
6	0.40	3"×4.1 C	1.1	1.54 lbs	6	0.49	3"×4.1 C	1.1	1.54 lbs
7	0.55	"	"	"	7	0.68	"	"	"
8	0.72	"	"	"	8	0.88	"	"	"
9	0.91	"	"	"	9	1.11	"	"	"
10	1.12	4"×5.4 C	1.9	2.02 "	10	1.38	4"×5.4 C	1.9	2.02 "
11	1.36	"	"	"	11	1.66	"	"	"
12	1.62	"	"	"	12	1.98	"	"	"
13	1.90	"	"	"	13	2.32	5"×6.7 C	3.0	2.51 "
14	2.20	5"×6.7 C	3.0	2.51 "	14	2.69	"	"	"
15	2.53	"	"	"	15	3.10	"	"	"
16	2.88	"	"	"	16	3.52	6"×8.2 C	4.3	3.07 "
17	3.25	6"×8.2 C	4.3	3.07 "	17	3.97	"	"	"
18	3.64	"	"	"	18	4.46	"	"	"
19	4.06	"	"	"	19	4.96	7"×9.8 C	6.0	3.67 "
20	4.50	7"×9.8 C	6.0	3.67 "	20	5.50	"	"	"
21	4.96	"	"	"	21	6.06	"	"	"
22	5.45	"	"	"	22	6.65	8"×11.5 C	8.1	4.31 "
23	5.95	"	"	"	23	7.27	"	"	"
24	6.48	8"×11.5 C	8.1	4.31 "	24	7.92	"	"	"
25	7.03	"	"	"	25	8.59	9"×13.4 C	10.5	5.02 "
26	7.61	"	"	"	26	9.30	"	"	"

For purlin table where the deflection is restricted, and for other loads, write us.

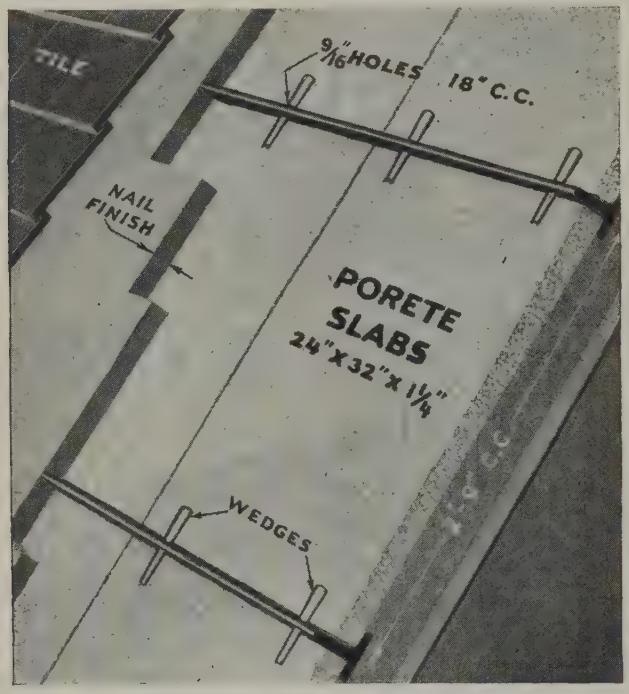
Roof on Sky Top Lodge, Canadensis, Pa.
ROSSITER, MULLER, MORTIMER & FOSTER, Architects

Continued on next page

Savoy-Plaza Hotel, New York, N. Y.
McKim, Mead & White, Architects

For Steep Tower and Mansard Roofs—Porete has become the standard roof slab material on fireproof buildings.

The exposure of roofs to strong winds and the elements at great heights demands a roof-deck to which tile, slate, copper or lead roofing can be nailed with



On Very Steep Roofs Porete Slabs Are Laid in Tee Irons and Held Down with Steel Wedges

safety and with perfect assurance that the tile and slate will not be blown off.

Porete will give such a nailing base which is easy and economical to erect and which combines at the same time very light weight, strength and good heat insulating value.

The heavy finish which is applied in the field bonds the roof slabs into a monolithic sheet.

Porete Roofs on Pressed Steel Joists or Trussed Bar Beams

The joists can be set farther apart than in usual construction and 25% less steel is required.

The slabs are fastened to the joists with nails or wire clips. In combination with these joists Porete provides a good looking, strong, durable, lightweight concrete roof in which the reinforcing metal is well protected from rusting.

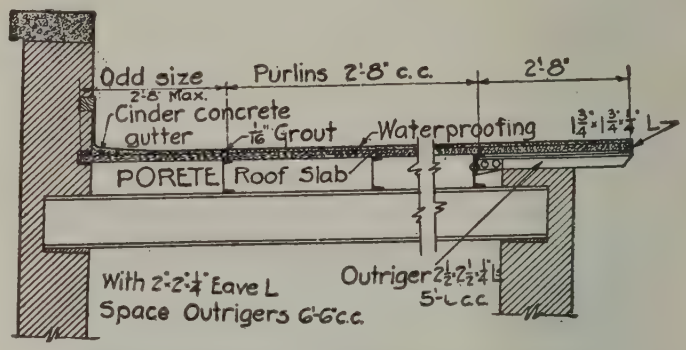
Porete Roofs—Long Span

Purlin Slab Construction—This is a combination of a 5 to 6-ft. long channel slab and the 2 ft. 8-in. span Porete slab. This roof is 1½ in. thick and weights 12 to 15 lb. per sq. ft.

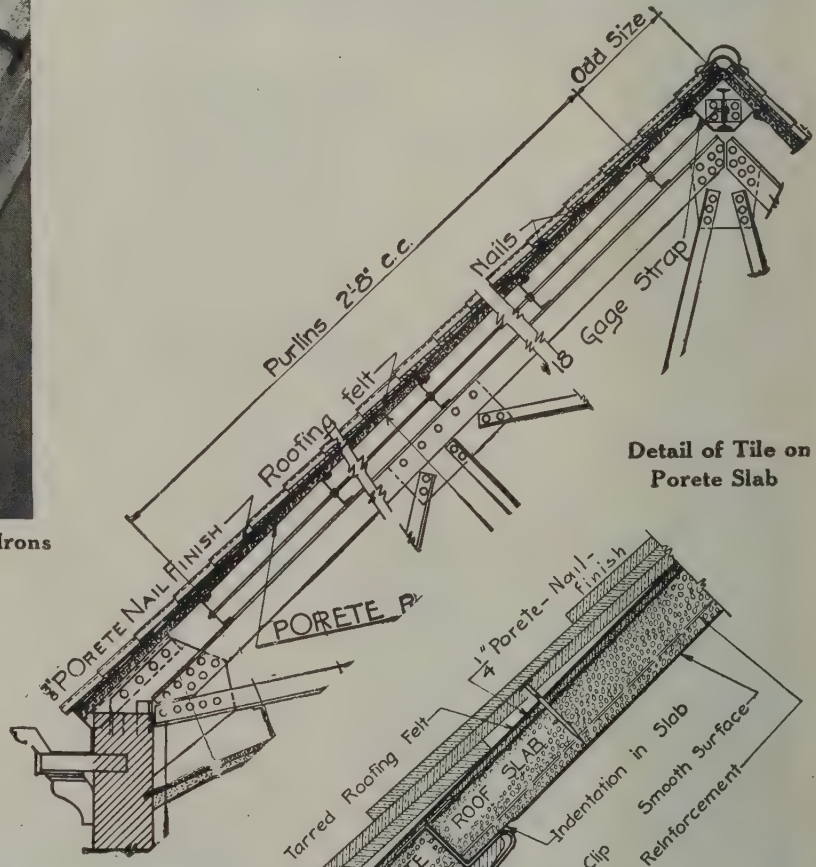
Flat Slab Construction—Consists of 4 to 5 ft. long precast slabs provided with a finish coat in the field. Thickness of roof 2⅛ to 2⅝ in. Weight 11 to 14 lb. per sq. ft.

We recommend this roof where high insulating value is required.

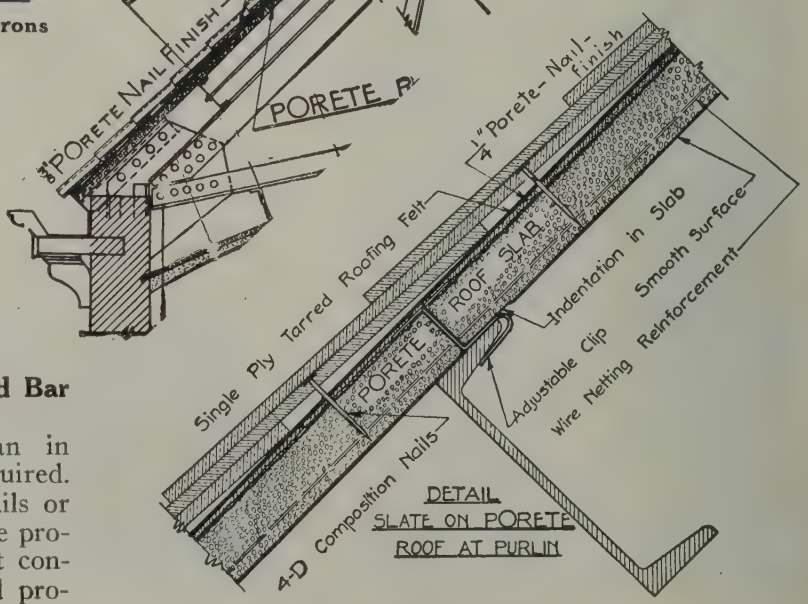
For Longer Span Up to 10 Ft. we erect sub-purlins on 2 ft. 8-in. centers—either channels, I-beams, rails or other sections bolted or welded to the main beams as a support for the 2 ft. 8-in. slabs.



Detail of Flat Roof; Parapet and Overhang



Detail of Tile on Porete Slab



Detail of Slate on Porete at Purlin

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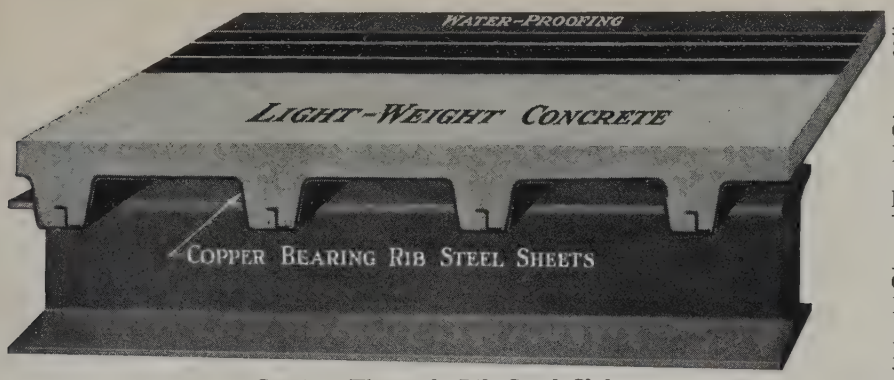


Section Through Rib Steel Slab

SAFE LIVE LOADS RIB STEEL SLABS

Span.....ft.	4	6	8	10	12
1-in. Solid Cement Finish Weight 15 to 20 lb. per sq. ft.					
Gauge.....	24	24	22	22	20
Depth of corrugation.....in.	1½	1½	1½	2	2
Load, lb. per sq. ft.	120	90	65	55	45
1½-in. Lightweight Nailable Concrete Finish Weight 9 to 15 lb. per sq. ft.					
Gauge.....	24	24	22	20	....
Depth of corrugation.....in.	1½	1½	1½	2	....
Load, lb. per sq. ft.	120	70	50	40	....

Rib Steel Roofs and Floors

Porete Rib Steel roofs and floors are constructed of ribbed, copper bearing steel sheets, 20 to 24 gauge, covered with a layer of solid concrete or lightweight, nailable, insulating concrete. The ribs formed in the steel sheets are designed as individual beams capable of sustaining the required loading of 40 lb. per sq. ft. The ribs are 1½ in. deep on standard and 2 in. deep on super sheets and are spaced 6 in. on centers.

These copper bearing rust resisting sheets are laid directly on structural steel purlins and securely fastened to the same with clips. After the sheets have been laid and fastened to the supporting steel, a 1-in. thick layer of lightweight insulating concrete is applied on top in plastic form, care being taken so that the depressions are entirely filled. After this layer of concrete is set, it will add additional rigidity and strength to the sheets.

Zee bar reinforcing rods are welded in the bottom of the ribs. These bars, when embedded in concrete, will serve as additional reinforcing and they also make a mechanical bond between the sheets and the concrete.

All steel sheets are painted in the shop as may be required for different classes of work.

The waterproofing on Porete Rib Steel roofs is done in the same way as on concrete roofs built up with felt and asphaltum.

Porete Rib Steel decks can be used on steep as well as flat roofs. When tile, slate, copper or other shingle type roofings are nailed direct to a Porete Rib Steel slab the minimum thickness of the slab should be 1½ in.

Advantages of Rib Steel Roofs—Rapid erection, lightweight for long spans, great strength and stiffness, permanency, good heat insulation value and very good appearance underneath.

If used on a floor there is an additional advantage that standard steel construction can be used with spans from 4 to 6 ft. The finished wood floor can be nailed directly to the Porete Nail Finish of the Rib Steel sheets.

Co-operative Service

It is advisable to consult the Engineering Department of Porete Mfg. Co. when laying out the steel for Porete roofs. Estimates for roofs will be gladly furnished.

An experienced force is always ready to lay roofs and floors anywhere in the United States.

Applying Concrete on Rib Steel Sheets

A Few Representative Porete Installations and Their Architects

Hospitals

St. Vincent's Hospital, Montclair, N. J., Crow, Lewis & Wick
Hospital Buildings, Asyla, N. J., Walter W. Sharpley
North County Community Hospital, Glen Cove, L. I., N. Y., Wilson, Peabody & Brown
State Hospital Buildings, Morris Plains, N. J., Allan B. Mills
Crawford-Allen Memorial Hospital, North Kingston, R. I., York & Sawyer

Schools and Churches

Andover Academy, Andover, Mass., Chas. A. Platt
Yale University, New Haven, Conn., James Gamble Rogers
Princeton University Chapel, Princeton, N. J., Cram & Ferguson
Irving Auditorium, Philadelphia, Pa., Horace Trumbauer
Temple and Synagogue, Brooklyn, N. Y., Simeon B. Eisendrath
St. Mary's Church, Jersey City, N. J., Robt. J. Reiley
Art Museum, Montclair, N. J., Goodwillie & Moran
Duke University (11 buildings) Durham, N. C., Horace Trumbauer
Public School, New Haven, Conn., Brown & Von Beren
St. Nicholas Church, New York, N. Y., O'Connor, Delany & Schultz

Residences

Residence, Plandome, L. I., N. Y., F. A. Godley
Residence, Rumson, N. J., J. R. & F. B. Hinchman

Theaters, Hotels, Banks and Office Buildings

Strand Theater, Atlantic City, N. J., Hoffman-Henon Co.
Theater, Worcester, Mass., Thomas W. Lamb
Berkshire Theater, Brooklyn, N. Y., Harrison G. Wiseman
Essex County Trust Co., East Orange, N. J., Dennison & Hirons
Keith's Theater, Jamaica, L. I., N. Y., Thos. Short
New Netherlands Hotel, New York, N. Y., Shultz & Weaver
Sky Top Lodges, Canadensis, Pa., Rossiter, Muller, Mortimer & Foster
Shore Road Theater, Brooklyn, N. Y., M. W. DelGaudio
Y. M. C. A., Schenectady, N. Y., Helmle & Corbett
Savoy-Plaza Hotel, New York, N. Y., McKim, Meade & White

Industrial Buildings, Power Plants and Garages

Power Plants, Atlantic City, N. J., Scranton, Pa., Rockford, Ill., American Gas & Electric Co., Engineers
Virginian Railway Power Plant, Narrows, Va., Gibbs & Hill
Radio Corporation of America, Skinner & Cook
Fulton Water Works, Fulton, N. J., Hazen & Whipple
Nazareth Cement Company, Ford, Bacon & Davis
Ward Baking Co. Garage, Cambridge, Mass.
Philadelphia & Reading Grain Elevator, Philadelphia, Pa., Fegles Construction Co.

FLEX-OR-CRETE INC.

Manufacturers and Distributors of Structural Fireproof Nailing Concrete

TELEPHONE
HANCOCK 9396

1111 Statler Building
BOSTON, MASS.

FACTORY
MALDEN, MASS.

Registered
FLEX-OR-CRETE INC.
Trade Mark
1111 STATLER BUILDING
BOSTON.MASS.

Flex-Or-Crete

Flex-Or-Crete is a *fireproof permanently nailable concrete, light in weight* and possessing a *high compressive strength.* It is *non-corrosive, permanently resilient* and a *non-conductor* of sound and heat.

Nailing concrete is used instead of wood sleepers, screeds or nailing strips, and as a nailing base for floors, roofs, partitions and grounds. The nails are driven through the wood floors, slate, tile or metal roofing, directly into the nailing concrete.

Flex-Or-Crete is supplied in the form of powder, the ingredients of which, except cement, are specially prepared and mixed at our factory and shipped in burlap bags. When mixed with cement and poured in place, its surface resembles that of granolithic.

Approvals

Flex-Or-Crete has enjoyed over ten years' performance. It enjoys the endorsement of the leading architects and engineers, the Underwriters' Laboratories, Inc., National Board of Fire Underwriters, the Massachusetts Institute of Technology and Columbia University.

Qualities

Fireproof—Flex-Or-Crete is fireproof having stood as much as 3500° F. before any signs of disintegration appeared. (See Columbia University Test.)

Permanently Nailable—Regardless of its age it can always be nailed into and holds a nail better than the average grades of wood. Its resistance to the withdrawal of a nail is 60% greater than the average nailing concrete. It requires 540 lb. pull to remove a 3-in. nail driven 2½ in.

Light in Weight—It weighs 84 lb. per cu. ft., almost 50% less than rock concrete, reducing the dead-load by approximately one-half, and effecting a saving of 28% in steel.

Non-conductor of Sound and Heat—Flex-Or-Crete prevents the condensation of moisture common to concrete surfaces. It acts as a sound deadener between floors and is a non-conductor of sound and heat.

Permanently Resilient—Flex-Or-Crete has the resiliency of ordinary soft pine and a floor constructed of 2 in. on a concrete base covered with linoleum is silent and non-fatiguing, so essential in hospitals, libraries, schoolhouses, theaters, assembly halls and office buildings.

High in Compressive Strength—The average compressive strength of Flex-Or-Crete is 1200 lb. per sq. in. or approximately 70% of the strength of rock concrete and comparable to 1-2-4 concrete.

Non-corrosive—Flex-Or-Crete contains no injurious chemicals, does not cause decay or corrosion of metals, and eliminates the danger of cinder concrete which may generate sulphuric acid so destructive to pipes and conduits, also to linoleum and wood floors.

Verminproof and Sanitary—Flex-Or-Crete eliminates most of the cracks and small spaces common to ordinary methods of floor construction.

Forms an Excellent Bond—It bonds perfectly with concrete, tiles, cement block and brick, so that the floor is solid and not floating as is the case with screeds and cinders.

Application

Flex-Or-Crete is shipped in burlap bags, 26 bags to the ton. At the job one bag of cement is added to each bag of Flex-Or-Crete. Sufficient water is then added to produce a mortar of such consistency that it may be poured and screeded to a smooth, even surface. One ton (26 bags), when mixed with 26 bags of cement will cover 720 sq. ft. 1 in. thick or 360 sq. ft. 2 in. thick. No screening or measuring is necessary and the quality of the mixture never varies. During the setting of Flex-Or-Crete the temperature should not be more than 90° F.

Service

This Company will send a man to each installation when necessary, to instruct in the easiest and best methods of laying.

Uses

Fireproof, Structural, Nailable Roof Slabs—Flex-Or-Crete was designed especially for roof slabs where a decorative roofing such as tile, slate or copper is desired, and its light weight affords a saving in the steel. Its ultimate compressive strength, which is about 1200 lb. per sq. in. (higher than the best cinder concrete) allows spans up to 6 and 8 ft. for a 4-in. slab. In addition, it is one of the best fire retardants yet tested. The roof covering may be renewed and repaired at any time as Flex-Or-Crete is *permanently* nailable.

Nailing Base for Wood Floors—Flex-Or-Crete is poured and screeded to a smooth, even surface 2 in. thick over the structural floor with which it bonds perfectly, forming a resilient, quiet, durable, nailable base for the finished floor. No floor lining is necessary. It eliminates the time and expense in laying the screeds which often rot away within a few years and leave a dangerous point of weakness in the floor.

Metal Lumber Floors and Roofs—Flex-Or-Crete is used in combination with metal lumber for floors of light occupancy buildings. It is laid on metal lath with a thickness of 2 in., the metal lumber being spaced from 16 to 30 in. on centers. The use of Flex-Or-Crete instead of concrete with metal lumber eliminates the necessity of wooden screeds, and thus gives a continuous unbroken slab.

Continued on next page

Subfloors Under Linoleum—Linoleum laid on concrete is at times damaged by "sweating," "blistering," and "creeping," requiring expensive repairs after the work has been installed and considered complete. Apparently these defects are due to the relatively high heat conductivity of the concrete, causing the precipitation of atmospheric moisture. Linoleum has been laid on Flex-Or-Crete in many buildings and in not one instance have these defects appeared, for Flex-Or-Crete is a non-conductor of heat.

Ceilings and Partitions—Flex-Or-Crete may be plastered on metal lath for fireproofing, sound deadening, and as a nailing base for wood trim. Partitions constructed of Flex-Or-Crete receive directly nailed or screwed the mouldings, door jambs, baseboards, chair rail, picture moulding and other items, and eliminate the necessity of nailing strips, drilling and wood plugs which is the usual procedure in the average fireproof construction of partitions in modern buildings. It absorbs 50% less paint than ordinary plaster usually used in partitions.

Stucco—Flex-Or-Crete gives a very permanent product. Many architects prefer it for stucco, as it is particularly impervious to water, and sets very hard, thus providing an excellent permanent stucco.

Design—In the design of Flex-Or-Crete slabs the same formulas may be used as in the design of concrete slabs. The ultimate compressive strength for Flex-Or-Crete may be taken as 1200 lb. per sq. in. It weighs 7 lb. to the sq. ft. 1 in. thick or 84 lb. to the cu. ft., about one-half the weight of ordinary portland cement concrete.

Test Data

Complete information will be furnished on request regarding fire, load and water tests by Columbia University, Thermal Conductivity Test by Massachusetts Institute of Technology, Strength Tests by Massachusetts Institute of Technology, Compressive Tests by Columbia University, Nail Tests by Massachusetts Institute of Technology, etc.

Installations

Flex-Or-Crete Inc. will be pleased to furnish a list of installations, architects' references, cuts, literature or other information whenever requested.

Construction Department

Realizing the necessity of accurately following specifications we have organized our own engineering, estimating and construction departments. Our experience is at your service, assuring guaranteed construction under all conditions for which Flex-Or-Crete is designed.

We shall be glad to submit competitive bids, estimates, or recommendations.

Specifications

Note: Specifications for any particular job will be furnished by us on request.

Structural Slabs—(1) All roof slabs, including dormer and cornice slabs, shall be of Flex-Or-Crete, as manufactured by Flex-Or-Crete Inc., 1111 Statler Building, Boston, Mass.

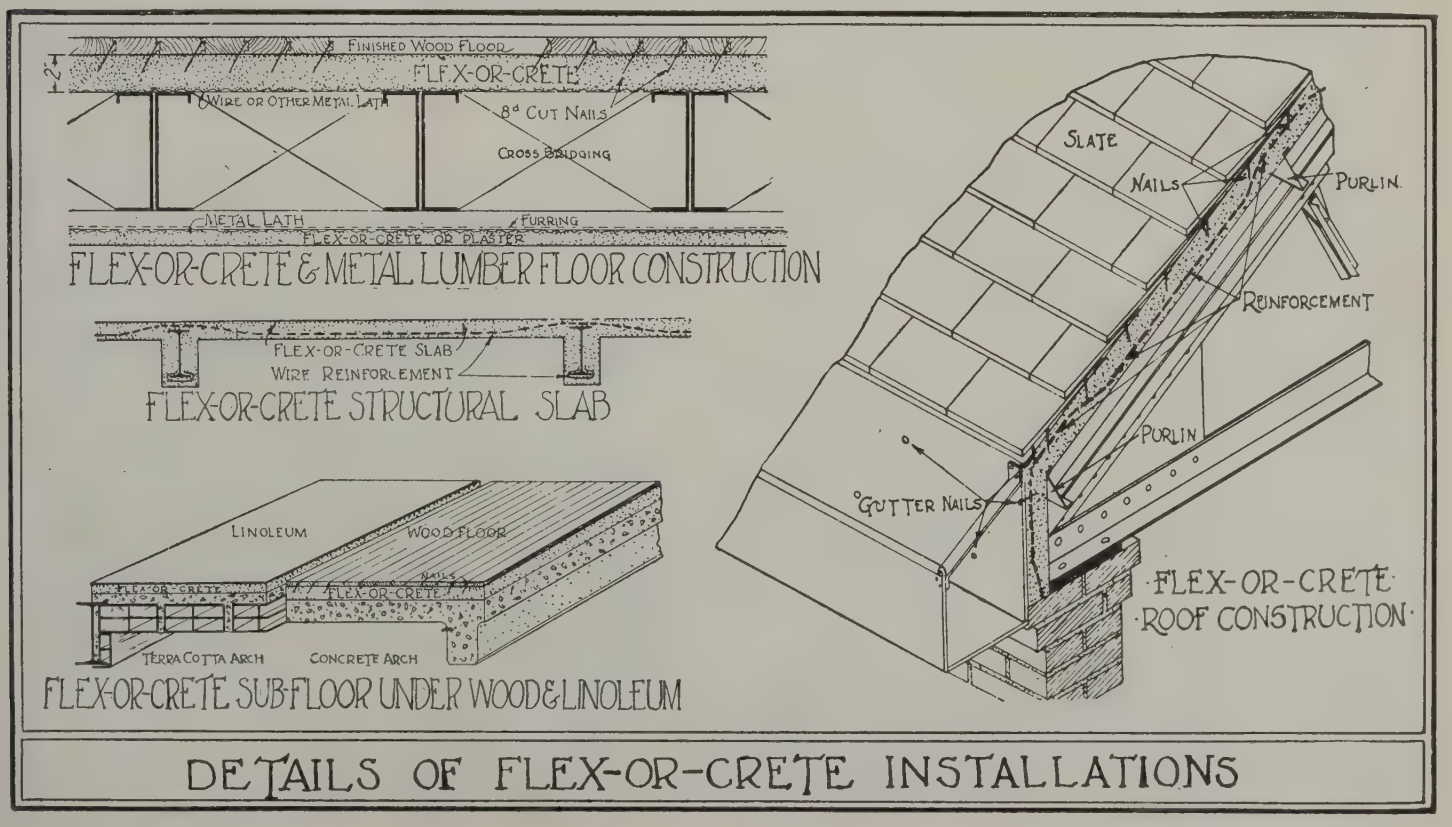
(2) Flex-Or-Crete shall be mixed in the proportion of one bag of cement to each bag of Flex-Or-Crete, and thoroughly mixed. Sufficient water shall then be added to produce a mortar that can be poured and screeded to a smooth even surface.

(3) The placing of the reinforcement and the forms is the same as for ordinary concrete. The forms shall be of sufficient strength to support the wet material and shall be tight enough to prevent loss. They shall remain in place until the Flex-Or-Crete has set, at least 10 days.

(4) The thickness shall be (..... in.) above mesh and (..... in.) below.

(5) The reinforcement shall be (state reinforcement).

(6) Where marked on plans the structural steel will be wrapped with (.....) reinforcement, and fireproofed with (..... in.) of Flex-Or-Crete.



THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete

105 West 40th Street, NEW YORK, N. Y.

SELLING AGENTS IN ALL THE PRINCIPAL CITIES IN THE UNITED STATES

Product

NAILCRETE (Nailing Concrete). Patented—name registered.

NAILCRETE
PATENTED - NAME REG.

Nailcrete (Nailing Concrete)

Nailcrete is a cementitious, fibrous, *all-mineral* fireproof compound, containing no animal or vegetable matter, no acids, alkalis or any substance injurious to metals, wood or other construction materials coming in contact with it.

Nailcrete is regularly supplied in burlap bags containing in each case the correct quantity for the mix used. It is to be mixed on the job with portland cement, screened sand and clean water, and screeded smooth and level. Complete instructions with each shipment.

Origin

Nailcrete has been in successful commercial use for more than 20 years. It was developed after extended laboratory research and tests conducted by Grosvenor Atterbury, F.A.I. A., collaborating with the Russell Sage Foundation in connection with their economic construction developments.

Advantageous Qualities and Physical Properties

Nailcrete is absolutely fireproof and verminproof; will not shrink, swell, or rot; is unaffected by dampness, a poor conductor of heat and an effective sound-deadener.

Nailcrete has the same compressive strength as 1-3-6 cinder concrete and is 20% lighter (Nailcrete weighs about 90 lb. per cu. ft.) thereby saving steel in building design. Its nailing properties are unsurpassed, as Nailcrete holds nails better than pine.

Coefficient of expansion, also setting and drying periods are substantially the same as those of cinder concrete. Nailcrete calls for the same precautions against freezing, quick drying, etc., as are necessary with ordinary concrete.

NAILCRETE SLABS—SAFE LOADS IN LB. PER SQ. FT.

Gross sectional area of steel in sq. in. per ft. slab	Thickness of Nailcrete above steel	Span in feet									
		1½	2	2½	3	3½	4	4½	5	5½	6
⅜-in. Hy-Rib, Ribplex or equal, .061 sq. in.	2 in.	480	312	176	122	....	....	....	....	....	....
	2½ in.	....	....	232	161	118	91	....	....	....	....
	3 in.	....	....	....	....	144	110	87	70	....	....
¾-in. Hy-Rib, Ribplex or equal, .1407 sq. in.	2 in.	....	....	....	158	114	87	....	....	....	....
	2½ in.	....	....	....	230	171	130	102	....	....	....
	3 in.	....	....	....	....	233	177	139	113	....	....
	3½ in.	....	....	....	....	....	228	180	146	121	....
	4 in.	....	....	....	....	....	....	238	193	159	134

Nailcrete weighs about 90 lb. cu. ft. or 7½ lb. per in., 1 ft. square.
Table based on WL/10. For WL/8 (or simple span), deduct 20% from above.
Brace self-centering lath to support wet Nailcrete.
Safe loads on spans above 6 ft. furnished on request.
Total live and dead load on tile roofs: 2-ft. slab, 66 lb.; 2½-ft., 70 lb.; 3-ft., 74 lb.; 3½-ft., 78 lb.; 4-ft., 82 lb. per sq. ft.

Uses of Nailcrete

Nailcrete is used without sleepers and without underflooring or sheathing, and is more durable than the ordinary construction using wood sleepers and cinder-concrete fill. It is especially suitable as a fireproof nailing base for floors, roof covering of various kinds, etc., as follows:

(a) Subfloors—Nailcrete is laid 2 in. thick (weight about 15 lb. per sq. ft.) as a subfloor on top of the structural slab or floor arch, to which is directly applied wood flooring, cork tile, etc., giving the floor greater resiliency and making it more impervious to sound. (See specifications.)

(b) Reinforced Floor Slabs for Metal Lumber—Nailcrete is used 2 in. thick on top of metal lath placed on metal lumber or bar joist floor beams. In this case the Nailcrete acts as fireproof floor slab and as a nailing base for the finished wood floor. (See specifications and table of safe loads.)

(c) Roof Coating—A fireproof, rotproof nailing base 1½ to 2 in. thick directly on top of roof slab to receive tile, slate, copper, etc. (See specifications.)

(d) Reinforced Roof Slab—A poured-in-place construction on rafters of steel, metal lumber or bar joists. (See specifications and table of safe loads.)

(e) Nailcrete Floor-Fill—Under cement finish, terrazzo, marble, tile, etc., as a non-corrosive fill in place of cinder concrete. (See specifications.)

(f) Plaster, Interior and Exterior—For interior plastering especially for fireproofing, sound-insulating and as a nailing base for wood paneling; for exterior plastering of penthouse walls, skylight curbs, etc., to receive the sheet metal covering. (See specifications.)

Cost

Nailcrete installed costs less than good wood sleeper and cinder-concrete fill construction. (Estimates furnished by all contractors.)

Service and Supervision

Where practicable, THE NAILCRETE CORPORATION will send a representative to the job, without expense to the contractor, to instruct users in the proper installation of Nailcrete.

References

A list of Nailcrete installations will be furnished on request.

Old Assay Office Front Restored as American Wing, Metropolitan Museum of Art, New York, N. Y.
GROSVENOR ATTERBURY, Architect; STOWE PHELPS and JOHN TOMPKINS, Associated
Nailcrete was used as a fireproof nailing base under all wood floors and also under copper roof

Continued on next page

Specifications for Nailcrete

Note: Always specify Nailcrete by name.

Materials—Nailcrete shall be made with portland cement and sand strictly in accordance with the specifications of the manufacturer. All sand shall be sharp, clean, and screened through ¼-in. mesh.

Preparatory Work—Immediately before Nailcrete is laid, the surface to be covered shall be swept broom-clean, thoroughly wetted and grouted.

Setting—All Nailcrete shall be allowed to set properly before being walked on.

Note: Ordinarily 2 days in summer and 3 days in winter.

Nailcrete Subfloors—On structural floor construction Nailcrete shall be laid 2 in. thick and screeded, and, if necessary, troweled, to a level.

The wood floor is not to be laid until the Nailcrete has thoroughly dried out. Flooring to be nailed with 8d cut nails, driven at an angle of approximately 45°.

Note: For high class work specify (under the heading of Carpentry) 1 layer of tarred paper (not less than 2-ply) additional deadening felt, if desired, and the finish wood flooring to be used. *Under-flooring* is *never* necessary.

On Metal Lumber Beams—Cover the floors of rooms, etc. (specify which ones are to be covered), with metal lath secured directly to the beams (not over 2 ft. apart) and on top of the metal lath put a bed of Nailcrete not less than 2 in. thick at the thinnest point, screeded level to receive the finish flooring specified under Carpentry.

Note: In high class work specify paper as above. Even in work of the highest class underflooring is unnecessary.

Nailcrete Roof Coating—The structural roof construction shall be covered with 2 in. of Nailcrete.

Note: If slate are thicker than ¾ in., consult The Nailcrete Corporation as to the thickness of the Nailcrete.

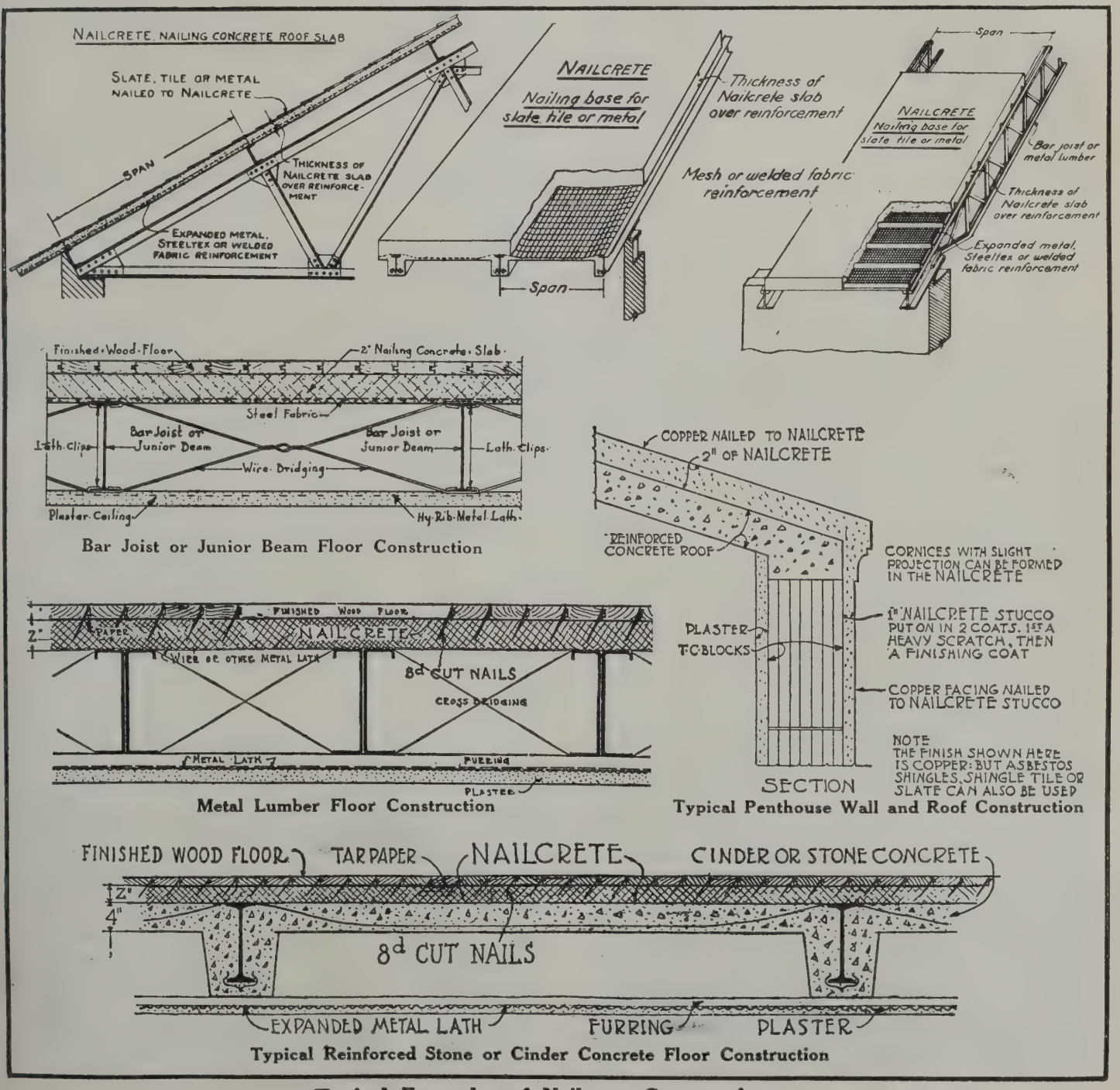
Reinforced Sloping Roof Slab—Cover steel rafters with self-centering lath (as specified by manufacturers) or pour in place fabric-reinforced Nailcrete slab ..... in. thick. (See table for areas of steel and safe loads.)

Nailcrete Floor-Fill—Over structural arch apply ..... in. Nailcrete Floor-Fill in accordance with manufacturer's specifications.

Plaster—***Interior***—Plaster interior walls to an approved finish, true and even as per instructions of The Nailcrete Corporation.

Exterior—Plaster the exterior of penthouse walls, skylight curbs, etc., with Nailcrete plaster 1 in. thick in 2 coats, scratch and finish, troweled (or floated) true and even.

Note: If the Nailcrete plaster is to be applied to gypsum blocks, the blocks should be covered first with proper bonding material, and the Nailcrete is then to be applied while the bonding material is still tacky.



Typical Examples of Nailcrete Construction

BLAW-KNOX COMPANY

Manufacturers of Blawsteel Galvanized Roof Sheathing

674 Farmers Bank Building, PITTSBURGH, PA.

SALES OFFICES

BALTIMORE, MD., Bayard and Warner Streets
BIRMINGHAM, ALA., Brown-Marx Building
BUFFALO, N. Y., Genesee Building
CHICAGO, ILL., Peoples Gas Building
CLEVELAND, OHIO, 616 Union Building
DETROIT, MICH., Lincoln Building
NEW YORK, N. Y., 342 Madison Avenue
PHILADELPHIA, PA., 332 Widener Building

EXPORT DIVISION: Milliken Bros.—Blaw Knox Corp., Canadian Pacific Building, NEW YORK, N. Y.

For Steel Grating, see page A791

Blawsteel Galvanized Roof Sheathing

Blawsteel Galvanized Roof Sheathing is impervious to moisture and is light in weight and low in cost. It can be erected in less time than other types of roof sheathing and allows building construction to be carried on almost without a break, regardless of weather conditions. Rain or snow can be swept off the sheathing, or moisture wiped off and insulation applied in any weather. This makes Blawsteel Galvanized Roof Sheathing particularly desirable and economical for use on all buildings designed for flat roofs, a fact that is being widely recognized by architects, contractors and owners.

Blawsteel Galvanized Roof Sheathing has an expansion joint every 4 in. in the length of the building, and roofing placed on this steel sheathing is not subject to strain caused by expansion and contraction. It forms a more elastic support for roofing than other types of sheathing. It is weathertight and rustproof and can be easily protected against inside deterioration from injurious gases by using acidproof paint.

Any of the tried and tested insulating materials can be used on Blawsteel Galvanized Roof Sheathing, together with any type of roofing material that is specified by architect, engineer or owner. Asphalt (and not tar), however, must be used in mopping insulation to steel sheets.

Safety with Economy—Blawsteel Galvanized Roof Sheathing is non-burnable and therefore particularly desirable where specifications absolutely eliminate the use of wood. The advantages of having a non-burnable roof are so obvious that they need not be taken up in detail. With the use of Blaw Galvanized Roof Sheathing, insurance rates are greatly reduced; in some instances sufficient to more than pay the interest on the investment. In addition to its non-burnable qualities, steel sheathing will not disintegrate under the action of fumes or gases, and cracks cannot develop owing to expansion and contraction caused by temperature changes.

Weight—Weights of Blawsteel Galvanized Roof Sheathing and other types of materials are given below:

Weight of three-ply "A" specification prepared roofing with ½-in. insulation on Blawsteel Galvanized Roof Sheathing .... 5 lb. per sq. ft. Weight of wood roof, 1⅞-in. tongue and groove with three-ply prepared roofing, about 10 lb. per sq. ft. Weight of 2-in. gypsum roof, including T bars with three-ply roofing, about 15 lb. per sq. ft. Weight of 2-in. concrete roof with three-ply prepared roofing, about 27 lb. per sq. ft.

Pitch—Roof pitch for Blawsteel Galvanized Roof Sheathing is ¼ to ¾ in. per ft.—½-in. per ft. is standard.

Purlins—Blawsteel Galvanized Roof Sheathing is ordinarily placed on standard structural channels. Usual bay spacing requires 7-in. 9.8-lb. channel purlins spaced 3 ft. 10½ in. between centers for 40-lb. live load. Increased load or bay length would require 8, 9 or 10-in. channels, depending on load and spacing.

Blawsteel Sheathing—Blawsteel Galvanized Roof Sheathing consists of copper bearing, galvanized sheets, with longitudinal integral reinforcing ribs pressed into the sheet on 4-in. centers.

Installing Blawsteel Sheathing—Blawsteel Standard Flat Roof Sheets shall be laid (starting at the eaves of the building) and ribs shall be placed downward, resting on purlins—with flat side up. Sheets are placed so that ribs fit into grooves in wood filler in eave cornice. The sheet metal cornice is then nailed down through end of sheet, by driving galvanized nails into wood core. Sheets are interlocked at sides. As sheets are placed they are fastened to eave purlins by means of special anchors provided for this purpose. Anchors are placed at toe of purlin, one in center of each 20-in. wide sheet and one at side sheet joint.

After first course of sheets is in place, the second course is started, lapping 3 in. on first course—the ribs of the second course telescoping with the ribs of first course. Anchors are then placed every 10-in.—one in center and one in joint of all sheets at lap—which occur over the purlin.

Each course of sheets is placed likewise until ridge is reached—over the sheets at ridge a 12-in. wide and 10-ft. long ridge cap is placed and fastened to sheets with four metal screws.

Cleaning—After sheets are all in place and anchored securely, and before insulation or roofing is applied, sheathing shall be swept clean of all debris or dirt, and the entire surface mopped with dilute acetic acid or vinegar.

Laying Sheets in Place

Ready for Insulation and Roofing

Continued on next page

STANDARD CHANNEL PURLINS FOR 40-LB. LIVE LOAD

Factor Safety 4 — Stress 18,000 lb. per sq. in.

Bay length, ft.	Span center to center purlins				
	3 ft. 10½ in.	4 ft. 10½ in.	5 ft. 10½ in.	6 ft. 9 in.	7 ft. 9 in.
16	6-in. channel 8.2 lb.	7-in. channel 9.8 lb.	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	8-in. channel 11.5 lb.
18	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	9-in. channel 13.4 lb.
20	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.
22	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.	12-in. channel 20.7 lb.
24	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.	12-in. channel 20.7 lb.	12-in. channel 20.7 lb.

BLAWSTEEL ROOF SHEATHING

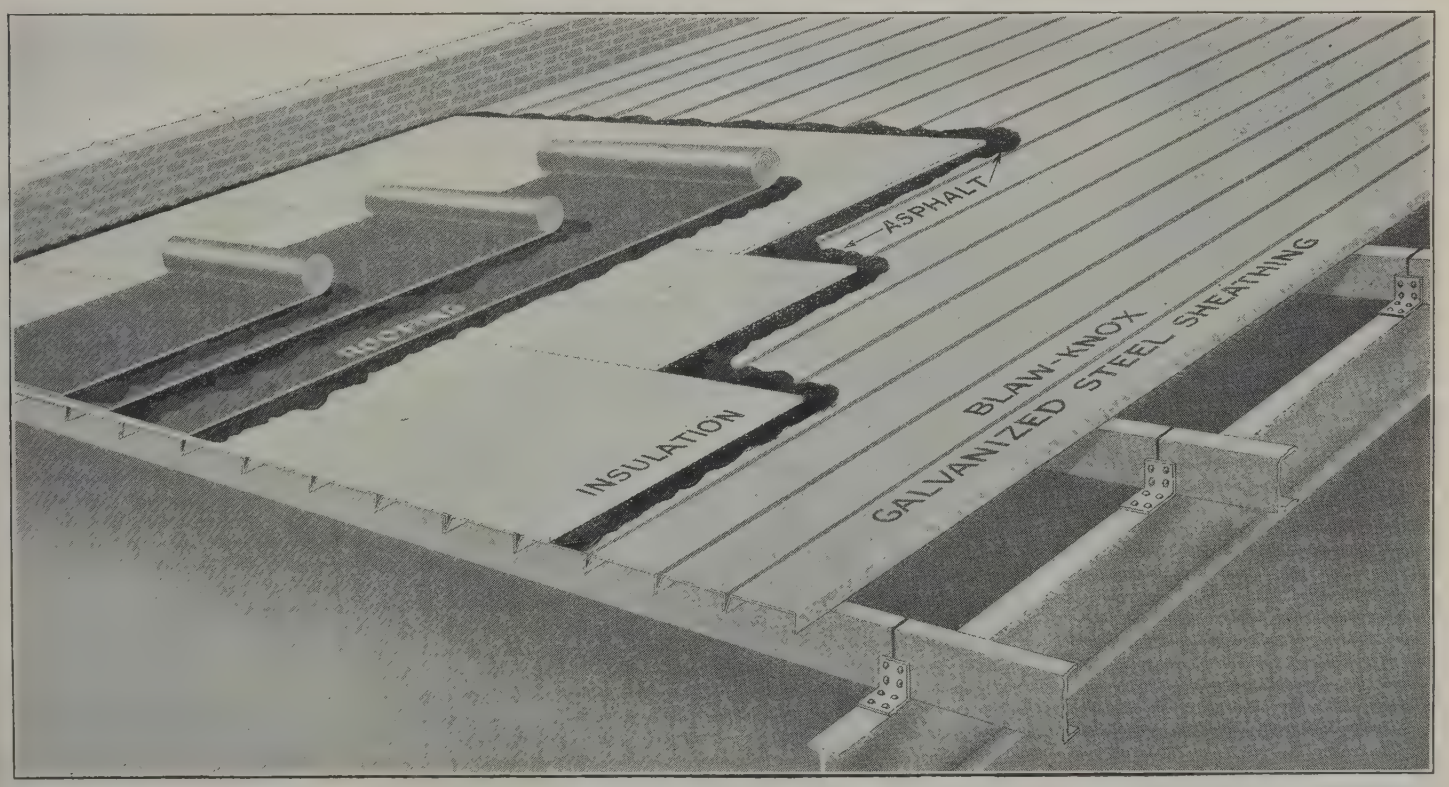
Safe Live Load—pounds per square foot

Span, ft.	Span, in.	Load in lb. per sq. ft.		
		24 ga.	22 ga.	20 ga.
3	10½	49	.....	.....
4	4½	38	48	.....
4	10½	30	38	52
5	4½	24	30	42
5	10½	.....	25	35
6	3	.....	22	30
6	9	.....	.....	26
7	3	.....	.....	22
7	9	.....	.....	19
8	3	.....	.....	16

BLAWSTEEL LONGSPAN ROOF SHEATHING

Safe Live Load—pounds per square foot

Span, ft.	Span, in.	Load in lb. per sq. ft.		
		24 ga.	22 ga.	20 ga.
3	10½	74	.....	.....
4	4½	55	70	.....
4	10½	46	59	83
5	4½	37	47	67
5	10½	31	40	57
6	3	27	35	50
6	9	.....	30	43
7	3	.....	25	36
7	9	.....	.....	30
8	3	.....	.....	26



HOLORIB INCORPORATED

Manufacturers of Steel Roof Decks—Applied under Governing Specifications with Insulation and Waterproofing

1515 Fairfield Avenue, CLEVELAND, OHIO

BRANCH OFFICES

CHICAGO OFFICE, 53 W. Jackson Boulevard
DETROIT OFFICE, 5-112 General Motors Building
SYRACUSE OFFICE, 136 Walton Street
PHILADELPHIA OFFICE, 1015 Chestnut Street
DALLAS OFFICE, 410 Construction Industries Building

Product

HOLORIB REINFORCED STEEL ROOF PLATES, a strong, rigid form of integral reinforced roof construction, forming the permanent base of a completely insulated and waterproofed unit.

HOLORIB ROOF UNIT
Deck-Insulation-Waterproofing

Service

A Holorib Roof is designed by Holorib engineers for the building on which it is to be applied in co-operation with the architect and engineer. HOLORIB INCORPORATED produce the steel sheets, metal edging, backing or closures, fastening clips, and (1) will contract to erect the steel deck with their own field force, or (2) furnish superintendence at a moderate charge, so that the deck may be applied by the general contractor, or (3) will co-operate with responsible and capable roofing contractors so that the architect and owner may be relieved of all responsibility for the permanent satisfaction and stability of the complete roof unit.

HOLORIB INCORPORATED recommend that insulation always be applied over their steel roof deck. As a result of our experience, we prefer the pressure resisting or rigid types of insulating material. We further believe that the interest of the owner and architect is best served by the use of good quality waterproof coverings, and will be glad to furnish suitable specifications if so requested.

Holorib engineers are thoroughly familiar with structural design and their services in laying out the most economical framing plans for roof decks are at the disposal of architect and owner.

Construction

Holorib Deck Plates are fabricated from copper-bearing steel sheets reinforced by self-contained closed triangular ribs rolled into the sheet longitudinally, each rib forming a complete girder beam that rests directly on the purlins and anchored to them by specially formed anchor clips. The sheets dovetail and interlock securely together on both sides and ends, forming a deck through which there is no possibility of asphalt drippage.

Directly upon the Holorib Steel Roof Deck the correct thickness of pressure resisting insulation is full mopped in hot asphalt. Complete adhesion and thorough waterproofing is assured as the upper surface of Holorib is continuous, smooth and level. The built up waterproofing is then mopped to the dry insulation, forming a complete weathertight unit.

Holorib Steel Roof Deck construction is applicable to flat, pitched, or curved roofs, and the proper gauge Holorib sheets are fabricated for those purlin spacings which are the most economical in the use of structural steel.

Standard 24-gauge Holorib sheets are rolled with triangular ribs ¾ in. deep spaced 3¼ in on center. They are specially designed for structural purlins or light joists spaced under 5 ft. Wide span Holorib sheets are fabricated from 22 and 20 gauge copper-bearing steel with triangular ribs 1½ in. deep spaced 6 in. on center, and will cover with unusual rigidity purlin spacings as high as 8 ft.

All Holorib sheets are dip coated and oven baked at the factory with a steel gray finish forming a tough protective film not readily abraded in shipment, which is, in addition, a first class base for a field coat. With the application of this field coat following erection, no maintenance work will be necessary, except under very unusual conditions, and the steel ceiling will not require any more attention than that given the structural members during future years.

The Holorib Steel Deck is fireproof, and the complete unit itself rates as incombustible.

The Insulated Roof Unit

The insulation as applied to Holorib Steel Deck Plates effectively retards the passage of heat in either direction. In this respect, the Holorib Roof Unit with 1 in. of insulation is equal to 24 in. of solid concrete in heat retarding value. This effective insulation very definitely reduces fuel consumption year after year, and may well be taken into account in designing new buildings by reducing the amount of radiation and size of the heating plant.

Dry steel never rusts. The insulation applied over Holorib entirely prevents condensation from warm air within the building meeting a surface chilled by a colder exterior temperature, with the result that the Holorib Roof Deck always remains at approximately room temperature well below the dew point of the interior air. Accumulation of moisture due to condensation is totally absent.

With the steel deck ceiling protected with paint from below and insulation above, no injurious corroding action is possible.

Without the use of insulation a steel roof deck is no more permanent than any copper-bearing steel sheet. *With* insulation the Holorib Steel Deck is placed in exactly the same position as any metal furniture, such as filing cabinets, steel desks, metal trim, etc., contained *within the building.*

With high humidities and temperatures, from 1½ to 2 in. of insulation should be applied in broken joint construction. The ceiling should be given two field coats of good paint.

In the average heated building, such as theaters, schools, auditoriums, machineshops and garages, a 1-in. thickness of insulating material will return a substantial dividend in fuel saved annually, and will entirely prevent the possibility of condensation.

In slightly heated buildings where cost is the chief factor and there is little likelihood of a considerable temperature difference within and without the building, a ½-in. layer will prove satisfactory. In all installations at least one field coat of paint should be applied to the ceiling.

Final waterproofing is accomplished by means of built-up felts with a surface finish of slag, gravel, or asbestos, or a 4-ply built-up asphalt roof. Slate or tile has been permanently and successfully applied on steep Holorib Roofs, and on such surfaces the first layer of insulation is both mopped and fastened to the Holorib with sheet metal screws and 1-in. washers; the second ply is then mopped and nailed to the first layer, and over this surface is mopped an asphalt saturated sheet, the slates are then nailed directly into the insulation, using barbed copper nails.

Special specifications resulting from our experience covering roofs of this type will be furnished upon request.

Setting Holorib Clips

Laying a Holorib Sheet

Making Holorib Endlap

Anchoring Holorib Clips to Sheets

Continued on next page

Comparative Insulating Values

The thermal conductivity of roofs *with built-up waterproofing* are expressed in B.t.u. per hour, per degree difference. (From 1928 edition of the American Society of Heating and Ventilating Engineers Guide.)

Holorib with ½-in. insulation	0.358
Holorib with 1-in. insulation	0.232
2-in. concrete	0.658
3-in. concrete	0.610
2-in. wood (new, not shrunken or warped, full, *not* commercial thickness	0.345
3-in. poured gypsum with 15% wood fiber and plaster board base	0.369
4-in. poured gypsum mixed with 15% wood fiber and plaster board base	0.318
Corrugated asbestos, per *inch* thickness	0.48

Steel Saving

The Holorib Insulated Roof is one of the lightest permanent decks in existence, and structural members may be considerably reduced in weight. The saving in steel is frequently measured in tons with a corresponding reduction in building costs.

Comparative Roof Weights

Holorib:	Lb. per sq. ft.
Waterproof covering	1.5
1-in. insulation	1.5
Steel deck	1.6 to 2.9
Total approximately	5 lb.
2-in. plank	8
3-in. plank	11
3-in. gypsum	18
Precast concrete	18 to 25
3-in. poured concrete	38

Add 4 to 6 lb. per sq. ft. if slag or gravel is used.

Advantages

The Holorib Roof unit is always a permanently weathertight roof. The insulation can be kept dry and applied in that condition. The waterproofing membrane thoroughly cemented to *dry* insulation is unusually free from wrinkles and gas pockets, and will remain in good condition many years longer than over many other types of roof decks.

Contraction and expansion in the roof unit is practically eliminated. The steel deck is not affected by temperature or atmospheric changes.

Rates as fireproof over incombustible contents, and very often affords a reduction in insurance rates.

Speeds up completion of the building. On an average job, four men will apply 25 squares of steel deck per day.

The inside appearance is very attractive, no dust can collect on ribs.

Is *lower* in cost than other types of fire resistive construction *with the same insulating efficiency.*

General Information

Holorib Sheets will be cut to special lengths at the factory, but widths cannot be varied. Irregular shapes and angles to fit valleys, ridges, etc., are cut in the field. This work is rapidly accomplished with oxy-acetylene using a fine cutting tip, or an electric saw with hardened steel blades, or a nail saw.

Holorib may be applied on sidewall and curb construction under monitor sash. Special detailed drawings upon request.

All sheets must have a bearing at the ends of a building either raggle, corbel, or purlin. We furnish single starting sheets for the sides of the building. Overhang should be 8 in. or less at the ends of the sheet, but must be supported at the sides or gable end. All end laps of Holorib Sheets are made directly over, or within 6 in. of the purlin, without sacrifice of appearance or rigidity. Closures for ridges, valleys, gables, or eaves are generally furnished by the sheet metal and roofing contractor as they are applied over the insulation. Unless specifically stated they are not included in Holorib quotations. We will furnish a Holorib layout from dimensioned architectural drawings and steel plans. There is no charge for this work.

Euclid Village, Ohio, Sewage Disposal Plant

F. W. Pease Engineering Co., Engineers Geo. B. Gascoigne, Architect

SIZES, WEIGHTS AND LOADS OF HOLORIB ROOF DECKS

Sheet sizes, in.	24 gauge*	4 ft. 3 in. to 10 ft. 3 in. Multiples of 3 in. 16¼ in. wide.
	20 and 22 gauge**	5 ft. 3 in. to 10 ft. 3 in. Multiples of 6 in. 18 in. wide.

*All laps are made on purlins.
**All telescoping end laps are held within 6 in. of purlins.

Width of Holorib Decks with Clip			Safe Carrying Loads, Holorib Roof Unit			
Gauge	Rib size, in.	Weight, lb.	Gauge	Type	Purlin spacing	Safe load sq. ft., lb.
26*	¾	134	26*	Special	2′0″—3′0″	..
24	¾	170	24	Standard	4′0″—4′6″	60
22	1½	225	22	Wide-span	4′6″—5′6″	50
20	1½	290	22	Wide-span	5′6″—6′3″	45
			22	Wide-span	6′3″—7′0″	40
			20	Wide-span	7′0″—8′0″	40

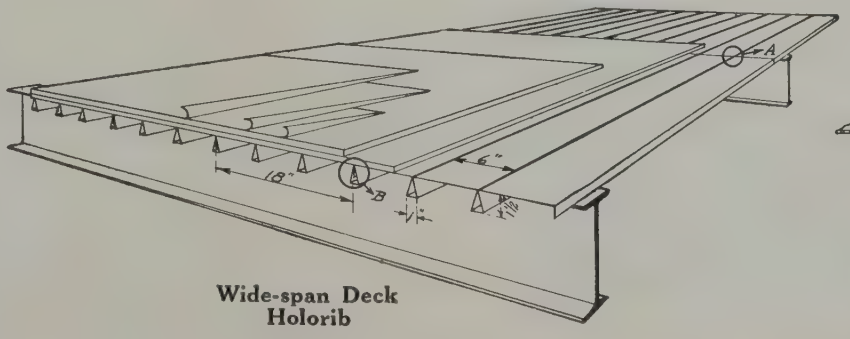
*Applied inverted for concrete floor forms. Send for complete literature. C. L. 36,000 lb. Classed "Iron & Steel Roofing N. O. I. B. N." 5th C. L., 4th L. C. L.

Typical Holorib Installations

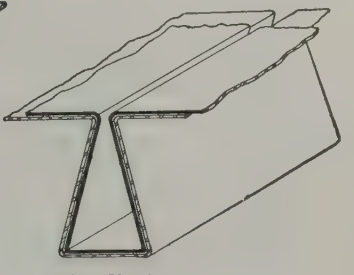
Selected with a view to illustrating the adaptability of the Holorib Roof Unit.

Building	Location	Squares
Illinois Bell Telephone Co.	Chicago, Ill.	270
Midland County Courthouse (Steeply pitched tile surface)	Midland, Mich.	146
Camden Vocational School	Camden, N. J.	520
Kingston High School	Kingston, Pa.	501
Brenham High School	Brenham, Tex.	162
New Mexico State University	Albuquerque, N. M.	370
Scottish Rite Cathedral	Indianapolis, Ind.	140
Park Ridge Theater	Park Ridge, Ill.	150
Dormont Theater	Pittsburgh, Pa.	129
Freihofer Theater	Upper Darby (Phila.) Pa.	340
Dayton Power & Light Co.	Dayton, Ohio	203
Columbus Railway, Power & Light Co.	Columbus, Ohio	320
Lincoln Garage Building	Cleveland, Ohio	233
Towell Cadillac Company	Cleveland, Ohio	360
White Company	Syracuse, N. Y.	390
Ohio Match Company	Wadsworth, Ohio	157
Delco Light Company	Dayton, Ohio	247
C. O. Bartlett & Snow Co.	Cleveland, Ohio	184
Celotex Company	Marrero, La.	843
Reo Motor Company	Lansing, Mich.	300
Ball Brothers Company	Noblesville, Ind.	210
International Harvester Co.	Buenos Aires, So. Amer.	120
Columbus Auditorium	Columbus, Ohio	365
Hart Parr Tractor Company	Charles City, Iowa	900
American Encaustic Tile Co.	Perth Amboy, N. J.	644
Rockford Drop Forge Company	Rockford, Ill.	200
Packard Motor Co.	Detroit, Mich.	382
Gemmer Manufacturing Co.	Detroit, Mich.	452
Alois Aufrichtig Mfg. Co.	St. Louis, Mo.	335
Dr. Phillips Packing Co.	Orlando, Fla.	317

DETAIL-B.
SIDE LAP.



Wide-span Deck Holorib



DETAIL-A.
END LAP.

IRONCLAD, INC.

Ironclad Insulated Copper Steel Roof Decks

817 14th Street, N. W.
WASHINGTON, D. C.

Ironclad Roofs—Quickly Laid at Less Cost

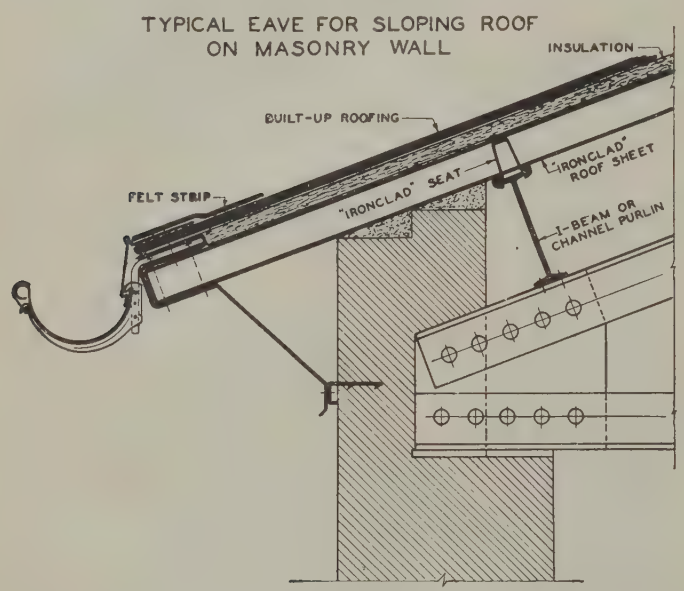
Ironclad Copper Steel Roof Sheets form an exceptionally strong metal roof, spanning approximately 6 to 8 ft. between purlins, and being practically as cheap in place as good wood construction.

Ironclad Copper Steel Roof Sheets are strong and durable. They provide ample support for a generous thickness of insulating material. The permissible longer spans between purlins (approximately 6 to 8 ft.) and the light weight of Ironclad (approximately 7 lb. per sq. ft. including steel purlins) effect substantial savings in the cost of the supporting framework.

Steel roofing, because of its strength, economy in cost, fire resisting qualities and long lived service, has earned merited recognition in all types of construction.

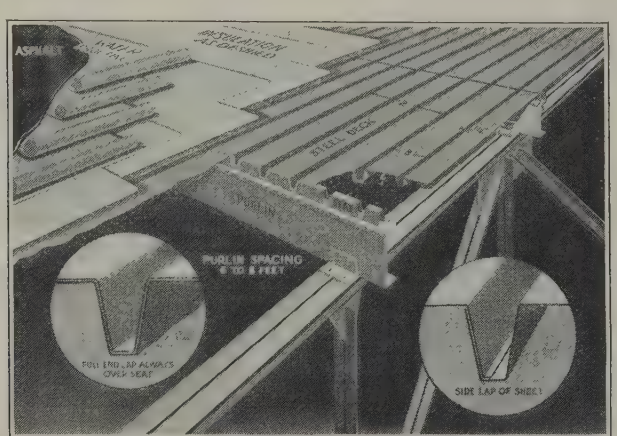
Ironclad for All Types of Roofs

Ironclad Copper Steel Roof Sheets are adaptable to any type of roof, regardless of the pitch. They have been most successfully used for roofing theaters, hospitals, industrial buildings, hangars, etc.. Ironclad may be used on flat, sloping, gable, hip, French, sawtooth and special types of roofs.



Advantages of Ironclad Roofs

Spans—Ironclad will span from 6 to 8 ft. between purlins, requiring a very small amount of structural support per square foot of roof.



Construction Details of Ironclad Roof

Weight—Due to its deep rib and effective seat, Ironclad is very strong but light in weight.

Expansion and Contraction—The effective methods of fastening Ironclad distribute expansion and contraction over the entire roof area uniformly.

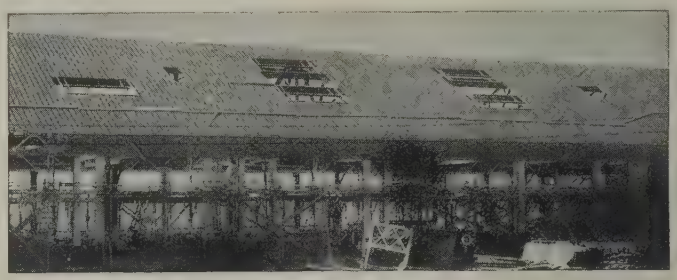
Permanency—Ironclad is made of rust resisting copper steel with a baked-on coat of paint, or can be supplied in galvanized copper steel.

Unusual Conditions—Ironclad fastening clips and other appurtenances take care of even unusual conditions.

Economy—Ironclad Roofs are practically as cheap in place as good wood construction. They are easily and quickly placed, effecting a saving in time and labor. Light weight and longer span save money on framing.

Ironclad Used as Siding

Ironclad Copper Steel Roof Sheets can be used for siding and, due to their rigidity, save steel or other supporting material. Metal screws and washers are furnished to hold the insulation or wood nailing strips for slate or tile on vertical surfaces.



Ironclad Used on Sloping Roof

Designing Information

Ironclad Copper Steel Roof Sheets are furnished in 24, 22, 20 and 18 gauge. Each sheet is 2 ft. wide and lengths are 5, 6, 7 or 8 ft. and lap is optional but should not be less than 1 in.; consequently each Ironclad sheet covers a roof area equal to its own length in feet less 1 in. (or the lap allowed) multiplied by 2 ft., or the full width of the formed sheet. Ribs are full 2 in. in depth, spaced 8 in. center to center. The seats are 2¼ in. in depth so the distance from top of purlin to top of deck is 2¼ in. plus thickness of sheet used.

Specifications

Roof Sheathing—The roof sheathing shall be Ironclad Copper Steel Plates with ribs not less than 2 in. deep or more than 8 in. from center to center of ribs. The plates shall be supported by pressed copper steel seats securely held to the purlins. All joints shall come over supports. The ribs shall be formed with bends not exceeding 90° and all corners shall have a radius of not less than twice the thickness of the sheet. The sheet shall be fastened to the pressed steel seats with clips or other suitable means permitting expansion and contraction without deformation of the sheet. The sheets shall overlap at the ends for their entire width and depth, not less than 1 in. and for their entire length not less than the depth of one rib.

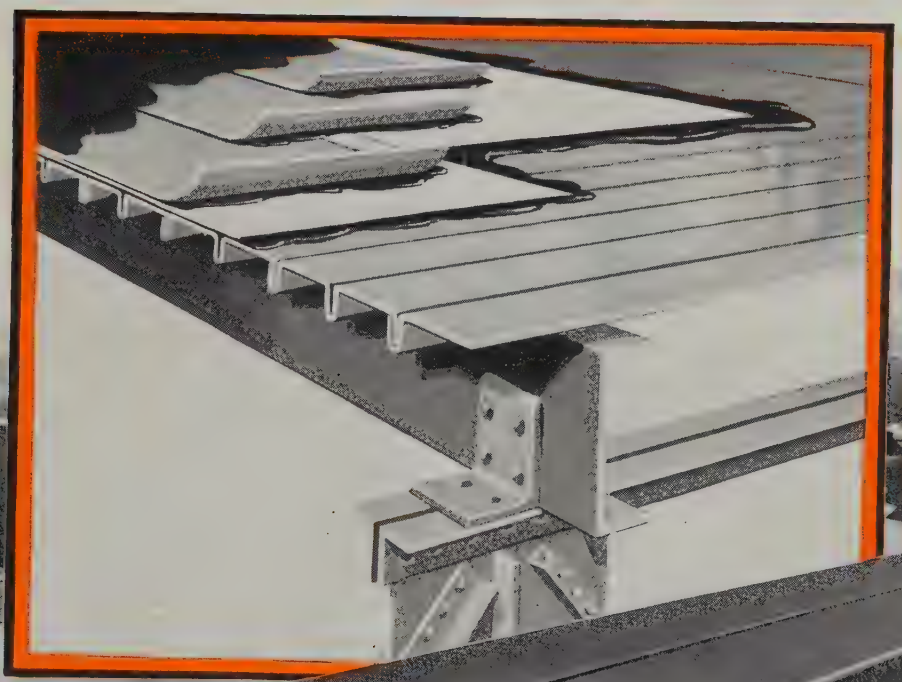
The sheets shall be made of ..... gauge metal to fit purlin spacing of .... feet .... inches. Sheet material for the roof shall be coated with a baked-on shop coat of preservative paint.

Insulation—The sheathing shall be insulated with ..... of a thickness of not less than ..... embedded in high temperature asphalt, and on slopes over 3 in. to the foot shall be fastened with metal screws and washers, using not less than one screw for each 4 sq. ft. of insulation.

Waterproofing—(Usual type of specification.) If slate or tile roofing is to be placed over the insulation, suitable nailing strips shall be fastened through the insulation into the roofing sheet with metal screws.

MAHON

STEEL ROOF DECK



THE R. C. MAHON COMPANY

DETROIT, MICHIGAN

THE R. C. MAHON COMPANY

Manufacturers of the Mahon Steel Roof Deck

HOME OFFICE AND PLANT

DETROIT, MICH.

BRANCH OFFICES: NEW YORK, N. Y., AND CHICAGO, ILL.

Product

MAHON STEEL ROOF DECK.

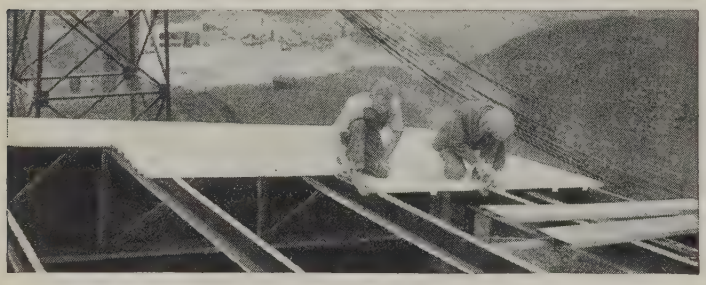
For Fire Doors, see page A963; for Roof Sumps, see page C2789.

Mahon Steel Roof Deck for Every Type of Roof

The Mahon Steel Roof Deck, details of which are set forth in these pages, offers a roof suited to practically any type of building calling for either flat, pitched or arched roof construction.

Architects and contractors will find that the Mahon Steel Roof Deck greatly simplifies roof design, and builders will appreciate the ease with which the roof can be applied. It has advantages in structural simplicity which permit rapid erection and consequently lower the cost of construction—a feature that wins approval of building owners everywhere.

The laying of a Mahon Steel Roof Deck is one of the simplest structural operations that you have ever



Mahon Steel Roof Deck Is Easily and Quickly Laid

witnessed. The work, due to the ingenious design of parts, can proceed swiftly and is done entirely from the upper side of the roof. Every plate of a Mahon Steel Roof Deck fits into the preceding unit. There are no end fittings—the ends being lapped one over the other. All lap joints occur directly over purlins. All clips are installed from the top as the plates are put in place.

The Mahon Steel Roof Deck consists of one standard roof plate and three standard clips by which the plates are fastened together and to the supporting framework.

Material

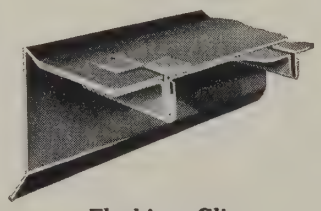
Mahon Steel Roof Deck is furnished in 18 and 20 gauge, in copper bearing or galvanized steel. Mahon has established 20 gauge as a minimum thickness of steel for roof deck plates as a result of exhaustive tests which indicate this as the minimum that can be safely and economically utilized. Weight impacts would be likely to seriously affect lighter gauge material.

Standard Assembling Clips

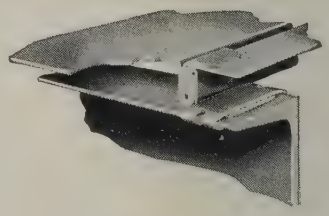
The laying of a Mahon Steel Roof Deck requires only the installation of the steel clips by which the plates are fastened together as they are assembled, and by which they are fastened to the supporting structural steel. Mahon clips have been designed primarily for simplicity, and they have in every instance a strength more than adequate for the work they are called upon to perform.

Mahon Standard Steel Roof Deck Plate

Intermediate Clip Locking Roof Deck Plates Together Midway Between Purlins

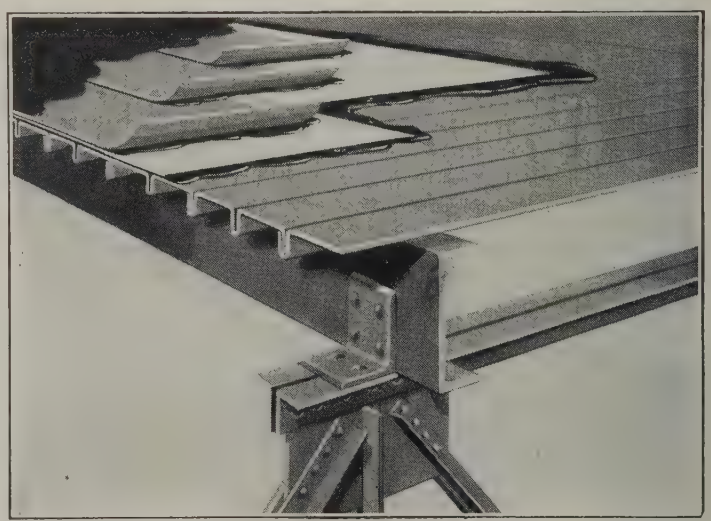


Flashing Clip for Attaching Flashing to Roof Deck Plates



Beam or Purlin Clip for Attaching Roof Deck Plates to Beam or Channel Purlins

There is not in the design of the Mahon Steel Roof Deck any part which can work up, become loose or in any way act to rupture the insulation or roofing material.



Cross Section of Mahon Steel Roof Deck Showing Application of Insulation and Waterproofing

Continued on next page

An Integral Unit Roof

The Mahon Steel Roof Deck installation, when completed, functions as a single steel plate, the separate units becoming an integral part of one interlocking whole when assembled.

A feature of the Mahon Steel Roof Deck which makes for extra rigidity and strength is the making of all end lap joints directly over purlins. The minimum end lap is 2 in. No unsightly laps or joints are visible from the underside of the Mahon Deck.

All plates in the Mahon Deck lay 12 in. wide when installed, ribs 1½ in. deep are 6 in. on centers. Every second rib where the sheets interlock provides three thicknesses of metal. Each deck plate is locked with special clips to the adjoining plate midway between purlins to prevent sagging of individual plates due to weight when the same weight is not exterted on those adjoining. This feature eliminates the possibility of loosening the bond between insulation or roofing applied to deck.

Universal Application

The unusual lightness of the Mahon Steel Roof Deck fits it for use on buildings of every type, including buildings with unusual roof spans such as auditoriums, gymnasiums, and the like. Designers will also find this type of roof deck admirably suited to factories, office buildings, hotels, apartments, hospitals, and schools.

Mahon Deck on a South Bend, Ind. Theater

The fact that a Mahon Steel Roof Deck can be insulated to exactly the degree required for the type of occupancy makes it an ideal construction for any type of building.

Expansion and Contraction

Expansion and contraction difficulties have been entirely obviated in the design of the Mahon Steel Roof Deck. Note in the center rib an ample allowance for lateral expansion and contraction, and also that longitudinal expansion and contraction of the plate is provided for in the lap joints.

These factors mean that bulging positively cannot occur in a Mahon Steel Roof Deck, and that no injury to insulation or composition roofing can occur through expansion or contraction.

Mahon Deck Used for Both Roof and Floor of a Conveyor Shaft

Monitor Flashings

The projecting ribs on the plates of the Mahon Steel Roof Deck can be cut and the sheet turned up to make a flashing under monitor windows, curbs, etc.

Saddles and Fill

Where saddles are required, any material which is of a permanent nature may be used. We have carried on a number of tests and believe gypsum to be the best material which has been brought to our attention up to the present time. We, therefore, recommend the application first of one layer of asphalt or tarred felt on the steel deck proper, the same to be cemented to the deck with asphalt or pitch. This should be mopped on top with asphalt or pitch over which the gypsum may be installed. Gypsum should then be allowed to dry before roofing is applied. Since gypsum is an insulator in itself, we suggest stopping the insulation at the gypsum line.

Caution—If a cinder fill is to be used, under no consideration should it be laid next to the steel deck. The sulphuric content of cinders is detrimental to steel, and for the protection of the deck where cinders are to be used we would recommend at least two plies of roofing felt laid with pitch or asphalt over areas of the deck to be covered with cinders.

Insulation

The Mahon Steel Roof Deck is a complete structural unit, and requires no insulation for stiffness or rigidity—these factors being amply provided for in the deck itself. In the case of unheated structures such as loading docks, warehouses and the like, insulation is not necessary. In buildings that must be heated or where condensation is a problem we recommend the use of insulation of any approved type—amount of insulation will be governed by the type of occupancy.

Mahon Deck Covers New Extension to Arvey Corp. Plant, Detroit, Mich.

Composition Roofing

Any standard composition roofing can be used over the Mahon Steel Roof Deck. Asphalt roofing may be preferable from a standpoint of weight. Sheets should be mopped solid similar to roof construction over concrete.

Fire Safety

No matter what type of occupancy a building is designed for, building codes in centers of population demand fire safety. Mahon Steel Roof Deck provides the utmost in fire safe roof construction, and will obtain for the owner a low insurance rate.

Continued on next page

Specification for Mahon Steel Roof Deck

(A) **Work Included—**

All roof surfaces shown on plans as steel deck.

(B) **General—**

Steel Deck shall be as manufactured by The R. C. Mahon Company, 8650 Mount Elliot Avenue, Detroit, Mich., or equivalent, meeting fully this manufacturer's standard of quality.

(C) **Materials—**

(C1) ***Deck Plates—***

(C1a) Deck plates shall be of copper bearing steel painted one shop coat of metallic paint.

(C1b) *Alternate*—Deck plates shall be of galvanized steel furnished unpainted.

Note: Select either (C1a) or (C1b) as desired.

(C1c) Deck plates shall not exceed 12 inches in width reinforced with webs or ribs not less than 1½ inches deep spaced not to exceed 6 inches on centers, so constructed as to allow for expansion and contraction.

(C1d) Minimum gauge of steel for plates shall be 20 gauge for spans up to and including 7 feet, and 18 gauge for spans over 7 feet up to and including 8 feet.

(C1e) Deck plates shall be capable of withstanding a distributed live load of 40 pounds per square foot without permanent deflection on the above maximum spans.

(C2) ***Attachment Clips—***

Furnish steel slips adapted to permanent attachment of plate ribs to each roof purlin spaced 12 inches on centers. Furnish interlocking clips for securing adjoining deck plates together midway between purlins.

(D) **Erection—**

All end laps of deck plates shall be made directly over roof purlins, with a minimum overlap of 2 inches.

Deck plates shall be secured to each purlin every 12 inches on centers by steel clips fastened to the deck ribs.

Each deck plate shall be secured to the adjoining plates by interlocking clips set midway between purlins.

Note: These interlocking clips create lateral continuity and prevent one sheet from deflecting below the level of those adjoining.

Engineering Data

Light Weight—

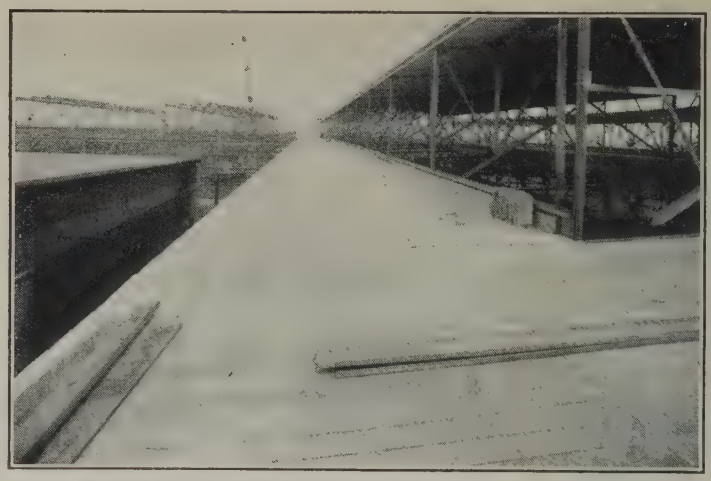
As indicated before, the weight of Mahon Steel Roof Deck is such that it permits considerable economies in construction. The Mahon 20 gauge deck weighs 2.5 pounds per square foot and the 18 gauge deck weighs 3.25 pounds per square foot. The total weight of roof will depend on the type and amount of insulation and the type of roofing material used.

Deflection—

Load tests for deflection carried out by the Perry Testing Laboratories, Detroit, Mich., on the Mahon Steel Roof Deck with live loads of 30 and 40 pounds per square foot showed no permanent deflection in either 18 or 20 gauge deck.

Thousands of Square Feet of Mahon Steel Roof Deck Are Utilized in This Building

Millions of square feet are now in use on various types of buildings



Another Application of the Mahon Deck on an Industrial Building

DEFLECTION IN INCHES—18 GAUGE—NO INSULATION

Purlin spacing	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″
Live load, 30 lbs. per sq. ft.	.083	.105	.156	.232	.325	.431	.554
Live load, 40 lbs. per sq. ft.	.104	.134	.202	.354	.398	.573	.732

DEFLECTION IN INCHES—18 GAUGE—1 INCH INSULATION

Purlin spacing	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″
Live load, 30 lbs. per sq. ft.	.061	.095	.125	.181	.235	.271	.354
Live load, 40 lbs. per sq. ft.	.088	.129	.162	.237	.317	.392	.512

DEFLECTION IN INCHES—20 GAUGE—NO INSULATION

Purlin spacing	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	....	....
Live load, 30 lbs. per sq. ft.	.098	.115	.167	.251	.338	....	....
Live load, 40 lbs. per sq. ft.	.112	.144	.220	.320	.447	....	....

DEFLECTION IN INCHES—20 GAUGE—1 INCH INSULATION

Purlin spacing	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	....	....
Live load, 30 lbs. per sq. ft.	.061	.088	.143	.213	.229	....	....
Live load, 40 lbs. per sq. ft.	.079	.124	.192	.270	.338	....	....

The method used in making these tests is clearly illustrated in the line diagram. All deflection readings were taken at "C" midway between purlins "A"-"B." Readings were taken at each rib and a mean deflection established.

Purlin "A" in the diagram is movable to test deflection at various purlin spacings.

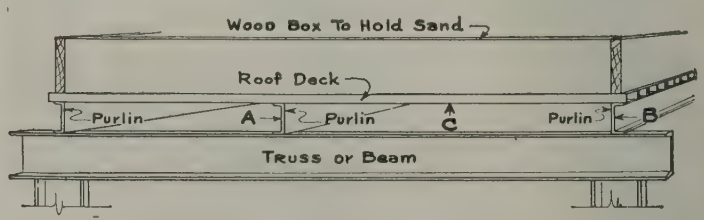


Diagram Illustrating Method of Testing Mahon Steel Roof Deck for Deflection

Continued on next page

Copper Bearing or Galvanized Steel

Mahon Steel Roof Deck Plates can be furnished in copper bearing or galvanized steel in either 18 or 20 gauge in any length up to 12 feet 4 inches.

Standard plates carried in stock in 20 gauge for immediate shipment in lengths of 4 feet 2 inches, 5 feet 2 inches, 6 feet 2 inches, 7 feet 2 inches, 8 feet 2 inches, 10 feet 4 inches.

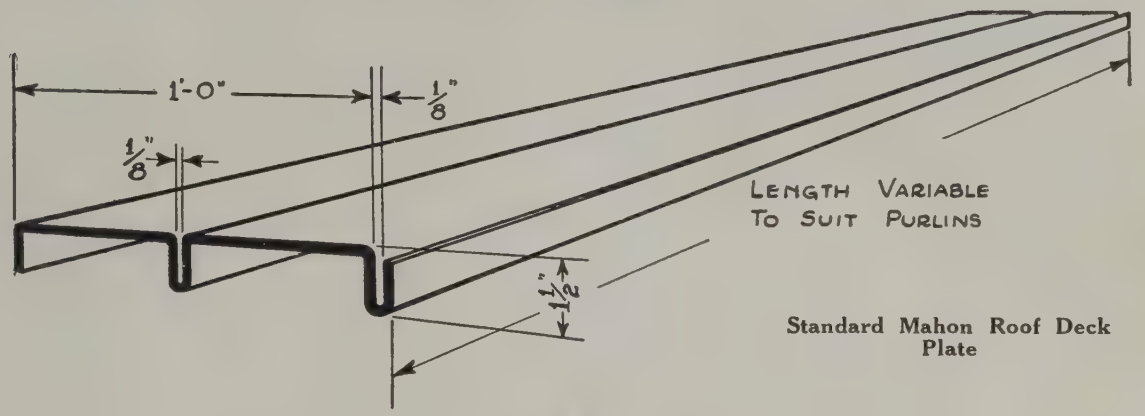
The 18 gauge is carried in stock in lengths of 8 feet 2 inches only.

Purlin Spacing

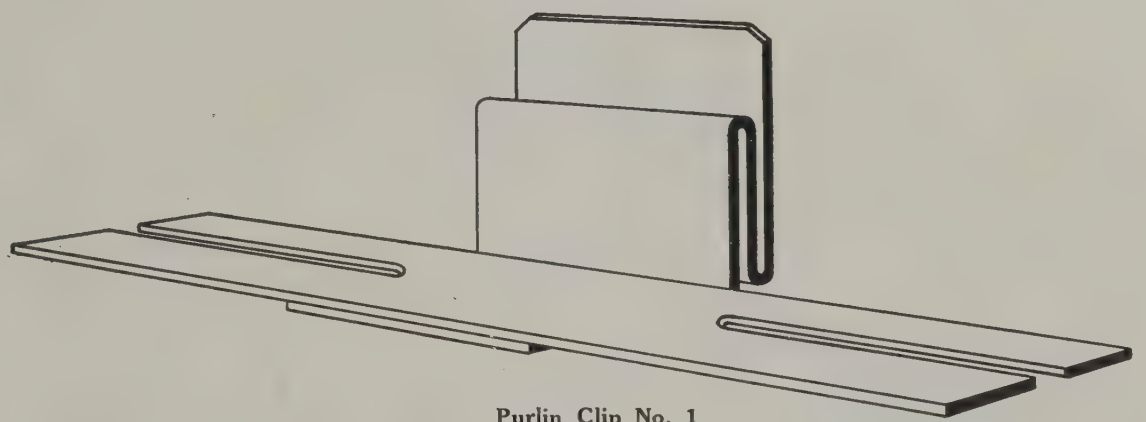
The 20 gauge deck plates are not recommended for purlin spacings exceeding 7 feet. Maximum purlin spacing for 18 gauge deck plates 8 feet.

STANDARD DECK PLATES RECOMMENDED FOR VARIOUS PURLIN SPACING

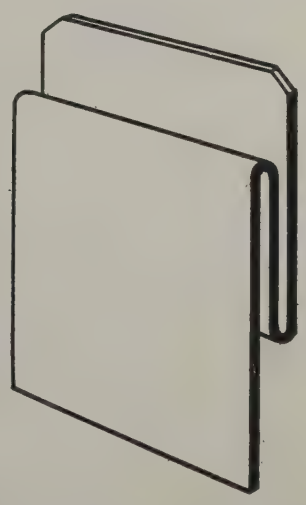
Purlin spacing	Plate lengths
to 4′-0″	8′-2″ or 12′ 4″
4′-0″ to 5′-0″	5′-2″ or 10′ 4″
5′-0″ to 6′-0″	6′-2″ or 11′-6″ or 12′-4″
6′-0″ to 7′-0″	7′-2″
7′-0″ to 8′-0″	8′-4″



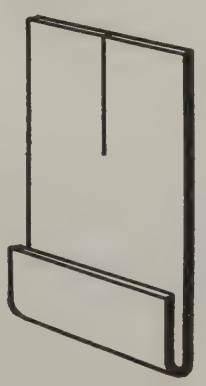
Standard Mahon Roof Deck Plate



Purlin Clip No. 1
For attaching roof neck plates to I-beam or channel purlins



Intermediate Clip No. 2
For locking roof deck plates together midway between purlins



Flashing Clip No. 3
For attaching flashing to roof deck plates

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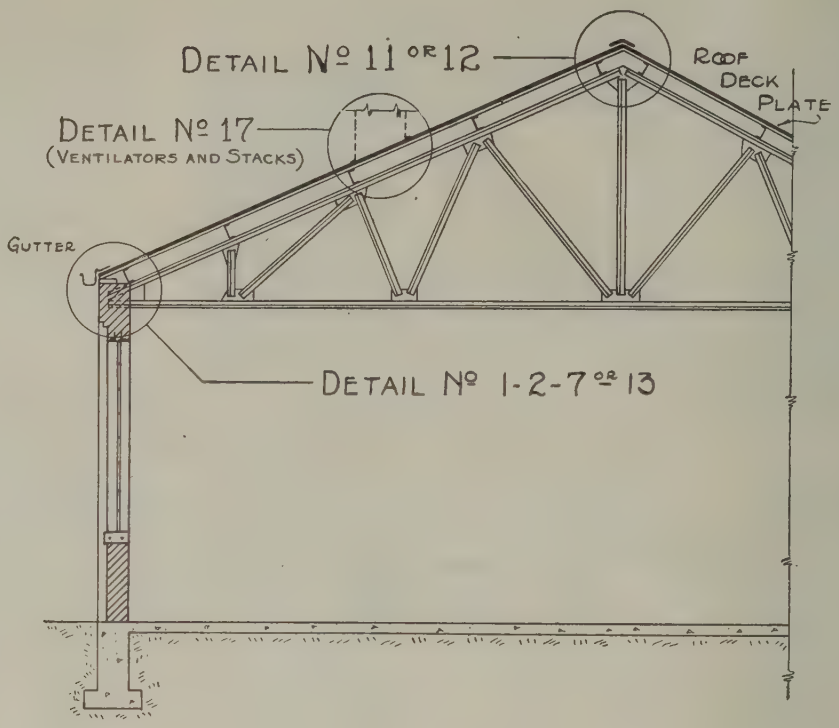
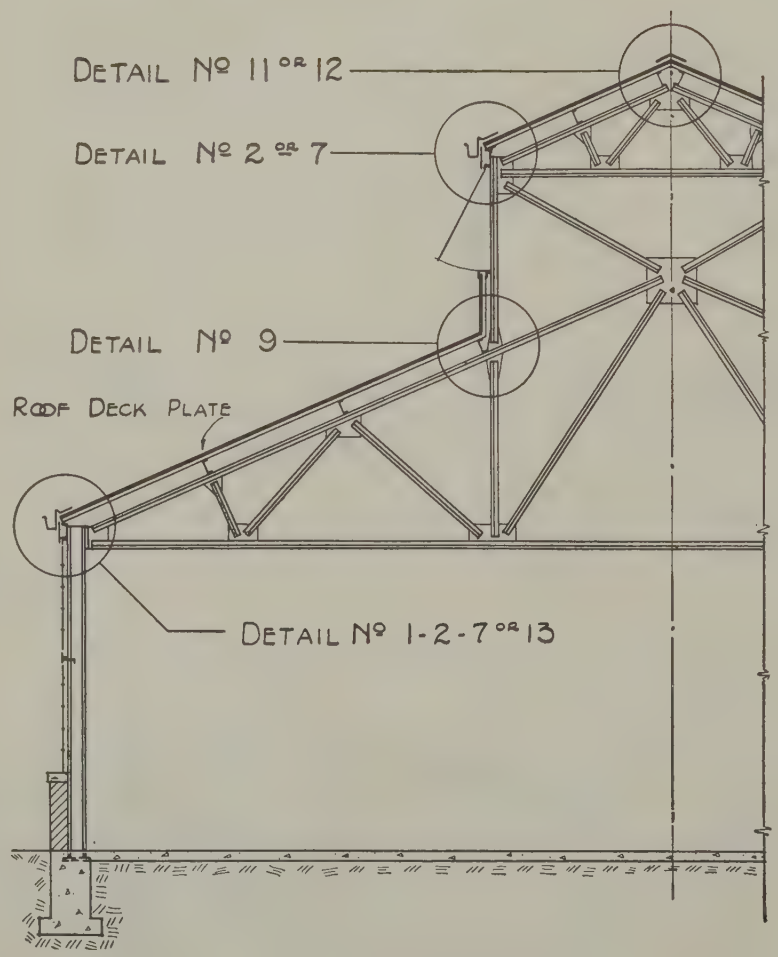


Application Pitched Roof



Application Pitched Roof—Monitor

MAHON STEEL ROOF DECK

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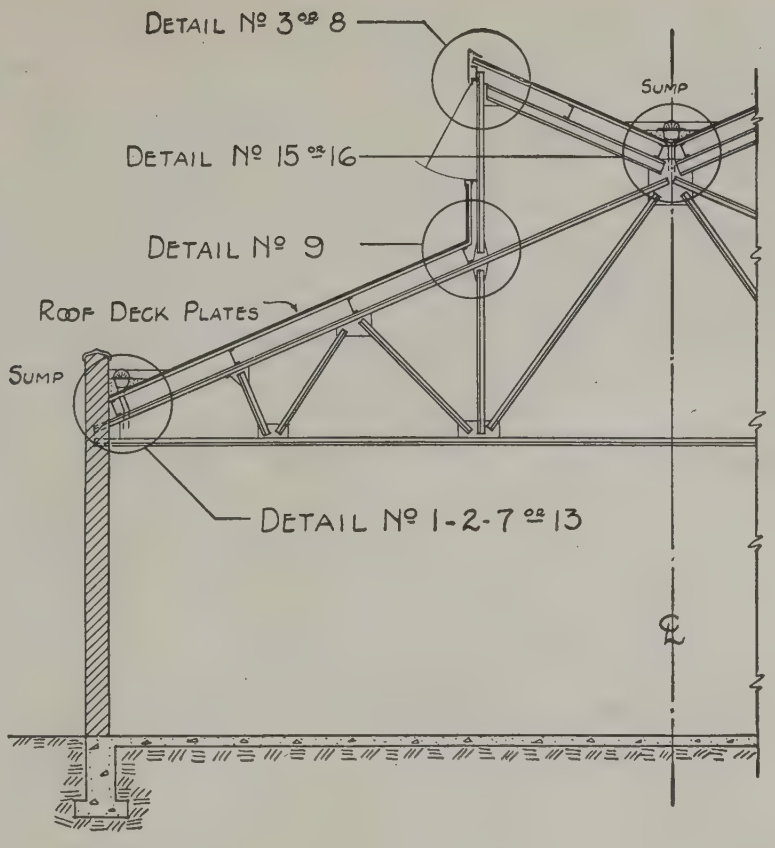
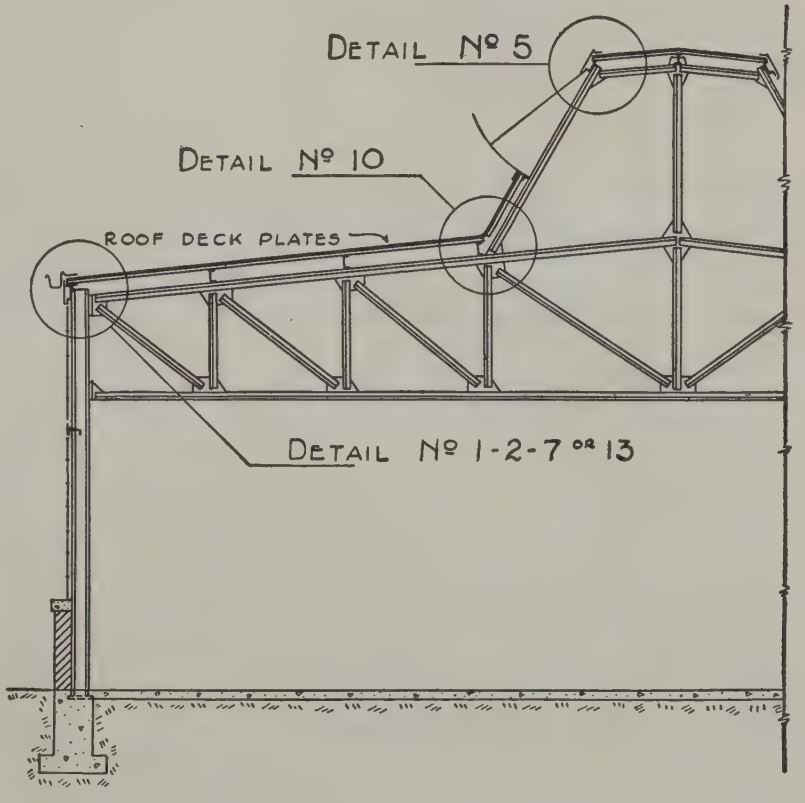


Application Pitched Roof—Valley Monitor



Application Flat Roof—"A" Frame

MAHON STEEL ROOF DECK

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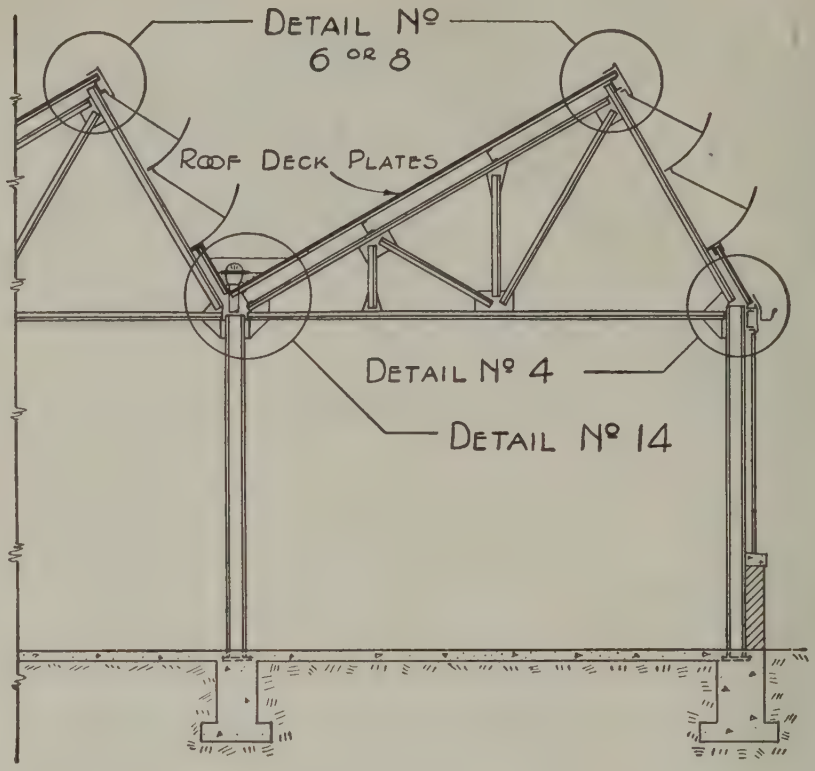
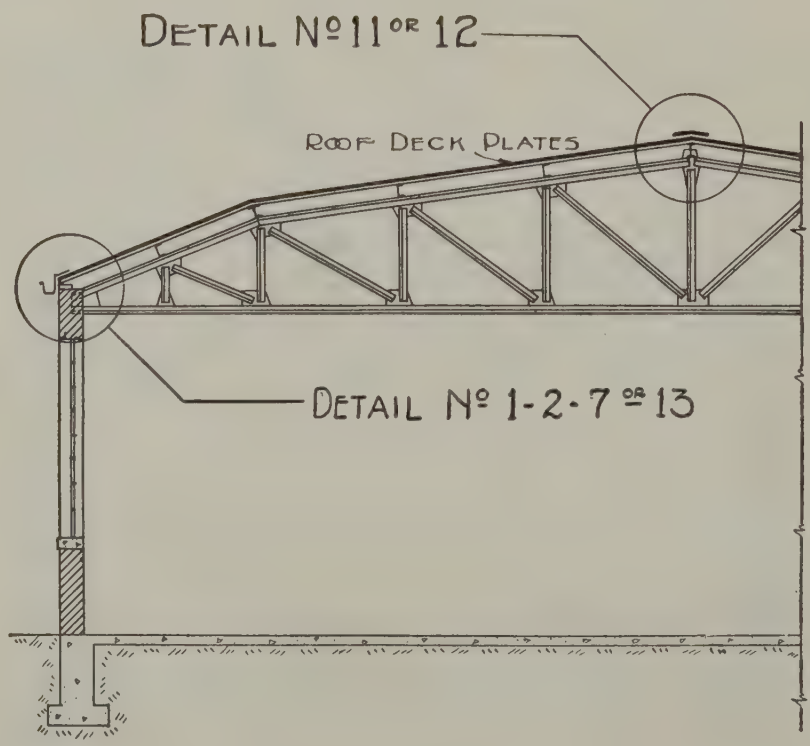
Application
Typical Sawtooth





Application
Hip Truss Roof

MAHON STEEL ROOF DECK

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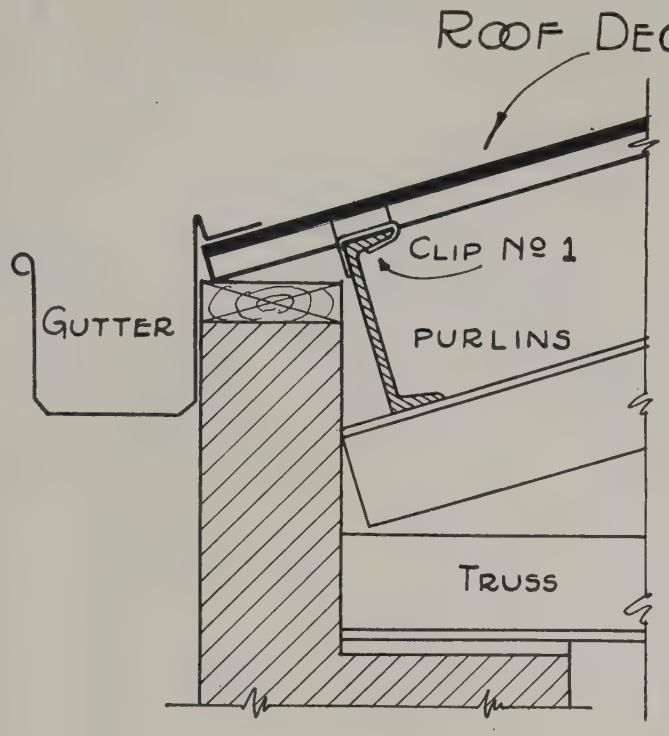
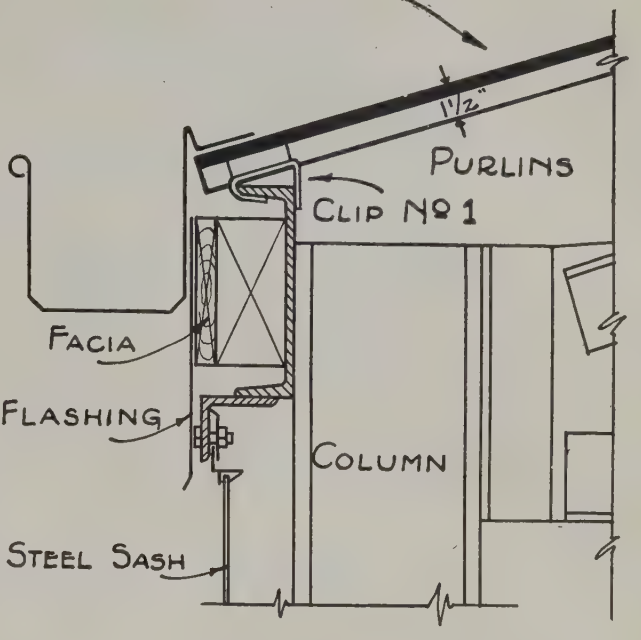


DETAIL Nº 1



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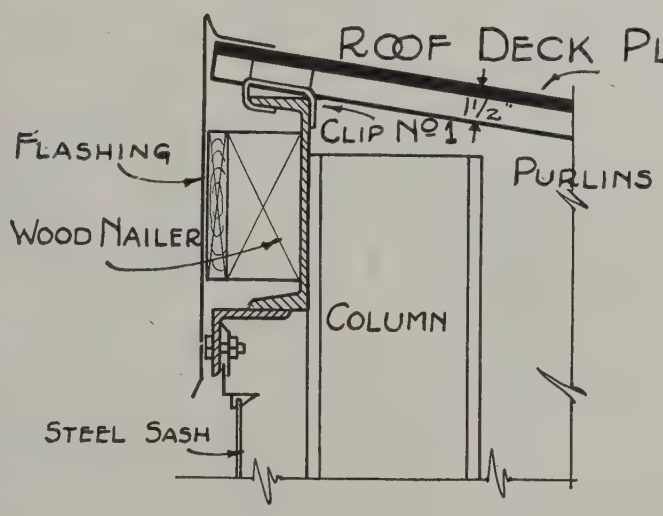
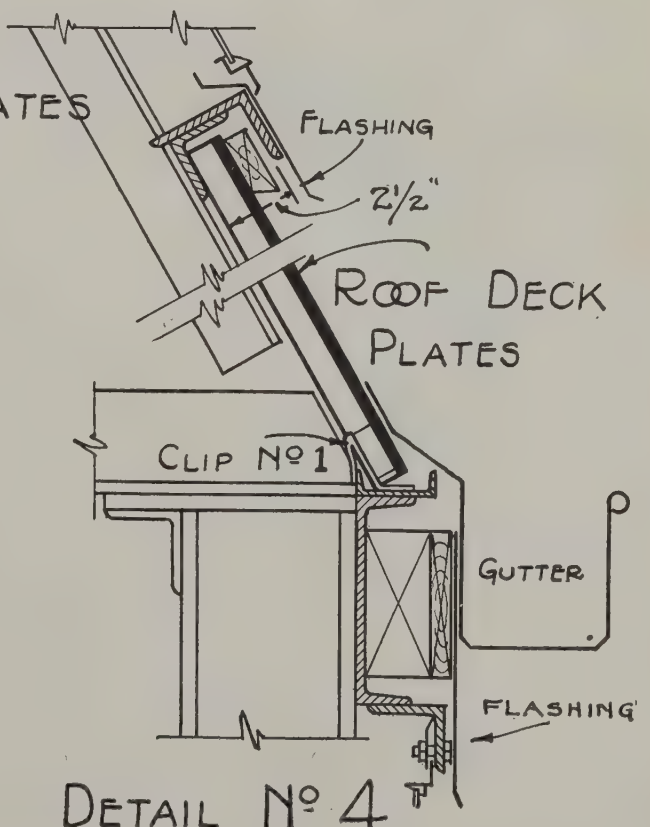


DETAIL Nº 3



DETAIL Nº 4

MAHON STEEL ROOF DECK

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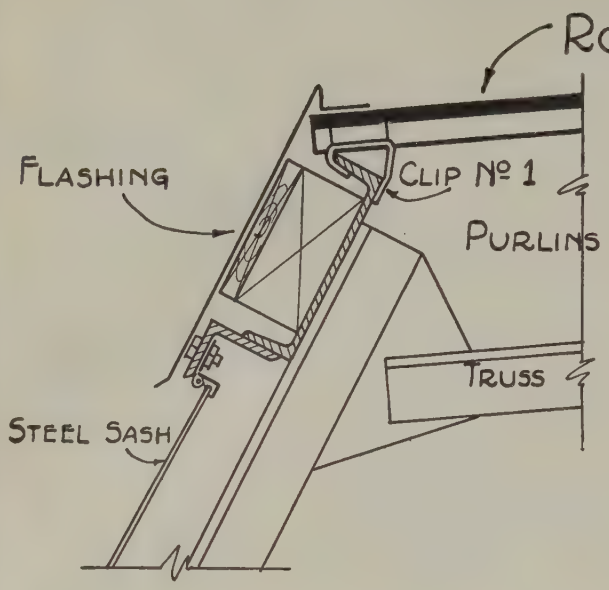

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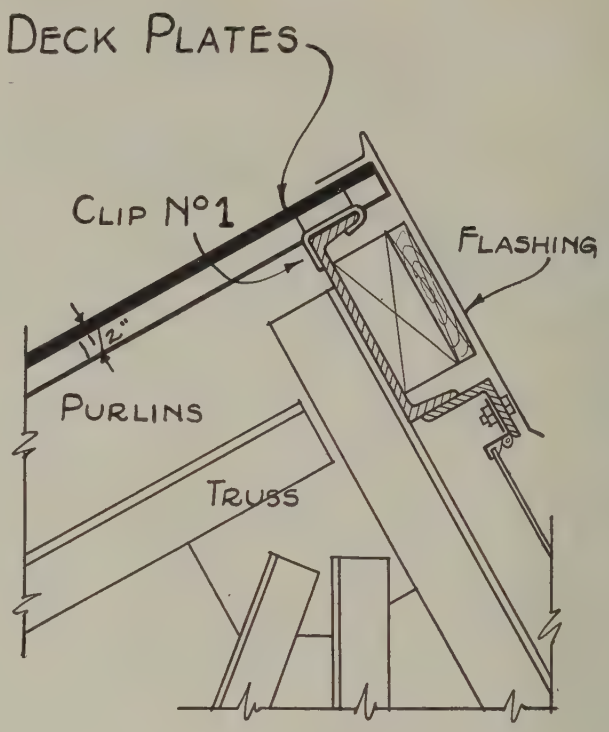

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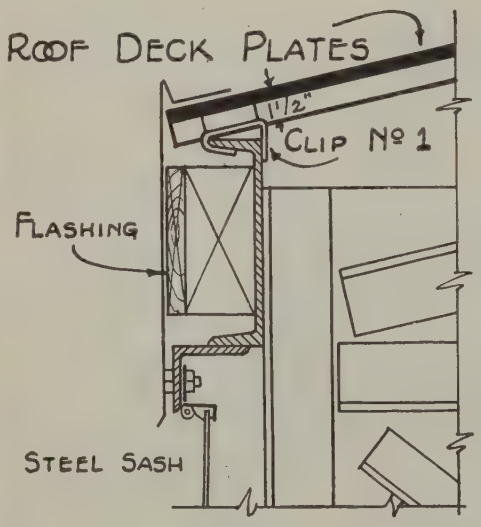

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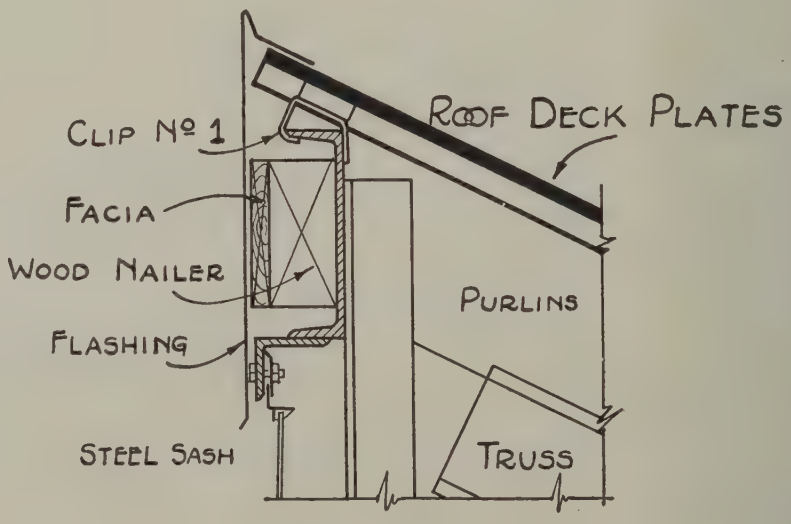

DETAIL Nº 8

MAHON STEEL ROOF DECK

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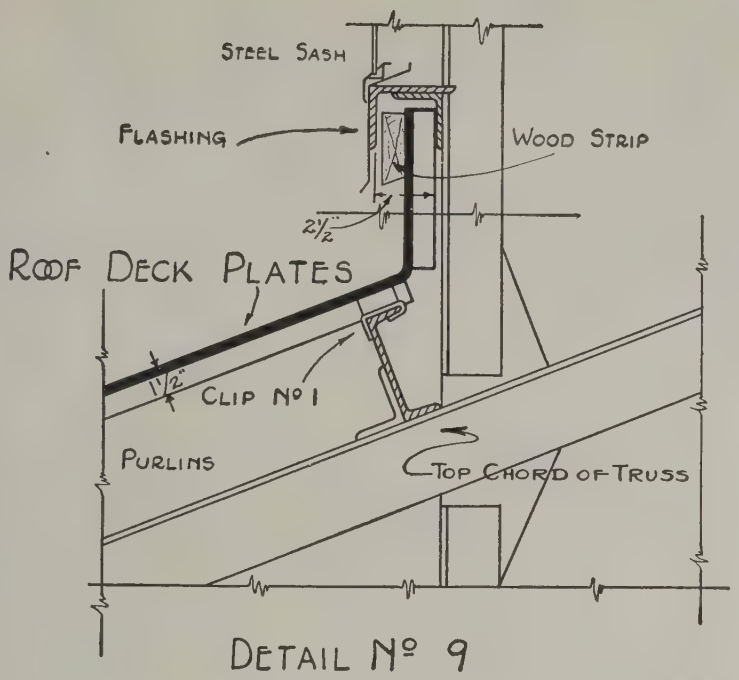

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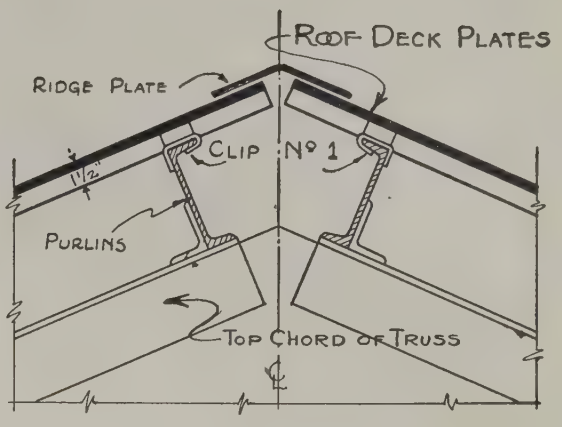

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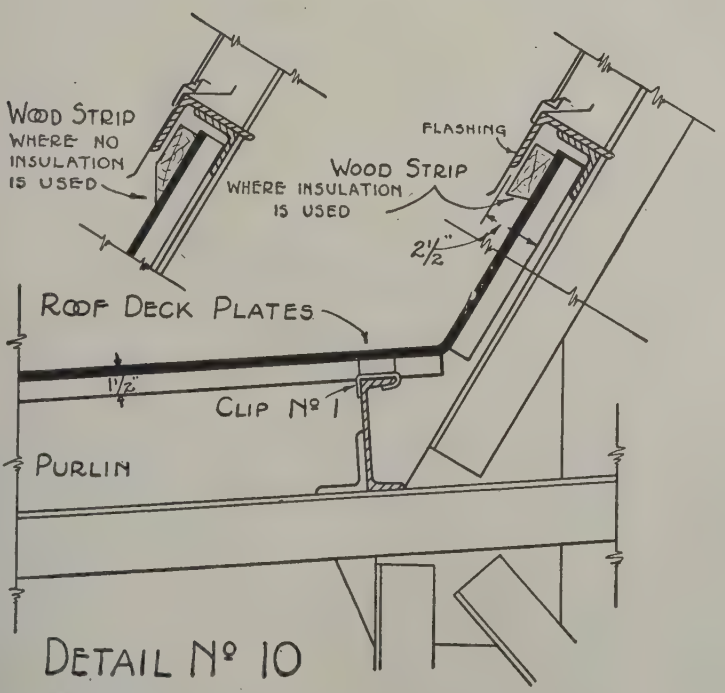

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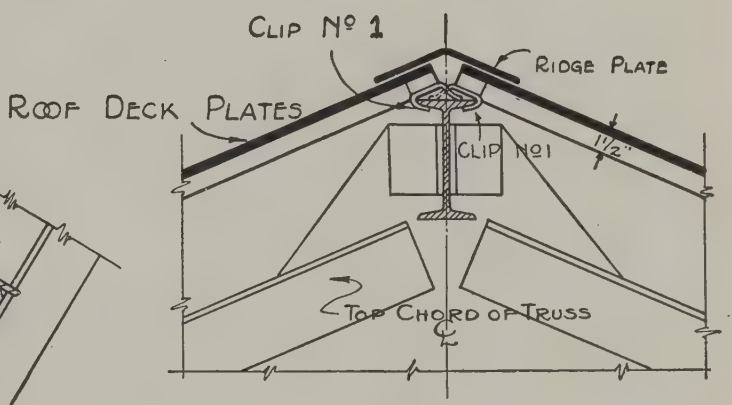

DETAIL Nº 12

MAHON STEEL ROOF DECK

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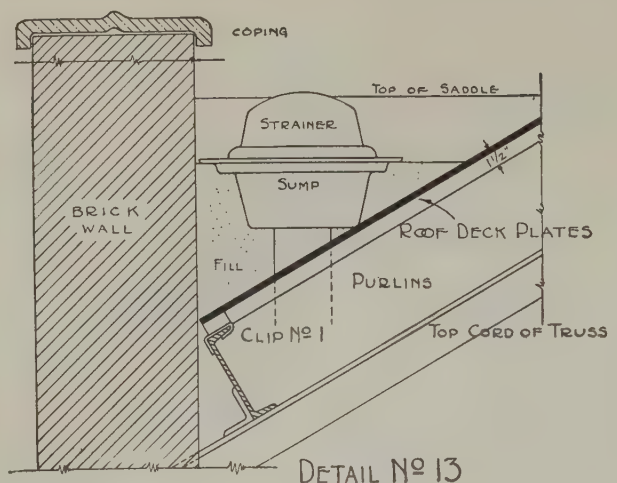

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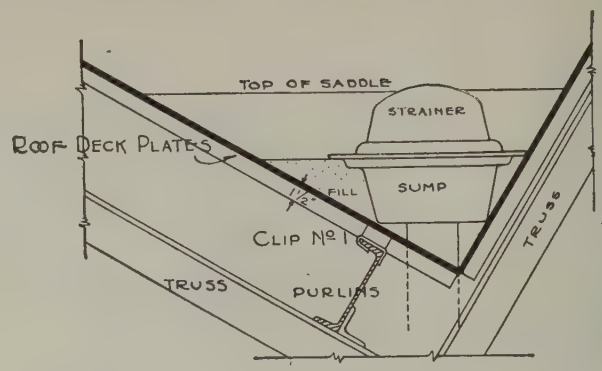

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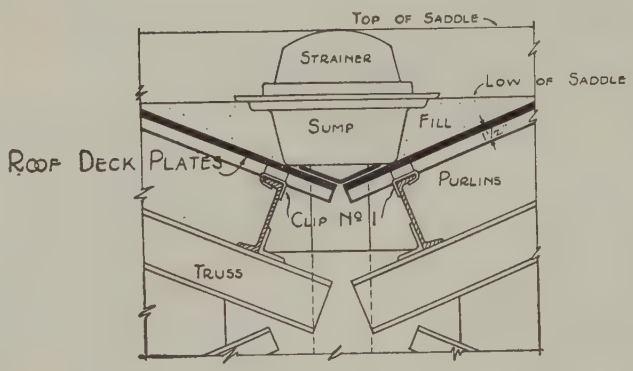

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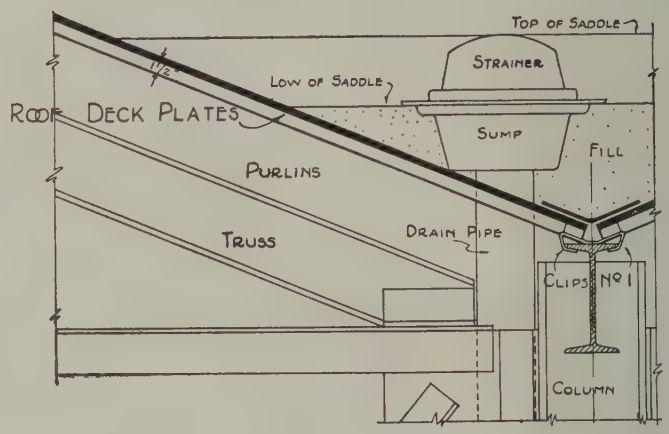

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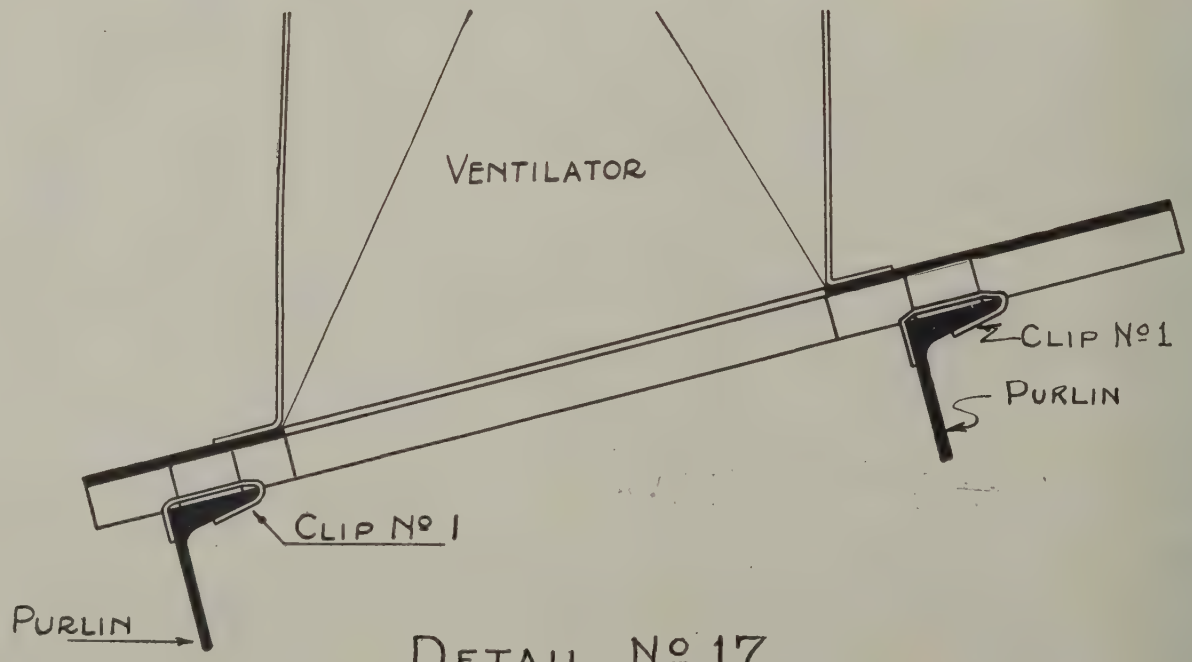


DETAIL Nº 17

TYPICAL FRAMING — OPENINGS FOR VENTILATORS AND STACKS

MAHON STEEL ROOF DECK

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Steeldeck Roofs

YOUNGSTOWN, OHIO

For Branch Offices, see Local Telephone Directory

Product

STEELDECK ROOFS.

For other Truscon Products, see pages in this edition as follows:

Concrete Reinforcement, page A151.
Steel Joists, page A674.
Steel Doors, pages A986-987.
Steel Windows, pages A1299-1303.
Metal Lath, pages B1704-1705.

TRUSCON I-PLATES
PATENTS PENDING
Insulated and Waterproofed

The Importance of the Right Roof

When choosing a roof design, occupancy conditions, heating, ventilation, humidity—both exterior and interior—and geographic location must be considered. The right roof must be practicable in design and purpose. The right roof must successfully protect against the elements of wind, water and fire. It must be flexible, firm and free from inherent movement caused by expansion and contraction. It must be economical. It must harmonize in its details with the structural supports.

Steeldeck Roofs of Truscon I-Plates are of a broad and general usefulness. They meet all requirements and conditions, and are particularly adaptable to theatres, gymnasiums, auditoriums, public halls and many industrial buildings requiring large floor areas free from supports and obstructions.

Truscon I-Plates Design

The I-Plates type of Steeldeck is a roof deck so formed that each plate is a unit capable of carrying the specified loads between the members of the roof structure.

I-Plates are manufactured from Nos. 18 and 20 gauge copper-bearing steel with I-Sections formed on the bottom side longitudinally. On one edge a complete I-Section is formed, on the other edge a turned down flange of about ½ in. is provided, to fit into the edge I-Sections of adjacent I-Plates when laying the Steeldeck. At one end the I-Sections of the I-Plates are flush with the top surface, at the other end the I-Sections are cut back about ¾ in. so that when laid, the end joints are lapped tight.

I-Plates are applied directly over the members of the roof supporting structure and are fastened by sleeve "purlin clips" that telescope over alternate I-Sections. They have prongs that are bent around the supporting members (usually purlins), and hold the I-Plates securely.

Advantages of I-Plates Construction

(1) *Light in weight*—not over 5 lbs. per square foot including insulation and waterproofing.

(2) *Incombustible*—fabricated complete from copper-alloy steel.

(3) *Expansion and contraction difficulties eliminated.* Expansion joints are provided in two directions at the sides and ends of each I-Plate. There can be no accumulation of appreciable movement.

Insulation and waterproofing is positively free from injury by this usual source of trouble.

(4) *Any degree of proper insulation* may be easily obtained.

(5) *Saves time* in completion of buildings, especially in wet and winter seasons.

(6) *Low final cost*—light weight effects savings in structural supports.

(7) *Engineeringly correct*—spans to 8 ft. between supports, depending upon the loading requirements.

(8) *Permanent*—made of copper-bearing steel. Protected from above and below.

(9) *Adaptability*—best for straightaway, flat, pitched and curved roofs with a minimum radius of 40 ft.

(10) *Undivided responsibility.* Roofers will furnish roofs complete—deck, insulation and waterproofing.

Descriptive Data

Standard width of I-Plates: 2 ft.

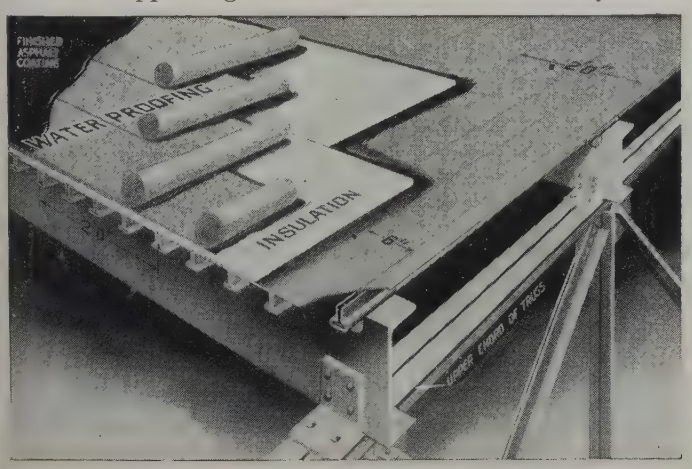
Length of I-Plates: standard, 10 and 8 ft.; special as required, 10 ft. maximum.

Dimensions of I-Sections: spaced, 6-in. centers; depth, 1 in.; bottom flange width, ⅝ in.

The dead load of I-Plates Steeldeck Roof and insulation and waterproofing is approximately 5 lb. per sq. ft.

LIVE LOADS AND SPANS

Live loads, lbs. sq. ft.	Spans (purlin to purlin)	
	No. 18 Ga. ft. in.	No. 20 Ga. ft. in.
45	6 9	5 8
40	7 0	6 0
35	7 3	6 3
30	7 6	6 6
25	8 0	7 0



Truscon I-Plate Roof Construction

Laying Steeldeck Roof with Truscon I-Plates

PAN METAL ROOF DECK CO.

AKRON, OHIO

Product

Pan Metal Roof Deck.

Description

The Pan Metal Roof Deck is an improved metal form designed especially for roof construction, which has earned the approval of architects, engineers and builders everywhere.

It consists of pressed metal units as illustrated in the sectional details herein shown, and has no sharp folded members to take on rust. Consulting engineers agree with us, when we claim that no stronger sheet of light metal can be formed that will carry an equal load.

It provides long life, strength and perfect fitting joints. The sheets are formed under a powerful press, insuring uniform pans that will rest neatly, and they are made to lay 24-in. centers up to 12 ft. 2 in. long.

Insulation made in 12, 24, 36 or 48-in. widths will center on the wood cleats in pans. All sheets are laid from above and no underneath scaffold is required.

Galvanized sheets cost slightly more than painted (black) steel sheets but are more enduring. Sheets can be painted with acidproof asphalt paint for foundries and factories where gas accumulates.

Layout plans will be furnished by us from blue prints, insuring proper spacing.

Factory Sawtooth Construction

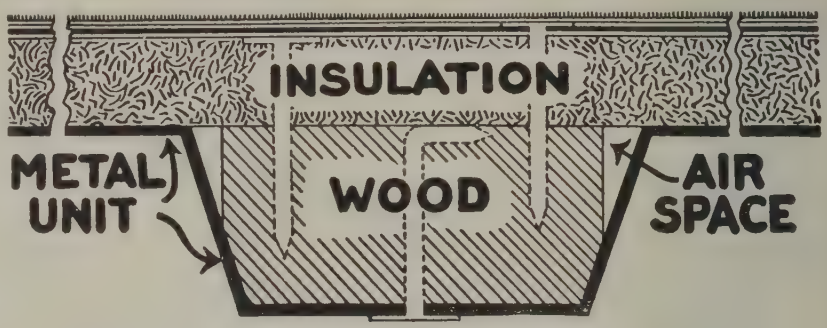
For factory sawtooth construction, the heavy steel frame can be eliminated and light metal joists with the pan deck substituted at greatly reduced cost.

Sheet Metal Building

There are tens of thousands of sheet iron buildings in use in the United States that are not insulated, because of the difficulty of connecting the insulation to the sheets. Without this insulation they are cold in winter and extremely hot in summer.

With the Pan Metal Deck and its method of wood cleat anchorage, any form of insulation can be nailed securely to the metal sheets. The sleepers provide air circulation through the slots at every purlin. These are made of wood that will not split, thoroughly painted with linseed oil paint and they will stay in position.

The seams or joints in this construction are made directly over purlins, thereby making a neat appearance when a finish underneath is desired.



Construction Details Showing Shape of the Pan Deck and the Location of Wood Cleat, etc.

Advise us of your requirements or your problems, and we will immediately give you all necessary information to enable you to erect a substantial structure at the least expense and trouble. Blue prints, etc., gladly supplied for all requirements.

For Residences

The Pan Metal Deck can be used on residences for pitched roofs when slate, tile or other roofing material is desired, rendering this construction fireproof inside and out.

The rafters are first placed in position and securely nailed. Upon them the purlins are laid and fastened; over these are secured the Pan Metal Deck forms. These in turn are covered with insulation, and with roofing material—shingles, tile, or whatever architect specifies. If built-up roofing is used, it is applied directly to insulating surface. Where asphalt shingles or strip shingles are used, they may be nailed directly to insulation.

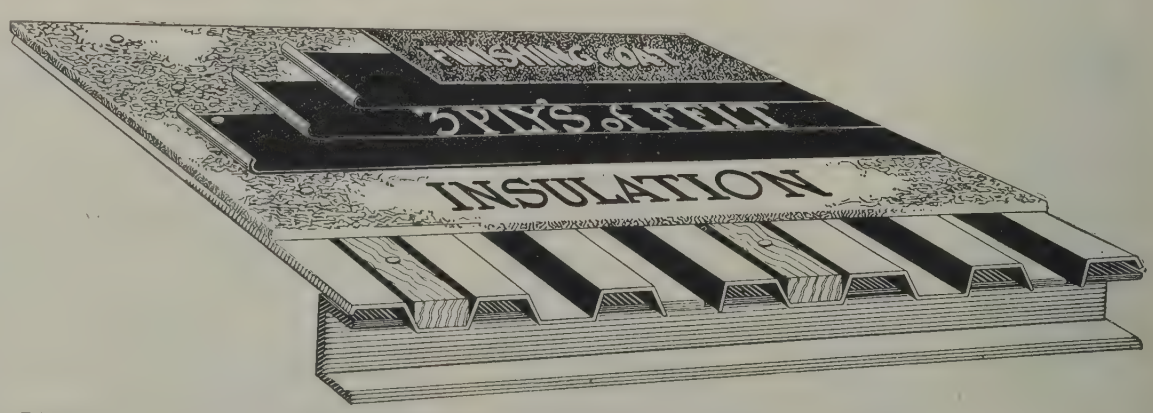


Diagram of Pan Metal Roof Deck Showing Light Metal Joist, Wood Cleats and Method of Laying Insulation and Roofing

Fireproof above and below and insulated. None but galvanized sheets used in our construction.
The advantages of galvanized metal is obvious to every architect and engineer.
Metal decks have found their place in building construction

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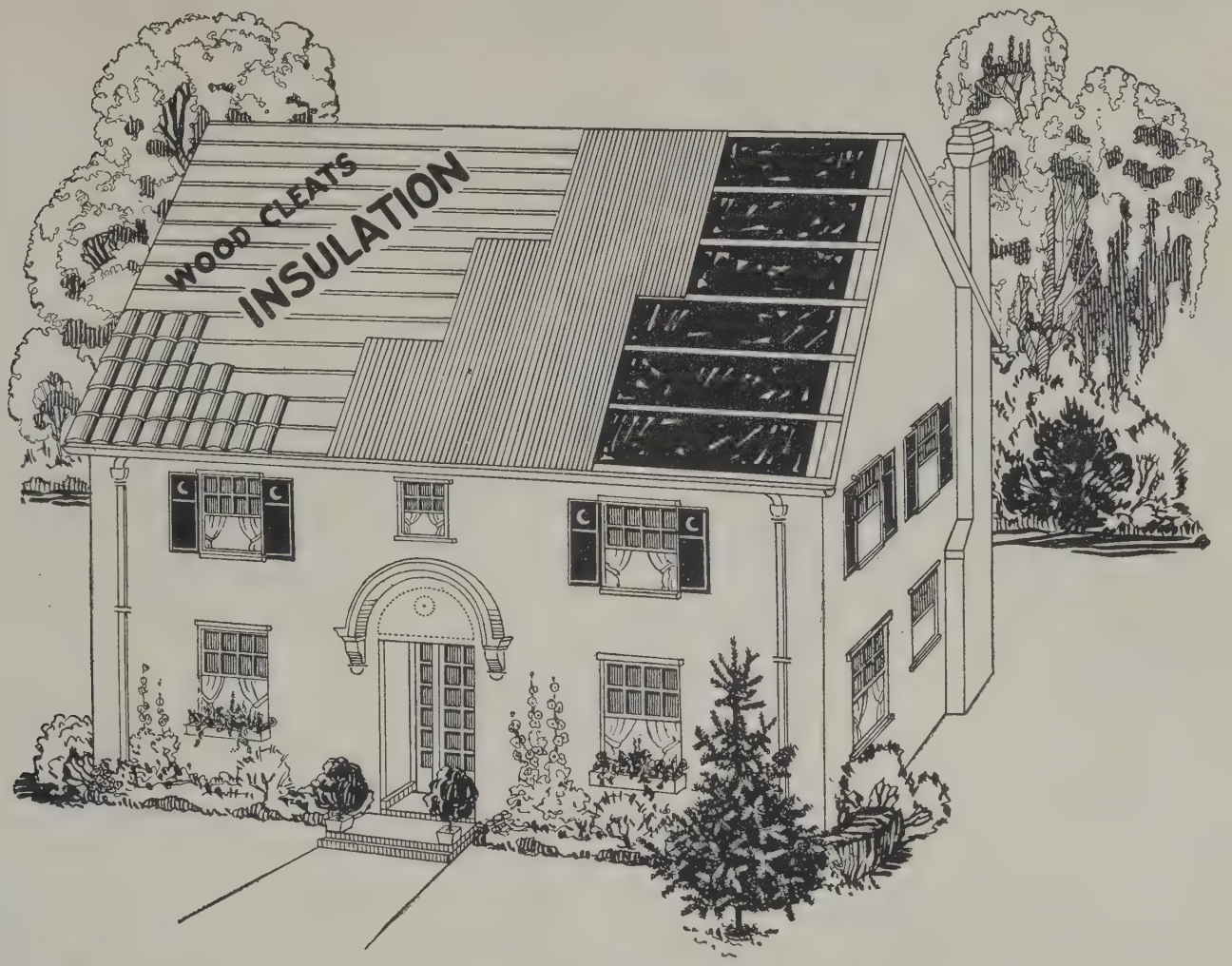


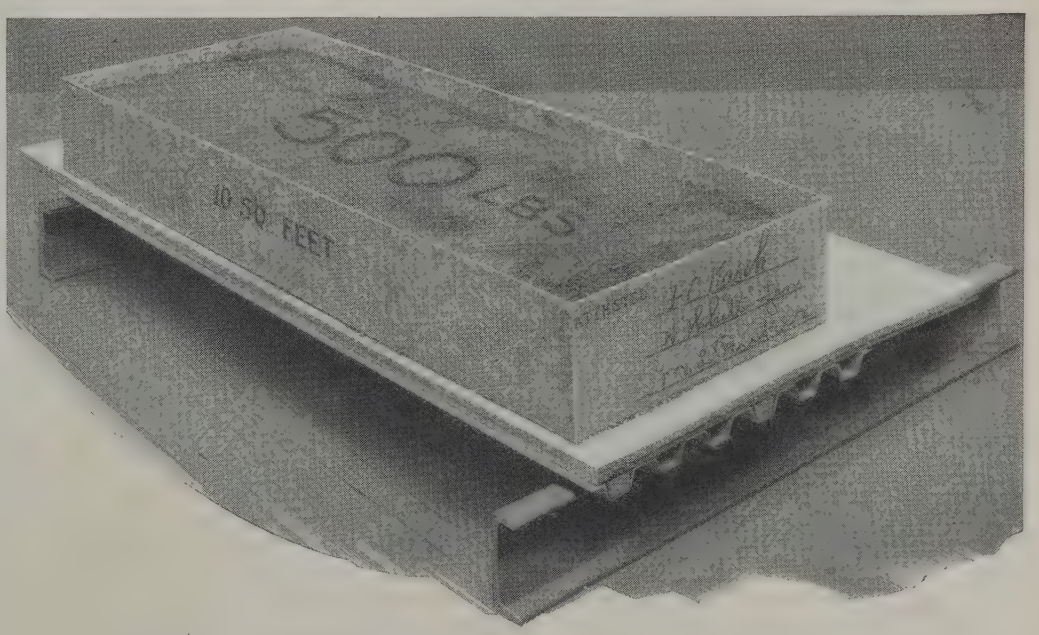
Pan Deck Used on Pitched Roof with Tile or Slate Covering

This combination with steel joists in either brick or wood constructed buildings will protect the building from adjoining hazards and will also keep the fire within the building. We know of no scheme that will assure such efficient fire protection at such low cost

The slot at the purlins is locked in ¼ in. wide by ¾ in. long. The lug is made of ⅛ in. thick hot galvanized iron and will not rust. It is so tough that it can be doubled and hammered together without breaking. The slot being ⅛ in. wider than the lug permits the metal to expand and contract.

Flashing at vertical walls can be securely nailed by placing an extra wood sleeper there.

If necessary to install gutters, a horizontal wood strip ⅞x20 in. can be nailed to ends of sleepers at the eaves.



An Actual Strength Test of Pan Deck Roof, 22 Gauge

Service and Information

We have placed the sale and erection of Pan Metal Roof Deck in the hands of only reliable roofers and sheet metal concerns in your territory who will give you first class service.

KEYSTONE GYPSUM FIREPROOFING CORPORATION

Marbridge Building, 34th Street and Broadway
NEW YORK, N. Y.

BRANCH OFFICES

PHILADELPHIA, PA., North American Building
WASHINGTON, D. C., 2525 Pennsylvania Ave., N. W.
BOSTON, MASS., 8 Beacon Street
QUEBEC, QUE., 140 St. John Street
MONTREAL, QUE., 306 New Birks Building

Products

The erection of the METROPOLITAN SYSTEM of GYPSUM FIREPROOF FLOOR and ROOF CONSTRUCTION.

Metropolitan System of Gypsum Fireproof Floor and Roof Construction

The principle of this system is that of the suspension bridge. It is a gypsum slab poured in place on parallel and uniformly spaced cables, the ends of the cables securely and rigidly anchored to the frame of the building. Enough cables are put in to carry the total load, with a factor of safety of 4, without regard to the compression value of the Metropolitan composition.

The composition is 87½% calcined gypsum, and 12½% wood planer chips.

The practical advantages of the system have been demonstrated over a period of thirty-five years in hundreds of installations throughout the United States and Canada, under a wide extreme of climatic conditions.

Meritorious Features of the Metropolitan System

Safety and Strength—The metal construction makes the Metropolitan system one of the safest types of roof and floor construction. Stresses are calculated by approved engineering formulae. The cables carry all the load. The Metropolitan composition is used merely to protect the wires and structural framework against fire and corrosion and to distribute the load.

Economy of First Cost Due to Light Weight and Rapidity of Construction—Metropolitan composition weighs less than 5 lb. per sq. ft. per inch of thickness. For floors minimum thickness is 3½ in.; for roofs, 3 in. The light weight permits lighter beams and wide spacing, thus saving tons of steel. This feature makes it particularly advantageous in additional story work. In existing structures, this extreme lightness permits the replacing of less sturdy floors without either strengthening existing frames or overloading them.

The fact that Metropolitan gypsum composition sets within 30 minutes after the slab is poured, and forms can be dropped within 60 minutes, leaving slab good for calculated loads, makes for rapid construction—a prime factor in construction economy. The Swarthmore Apartments in Philadelphia, Pa., stand as a monument to the speed with which the system may be installed. This job was put up, 12 floors and roof, in fourteen working days.

Non-conductivity, Insulation and Fire Resistance—The high insulating value of Metropolitan gypsum composition as a roof material effects a saving in cost of the heating plant. Condensation of moisture on the undersurface is eliminated.

It is a fire resistant of the highest quality. Complete reports of fire tests conducted for the New York and Toronto building bureaus gladly furnished.

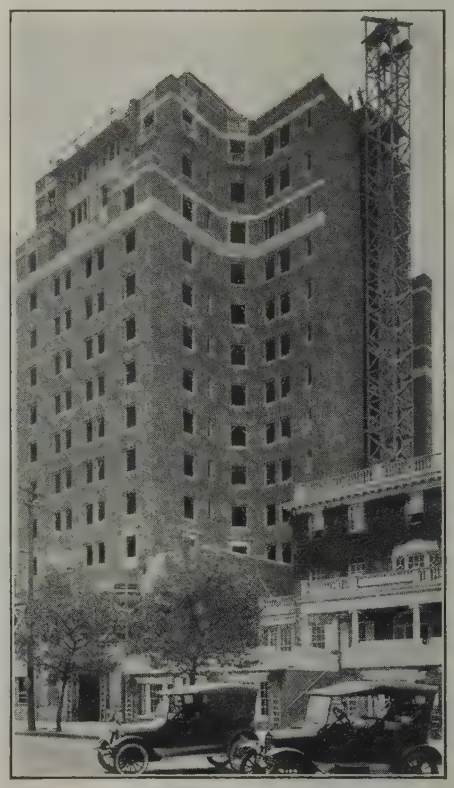
Sound Deadener—Gypsum has excellent sound deadening properties. In the Metropolitan composition full advantage is taken of this characteristic.

Durability—Metropolitan floors and roofs have been in active service, under severe conditions, for nearly forty years and are today, without exception, in as good a condition as when installed. Frequently sections have been cut out of Metropolitan floors which have been installed for many years, and in every case, the embedded beams and girders, as well as the steel cables, have been found in perfect condition.

Low Maintenance—Elasticity is necessary to good roof and floor construction. Shocks, vibrations and unequal stresses are likely to crack an inelastic construction. The wood filler in the Metropolitan composition provides elasticity and Metropolitan roofs and floors remain intact under the severest conditions, thus eliminating the annoyance and expense of constant repairs.

Service—This company contracts for entire installation of both floor and roof arches. They regard each contract as a sale of service in addition to sale of material and workmanship. Nor is delivery of service completed with acceptance of contract. It is a service, in other words, rendered not only *during* the work but *before* and *after* its execution.

Guaranteed Construction—The KEYSTONE GYPSUM FIREPROOFING CORPORATION guarantees every square foot of floor or roof construction they install against failure from any cause, under the conditions for which it was designed.



Colton Manor Hotel, Atlantic City, N. J.
Twelve Metropolitan floors and roof

Where the Metropolitan System Is Used

The Metropolitan system is in thoroughly satisfactory use in innumerable hotels, clubs, schools, hospitals, churches, apartment houses, theatres, office buildings, power plants, paper mills, machine shops, garages and manufacturing buildings.

Continued on next page

Information for Designing

Services of Engineering Department—Our Engineering Department should be consulted before steel design of building is completed. We will gladly send our engineers to confer with you without expense or obligation.

Economical Spans—The construction can be installed between supports spaced up to 9 ft. in clear. Our experience has shown that under average conditions a spacing of 6 ft. 6 in. to 7 ft. is the most economical.

Waterproof Roofing—Any standard type of waterproof roofing may be successfully applied to our metropolitan system. The form most generally applied, however, is a 3-ply built-up roofing.

Specifications

Fireproof Floors and Roofs—After forms or centers have been placed in proper position, cables, each composed of two No. 12 (or equivalent) galvanized wires twisted, shall be carried over the tops of the beams or purlins to outside wall beams or end purlins and be secured to them by strong hooks or anchors. These cables shall be laid parallel, 1 to 3 in. apart, according to spans and loads, and shall pass under round iron bars, midway between the purlins, so as to cause the cables to deflect uniformly. The Metropolitan composition shall then be poured-in-place, and brought to an even surface about ½ in. above the top of the beams, forming a slab ready to receive [sleeper fill or grading] [finished roofing or grading] and with the underside left as smooth as practicable. The slab shall be designed to carry safely the live load with a factor of safety of 4.

Note: For fireproof floors, fireproofing beams and girders (not trusses) shall be used, according to the local building laws.

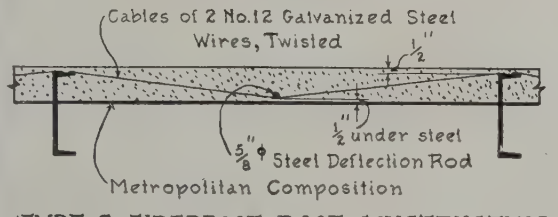
Cables composed of 2-No.12 Cold Drawn Galvanized Steel Wires Twisted
Cable = 2 x .00874 @ 20000#/□" = 350#

$20000^{\#/\square''}$ $W = \frac{1152\,Td}{bLY^2+16d^2}$ **NO. 12.**

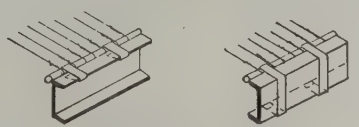
	SLAB THICKNESS	CABLE SPACING	CLEAR DISTANCE BETWEEN FLANGES OF BEAMS 3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
ROOFS	3	1	450	345	273	221	183	154	131	114						
		1¼	360	276	218	177	147	124	105	91						
		1½	301	230	182	147	123	103	88	76						
		1¾	258	197	156	126	104	88	75	65						
		2	225	172	137	110	92	77	65	57						
		2¼	200	153	122	99	82	68	58	51						
		2½	180	138	109	88	74	61	51	46						
		2¾	164	125	100	80	67	57	48	41						
		3	150	115	91	74	61	52	44	38						
	3½	1	556	430	340	275	227	93	165	141	124	109	96			
		1¼	445	343	272	220	182	154	132	113	99	87	77			
		1½	370	285	226	184	152	128	110	95	82	73	64			
		1¾	317	245	192	155	130	110	94	82	71	62	55			
		2	278	215	169	138	114	96	82	71	61	55	48			
		2¼	247	191	150	123	102	85	73	63	54	49	42			
		2½	222	171	136	110	91	77	66	57	50	44	38			
		2¾	202	155	124	101	83	70	59	52	45	39	35			
		3	185	143	113	92	76	64	55	47	41	36	32			

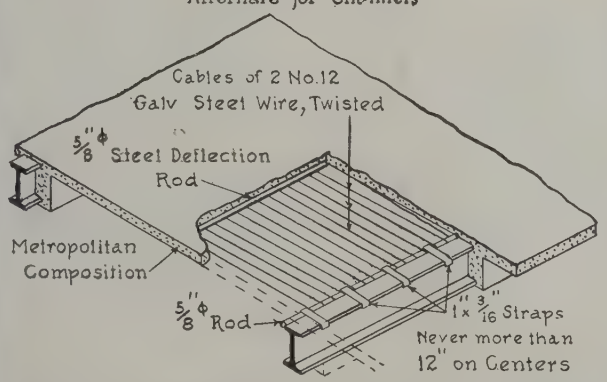
← ROOFS

	SLAB THICKNESS	CABLE SPACING	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
FLOORS	4	1	658	508	403	330	270	230	195	169	148	129	115	102	93	83
		1¼	527	406	322	264	216	184	156	135	118	103	91	82	75	67
		1½	438	338	268	220	180	153	130	112	98	86	77	69	62	56
		1¾	376	290	230	188	154	131	111	97	84	74	66	59	53	48
		2	328	254	201	165	135	115	98	84	74	64	57	52	46	41
		2¼	292	226	178	147	120	102	87	75	65	57	51	46	41	37
		2½	264	203	165	131	108	91	78	67	58	52	46	41	37	34
		2¾	240	185	147	120	98	83	71	61	54	47	42	37	34	31
		3	219	169	134	110	90	77	65	57	49	43	38	35	31	28
	4½	1	757	583	466	382	313	264	226	195	172	150	134	120	107	97
		1¼	605	467	373	305	251	212	181	155	137	121	107	96	86	78
		1½	505	389	310	255	209	177	150	130	114	101	89	79	72	64
		1¾	432	334	266	218	179	151	129	111	98	86	77	69	61	56
		2	378	292	233	190	157	132	113	97	85	76	67	60	54	48
		2¼	336	260	207	169	140	118	101	86	76	67	59	54	48	43
		2½	303	234	186	152	126	106	90	78	68	60	54	48	43	38
		2¾	275	213	170	139	114	96	82	71	62	56	49	43	39	35
		3	252	194	155	127	104	88	75	65	57	50	45	40	35	32
	5	1	853	660	528	433	358	302	259	224	196	173	153	136	122	111
		1¼	682	528	423	347	286	242	207	179	156	138	123	109	98	89
		1½	569	441	352	288	239	201	172	150	130	115	102	91	81	74
		1¾	487	378	302	247	205	172	147	128	111	98	87	78	70	63
		2	427	330	264	216	179	151	129	112	98	86	77	68	61	56
		2¼	380	294	235	193	159	134	115	100	86	77	68	60	55	50
		2½	341	265	212	173	144	120	104	90	78	69	61	55	49	44
		2¾	310	241	192	157	130	109	94	82	71	62	56	50	45	40
		3	284	220	176	144	120	101	86	75	65	58	51	45	41	37
	5½	1	944	738	592	483	402	340	290	252	220	193	171	153	138	125
	6	1	1032	807	648	531	442	374	321	278	243	214	190	170	153	138

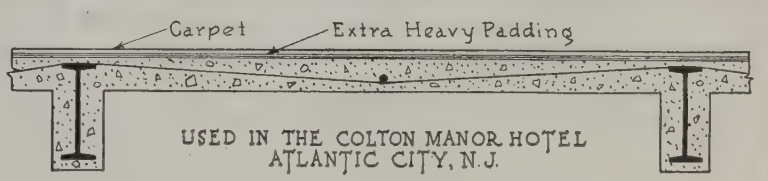


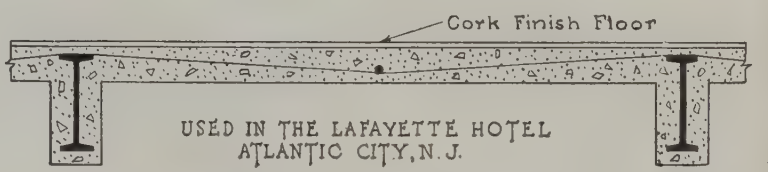
TYPE C FIREPROOF ROOF CONSTRUCTION

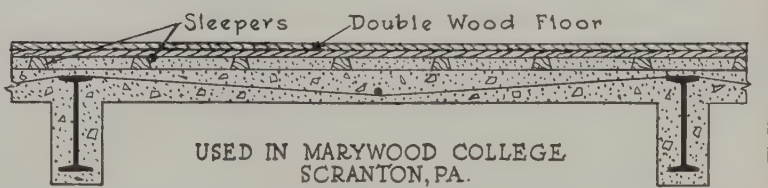


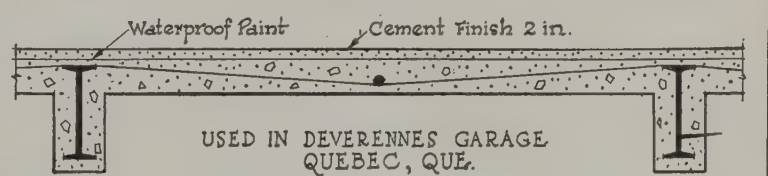


TYPE B FIREPROOF FLOOR CONSTRUCTION









VARIOUS TYPES OF FLOORING AND FLOOR COVERING USED WITH THE METROPOLITAN SYSTEM

DETAILS SHOWING ADAPTABILITY OF THE METROPOLITAN SYSTEM

A Few Representative Installations of the Metropolitan System

State Office Building, Richmond, Va.
Richmond Trust Co., Richmond, Va.
Marywood College, Scranton, Pa.
Title Guarantee and Trust Co., New York, N. Y.
42 Broadway Building, New York, N. Y.
60 Wall Building, New York, N. Y.
Colton Manor Hotel, Atlantic City, N. J.
Lafayette Hotel, Atlantic City, N. J.
Levin Apartment Hotel, Atlantic City, N. J.
Thalheimer Store, Richmond, Va.
Sauvegarde Life Insurance Building, Montreal, Que.
Technical High School, Toronto, Ont.
Elks Club, Scranton, Pa.
Germantown Hospital, Germantown, Pa.
Overbrook Apartments, Overbrook, Pa.
Corcoran Art Gallery, Washington, D. C.
General Electric Building, Buffalo, N. Y.
Wesleyan Building, Boston, Mass.

LATHROP-HOGE GYPSUM CONSTRUCTION CO.

Gypsum Floors, Roofs and Partitions

Neave Building, CINCINNATI, OHIO

BRANCH OFFICES, 105 West Monroe Street, CHICAGO, ILL.; 207 Fulton Building, PITTSBURGH, PA.

Products

MONOLITHIC GYPSUM FLOOR and ROOF CONSTRUCTION:

Standard Suspension Type.

Hoge Rail Type (U. S. Pat.—1464711, Can. Pat. —241477).

Enclosed Rail Type (U. S. Pat. Pending, Can. Pat. —254632).

Preformed Rail Type Floor and Roof Slabs (Patent Pending).

Construction Service

This company, backed by 13 years' experience in gypsum construction, is at your service for advice and estimates for the above types of construction installed complete in any part of North America.

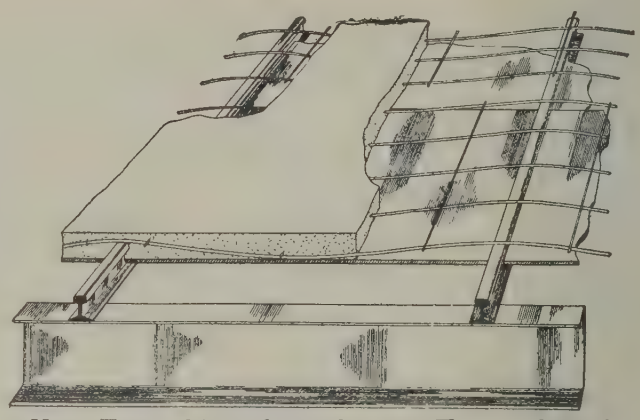
Rail Type of Monolithic Gypsum Floor and Roof Construction

The Standard Suspension type of gypsum slab construction was the only type of poured-in-place or monolithic roof and floor slab construction extensively used until the rail types were originated and developed by this company a few years ago.

Specifications and list of representative installations of the Standard Suspension type of construction sent on request.

While this company is prepared to install the Suspension type where specified or on rare occasions where it fits special conditions, the approval of architects, engineers, and owners throughout the United States and Canada is convincing proof that the Hoge and the Enclosed Rail Types are best suited to the great majority of conditions, and conform more readily to the standards of design and appearance required by architects.

Hoge Rail Type—In the Hoge Type small A.S.C.E. rail sections are laid about 32 in. apart on the top of walls, beams or purlins spanning the distance between beam or wall supports). On the lower flanges of the rails are supported ⅜ in. standard gypsum board, Celotex or Insulite composition board, with joints over purlins to form a solid under surface, paneled by the lower flanges of the rails. The rails are designed to carry all loads, which are transferred to them by continuous mesh reinforcement running across and resting on top of the rails. Standard gypsum composition is poured in place over the gypsum board, Celotex or Insulite, and finished smooth ½-in. or more above the tops of the rails, ready to receive the roof or floor finish. The under surface can be decorated as desired or a finished plaster ceiling can be applied.



Hoge Type of Monolithic Gypsum Floor and Roof Construction

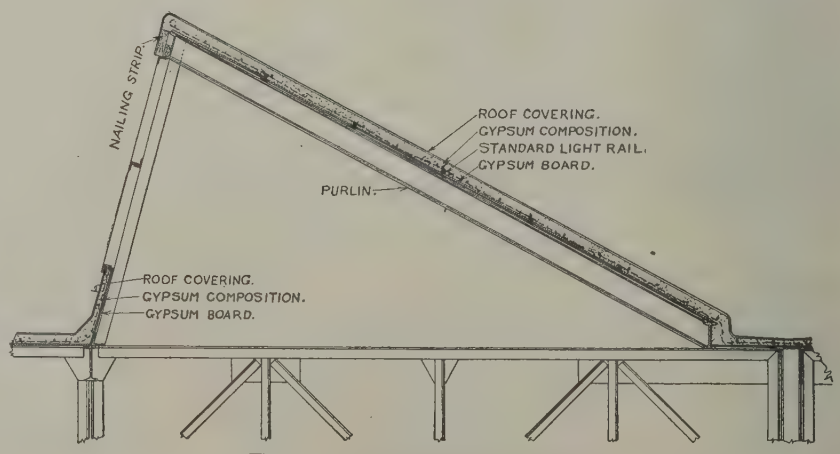
Specifications Hoge Type Monolithic Gypsum Construction—The floors and roofs named herein shall be the HOGE Type Monolithic Gypsum Board and Rail Construction as furnished by the LATHROP-HOGE GYPSUM CONSTRUCTION Co., Cincinnati, Ohio.

A.S.C.E. rail sections designed to carry all loads between supports shall be laid on the top of walls, beams, or roof purlins at sufficient spacing to receive ⅜-in. standard gypsum board carried on the lower flanges; gypsum board shall be butted tightly to form an even undersurface and braced in place if necessary to prevent buckling; galvanized mesh reinforcement of a minimum area per foot of the slab cross section of .026 in. shall be stretched over the tops of rails and allowed to sag to the top of gypsum board, forming a continuous reinforcement.

SAFE LOAD FOR RAIL TYPE SLABS

Rails 32" o.c. S=18000 lb per sq. in. $M=\frac{WL}{10}=S\frac{I}{X}$ For Rail Spacing of 24" Multiply Table Values by 4/3 For Rail Spacing of 36" Multiply Table Values by 9/8

SPAN / RAIL SECTION	4'0	4'6	5'0	5'6	6'0	6'6	7'0	7'6	8'0	8'6	9'0	9'6	10'0	10'6	11'0	11'6	12'0	12'6	13'0	13'6	14'0	14'6	15'0	15'6	16'0
8#	119	94	77	63	53	46	39						Slab Weight 12 lb. per sq. ft												
12#			153	126	107	90	78	68	60	53	47	40													
16#					167	141	122	107	93	83	74	67	60	55	49	44									
20#	Slab Weight = 14 #/□'				197	169	148	130	115	103	91	83	76	69	63	58	54	50	46						
25#	Slab Weight = 15 #/□'						186	164	144	130	115	106	97	87	79	72	67	62	58	54	50	47			
30#	Slab Weight = 16 #/□'									192	165	150	137	124	113	105	97	89	82	76	71	66	62	59	



Typical Sawtooth Construction

Continued on next page

Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency and poured into place, forming a solid reinforced slab 2½ in. thick, including the gypsum board. The top surface of slab shall be left ready to receive the finish desired, such as fill, grading or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

Curbs, walls, mullions, etc., shall be constructed with gypsum board facing and gypsum composition poured or plastered to regular thickness on the outer surface; or such curbs, walls, mullions, etc., may be constructed of precast gypsum blocks, all joints to be struck and outer surfaces on roofs left ready for waterproofing or other finish.

Typical Installations Hoge Type—

John Van Realty Co., Cincinnati, Ohio, 130,000 sq. ft.
Clinchfield Railroad Co., Erwin, Tenn., 93,000 sq. ft.
Pullman Car Co., Pullman, Ill., 300,000 sq. ft.
University of Illinois, Urbana, Ill., 85,000 sq. ft.
Bessemer Gas Engine Co., Grove City, Pa., 44,000 sq. ft.
Fraser Co., Ltd., Madawaska, Me., 240,000 sq. ft.
White Motor Co., San Francisco, Calif., 35,000 sq. ft.

Installations of the Hoge type may be found in practically every section of the United States.

Enclosed Rail Type—Where fireproofing or greater insulation value is desired, wooden forms are hung so as to cover the bottom of the rails with ¾ in. of gypsum composition, leaving a solid, even paneled gypsum under surface as in our Standard Suspension type slab.

Typical Installations Enclosed Rail Type—

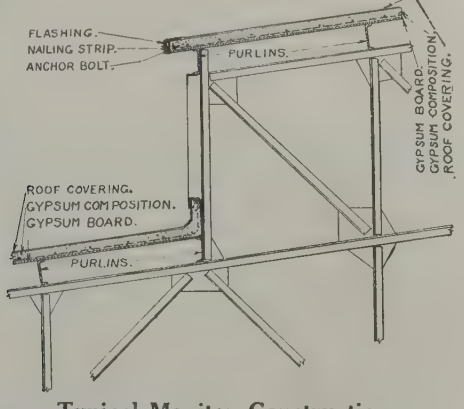
Port Alfred Pulp & Paper Co., Port Alfred, Que., 135,000 sq. ft.
Newfoundland Power & Paper Co., Corner Brook, N. F., 43,000 sq. ft.
Southern International Paper Co., Bastrop, La., 98,000 sq. ft.
Southern International Paper Co., Camden, Ark., 85,000 sq. ft.
United Paperboard Co., Lockport, N. Y., 46,000 sq. ft.
E. B. Eddy Co., Hull, Que., 35,000 sq. ft.

Specifications, Enclosed Rail Type Monolithic Gypsum Slab Construction—The floors and roofs named herein shall be the Enclosed Rail Monolithic Gypsum Slab Construction as furnished by the Lathrop-Hoge Gypsum Construction Co., Cincinnati, Ohio.

Standard rail sections designed to carry all loads between supports shall be set on walls, beams, or roof purlins at proper elevation to provide at least ¾-in. covering of gypsum under their bottom flange. Across these rails shall be stretched galvanized mesh reinforcement, having .026 in. minimum area per foot of slab cross section, and allowed to sag to within ¾-in. of temporary wood or other forms, making a continuous reinforcement at right angles to the rail subpurlins.

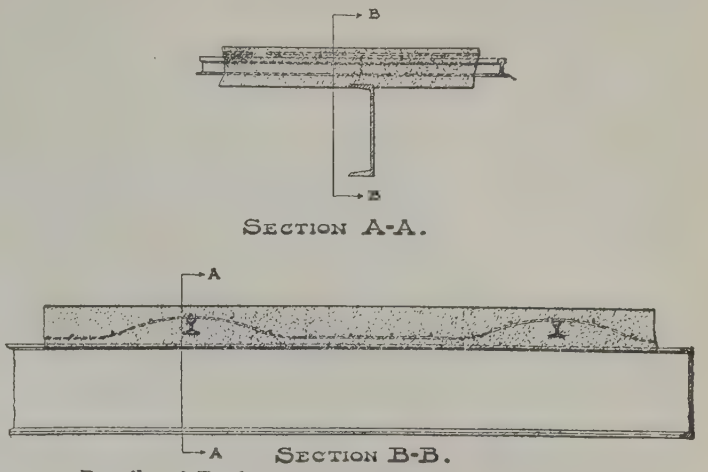
Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency, and poured into place on the forms, completely enclosing the rails to form a slab 3 in. thick (or more where specified). The top surface of slab shall be left ready to receive the finish desired, such as fill, grading, or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle, with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

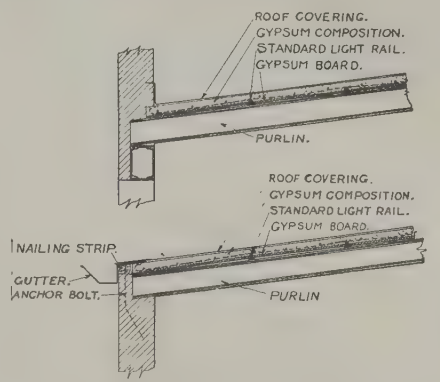


Typical Monitor Construction

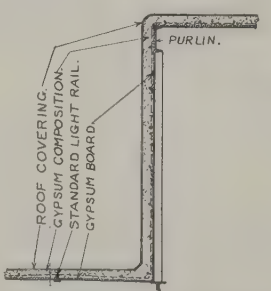
Curbs, walls, mullions, etc., shall be constructed with gypsum composition as above, sufficient steel reinforcement being provided to stiffen against wind pressure or other loading. Or such curbs, walls, mullions, etc., may be constructed of gypsum composition blocks laid up in gypsum mortar, all joints to be struck, and outer surfaces on roofs left ready for waterproofing.



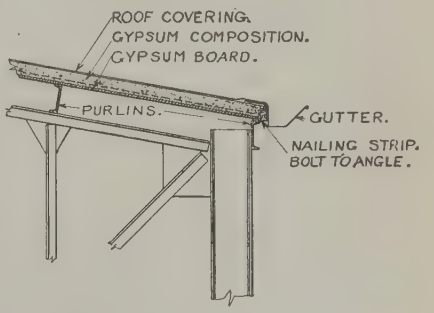
Details of Enclosed Rail Monolithic Gypsum Slab Construction



Typical Details at Wall



Typical Section Through End Wall of Sawtooth



Typical Details of Eave Purlin

Advantages of Rail Types

The rail types of construction have all the advantages of light weight, time saving construction, high insulation properties, fire resistance, vibration resistance, permanence and strength of the standard suspension type and eliminate the special steel designs required for that type.

It is readily applied to framing designs not laid out for the standard slab, in replacement of old roofs and floors where applications to framing are difficult, or where a uniform paneled under surface is desired.

The simplicity of the above designs permits adaptation to any layout of supports by varying the size of rails. No steel supports are required at the walls.

H. E. MARKS CORPORATION

Marks Systems of Gypsum Construction

115-121 Federal Street
PITTSBURGH, PA.

901 Schaff Building
PHILADELPHIA, PA.

Products

Manufacturers and Erectors of "MARKS SYSTEMS" of POURED-IN-PLACE ROOF and FLOOR CONSTRUCTIONS:

T System
Beam System
Rail System
Suspended System

Marks Poured-in-Place Gypsum Roofs

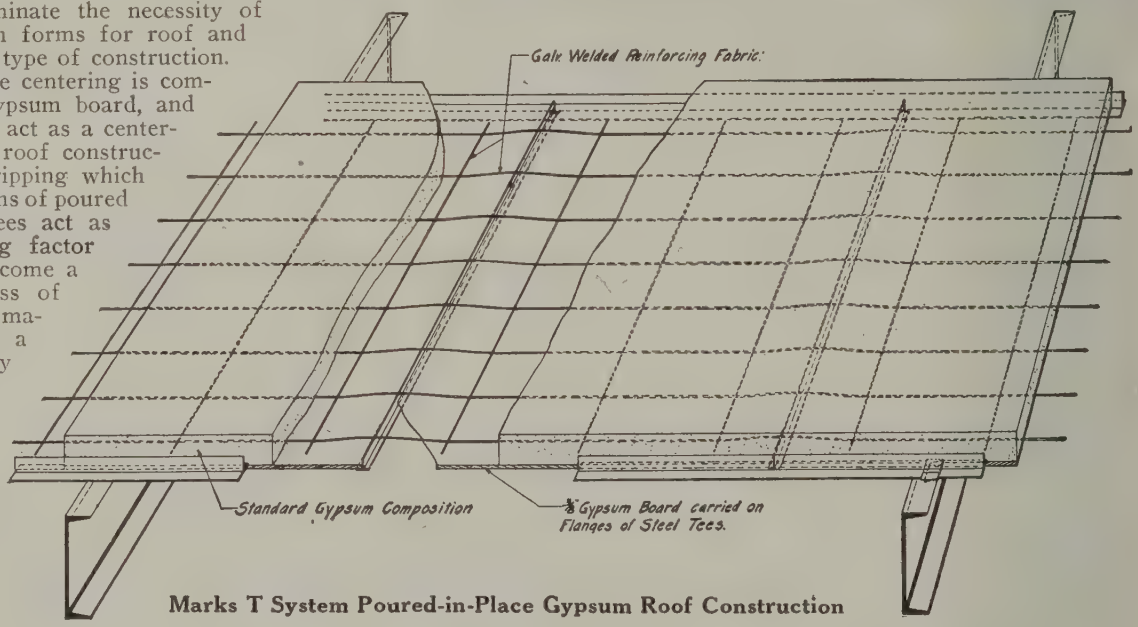
The Marks T System of Poured-in-Place Gypsum Roofs was designed primarily to eliminate the necessity of erecting temporary wooden forms for roof and floor slabs required in this type of construction. In the Marks T System the centering is composed of steel tees and gypsum board, and not only does this material act as a centering, but it remains in the roof construction and eliminates the dripping which is unavoidable in other forms of poured construction. The steel tees act as an additional load bearing factor and the gypsum boards become a part of the total thickness of the roof slab; so that this material, though acting as a form temporarily, actually becomes a part of the roof structure.

The galvanized welded wire reinforcement, in which the longitudinal members are spaced 4 in. apart and cross members 12 in. apart, is made in rolls of the same width as the space between the longitudinal tees, and is continuous from one side of the roof to the other.

Advantages of This Construction—There are many:

Very frequently a considerable sum of money can be saved on account of its light dead load, especially if the Marks engineers are consulted before the steel columns, trusses, etc., have been designed.

The centering is practically tight and the aggregate poured does not drip through the slab, thereby keeping the interior of the building clean. There is, therefore, no inconvenience to any



Marks T System Poured-in-Place Gypsum Roof Construction

Marks T System Roof in Process of Construction

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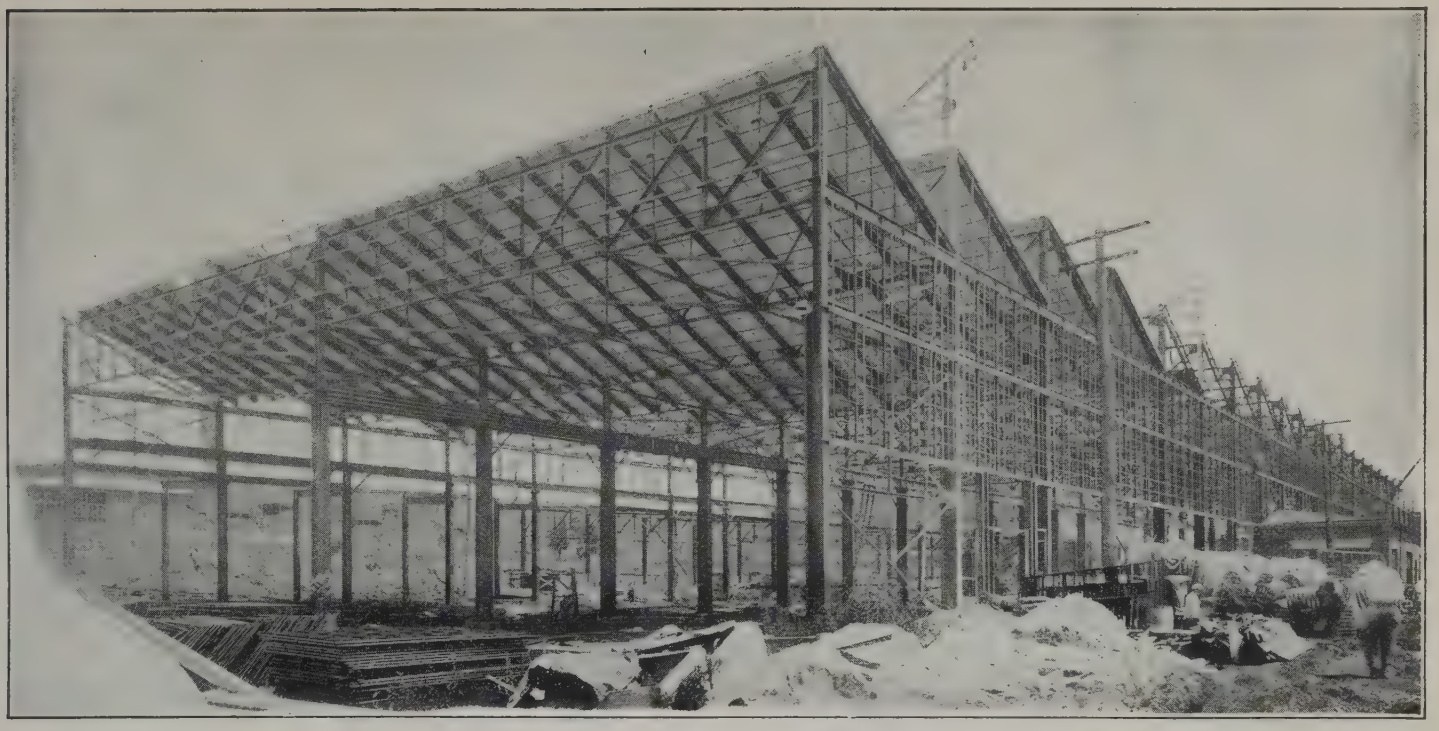
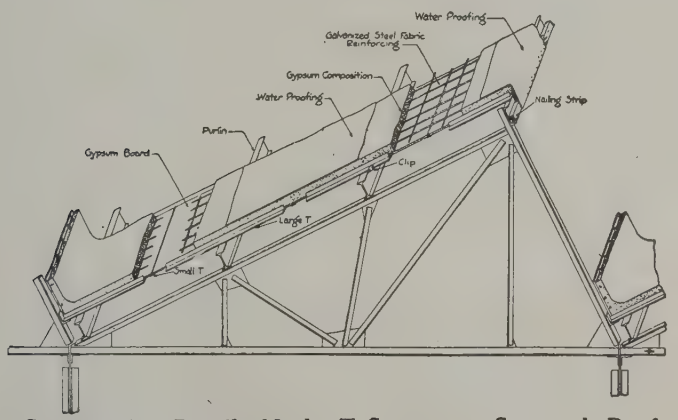


E. G. Budd Manufacturing Co., Philadelphia, Pa.
THE BALLINGER CO., Engineers WARK CO., General Contractors

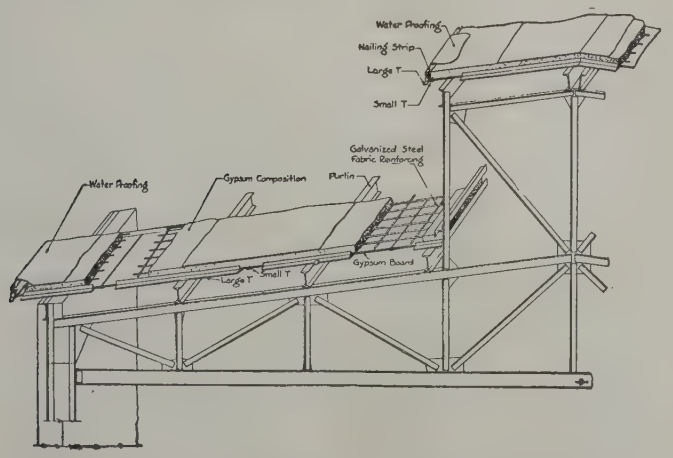
other work going on in the interior of the building. Especially is this a very important factor in re-roofing old buildings where continuous operation is required.

In the Marks T System the underside is perfectly clean. All of the companies for whom the Marks T System Roof has been built are very much pleased with the underside finish. It is not only a roof, but a finished ceiling.

The gypsum board finish absolutely prevents all dusting and discoloration of the gypsum on the underside.



Construction Details Marks T System on Sawtooth Roof



Construction Details Marks T System on Monitor Roof

In the Marks T System the steel reinforcement, the important factor in the load bearing capacity of the roof, has a minimum protection of ⅜-in. thickness of gypsum board. No end bay bracing or tie rods are required with the Marks T System.

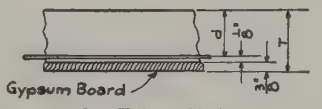
The combination of structural tees and reinforced gypsum on the Marks T System eliminates the possibility of sag between purlins. This construction is entirely above the purlins, and is adapted to meet any standard design of framework without changes or additions. Everything is furnished, including tees, materials and labor, completing the work ready for waterproofing.

Specifications for Marks T System Poured-in-Place Gypsum Roof

The roof decks shall be constructed of ..... thickness of the Marks T System of Reinforced Gypsum in accordance with the details of construction as shown in the Marks catalogue. This work to be installed by the H. E. MARKS CORPORATION, Pittsburgh, Pa.

SAFE LOADS POURED-IN-PLACE CONSTRUCTION

Thickness of slab, in. = T	Weight of slab, lb. per sq. ft.	Galvanized welded-wire reinforcement				Span of slab in feet (center to center of purlins)									
		Gauge	Diameter, in.	Spacing in.	As	4	4½	5	5½	6	6½	7	7½	8	8½	9
						Safe superimposed loads in pounds per sq. ft. (weight of slab has been deducted)										
2½	11	8	0.1620	4	0.0618	68	52	40	31	24	...	...	...	...	...	...
		7				73	56	43	34	27	...	...	...	...	...	...
		6				78	60	46	36	29	23	...	...	...	...	...
		5				83	63	49	39	31	24	...	...	...	...	...
3	13	8	0.1770	4	0.0738	101	77	60	48	38	30	24	...	...	...	...
		7				109	83	65	51	41	33	27	...	...	...	...
		6				116	89	70	55	44	36	29	24	...	...	...
		5				123	95	74	59	48	39	31	26	...	...	...
		4				131	101	79	63	51	42	34	28	...	...	...
3½	15	7	0.1920	4	0.0869	150	115	90	72	58	47	39	32	26	...	...
		6				...	123	96	77	63	51	42	35	29	24	...
		5				...	131	103	83	67	55	45	37	31	26	...
		4				...	139	110	88	72	59	49	41	34	28	...
4	17	6	0.2070	4	0.1010	...	161	127	102	83	68	56	47	39	33	27
		5				...	...	135	109	89	73	61	51	42	36	30
		4				...	...	144	116	95	78	65	55	46	39	33
4½	19	5	0.2253	4	0.1196	...	...	...	137	112	93	77	65	55	46	39
		4				...	...	...	147	120	100	83	70	59	51	43
		3	0.2437		0.1399	...	...	...	157	128	107	89	75	64	55	47



d = T less ½ in.

Note: The load capacities as shown herewith are based on reinforced slab figures only. An additional factor of safety is obtained in this system by the use of the structural tees in the permanent form.

J. B. EURELL

Gypsum Floor and Roof Construction

225 South Fifteenth Street
PHILADELPHIA, PA.

Products

SUSPENSION SYSTEM, POURED-IN-PLACE GYPSUM FLOORS and ROOFS.

Description of the Suspension System

The suspension system and the formulæ used are based upon the simple principles of the suspension bridge. Cold drawn, twisted steel cables are laced across the floor or roof and are securely anchored at both ends to the wall purlins or beams. The cable spacing is such that the cables bear the entire designed load with a factor of safety of four. Steel transverse rods deflect the cables in the center of each arch and give them initial tension.

Advantages

Strength—Since the steel cables alone are considered, the gypsum being ignored, in calculating the strength of the slab, different commercial loads are taken care of by varying the cable spacing.

Light Weight—The suspension system gypsum slab weighs but 4½ lb. per sq. ft. per in. of thickness. Average floor slabs are 4 in. thick; average roofs slabs are 3 to 3½ in. This weight combined with beam spacings averaging 6 to 7 ft. produces remarkable savings in the amount of steel used in the building framework.

Speed of Construction—The wooden forms used in pouring the slab may be stripped one hour after pouring and the slab will be capable of bearing the full designed strength. Practical construction men can appreciate what this means in the way of rapidity of construction.

Fire Resistance—Numerous official tests have demonstrated that a gypsum slab will resist intense fires for long periods and not only effectually prevent the spreading of the fire, but also suffer but small damage to itself, which is easily repaired.

Heat Insulation—As a heat insulator, gypsum is more than three times as effective as stone or cinder concrete. No other fireproof material is nearly as effective as a heat insulator. This means saving in heating plant investment and in fuel bills. It also means freedom from condensation drip from the underside of roof slabs.

Durability—Suspension type gypsum roofs installed over thirty years ago are in a condition equal to that of the day they were installed.

Other Advantages—In addition, gypsum suspension slabs are elastic and free from expansion or contraction strains. Gypsum slabs lend themselves readily to alterations, such as cutting holes for stairways. Gypsum is also a sound-deadening material.

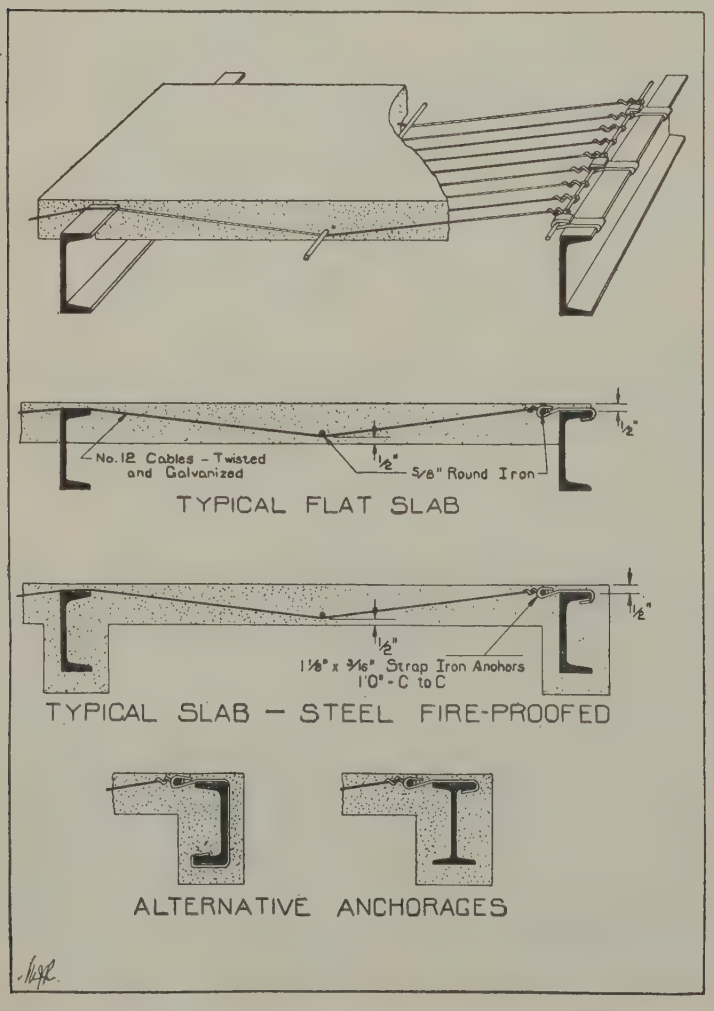


TABLE OF TOTAL LOADS
FLOOR AND ROOF CONSTRUCTION
SUSPENSION TYPE

Unit Working Stress = 20,000 Lbs. per Sq. In. for Steel Cables Composed of 2 No. 12 Cold Drawn Galvanized Steel Wires Twisted
Cable Tension=T = 2 x .00874 x 20,000 lbs. = 350 lbs./Cable.

$$W = \frac{1152Td}{bL\sqrt{L^2+16d^2}}$$

W = Total Safe Load, Lbs./Sq. Ft.
d = Deflection of Wires, Ins.
b = Cable Spacing, Ins.
L = Clear Span, Ins.

	Slab thickness inches	Cable spacing inches	Clear Distance Between Flanges of Beams													
			3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'6"	10'0"
Roofs Only	3	1	450	345	273	221	183	154	131	114						
		1¼	360	276	218	177	147	124	105	91						
		1½	301	230	182	147	123	103	88	76						
		1¾	258	197	156	126	104	88	75	65				←Roofs only→		
		2	225	172	137	110	92	77	65	57						
		2¼	200	153	122	99	82	68	58	51						
		2½	180	138	109	88	74	61	53	46						
		2¾	164	125	100	80	67	57	48	41						
	d = 2	3	150	115	91	74	61	52	44	38						
	3½	1	556	430	340	275	227	193	165	141	124	109	96			
		1¼	445	343	272	220	182	154	132	113	99	87	77			
		1½	370	285	226	184	152	128	110	95	82	73	64			
		1¾	317	245	192	155	130	110	94	82	71	62	55			
		2	278	215	169	138	114	96	82	71	61	55	48			
		2¼	247	191	150	123	102	85	73	63	54	49	42			
		2½	222	171	136	110	91	77	66	57	50	44	38			
		2¾	202	155	124	101	83	70	59	52	45	39	35			
	d = 2½	3	185	143	113	92	76	64	55	47	41	36	32			
Floors and Roofs	4	1	658	508	403	330	270	230	195	169	148	129	115	102	93	83
		1¼	527	406	322	264	216	184	156	135	118	103	91	82	75	67
		1½	438	338	268	220	180	153	130	112	98	86	77	69	62	56
		1¾	376	290	230	188	154	131	111	97	84	74	66	59	53	48
		2	328	254	201	165	135	115	98	84	74	64	57	52	46	41
		2¼	292	226	178	147	120	102	87	75	65	57	51	46	41	37
		2½	264	203	165	131	108	91	78	67	58	52	46	41	37	34
		2¾	240	185	147	120	98	83	71	61	54	47	42	37	34	31
	d = 3	3	219	169	134	110	90	77	65	57	49	43	38	35	31	28
	4½	1	757	583	466	382	313	264	226	195	172	150	134	120	107	97
		1¼	605	467	373	305	251	212	181	155	137	121	107	96	86	78
		1½	505	389	310	255	209	177	150	130	114	101	89	79	72	64
		1¾	432	334	266	218	179	151	129	111	98	86	77	69	61	56
		2	378	292	233	190	157	132	113	97	85	76	67	60	54	48
		2¼	336	260	207	169	140	118	101	86	76	67	59	54	48	43
		2½	303	234	186	152	126	106	90	78	68	60	54	48	43	38
		2¾	275	213	170	139	114	96	82	71	62	56	49	43	39	35
	d = 3½	3	252	194	155	127	104	88	75	65	57	50	45	40	35	32
	5	1	853	660	528	433	358	302	259	224	196	173	153	136	122	111
		1¼	682	528	423	347	286	242	207	179	156	138	123	109	98	89
		1½	569	441	352	288	239	201	172	150	130	115	102	91	81	74
		1¾	487	378	302	247	205	172	147	128	111	98	87	78	70	63
		2	427	330	264	216	179	151	129	112	98	86	77	68	61	56
		2¼	380	294	235	193	159	134	115	100	86	77	68	60	55	50
		2½	341	265	212	173	144	120	104	90	78	69	61	55	49	44
		2¾	310	241	192	157	130	109	94	82	71	62	56	50	45	40
	d = 4	3	284	220	176	144	120	101	86	75	65	58	51	45	41	37
	5½	1	944	738	592	483	402	340	290	252	220	193	171	153	138	125
	6	1	1032	807	648	531	442	374	321	278	243	214	190	170	153	138

Specification

The floor [roof] construction shall be Poured-in-place, Suspension System, Gypsum Slab. No. 12, cold drawn, twisted steel cables shall be laid over the tops of the beams [purlins] and secured to the wall beams [end purlins] by means of strong strap anchors and anchorage rods. These cables shall be laid parallel .... inches apart (see table) and shall be tied down in the center of each arch by means of iron rods running parallel to the structural beams. The wooden forms shall be placed so that they are ½ in. below the undersurface of the deflected cables. Gypsum concrete, composed of calcined gypsum and not more than 12% by weight of soft wood chips, shall be poured-in-place and be troweled to an even surface ½ in. above the tops of the beams [purlins], ready to receive the sleeper fill [grading] [waterproofing] [slate] [tile]. The slab shall carry the specified live load of .... pounds per square foot with a factor of safety of 4.

Some Installations of the Suspension System Installed by the J. B. Eurell Organization

Bethlehem Steel Company, over 1,500,000 sq. ft.
Baldwin Locomotive Works, Eddystone, Pa., Section "D" Machine Shop, 500,000 sq. ft.
Johns-Hopkins Hospital, Women's Clinic, Joseph Evens Sperry, Architect
Philadelphia Rapid Transit Company, Philadelphia, Pa.
University of Pennsylvania, Philadelphia, Pa., Day & Klauder, Architects
Ingersoll-Rand Co., Phillipsburg, N. J.
American-La France Fire Engine Co., Philadelphia, Pa., Carson & Carson, Engineers
Watson Stabilator Co., Philadelphia, Pa., Ballinger Co., Architects and Engineers
Seminary of St. Charles of Borromeo, Philadelphia, Pa., Paul Monoghan, Architect

AMERICAN ENAMELED BRICK & TILE COMPANY

INCORPORATED 1893

Manufacturers of Enameled Brick

Dealers in Face Brick

TELEPHONES
LEXINGTON 1183, 1184, 1185

Graybar Building, 420 Lexington Avenue
NEW YORK, N. Y.

CABLE ADDRESS
"AMEREBRICK"

AGENTS IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

TRADE AM-EN MARK

The Last Word in Enameled Brick

Products

ENAMELED and PORCELAIN BRICK: White, Mottled and Standard Colors in Standard Sizes and Ornamental Shapes. (See plates.) We are the largest manufacturers of this commodity in North and South America.

Territory

The business operations of this firm cover North and South America, Europe, Asia and Australia.

Personal Representatives

For the convenience of our customers in the United States and Canada, we have, in order to keep in closer touch with them, located representatives in all the principal cities to attend personally to inquiries, orders and deliveries.

Dispatch of Shipments

Factory and office are in constant telephone connection with each other, and we have a local telephone exchange connecting every department of the factory for quick and systematic dispatch of business.

Shipping Facilities

Our works, located but an hour's travel from the New York Office, are situated so as to enable shipping over two of the largest railroads—the Pennsylvania and the Central of New Jersey, and their connecting lines. We are also situated on tide water, so that shipments can be made by vessel for the coastwise and export trade.

Precaution Against Delay

Every part of our factory, including machinery, has its duplicate, which prevents any possibility of delay caused by breakdowns, should they occur.

Capacity

Our present capacity is 12,000,000 brick per annum, which will be increased as occasioned by the demand.

Stock

The average stock on hand at our factory is more than 2,000,000 brick, giving a large assortment for immediate shipment.

Illustrations of Stock Designs

Much delay is saved by use of stock design of moulded brick. In the two following pages are shown designs that we recommend as being most satisfactory in manufacturing results. We try to keep a stock of these on hand, in standard colors. These designs are chosen to reduce manufacturing difficulties and delays to a minimum; to enable composite mouldings to be made up; and to enable prompt filling of orders.

Send for plates and actual paper reproduction depicting decorative possibilities of enameled brick.

Details Required for Special Arch Brickwork

When ordering special arches, please consult the accompanying cuts and give all necessary information as to details. Furnish details as far as possible in advance of the time the arches will be required. We should be allowed from 4 to 6 weeks' time to make up arch brick to conform with detail. We keep no arches in stock.

We can not always guarantee uniformity of shade in arches as in regular deliveries of first quality plain stock brick, therefore strongly recommend the use of stock specials for lintels of doors and windows. (See study of window opening on second page following.)

Colors—In Bright Enameled or Dull Porcelain Finish

In addition to our regular white and standard colors, such as our sage green, red brown, black, etc., we have made a specialty of mottles in the following colors:

Gray, brown, black, mixed gray and black, which give an excellent appearance for both interior and exterior work, having a finish more on the type of marble than enameled brick.

If you have in mind, at any time, a particular color, shade or finish of enameled brick for interior or exterior purposes, advise us of your ideas and requirements and we will be pleased to submit samples.

Uniformity of Shade of Our Product

We guarantee uniformity of shade in all first quality deliveries to the limit of practicability. Colors and effects giving most uniform results are, in order of uniformity, white, mottled gray, mottled brown, mottled black, sage green and red brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders if ample time be given, to match in shade the moulded and stretcher stock, but can not always guarantee to uniformly shade shipments of specials, particularly on rush shipments.

Special Features and Advantages

In making our product we follow the English and Scotch systems, working by the soft mud process. This is without question the only process which insures durability and the closest relation of bond obtainable between body and glaze.

Our brick are burnt in but one fire, thus making the chemical change in the body and the glaze simultaneous.

Where manufacturers use the dry pressed process, the brick have to be burnt first as front brick before the enamel can be applied, and fired again for the fluxing of the glaze.

We use hard and durable glazes, not soft lead glazes frequently seen on inferior grades of enameled brick and tile.

There has not been a single case during our 36 years of business where any peeling or discoloring has been seen or reported.

This is better than any guarantee which we might be asked to give, as it covers a distributed output of over 145,000,000 brick, located all over the United States and elsewhere and subject to all varieties of climatic conditions.

Cleaning

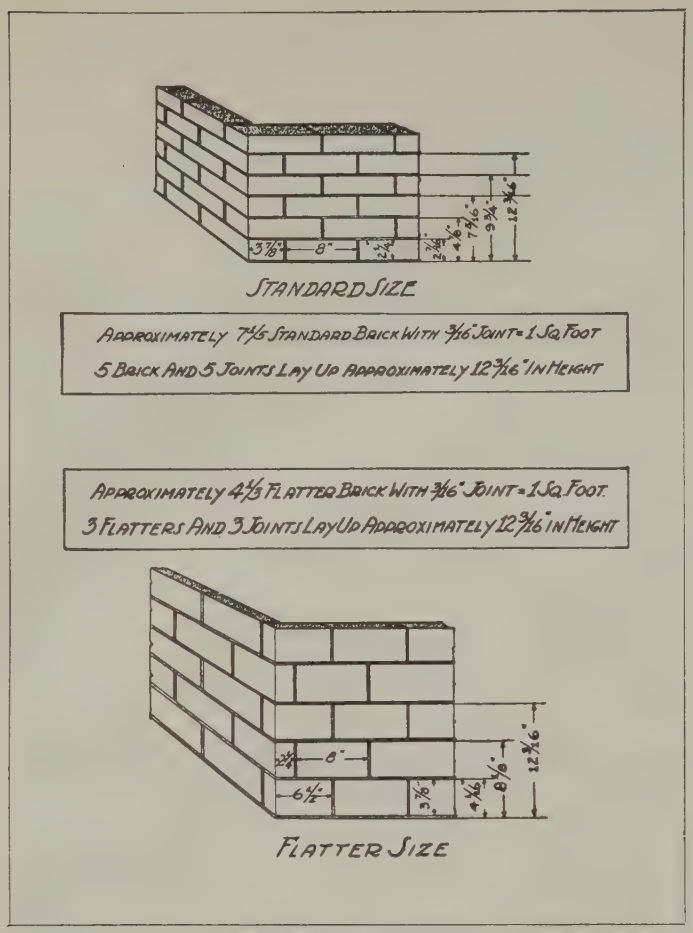
Enameled brick are best cleaned with some alkaline solution, such as caustic soda or sodium carbonate. This cleans the enamel and does not affect the cement or lime mortar.

Acids

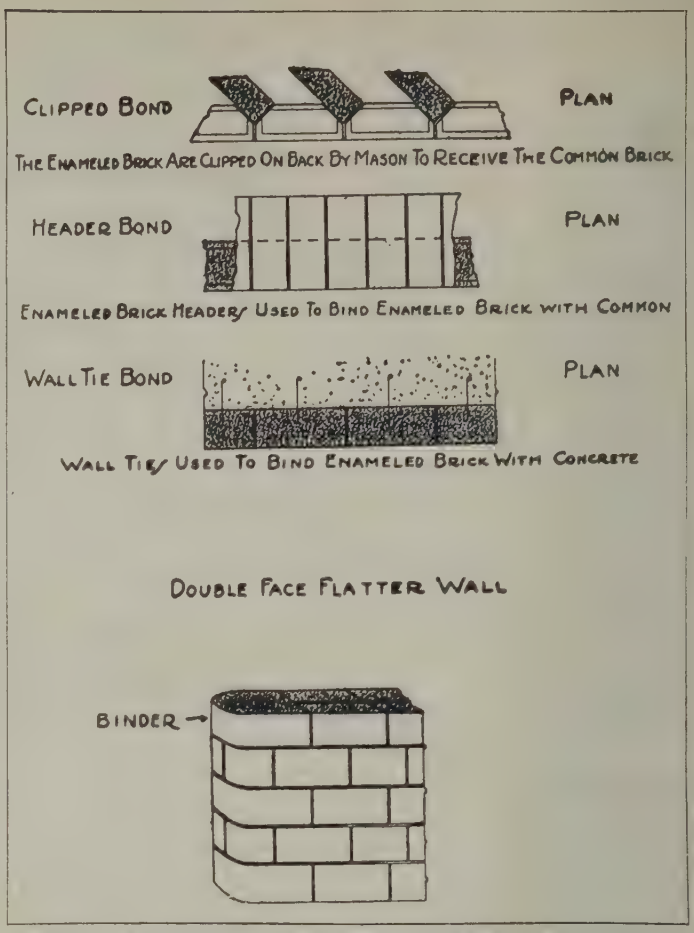
Sulphuric, nitric, or hydrochloric acids, even in concentrated form, will not affect our glazes; but if used as a wash, even when diluted, they will attack the cement or lime mortar.

The only commercial acids which will attack and destroy our enamel are hydrofluoric and hydrofluorsilicic.

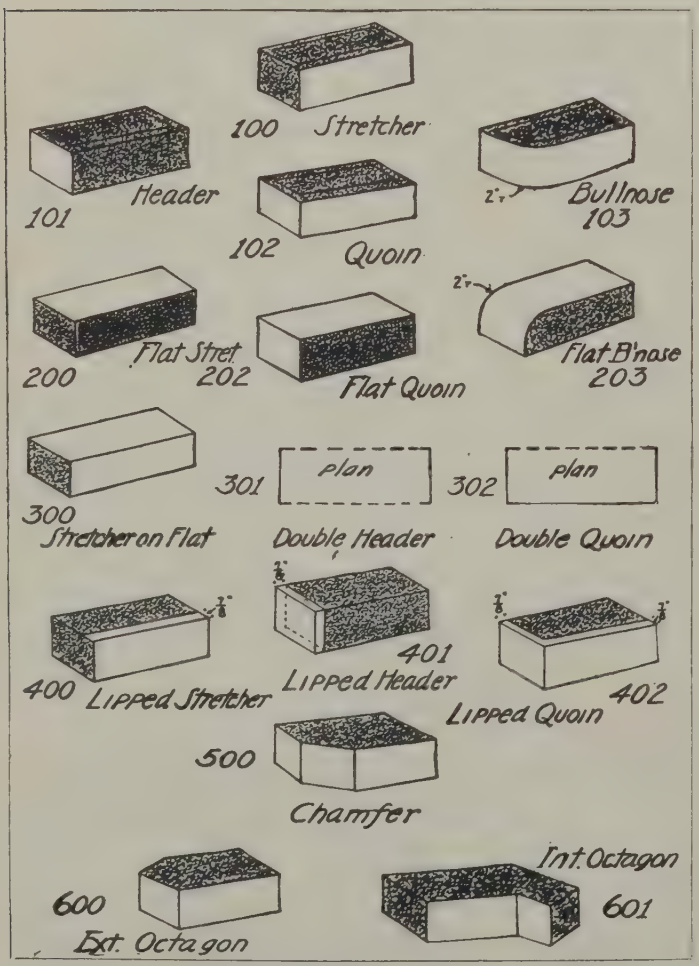
Continued on next page



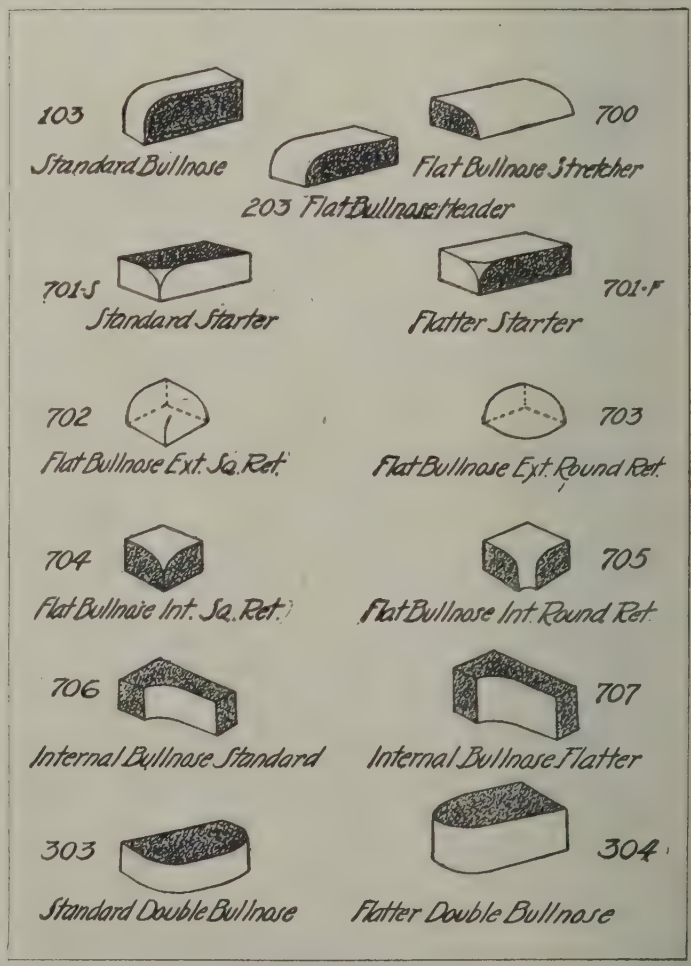
Comparison of Sizes Showing Number of Bricks Per Square Foot
All dimensions are approximate



System of Bonding or Tying Enameled Brick to Common Brick or Concrete Backing, Also Method of Bonding Flatter Brick for Partitions



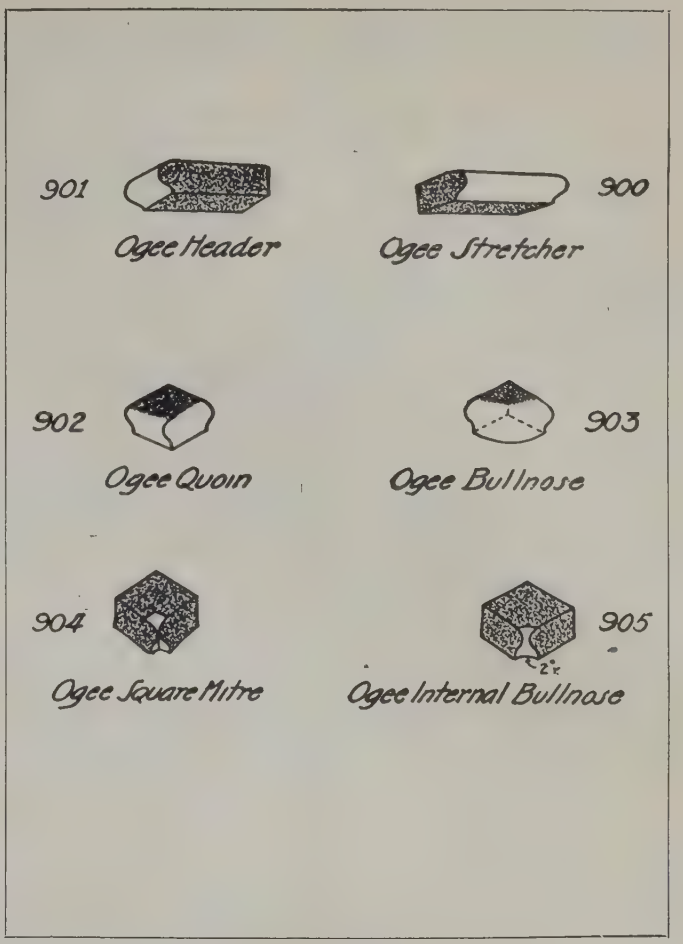
Illustrations of Types
For projection and dimensions see next page



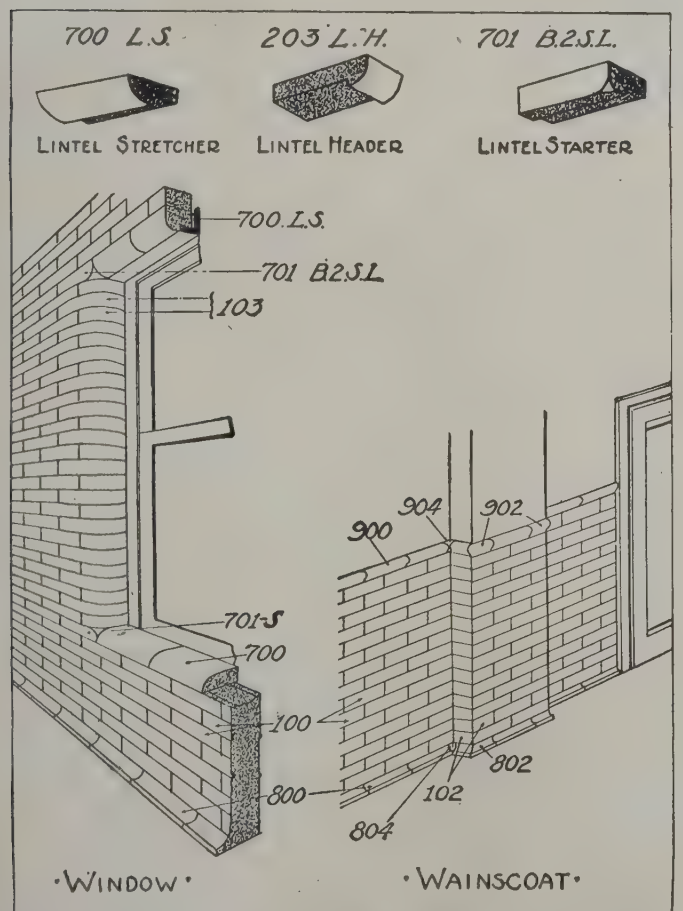
Bullnose Specials
For projection and dimensions see next page. All brick shown have 2-in. radius

Continued on next page

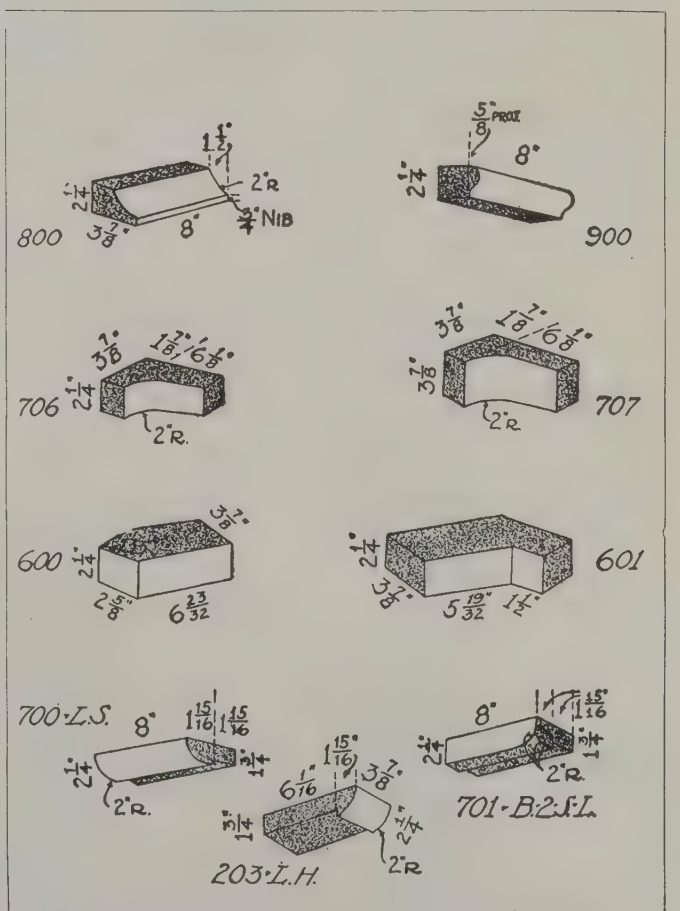
Cove Mould
For projection and dimensions see cut below



Ogee Mould
For projection and dimensions see cut below



Study of a Window Opening and of a Base and Cap Course
For projection and dimensions see next cut



Projection and Dimensions of Special Shapes

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

2121 Guarantee Title Building
CLEVELAND, OHIO
DISTRICT ORGANIZATIONS

BOSTON, MASS., 11 Beacon Street
CHICAGO, ILL., 228 North LaSalle Street
CLEVELAND, OHIO, 2124 Guarantee Title Building
DENVER, COLO., 1735 Stout Street
DETROIT, MICH., 400 U. S. Mortgage Trust Building
HARTFORD, CONN., 226 Pearl Street
LOS ANGELES, CAL., 634 Chamber of Commerce Building
NEW ORLEANS, LA., 727 Canal Bank Building
NEW YORK, N. Y., 1716 Grand Central Terminal
NORFOLK, VA., 112 West Plume Street
PHILADELPHIA, PA., 1420-22 Walnut Street
PITTSBURGH, PA., 305-6 B. F. Jones Law Building
RALEIGH, N. C., 508 Commercial National Bank Building
ROCHESTER, N. Y., P. O. Box 773
SALT LAKE CITY, UTAH, 301 Atlas Block
SAN FRANCISCO, CAL., 301 Sheldon Building
SEATTLE, WASH., 913 Arctic Building
VANCOUVER, B. C., 701 British Columbia Mining Building

General Information

BRICK *forever*

Herewith are presented the essential data and information about common brick which the architect or engineer should have at his command.

Common brick includes all types of burned clay or shale brick which have a natural surface, i.e., not specially treated to produce certain surface effects. As is well known, common brick can be had in a wide variety of colors and surface textures, even in brick made in the same locality. The overburned "clinker" brick and the "culls," with both of which architects have accomplished such beautiful effects, are common brick.

Strength of Brick Walls

Recent investigations at the U. S. Bureau of Standards (1926-1927) furnish the latest, most complete and authoritative data on brick wall strengths. The essential results obtained in tests on over 160 full-sized wall panels, 6 ft. long by 9 ft. high and of several thicknesses, are tabulated below. The ultimate compressive strengths of both solid and Ideal (Construction described in "Brick—How to Build and Estimate") hollow walls, per square inch of gross cross-sectional area are given.

Fire Resistance of Brick Masonry

The recommendations of the National Board of Fire Underwriters, through the Underwriters' Laboratory, Inc., are as follows:

Walls (exterior and interior) and partitions built of common, hard-burned clay brick with cement or lime and cement mortar, conforming in height, loading, and other limitations to requirements of the building code, recommended by the National Board of Fire Underwriters; of good average workmanship and quality of materials, and built according to good current practice

Character of brick	Thickness of wall, in.	Type of wall	Kind of mortar: Cement	Lime	Sand	Compressive strength, lb. per sq. in. of gross cross-sectional area: Max.	Min.	Avge.	Workmanship
"A" Stiff mud, end cut C.S.-3280 M.R.-1225	8	Solid	1	.....	3	751	578	664	Poor
	12	Solid	1	.....	3	1165*	656	656	
	8	Solid	1	1¼	6	618	574	593	
	12	Solid	1	1¼	6	582	576	579	
"B" Soft mud C.S.-3540 M.R.-670	8	Solid	1	.....	3	1303	893	1081	Inspected
	12	Solid	1	.....	3	1345	1114	1209	
	8	Solid	1	1	6	1062	760	909	
	12	Solid	1	1	6	1048	939	984	
"C" Dry press C.S.-3410 M.R.-820	8	Solid	1	.....	3	1407	1333	1382	Inspected
	8	Hollow, R.B.	1	.....	3	951	890	922	
	8	Hollow, A.R.-F.B.	1	.....	3	857	718	799	
	8	Hollow, A.R.	1	.....	3	1175	736	920	
	12	Solid	1	.....	3	1855	1349	1638	
	12	Hollow, R.B.	1	.....	3	One wall	.....	1012	
	12	Hollow, A.R.-F.B.	1	.....	3	922	552	711	
	12	Hollow, A.R.	1	.....	3	869	744	802	
	12	Hollow, R.B. heavy duty	1	.....	3	1034	833	940	
	8	Solid	1	1	6	1340	967	1161	
	8	Hollow, R.B.	1	1	6	964	903	939	
	8	Hollow, A.R.-F.B.	1	1	6	801	696	749	
	8	Hollow, A.R.	1	1	6	892	653	764	
	12	Solid	1	1	6	1374	1227	1302	
	12	Hollow, A.R.-F.B.	1	1	6	812	570	674	
	12	Hollow, A.R.	1	1	6	749	644	706	
	12	Hollow, R.B. heavy duty	1	1	6	950	774	851	
	4	Economy	1	.....	3	1877	1348	1624	
	4	Economy	1	1	6	1564	1364	1433	
"D" Soft mud, sand struck C.S.-8595 M.R.-1550	8	Solid	1	.....	3	2952	2040	2635	Inspected
	8	Hollow, R.B.	1	.....	3	1269	1104	1206	
	8	Hollow, A.R.-F.B.	1	.....	3	925	680	775	
	8	Hollow, A.R.	1	.....	3	1067	797	957	
	12	Solid	1	.....	3	3228	2440	2788	
	12	Hollow, R.B.	1	.....	3	One wall	.....	1158	
	12	Hollow, A.R.-F.B.	1	.....	3	1005	878	942	
	12	Hollow, A.R.	1	.....	3	934	774	868	
	12	Hollow, R.B. heavy duty	1	.....	3	1635	1532	1589	
	8	Solid	1	1	6	1877	1710	1791	
	8	Hollow, R.B.	1	1	6	1154	680	882	
	8	Hollow, A.R.-F.B.	1	1	6	745	556	638	
	8	Hollow, A.R.	1	1	6	1054	780	876	
	12	Solid	1	1	6	1991	1816	1888	
	12	Hollow, R.B.	1	1	6	.....	No test	.....	
	12	Hollow, A.R.-F.B.	1	1	6	898	698	829	
	12	Hollow, A.R.	1	1	6	803	638	742	
	12	Hollow, R.B. heavy duty	1	1	6	1152	832	964	
	4	Economy	1	.....	3	3520	2757	3146	
	4	Economy	1	1	6	1974	1879	1938	

*One wall laid with good workmanship.
C.S. = Compressive strength. M.R. = Modulus of rupture — lb. per sq. in. R.B. = Rolok Bak. A.R. = All Rolok. F.B. = Flemish Bond.

"C" Brick, C.S. = 3410, M.R. = 820

Thickness of wall, in.	Hollow wall construction	Mortar	Compressive strength average values, lb. per sq. in.		
8	R.B.	1—3	922	958	
12	R.B. (one wall)	1—3	1012		
12	R.B. heavy duty	1—3	940		
8	A.R.-F.B.	1—3	799	755	872
12	A.R.-F.B.	1—3	711		
8	A.R.	1—3	920	861	
12	A.R.	1—3	802		

Average wall strength, all hollow walls, 1—3 mortar = 872.

8	R.B.	1—1—6	939	895	
12	R.B. heavy duty	1—1—6	851		
8	A.R.-F.B.	1—1—6	749	712	781
12	A.R.-F.B.	1—1—6	674		
8	A.R.	1—1—6	764	735	
12	A.R.	1—1—6	706		

Average wall strength, all hollow walls, 1—1—6 mortar = 781.

Ratio, all types hollow walls, $\frac{\text{1—3 Mortar}}{\text{1—1—6 Mortar}} = 0.896$.

"D" Brick, C.S. = 8595, M.R. = 1550

8	R.B.	1—3	1206	1318	
12	R.B.	1—3	1158		
12	R.B. heavy duty	1—3	1589		
8	A.R.-F.B.	1—3	775	859	1070
12	A.R.-F.B.	1—3	942		
8	A.R.	1—3	957	913	
12	A.R.	1—3	868		

Average wall strength, all hollow walls, 1—3 mortar = 1070.

8	R.B.	1—1—6	882	923	
12	R.B.	1—1—6	No test		
12	R.B. heavy duty	1—1—6	964		
8	A.R.-F.B.	1—1—6	638	734	822
12	A.R.-F.B.	1—1—6	829		
8	A.R.	1—1—6	876	809	
12	A.R.	1—1—6	742		

Average wall strength, all hollow walls, 1—1—6 mortar = 822.

Ratio, all types hollow walls, $\frac{\text{1—3 Mortar}}{\text{1—1—6 Mortar}} = 0.768$.

Continued on next page

are shown by tests conducted at the United States Bureau of Standards and at Underwriters' Laboratories, Inc., in accordance with the Standard Fire Test Specification to furnish protection against passage of flame and dangerous transmission of heat for the periods stated in the following classifications. The thickness here given as 12 in. is in some parts of the country designated as 13 in. These terms are to be considered as equivalent.

CLASSIFICATIONS

	Ratings
4-in. interior partitions. Non-bearing	1 hour
8-in. interior or exterior walls. Non-bearing, or bearing with incombustible structural members framed in	5 hours
Bearing, with combustible structural members framed in	2 hours
12-in. interior or exterior walls. Non-bearing or bearing. Not less than	9 hours

The foregoing classifications will usually be increased at least ½ hour by the application of portland cement stucco or portland cement or gypsum plaster ¾ in. thick, to either side.

The report of the Bureau of Standards' tests, too voluminous for inclusion here, is found in the Bureau of Standards Circular Letter No. 228. It contains much more data than given in the rating table above.

Thermal Resistance

The subject of resistance of brick masonry to the transmission of heat and to the infiltration of air has been a matter of investigation by several authorities and is, at the present time, being studied. Our present knowledge is perhaps best reflected in the following data taken from the 1928 edition of the American Society of Heating and Ventilating Engineers "Guide." It should be remembered that the values given reflect the condition of a 15-mile wind blowing against the exposed side of the building; values for still air would necessarily be somewhat lower than that given.

VALUE OF COEFFICIENT "U"
(B.t.u. per square foot per hour per degree)

Brick walls, thickness in inches	8	12	18	24
Plain, no interior finish	0.358	0.278	0.218	0.173
½-in. plaster on one side	0.332	0.263	0.208	0.166
¾-in. plaster on metal lath, furred	0.216	0.185	0.156	0.131
½-in. plaster on wood lath, furred	0.209	0.179	0.152	0.128
½-in. plaster on ⅜-in. plaster board, furred	0.215	0.184	0.155	0.131

It is important to remember that the heat loss from buildings through windows, doors and through the roof is at a very much higher rate than could possibly take place through brick walls. Attention to these points brings much greater returns than efforts to increase the thermal resistance of brick masonry.

Sound Resistance

Quantitative data on sound resistance requires considerable explanation to make it understandable and useful. Such values as are commonly given are those supposed to represent relative intensities as measured by the ear and are the natural logarithms of the physical factors of reduction as determined by laboratory experiments.

Investigations at the Bureau of Standards show brick masonry to have a very high reduction factor even in thin walls. The following values will give a rough idea for the more common constructions:

AVERAGE REDUCTION FACTOR

8-in. brick wall plastered both sides	5.72
3¾-in. brick wall, plastered both sides	5.37
2¼-in. brick wall, plastered both sides	4.87
2¼-in. brick wall, furring, plaster boards and plastered both sides	5.35

Weather Resistance

The physical properties of brick itself has but little to do with the ability of brick masonry to resist water penetration. The real situation is best expressed in the following abstract taken from the 1928 annual report of Committee C-3 (the brick committee) to the American Society for Testing Materials.

"There appears to be a widespread belief that the percentage of absorption of individual bricks is a governing factor in the ability of brick masonry to resist moisture penetration. It has been conclusively shown that such a belief is erroneous. On the contrary, a certain amount of absorption in the brick assists in obtaining a better bond between brick and mortar and therefore a more water-tight joint. Any water penetration in brick masonry undoubtedly passes largely through the mortar joint and not through the brick. This committee has always felt that if absorption percentage has any significance, it is as a possible measure of that quality of brick masonry known as durability."

Permanence

The very process of making brick produces an inherent quality of permanence. The clays and shales, which are the raw materials from which brick are made, have been purified and reduced by nature to a chemically stable compound or mixture, and the process of burning for many hours at high temperatures (about 2000° F.) produces a product which is as near indestructible as any building material can be. No building material surpasses brick in this respect.

There are no laboratory tests which can accurately measure the permanence of a building material, time alone can supply the test. Brick structures of all kinds standing in almost perfect condition after centuries of exposure are the best proof of the permanence of common brick.

Publications

Books of the Association, which the architect should find useful, are listed below:

The Heart of the Home—Beautifully illustrated brick fireplace designs with complete directions for proper construction. 25 cents.

Skintled Brickwork—Photos and details showing how to obtain these interesting and attractive wall surfaces. 15 cents.

Brick—How to Build and Estimate—A complete manual of brick construction including important and useful data and tables of required material quantities. 25 cents.

Mortar—All the essential information about mixing and using all kinds of mortar. Free.

Reinforced Brick Storage Structures and Silos—Full information and data on these economical brick structures including complete construction directions. 15 cents.

Strength and Other Physical Properties of Brick Masonry—Free.

THE CARLYLE-LABOLD CO.

Manufacturers of Clatone Face Brick

PORTSMOUTH, OHIO

PLANTS: SCIOTOVILLE AND COAL GROVE, OHIO
(Both on Norfolk and Western Railway)

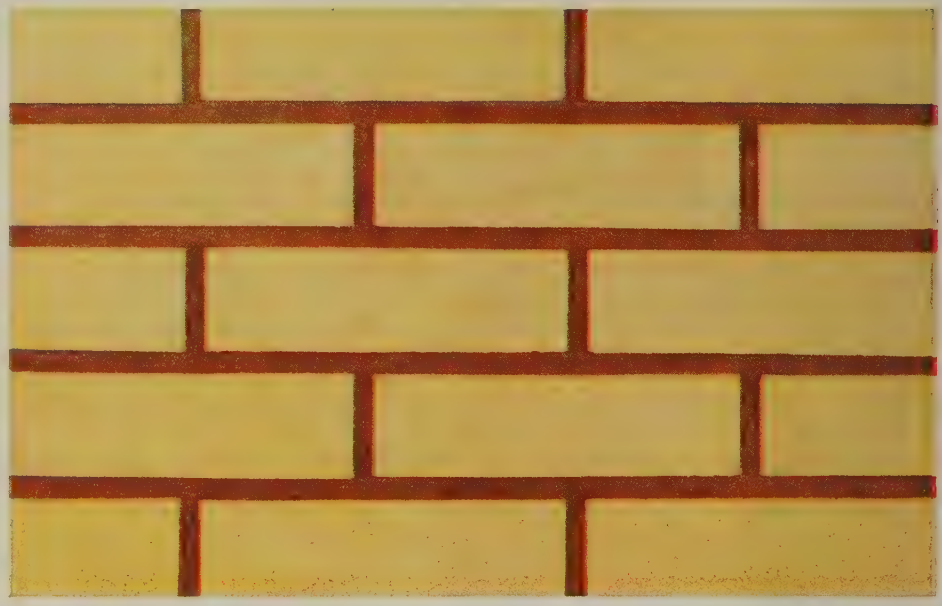
Clatone Face Brick

Clatone Face Brick are produced in Buffs, Greys, Tans and Ironspots in a special smooth and rough texture.

Clatone Face Brick are made of clays of high and uniform quality by an organization which is putting into its products today the full benefits of the experience and knowledge gained in 25 years of brick manufacture.

The wide range of colors and textures available in Clatone Brick enables the architect to achieve many beautiful color harmonies and unusual effects with Clatone Brick. They are mined from fire clay, entirely free of impurities that might result in discoloration of any kind.

See also our pages on Quarry Tiles.



Above: No. 75
A beautiful shade of Ivory Buff in the smooth texture. This is an excellent Brick for either interior or exterior work on almost any type of construction.

CLATONE

Left: No. 507
An attractive blend of Buffs, Pinkish Buffs and Light Greys. The combination of colors in this blend is very attractive and can be used to advantage by architects desirous of obtaining the unusual effect.

Below: No. 661
A beautiful blend of light and dark rough texture Ironspots. The different shades in this blend can be furnished separately in the same texture. We can also furnish the same shades selected or blended in the smooth texture Ironspots.

Production Facilities

Our annual capacity of twenty-five million bricks assures you of satisfactory shipments and avoids delays in building construction. Our plants are centrally located for quick shipments to any part of the United States and Canada east of the Rockies.

We distributed these bricks during 1928 into thirty-two states, Canada and Cuba. Authorized dealers in all principal cities. Inquiries sent direct to Portsmouth will be given immediate attention.

THE FINZER BROS. CLAY CO.

Manufacturers of Finzer Face Brick for Interior and Exterior Use

SUGARCREEK, OHIO

THE CLAY CITY

Finzer Bros. Face Brick Colors

The regular Finzer line of face brick can be supplied in the following colors:

Finzer Red Rug Face—110, 120, 125, 130, 140, 145, 150.

Finzer Red Smooth Face—10, 20, 25, 30, 40, 45, 50.

Finzer Ivories Rug Face—220, 230, 250.

Finzer Ivories Smooth Face—320, 330, Courts.

Finzer Golden Buffs Rug Face—280, 290, 290 Special, 295, 297.

Finzer Golden Buffs Smooth Face—380, 390, 390 Special, 355 Range.

Forestblend Matt Face.

Forestblend may be obtained in five shades of each of the colors listed below. Forestblends offered in Shades 410 to 460, inclusive, will permit the architect to effect practically any color scheme desired. That is accomplished by eliminating certain shades and substituting others. This additional service is given without extra charge by Finzer representatives.

455A—Browns and Blues.
455AX—Polychromes, Red, Brown and Gunmetal.
455B—Dark Tangerines.
455C—Greens in range.
455CX—Red, Purple, Green and Russet Polychrome.
455D—Reds and red hearts.
455E—Light Tangerines.
455F—Sycamore Barks.
455G—Golden Matts. Range of color.
410—Light Reds.
420—Medium Light Red.
440—Medium Dark Red.
445—Dark Red.
450, 460—Range Dark Red.

Here are some of the most popular ranges: (a) A C and 445 Blend; (b) Orientals—Browns, Blues, Reds and Tangerines; (c) 455 Full Range; (d) 456 Full Range with 20% Sycamore Barks; (e) B and E Tangerine Mix; (f) 455 AX and CX mix; (g) 455 F and G Mix.

Textures

Finzer Face Brick can be secured in Smooth, Forestblend or Rug Textures. Forestblends (in Shades 410 to 460) are made by special patented process and can be obtained only from the Finzer Bros. Clay Co. or their representatives.

Special Note

Regular carload mix of Forestblend consists of 35% 455A's, 20% B and E's, 20% 455C's and CX, 10% of 445, 15% 455D's. These percentages can be varied to suit the purchaser's requirements. We can also include a percentage of straight Red Matts in shades 410 to 460 if a definite red tone is desired.

Plant Locations and Shipping Facilities

The Finzer Bros. plant is located on the Wheeling & Lake Erie Railroad, which road is able to furnish ample cars for all requirements. We have connections with New York Central, Pennsylvania, Baltimore & Ohio, Erie and Nickle Plate roads and all leading trunk lines of Eastern United States. The yearly capacity of our plants is 52 million bricks. Orders of any size can be taken care of promptly.

Special Advantages

The plant is located in Sugarcreek, Ohio, where the clays are renowned for their purity and beauty. Ours is one of the few plants equipped to mix shale and fireclay thereby producing shades which can be manufactured in very few plants. Our Factories are located on the same siding, and are the most up-to-date and modern in the Middle West. No extra charge for handling or shipping mixed carloads. Finzer Bros. representatives are located throughout Eastern United States and prompt shipments of any amount of brick can be made on short notice.

Samples

Samples of the textures and colors of Finzer Face Brick will be sent free of charge upon request.

Specifications

To insure the use of Finzer Bros. brick, insert the word "Finzer" or "Forestblend" at any place where face brick is called for in the specifications.

AC & 445—33⅓% A 33⅓% C & CX 33⅓% 445
Laid up in Flemish Bond

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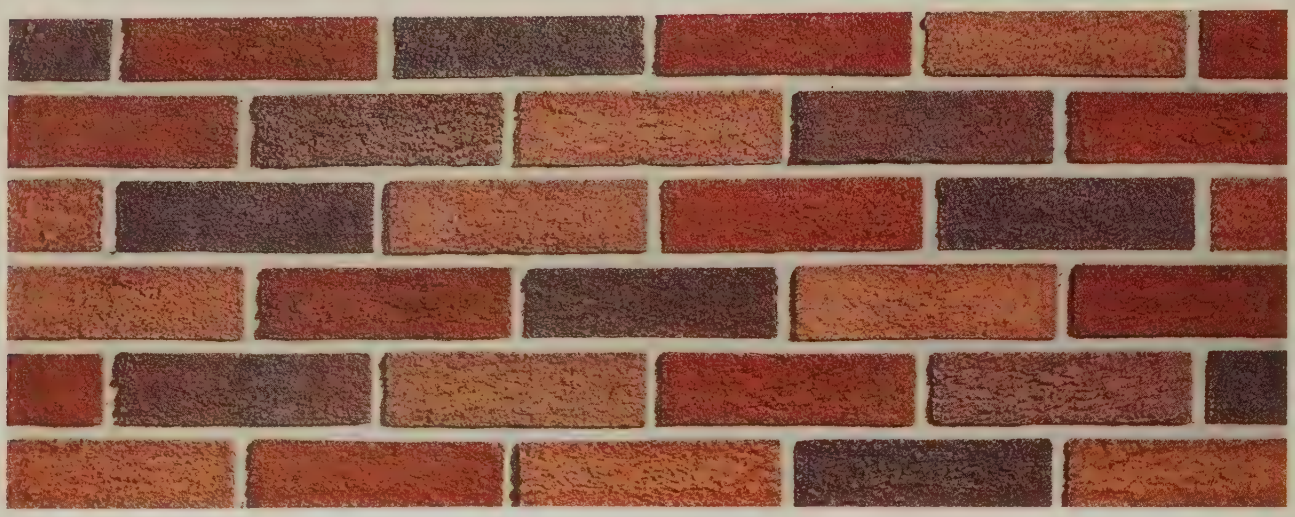

ORIENTAL—33⅓% B & E Tangerines
33⅓% 455A 33⅓% 445 Running Bond or
Stretcher—White Mortar

455CX—Comprises Purple, Green, Russett and Red
Polychromes in about equal quantities

455 FORESTBLEND FULL RANGE—35% 455A
20% 455 B & E 20% C & CX 15% D 10% 445

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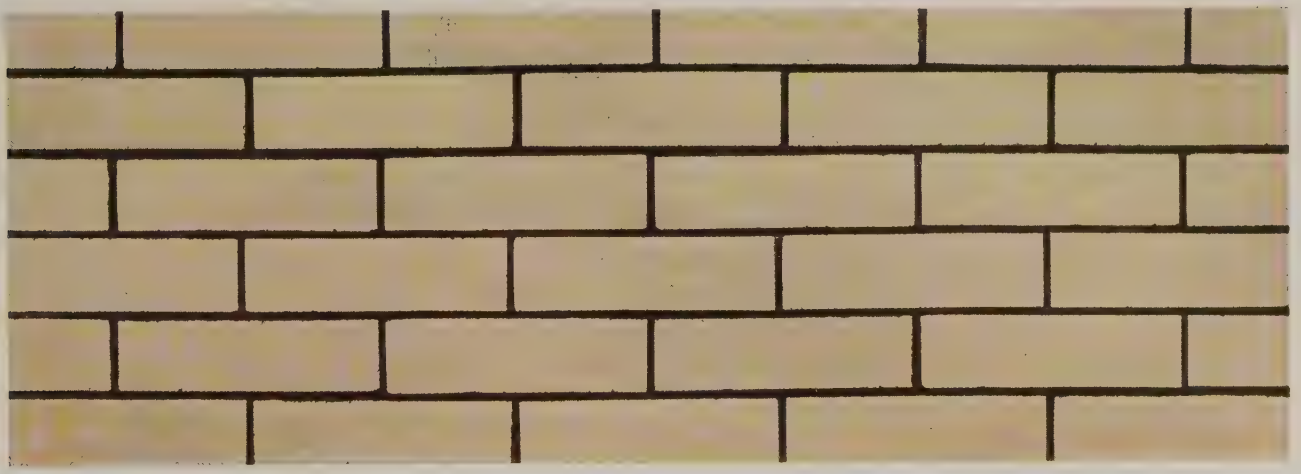
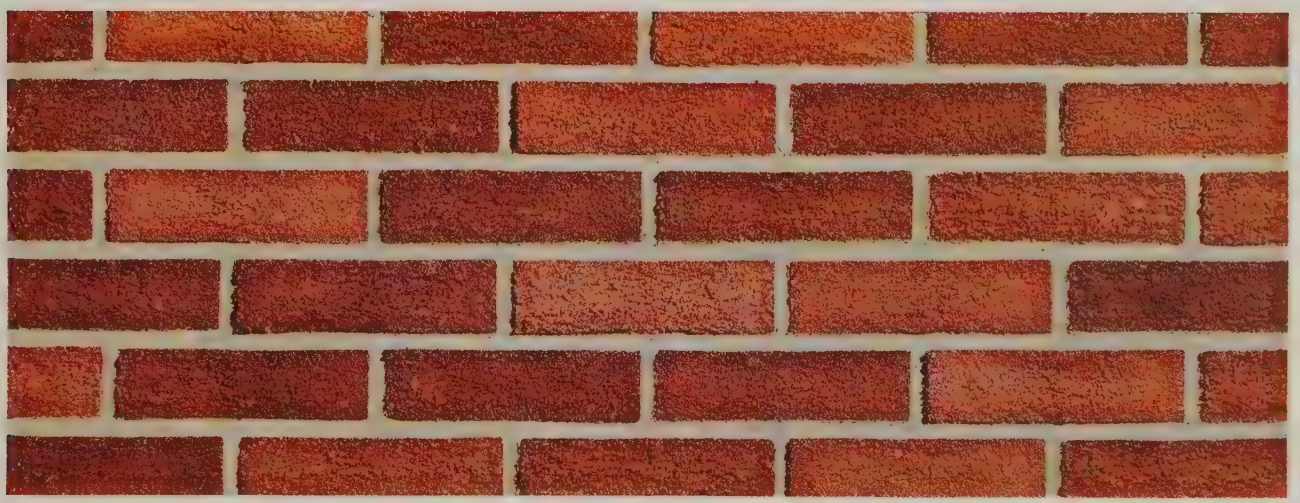


330 Ivory Smooth Buff—uniform shade



455 B & E—50% Light Tangerines, 50% Dark Tangerines
Shade 445—Dark Red Forestblends

455 F—Sycamore Bark. Can be furnished in a light or dark range of shades

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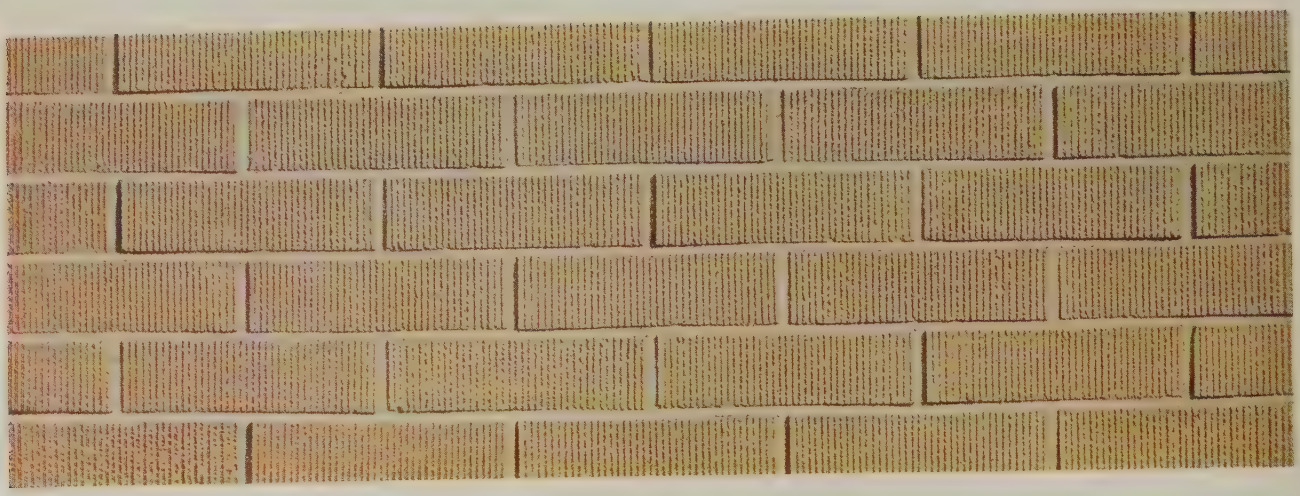
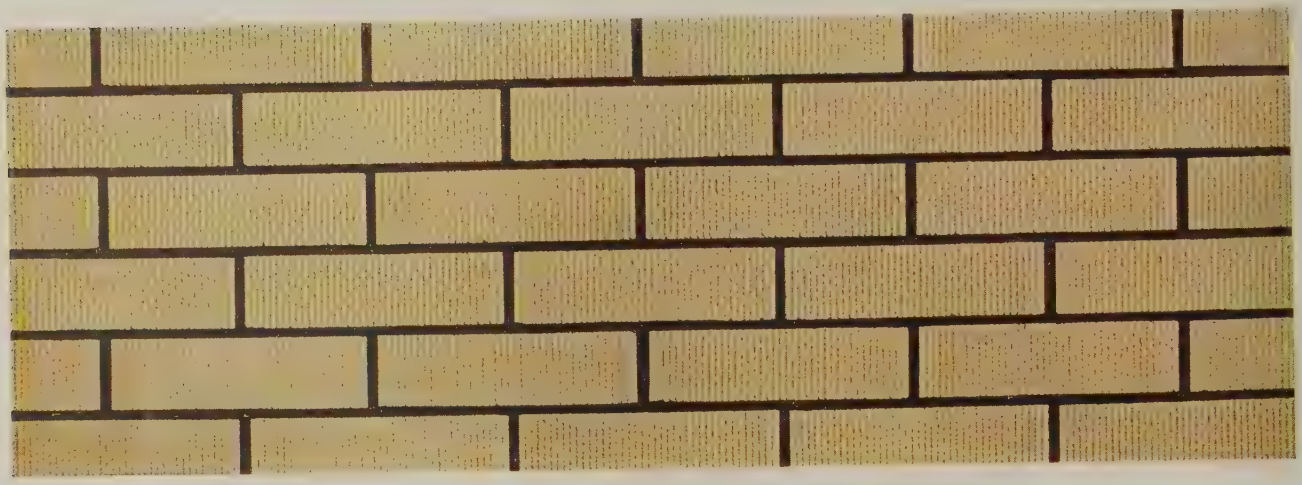
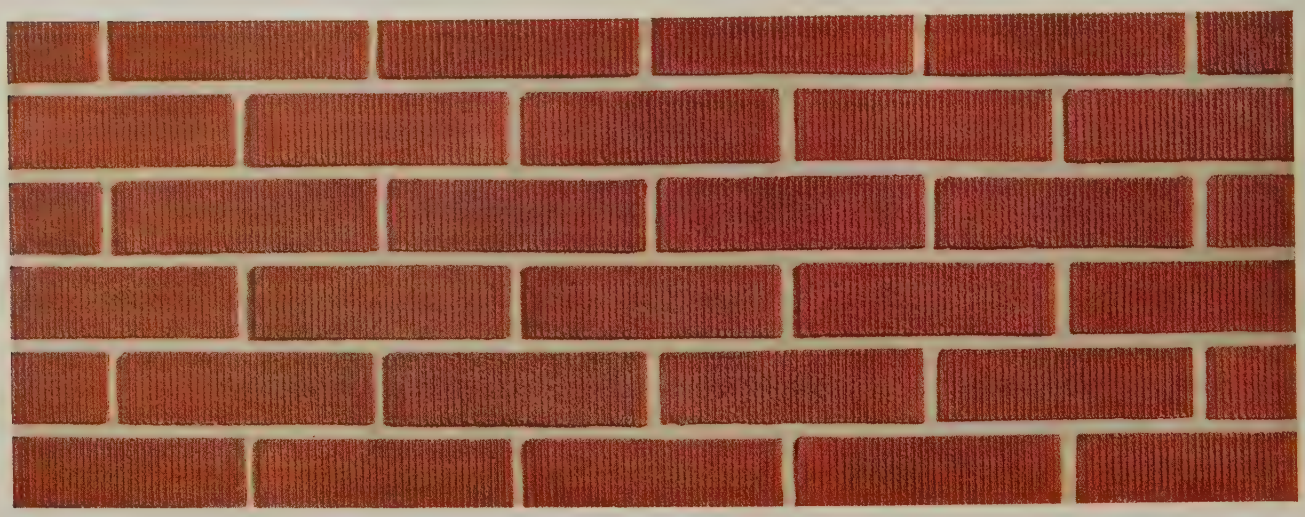


290 Dark Golden Buff—uniform shade



230 Finzer Ivory Buff—uniform shade



145 Finzer—Dark Reds

FISKE & COMPANY, INC.

Manufacturers of Face Brick—Sole Manufacturers of "Tapestry" Brick

115 Federal Street
BOSTON, MASS.
BRANCH OFFICE: 17 West 46th Street, NEW YORK, N. Y.

Products

FACE BRICK: FISKE MILTON REDS, DARLINGTON GRAYS, "TAPESTRY," "TAPESTRY" ANTIQUES, "CALEDONIAN," and other high grade Face Brick.

Also Fire Brick and Brick Specialties.

Trade Names and Patents

"Tapestry" Reg. U. S. Pat. Off.
"Fiske" Reg. U. S. Pat. Off.
"Caledonian" Reg. U. S. Pat. Off.

To protect our customers against substitution of inferior products, these trade-marks are branded on our bricks.

"Darlington Gray"

A beautiful smooth surfaced brick, gray with large or small manganese specs as desired. Furnished in uniform shades of clear gray (tunnel kiln) or in a wider range with flashed brick (coal-burned). Fiske "Darlington Grays" with the distinctive gray background they offer are increasingly popular.

Fiske B. F. 5

This is another tunnel-kiln brick furnished in a clear shade of a delicate cream buff.

Fiske B. F. 43

The same brick as the B. F. 5 with a slight color range towards the clear gray.

"Fiske" Brick

A face brick with smooth face in grays and buffs, or end-cut rough texture in full range of colors and clear reds.

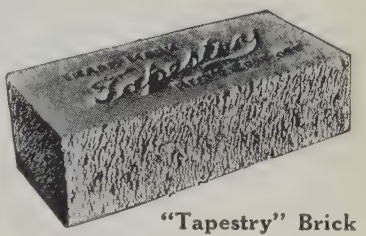
"Caledonian" Brick

A horizontal rough texture side-cut face brick burned to either clear colors or a range of shades.

"Tapestry"

This brick is too well known to the architectural profession to require detailed description. Its rough texture, end-cut face and flashed shades have become so popular that in many instances the name "Tapestry" has been applied to all brick approaching this description. Architects know that there is only one "Tapestry" Brick—that to get "Tapestry" Brick color effects "Tapestry" Brick must be used.

To protect both the architect who is building for distinction and the owner who takes pride in having the best, we mark each brick with the name "Tapestry."



"Tapestry" Brick

"Tapestry" Antiques

A variation of Fiske "Tapestry" Brick. These are, as the name applies, irregular bricks that might have come from an old English wall. Their shape and extra-flashed colors make "Tapestry" Antiques ideal for certain work.

Fiske Brick Colors

Fiske colors cannot be copied.

Individual deposits of raw material, expert, specialized firing, painstaking selection for shade and range make possible brick that no one else can duplicate. By the same token your order with Fiske can *always* be duplicated. An example of this is shown in the addition to the Union Trust Company of Providence, R. I., now being built (July, 1928) where the architect, George Frederick Hall, is matching Fiske Brick he used when he built the original structure 21 years ago.

Fiske Service (Since 1864)

Fiske service starts with the order and follows through till the final brick is laid. With large plants and unequalled facilities for filling every order on schedule FISKE & COMPANY, INC., offers the architect a welcome relief from delivery worries. You can count on Fiske Brick being on the job when, as and how you want them.

"The Black Brick Building," American Radiator Company, New York, N. Y.

Architectural Brick Development

FISKE & COMPANY, INC., has pioneered so many innovations in brickwork that it is natural for the architect to look to us for help in developing new brick. As was the case when Fiske co-operated with Raymond B. Hood in developing the now famous Fiske black brick for American Radiator building.

We can be of material assistance in working out new effects in brickwork. In view of the vogue of color which is sweeping the country such co-operation should be of unusual value to the architect who is seeking distinction in his brickwork.

View of a Fiske Tunnel Kiln

THE GREENDALE BRICK COMPANY

Manufacturers of "Greendale" Face Brick

General Offices: LOGAN, OHIO

DISTRIBUTORS

ATLANTA, GA., B. Mifflin Hood Brick Co.
BOSTON, MASS., Parry Brick Co.
BUFFALO, N. Y., John H. Black Co.
CHICAGO, ILL., Wisconsin Lime & Cement Co.
CINCINNATI, O., Cincinnati Builders Supply Co.
CLEVELAND, O., Cleveland Builders Supply & Brick Co.
DETROIT, MICH., Frederic B. Stevens, Inc.
KANSAS CITY, MO., Nicholson Clay Products Co.
MILWAUKEE, WIS., Wisconsin Face & Fire Brick Co.
NEW YORK, N. Y., O. W. Ketcham
PHILADELPHIA, PA., O. W. Ketcham
PITTSBURGH, PA., Martin Brick Co.
ST. LOUIS, MO., McEwing & Thomas Clay Products Co.
WASHINGTON, D. C., O. W. Ketcham

and in all leading cities

Product

A complete line of Face Brick sold under the trade name "Greendale". Suitable for every type of construction from the simplest bungalow to the most elaborate office building or public structure.

"Greendale"
TRADE MARK
FACE BRICK

Characteristics

"Greendales" are made from clays of unusually high and uniform quality, mined on our own properties. "Greendales" are thoroughly burned, vitrified, and retain their original beauty. Age and weathering only serve to enhance their beauty. They can be obtained in an unlimited variety of color tones ranging through various shades of red, buff, brown and gray. "Greendale" brick are assorted in uniform shades and can be blended in any percentage. The popularity of "Greendale" Brick is widely recognized because of their distinctive texture and wonderful color harmony.

"Greendale" Rug Brick

The texture of the "Greendale" Rug when laid in a wall gives the appearance of the soft and alluring color tones of a Turkish or Persian rug.

Shades — No. 72 Light Ivory; No. 74 Cream; No. 76 Light Buff; No. 78 Medium Buff; No. 80 Dark Buff with pinkish cast; No. 86 Flashed Grayish Brown; No. 88 Light Brown, tan cast; No. 90 Medium Brown; No. 92 Dark Brown; No. 94 Gun Metal.

"Greendale" Semi-Smooth

This is a new and unusual texture and is the result of much study and experiment to meet the insistent demand for a brick in the large cities which will resist the effects of smoke and dust and still produce a light wall effect. The texture is sufficiently rough so as not to give a wall the glaring effect of a smooth brick, but still removes the objection which many architects and owners feel toward the use of rough texture brick.

"Greendale" Red Rug Brick

Manufactured from selected shale and burned to a rich Burgundy Red. Manufactured for blending purposes only and not offered for sale as a straight line.

"Greendale" Blends

Pontiac Potpourri — A combination of gray, brown, gun metal and red Rugs; especially appropriate for certain types of churches, apartments and residences. Color card on request.

Seville — A blend of "flashed" grayish brown shades which can be readily adapted to Spanish types of architecture. This blend produces a light wall effect yet the colors are neutral to dust and dirt. Color card on request.

561 Full Range — A blending of all clear burned Rug shades running from light ivory to dark buff. Natural cement or buff mortar color is very appropriate with this blend. Illustration on opposite page.

563 Full Range — A blending of all "flashed" Rug shades running from gray to gun metal. Effective when laid in natural cement or double strength chocolate mortar with raked joints. Color card on request.

Cordova Blend — A blending of colors ranging from light ivory through various tones of gray, buffs, pinkish hues and light tans. A vast assortment of shades beautifully blended. Illustration on opposite page.

Barcelona Blend — A special array of color in grays, buffs, lavender cast and light tan. Distinctive in appearance and unique in effect.

Knickerbocker Blend — Comprising an extremely wide color variation through all the shades of gray and buff into tans and light brown. Very striking and unusual.

261 Full Range (Semi-Smooth) — Is furnished in the same range of color as the 561 Full Range. (See color illustration on opposite page.) However, this color range can be modified by leaving out the lighter or darker shades so as to give a more uniform effect.

262 (Semi-Smooth)—Harmony of color and quiet in wall effect, is this "Greendale" Semi-Smooth shown in illustration on opposite page. The color range can be modified to suit the particular taste.

Plant and Facilities

"Greendale" Face Brick is manufactured at Greendale, Ohio, in one of the largest individual plants in the country. The tract consists of about 2200 acres containing deposits of rich clay ideally adapted to the manufacture of superior face brick. A tunnel kiln recently completed gives a capacity of about 32,500,000 bricks annually. Large production and central location insure prompt and efficient service.

Information

"Greendale" distributors will be found in the principal cities where displays of brick may be seen and literature obtained. Samples are also on display at the Architects Samples Corporation, New York City. Inquiries addressed to our general offices at Logan, Ohio, will receive immediate attention. Samples and color cards on request.

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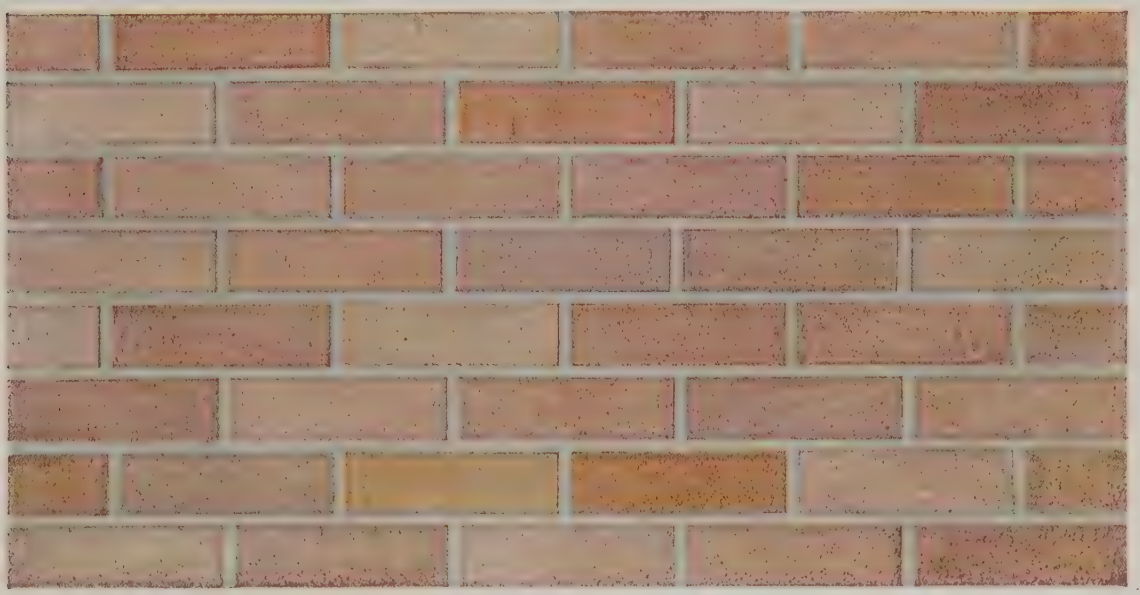
"Greendale" Cordova

A remarkable color range combining rare beauty, warmth and charm.



"Greendale" Shade 262 (Semi-Smooth)

An unusual texture produced in color tones particularly adapted to large structures.

"Greendale" Shade 561 Full Range

A wall of this shade is a study in masonry with every harsh feature common to other light brick eliminated. The same colors are produced in Semi-Smooth texture.

ESTABLISHED 1893

HANLEY COMPANY

Tunnel Kiln Face Brick

BRADFORD, PA.

NEW YORK OFFICE: 565 Fifth Avenue

BOSTON OFFICE: 260 Tremont Street

PLANTS: BRADFORD, PA., SUMMERVILLE, PA.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

All shades and textures of FACE BRICK in red, gray, buff, brown, golden, tangerine, manganese spot and white. In uniform shades or any blend or color combination desired. Court Brick, Imported Face Brick; Red Floor Tile.

TRADE-MARK

Hanley Face Brick—Available in All Colors and Textures

"Bradford Reds"—(a) Even shades in deep cherry red to a light red; available in dry press or wire cut. (b) Rich range of colors including greens, browns, tans, blues and reds. Also "Russets," a new blend containing ⅔ browns, tans, reddish tans and ⅓ red.

Hanley Buffs, Grays, Whites, Browns, Goldens, Tangerines—(a) Even shades in buff, gray, white, cream, brown, tangerine and golden. (b) Blends of practically any percentage of these colors which are desired to fit the architect's scheme for color.

Made in what is believed to be the largest and most modern tunnel kiln face brick plant in the world, these brick approach perfection in face brick, due to the unique process by which they are made. In the tunnel kiln process which was initiated in a practical way by the HANLEY COMPANY in 1921, and refined in 1925, brick are no longer burned in the beehive type of kiln with its large amount of manual handling and its resultant poor mechanical quality and heavy breakage.

Characteristics—Hanley Face Brick are made by a new process, introduced and developed by the HANLEY COMPANY, by virtue of which colors are predetermined and mixed to suit the architect, in contrast to the old type of brick plant which obtains a standard range of colors and does not have control over the percentage of shades and colors to be included in the blend. This ability to exactly mingle colors to order is a big step forward in the color possibilities of face brick, as any color combination can be chosen to blend with the roof, trim, shutters, entrance and landscape.

Court Brick

The practice of using "court brick" for light reflecting purposes in the tall structures being erected today, is growing with the increase in tall buildings. An additional usage for Hanley Courts is for basement interiors where, in 4-in. walls, both sides of the brick are exposed.

The Hanley Court Brick deserves special mention. It is not a discolored by-product, but is guaranteed to be free from dark headers or "flashings," mechanically an excellent product, and easy to lay. Hanley "Courts" will give a light wall effect far superior to that ever before offered.

Imported Face Brick

These handmade brick have received a widespread welcome from the leading residential and apartment architects in the country. They combine the non-mechanical features of imported brick with the soft, gently blending hues of yellow, orange, tan and red. Their use has been largely in suburban work where the color blend with shrubbery is very effective.

Red Floor Tile

Flawless surface, deep rich red color and impenetrable hardness are features which make Bradford Floor Tile distinctive. Made regularly in the following sizes and weights:

3x3 in., .55 lb. each; 3x6 in., 1.1 lb. each; 6x6 in., 2. lb. each; 4x4 in., 1.14 lb. each.

Territory Served

Due to the exceptionally high quality of Hanley Face Brick they are shipped to a wide territory, the Bradford Reds being sold regularly in thirty-two States east of the Rockies, whereas the white, gray and brown brick are distributed to an even wider territory.

Facilities

The name "Hanley" is a guarantee of the best products that 35 years' experience can produce.

Two of the most modern face brick plants in the world built on the *tunnel kiln principle,* enable us to promptly deliver red, gray and buff face brick in any quantity and in a number of distinctive types of smooth and rough texture.

Architects in thirty-two States have placed their confidence in Hanley products and have learned to depend on the character, reputation and stability of this progressive manufacturing concern.

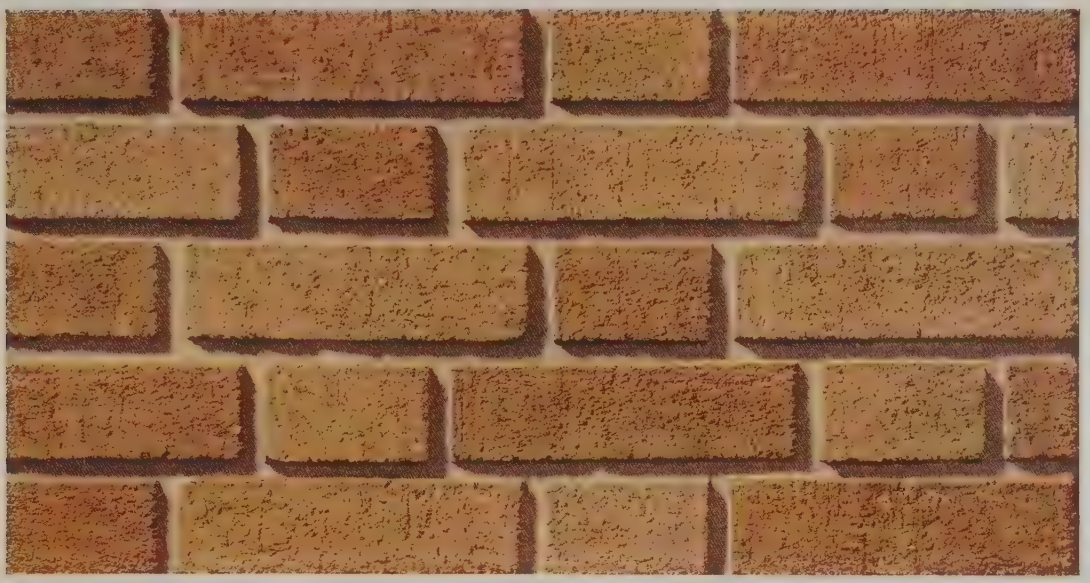
CHART OF STANDARD SHADES

Colors	Smooth wire cut	Vertical texture	Matt texture	Smooth dry press
Chocolate brown	.....	121	131	.....
Copper brown	.....	121B	131B	.....
Tangerine	.....	122	132	.....
Indian tan	.....	122B	132B	.....
Golden gray	113	*123	133	.....
Buff	114	124	134	.....
Buffish gray	115	125	135	.....
Manganese gray	116	*126	136	.....
Flashed golden gray	116S	.....	136S	.....
Maganese medium spot	116M	.....	.....	.....
Manganese large spot	116L	.....	.....	.....
Natural gray white	119	*129	139	.....
Dark cherry red	12	†21	†31	2
Cherry red	13	22	32	3
Medium red	14	23	33	4
Light red	15	24	34	.....

*Texture rolled in.

CHART OF STANDARD BLENDS

Blends	Smooth wire cut	Vertical texture	Matt texture	Remarks
POLYCHROME BLENDS:				
(1) Black, Blue, Brown and Red	.....	A-V	A-M	
(2) Black, Blue, Purple, Olive Green, Red Hearts, Red and Brown	.....	.....	B-M	
(3) Green, Brown, Red Hearts and Red	.....	.....	C-M	
RUSSETS:				
(1) ⅔ Brown, Tan, Reddish Tan; ⅓ Red Hearts and Red	.....	.....	Russets	
MOORISH BLENDS:				
(1) 25% Flashed Golden Gray; 25% Golden Gray and 50% Manganese Gray	N-S	.....	N-M	*Note:* Any of shades from 113 to 139 may be blended in any proportion desired.
(2) 50% Chocolate Brown and 50% Tangerine	.....	W-V	W-M	



WM Moorish Blend

A mixture of 50% Chocolate Brown and 50% Tangerine in a Matt texture. An ideal color combination for Spanish residences

NS Moorish Blend

A mixture of Gray and Golden colors in a smooth texture. A blend developed for large jobs where a range of color is desired with a gray background

Russet Blend

A mixture of Browns, Tans, Olive Green and Red used largely for suburban residences and apartment buildings where the colors blend with the tints of the Summer and Autumn foliage

HYDRAULIC-PRESS BRICK COMPANY

Manufacturers and Distributors of Hy-tex Brick

ST. LOUIS, MO.

BRANCH OFFICES, EXHIBIT ROOMS AND DISTRIBUTING CENTERS

BALTIMORE, MD., Munsey Building
CHICAGO, ILL., Builders' Building
CLEVELAND, OHIO, P. O. Box "Station B"
DAVENPORT, IOWA, Putnam Building
DUBOIS, PA., Deposit National Bank Building
INDIANAPOLIS, IND., Board of Trade Building
KANSAS CITY, MO., Rialto Building
MINNEAPOLIS, MINN., Wunder, Klein, Donohue Co., Representatives, Baker Building
NEW YORK, N. Y., Fredenburg & Lounsbury, Representatives, Architects Building, 101 Park Avenue
OMAHA, NEB., Woodmen of the World Building
PEORIA, ILL., Lehmann Building
PHILADELPHIA, PA., Otis Building
ROSEVILLE, OHIO
WASHINGTON, D. C., Colorado Building

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES

Hy-tex Brick

The Standard of Quality in Brick
TRADE-MARK

Products

The Hy-tex Brick line embraces: Face Brick, Enamel Brick, Salt Glaze Brick, Equitable Brick, Paving Brick, Common Brick and Hollow Building Tile, Swimming Pools and Brick Mosaics.

Hy-tex Face Brick

The Hy-tex color range runs in face brick from the lightest colored creams, grays and buffs to the darkest reds and browns in smooth, semi-smooth and rough textures. It offers literally hundreds of various tones in the gray, buff and red basal colors. No matter what your requirements, whether for exterior or interior use, you will find in the Hy-tex line just the brick you want.

Specialties

Hy-tex Enamel Brick—Hy-tex Enamel Brick are unapproached in quality and durability by any similar brick of domestic or foreign manufacture. The "double-burn" process, an improvement over European methods, used exclusively in manufacturing Hy-tex Enamel Brick, eliminates the uncertainties present where the enamel is spread on the green brick and both are burned together with practically no control over varying fusion points, unequal expansion and impurities burning out as bubbles in the glaze.

Hy-tex Enamel Brick in the White and Ivory shades are absolutely opaque. Hy-tex Enamels will not craze, peel or discolor under the severest climatic tests, as proved by the experience of exacting architects in all parts of the country. They are made in White, Ivory, Green, Brown, Blue, Jade, Black, Transparent Speckled Buff, Transparent Speckled Brown, and are used extensively for facing large office buildings, theaters, stores, etc., as well as for hospitals, corridors, schools, gymnasiums, laundries, restaurants, bake ovens, garages, engine rooms, outdoor and indoor swimming pools, etc.

Hy-tex Enamel Court Brick are in every way the same brick, as to make and durability, as Hy-tex Enamels, except that, in sorting for first quality, these have been set aside because of slight surface defects which are not noticeable in courts or areas. Unless closely examined, they make the same appearance as Hy-tex Enamels and render exactly the same service. They have been used in many large buildings with complete satisfaction.

Hy-tex Salt Glaze Brick—Hy-tex Salt Glaze Brick, ranging from light straw to golden brown, as illustrated on next page, permit walls of light, medium, dark or mingled shades. Samples on request. The salt glaze, which forms an integral part of these brick, will not scale or peel under the most severe conditions, and is proof against moisture, dust, smoke, stains, germs, and even acids. These are widely used as exterior brick in business, wholesale and industrial sections of cities, and for interiors where light reflection, and bright, clean, sanitary surfaces are desired or necessary, as in corridors, stairways, vestibules, wainscots, light courts, gymnasiums, toilet rooms, engine rooms, food factories, garages, etc. The cost of Hy-tex Salt Glaze Brick closely approximates that of plastered and painted common brick, while its maintenance cost is less.

Two new shades, Ivory and Green Salt Glaze, have been added; samples on request.

Hy-tex Equitables—This brick was originally created for the *Equitable Building* in New York City, and has since been available in white and grays in various speckled effects. They present a smooth impervious surface and wash with the rain to their original clean appearance; and do not craze, scale or discolor under the severest climatic conditions. Suitable for both exterior and interior requirements.

Facilities

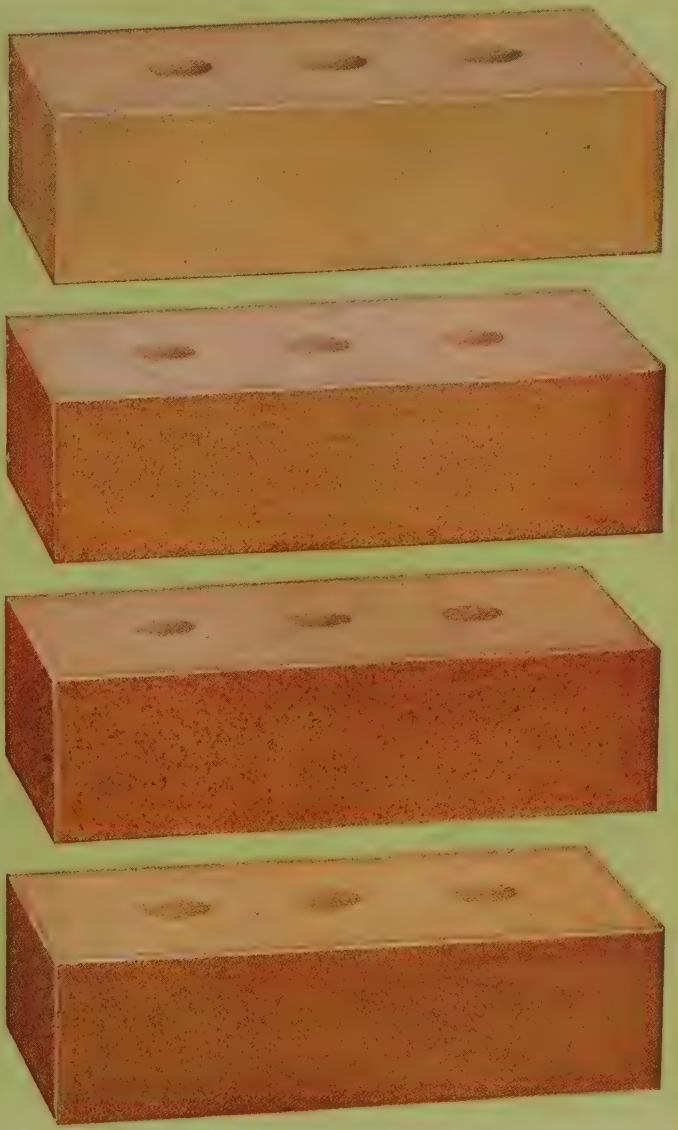
For over half a century the Hydraulic-Press Brick Company have been building the reputation which Hy-tex products enjoy today. During that time the Hy-tex organization has grown from one to twenty-two plants, scattered through the eight great clay-producing states. Branch office and agency distribution insures prompt and efficient service in all parts of the country.

Literature

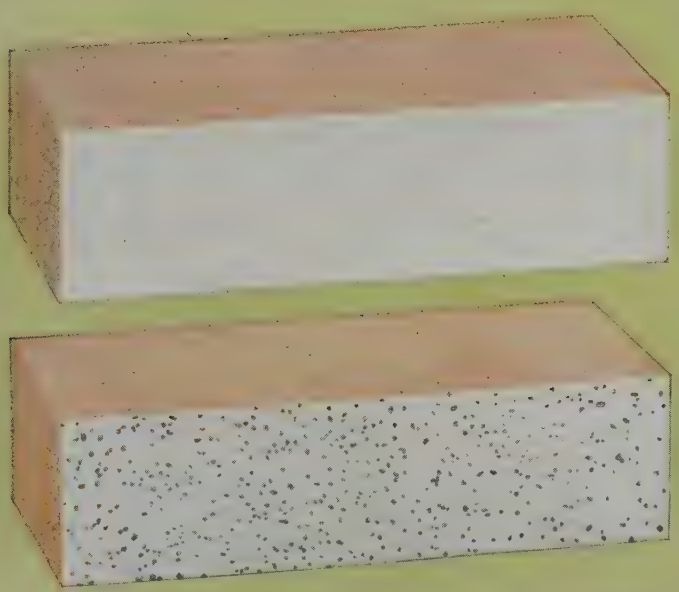
This Company has issued booklets on Hy-tex Brick, Salt Glaze Brick, Hy-tex Enamel Brick and Equitable Brick; Brick Scales and Tables, a ready and convenient method of determining the number of courses and joints in all brickwork; Color Cards, and other material. For any of the above, apply to nearest branch office.

Continued on next page

Hy-tex Enamel Brick
Top to bottom—White, Ivory, Green and Brown



Hy-tex Salt Glaze Brick
Top to bottom—Light, Medium, Dark and Brown

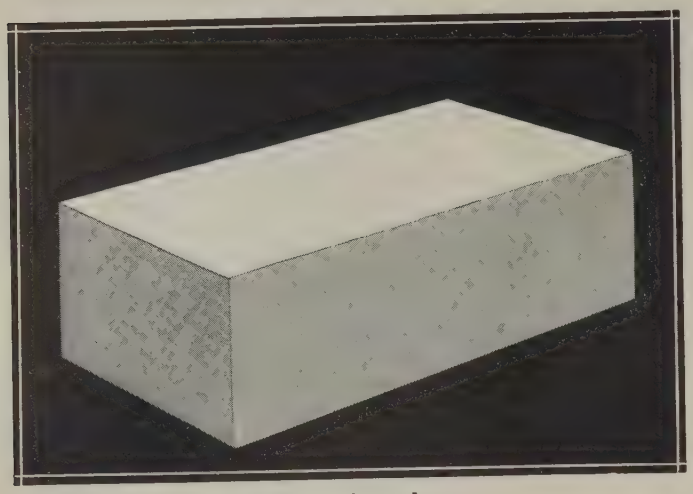


Hy-tex Equitable Brick

Color No. 100
Color No. 130

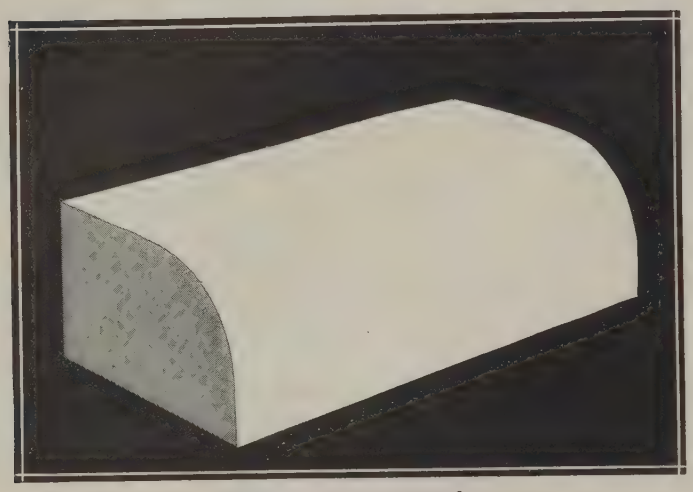
Color No. 110
Color No. 120

Continued on next page

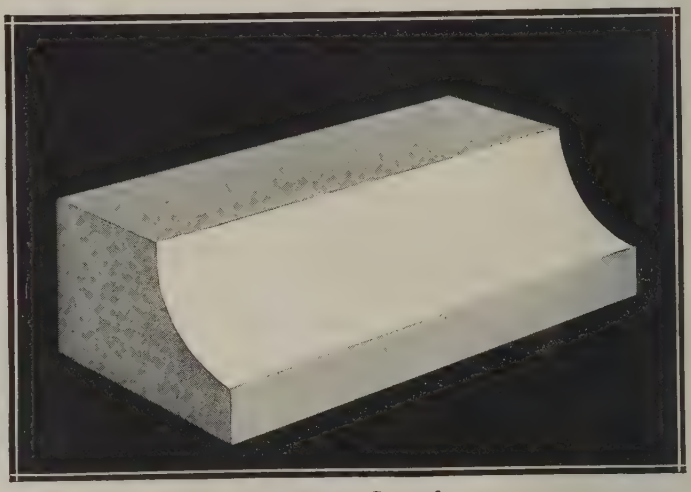


Flatter Stretcher

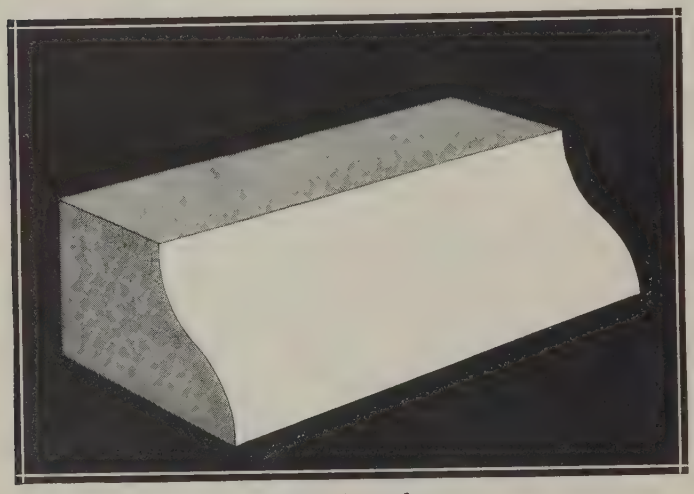
Bullnose External



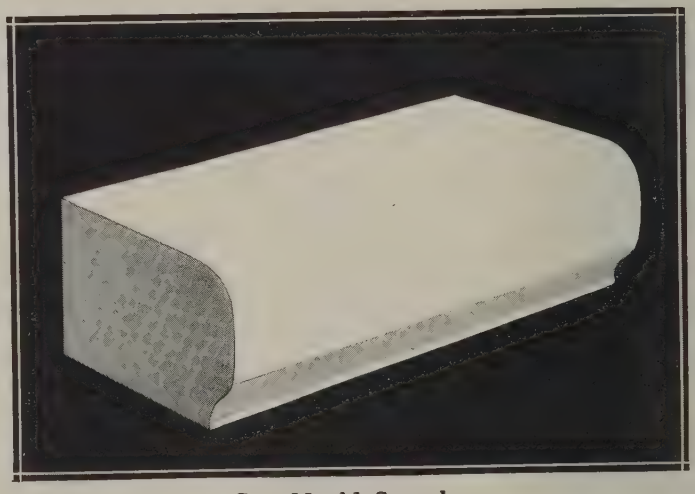
Bullnose Flat Stretcher



Cove Base Stretcher



Ogee Stretcher



Cap Mould Stretcher

Basic Shapes in Hy-tex Enamel Brick

The enameled surfaces and shapes shown here, together with the stretcher shown in the color group, form the seven basic shapes in Hy-tex Enamel Brick. The series is completed by furnishing for the plane surfaces the stretcher and flatter, the quoins, headers, and the over- and under-dipping of the abutting surfaces—either wholly or in part.

For the moulded shapes, in addition to this over- and under-dipping which may be necessary to cover conditions arising in use, there are provided the complementary brick essential to their general use. These are headers, internal and external angle brick, returns and stops.

For detailed information, showing the various brick and combinations thereof, refer to shape book issued by this Company.

THE METROPOLITAN PAVING BRICK CO.

Manufacturers of "Metro" Face Brick, Paving Brick and Hollow Tile

CANTON, OHIO

EIGHT PLANTS—CANTON, OHIO; MINERVA, OHIO; BESSEMER, PA.; OLEAN, N. Y.

Representatives in Principal Cities

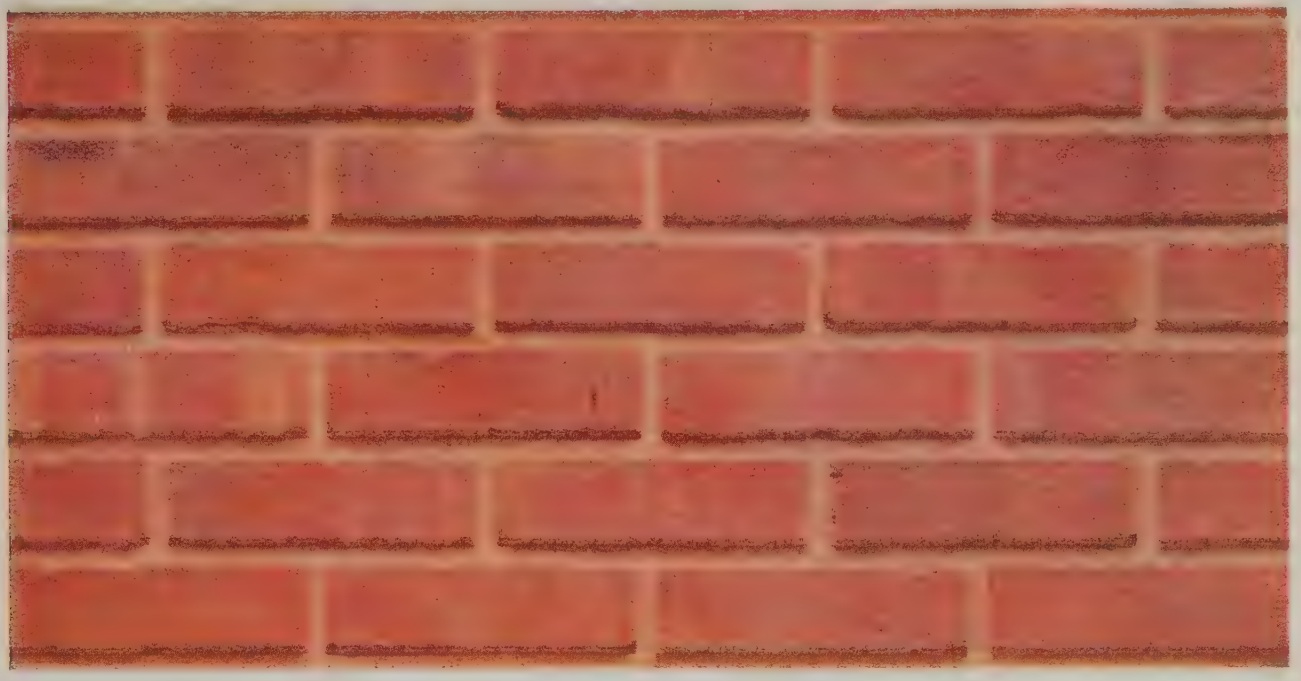
Products

"METRO" FACE BRICK
"Metro" Paving Brick and Hollow Tile.
"Metro" Vitrified Floor System for Trickling Filters.

"Metro" All-Purpose FACE BRICK

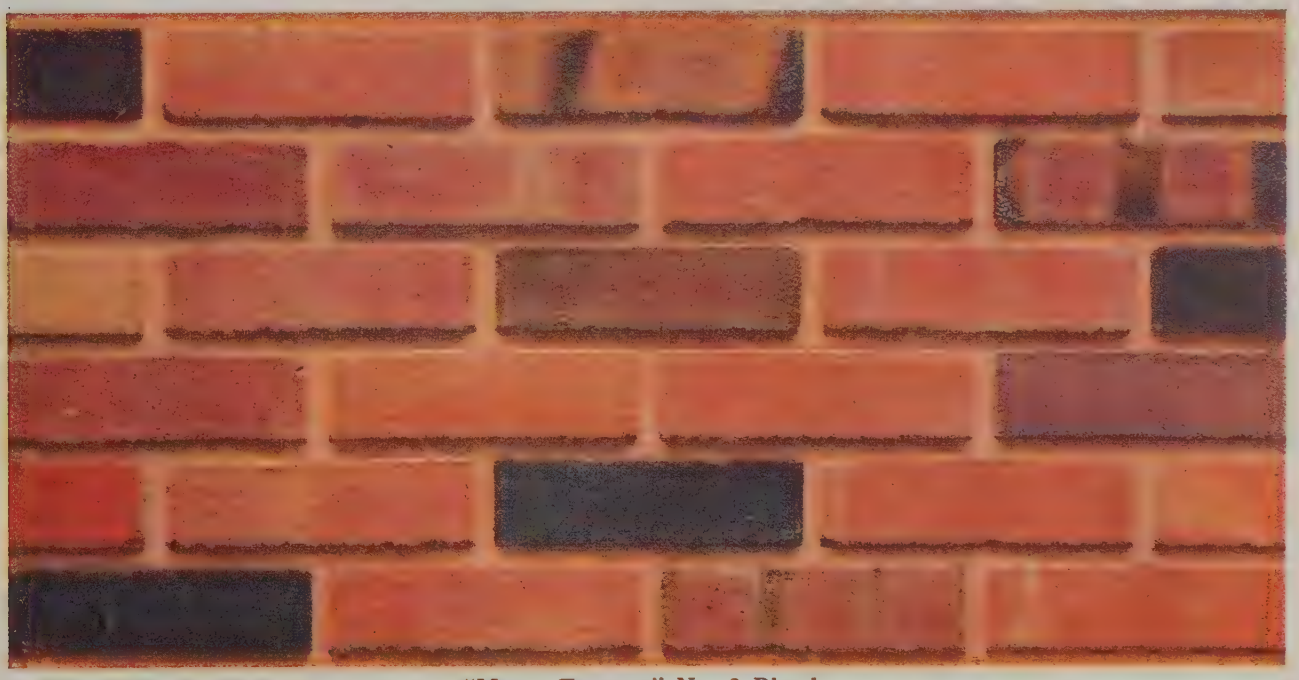
Samples

Samples of "Metro" products gladly furnished on request.



"Metro Taverns" No. 1 Blend

These brick are semi-smooth and impervious. The color in this brick made it popular for large operations for fine tone effects. No glaze and remains clean.



"Metro Taverns" No. 2 Blend

When a mingled effect is required in a semi-smooth impervious brick, we offer the above. Suitable for Dutch Colonial, English and Colonial types.

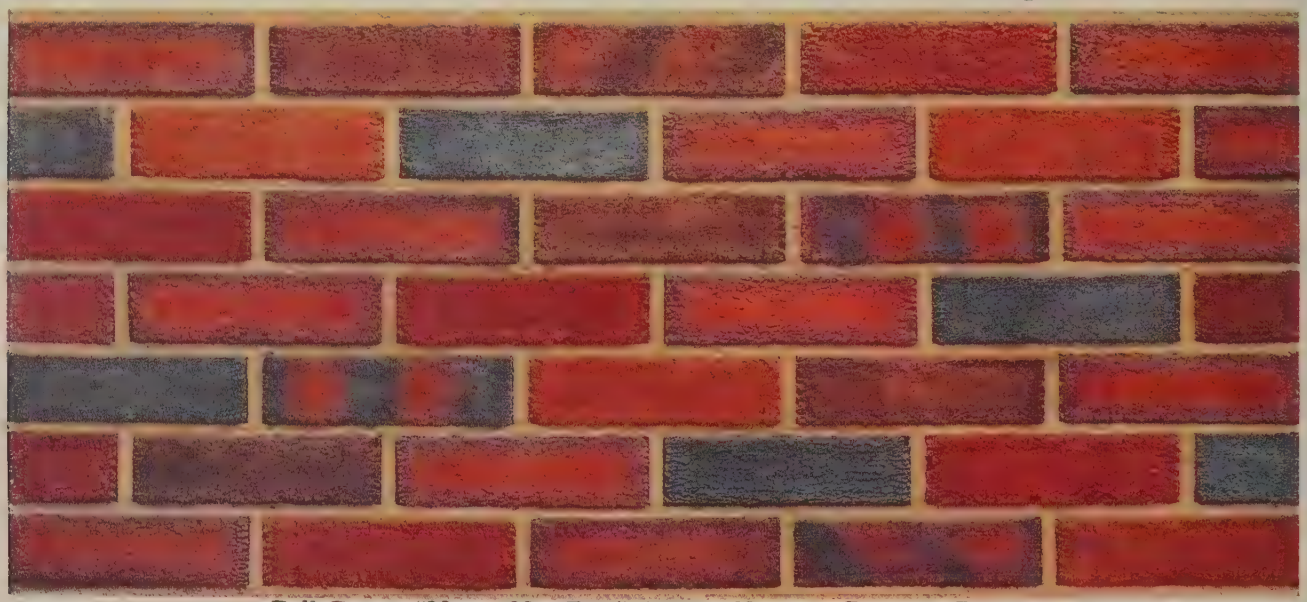
Continued on next page

"Metro Taverns" No. 3 Blend

Soft pastel shades produced on these semi-smooth brick give them a distinct Architectural appeal.

"Metro—English Art"

Delightful rough wall effects are obtainable with this brick. The undulating lines together with the light and shadow effects, produce a wall full of life and movement that is so desirable for exclusive work. Roughness or color as desired.



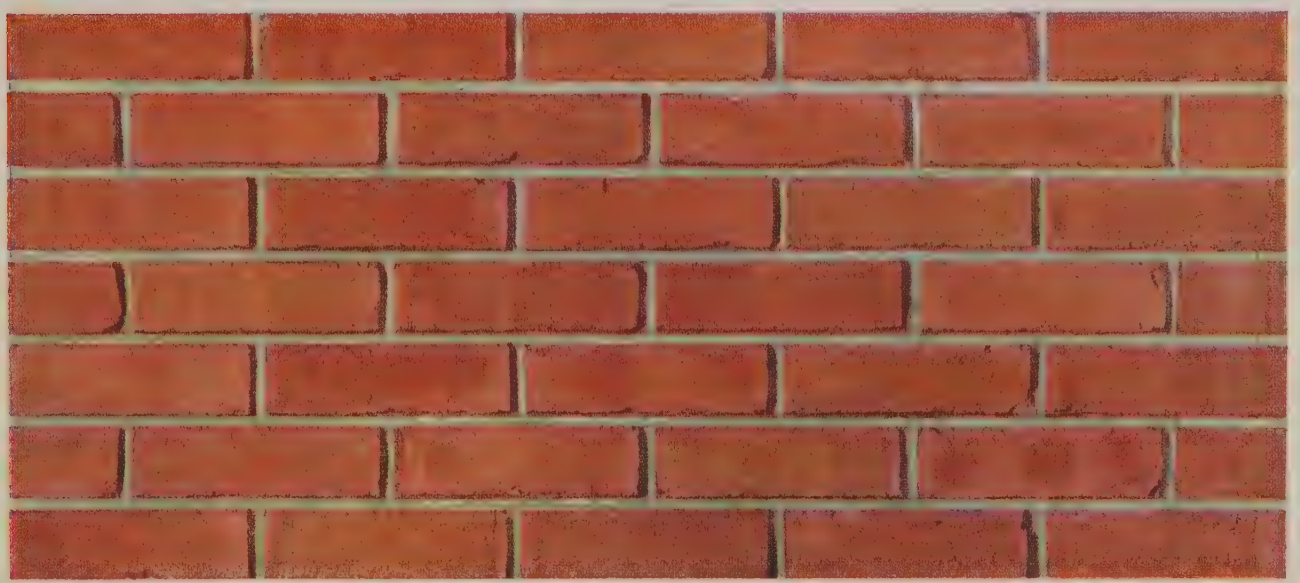
Full Range "Metro Mat-Tex." Shades Nos. 130-F to 180-F

We guarantee to ship any shade, percentage or mixture selected from the above, to produce any Architectural effects. Percentages can be varied, shades eliminated, at your discretion.

Continued on next page

Recent Operations:

The Barbizon, New York.
Gramercy Park Building, New York.
Alden Park Manor, Philadelphia.
Home for Aged, Syracuse, N. Y.
New York Central Station, Youngstown, Ohio.
Hotel Roosevelt, Pittsburgh.
Hotel Allerton, Cleveland.
Morrell Street Power House, Detroit.
The Cloisters, Chicago.
Mineola School, Mineola, L. I.
Firestone-Apsley Bldg., Hudson, Mass.
Pharmacy College, Albany.
Broadway Junior High, Toledo.
Eagles' Temple, Canton, Ohio.
McKelvey Residence, Youngstown, Ohio.
Case School, Cleveland, Ohio.
State Armory, Chillicothe, Ohio.
Puritan Telephone Building, Detroit.
Spicer and Rankin Schools, Akron, Ohio.
Newport High School, Newport, Ky.
Unitarian Church, Youngstown, Ohio.
Ypsi-Ann Office Building, Ann Arbor, Mich.
Marshall-Field Tenements, Chicago, Ill.
Reid-Murdock Bldg., Chicago, Ill.
Cincinnati Art Museum, Italian Court, Cincinnati, Ohio.
Hinchman Residence (Smith, Hinchman and Grylls), Detroit, Mich.
Parke-Davis Bldg., Detroit, Mich.
Grand River Telephone Bldg., Grand River, Mich.
Willys-Overland Co. Bldg., Toledo, Ohio.
General Motors Bldg., Pontiac, Mich.
Youngstown Hospital, Youngstown, Ohio.
Lomond School, Cleveland, Ohio.
Canterbury School, Cleveland, Ohio.
Biltmore Hotel, Dayton, Ohio.



"Metro" Sand Finish, Georgian, Red Range.
A vitrified shale brick that reproduces the age-old effects of sand-mold brick. Can be furnished also in full range.

"Metro" Smooth Colonial Full Range Mingle—Shades No. 230-F to 280-F
These brick are particularly adaptable to produce English or Colonial effects. The markings, and blend of color, give the weathered effect so desirable on this type of work.

THE MEDAL BRICK & TILE CO.

Manufacturers of Face Brick and Tile

MAIN OFFICE
4900 Euclid Avenue
CLEVELAND, OHIO

PLANTS AT WOOSTER, MALVERN AND CARROLTON, OHIO
DEALERS IN ALL PRINCIPAL CITIES

Products

Medal Face Brick in a variety of colorings and surface textures, including side cut matts, end cut matts, vertical, die cut and sanded textures. Wooster and Carrollton clays produce red ranges of charming variety. Malvern clays afford a brown, buff and ivory color sequence which is available in straight shades or any specified mingling of shades.

Agecrost Oldstyle Brick, for reproducing the effect of antiquity found in classic models of European and Colonial building.

Also Medal Building Tile.

Surface Textures

Medal Brick are furnished in matt textures, vertical textures, and in a die cut as well as the distinctive Agecrost surface, which has been granted a United States patent for originality and merit.

Agecrost Oldstyle Medal Brick

This brick has the general aspect of an early, handmade brick plus the effect of long weathering. The influence of its surface treatment upon color is to soften and harmonize the brilliant colorings of the Medal Range and to increase their richness. The surface is neither acutely smooth nor systematically roughened. Minor irregularities of outline are preserved without extremity or affectation.

Squared or Beveled Edges—Agecrost brick are furnished with squared edges, or with edges irregularly beveled or rounded, thus increasing the scope of effects obtainable by different joint treatments. Either type of edge has exhibited splendid effects with full mortared or recessed joints in white mortar or color. Perhaps the most prized advantage of the beveled brick is the appearance of a smaller face, when full mortared, without departure from standard dimensions. Thus a mixture of squared and beveled brick, full mortared, gives the effect of pleasing variety of size and the appearance of undulation in the mortar line, without disturbing actual bedding levels.

Agecrost Window Brick

These brick comprise more than thirty specials from which to erect window openings for metal casement windows or double hung windows in harmony with the general exterior treatment of the building. The 3/8-in. flange against which the window frame is set gives added security and complete weather protection around the window.

The general design of these windows is based on English precedent, and they afford a consistency not otherwise found in brick construction, as well as marked beauty. Detail drawings are shown for double and single splayed windows, while the lettered illustration on this page is of a simple double splayed window. Variations of these types, including the use of a double mullion for a major division in a large window, will suggest themselves to the architect as soon as he is familiar with the material. Every construction difficulty has been solved and manufacture simplified so that these beautiful, chamfered brick windows can be specified with economy and certainty of result.

Bulletin and blue prints with full details of single, double and bay windows showing suggested application of trim for veneer and solid wall construction for casement or double hung frames, will be mailed to architects on request.

Agecrost Special Shapes

The architect will find many uses for the above window shapes, aside from window construction. Aside from these shapes, we are especially well equipped to execute orders to your own design for specials to construct chimneys, drip moulds, louvers, etc. The Agecrost surface treatment lends itself remarkably well to specials regardless of their shape.

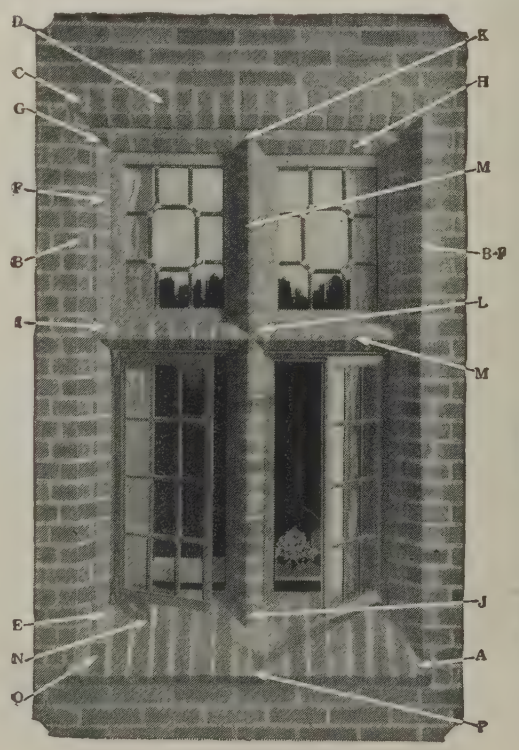
Color Control and Sorting

Medal Brick are offered in a wide variety of colors. An original system of color control is part of the Agecrost technique, yielding a rich assortment of lighter reds, salmons, ochres and orange tints. With these come deep greens, blues and polychromes with dark and medium reds. A separate Malvern range is offered, varying through warm browns into buff and ivory.

All Medal Brick are sorted on coming from the kiln into piles of like color and re-combined in definite color mingles according to specification.

Co-operative Service

Factory representatives in all territories assist Medal dealers to solve special problems. Name of nearest dealer furnished on request.



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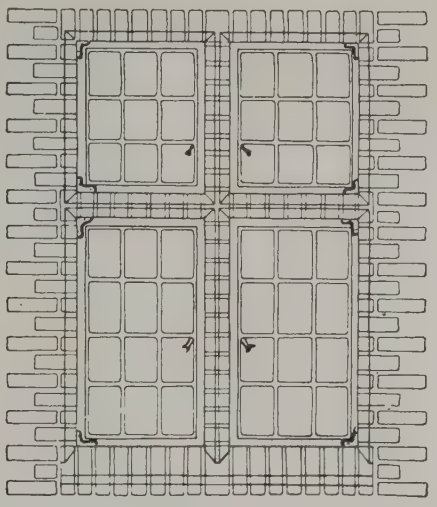
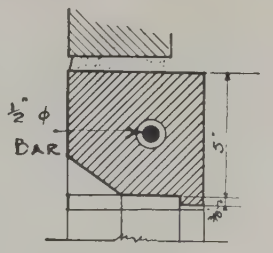
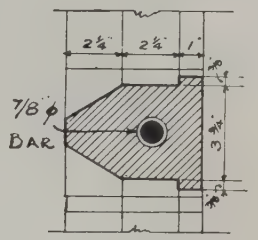
THE MEDAL BRICK & TILE CO.
CLEVELAND OHIO.



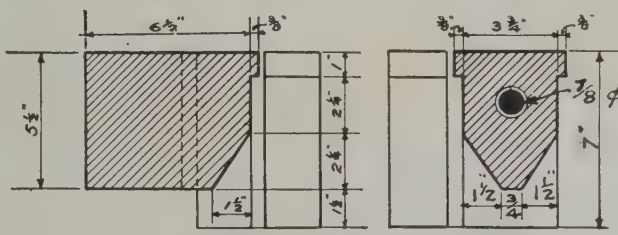
ELEVATION.
SINGLE SPLAY WINDOW.



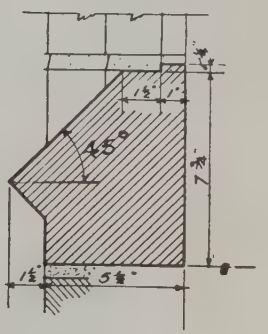
HEAD.



TRANSOM



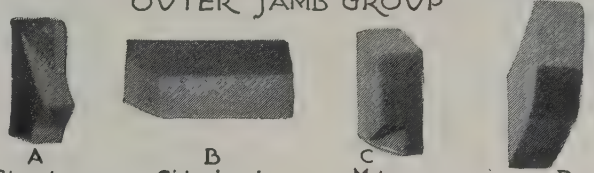
JAMB. MULLION.



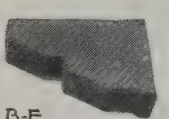
SILL.

FOR DOUBLE SPLAY WINDOW

OUTER JAMB GROUP

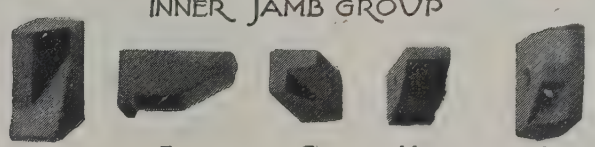


A Starter (Made in R & L)
B Side Jamb
C Mitre (Made in R & L)
D Head Jamb



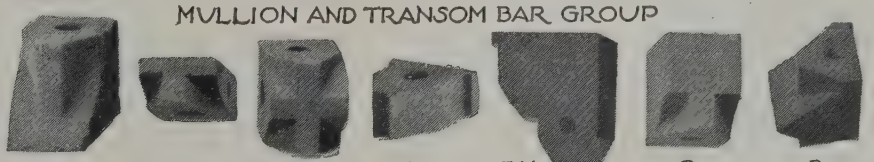
B-F Outer & Inner Jamb Brick

INNER JAMB GROUP



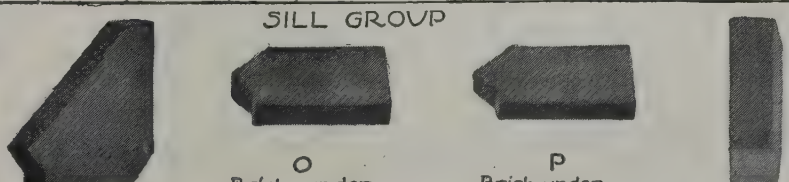
E Starter (Made in R & L)
F Side Jamb
G Mitre (Made in R & L)
H Head Jamb
I Transom Intersector

MULLION AND TRANSOM BAR GROUP



J Starter
K Mullion Head
L Intersector
M Mullion and Transom
F-M Double Splay Mullion
Q Special Mullion Head
R Double Splay Mullion Starter

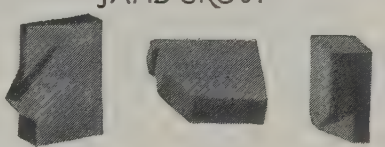
SILL GROUP



N Sill Brick
O Brick under Inner Jamb Starter
P Brick under Mullion Starter
S Octagon

FOR SINGLE SPLAY WINDOW

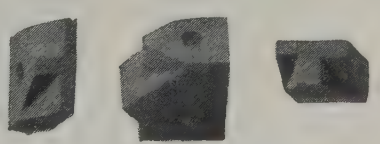
JAMB GROUP



A-1 Jamb Starter (Made in R & L)
B 1 Jamb Brick
C-1 Mitre (Made in R & L)

D-1 Head Jamb
F Side Jamb

MULLION, TRANSOM & SILL GROUP



I Transom Intersector
J-1 Mullion Starter
K-1 Mullion Head

L Intersector
M Mullion and Transom Brick
N-1 Sill Brick

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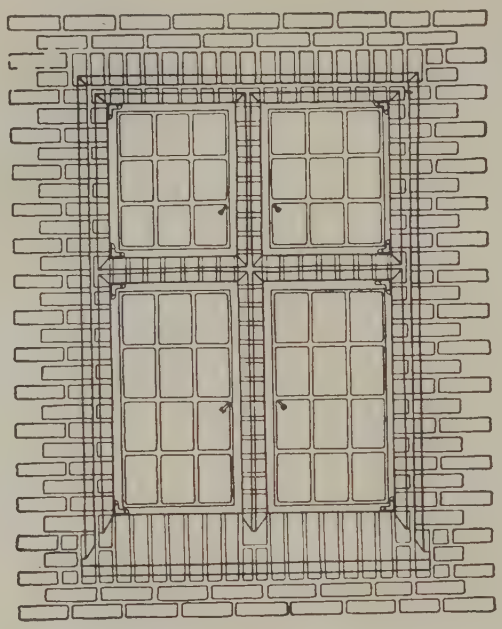
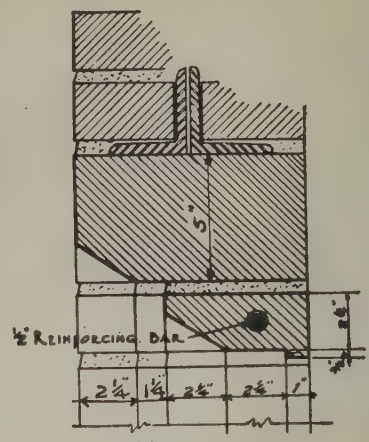
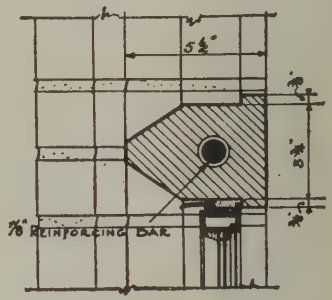
·THE·MEDAL·BRICK·&·TILE·CO:
·CLEVELAND·OHIO·



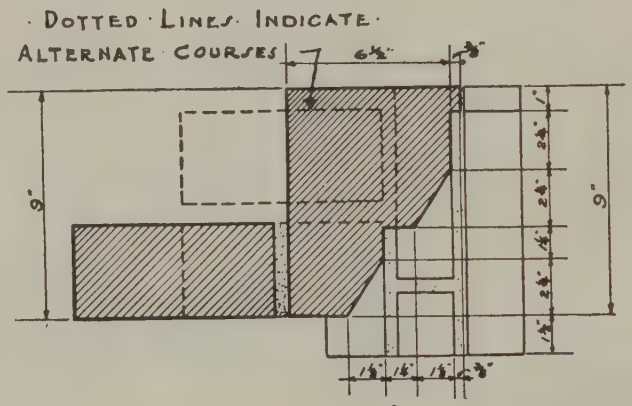
·ELEVATION·



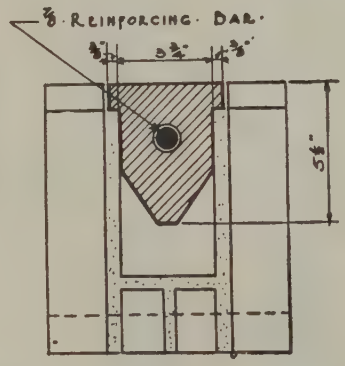
·HEAD·



·TRANSOM

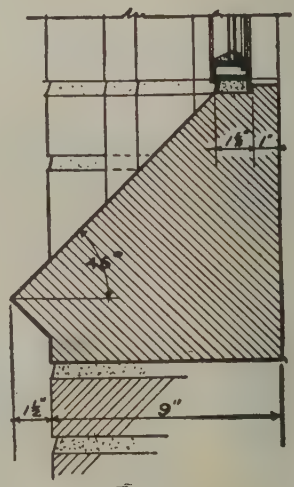


·JAMB·

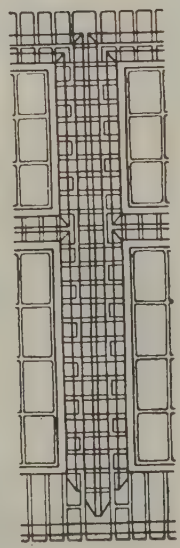


·MULLION·

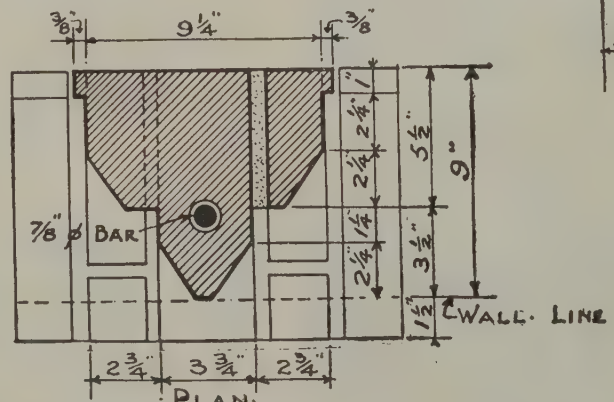
·DOUBLE·SPLAY·WINDOW·



·SILL·



·ELEVATION·
·DOUBLE·SPLAY·MULLION·
·USED·IN·CONNECTION·WITH
·DOUBLE·SPLAY·WINDOW·



·PLAN·
·DOUBLE·SPLAY·MULLION·

·DETAILS·AGECROST·WINDOW·BRICK·

·BRICK·OPENINGS·SHOULD·BE·INCREASED·¼"·IN·
·WIDTH·&·HEIGHT·ABOVE·SIZES·SHOWN·ON·
·CASEMENT·WINDOW·SCHEDULES·

ESTABLISHED 1900

SOMERS BRICK COMPANY

MANUFACTURERS

209 North Missouri Avenue

ATLANTIC CITY, N. J.

Products

"Somers" Variables, Reds, Colonials, Dull Finish Black Headers for Facing; Common Building Brick in the usual range. All brick of standard size.

History

The Somers Brick Company has been producing Sand finished brick by the "Soft Mud" process since 1900. The research and experiments of the company's specialists have achieved unusual results in the production of satisfactory brick for various effects. The wide range of brick produced by this company makes possible the reproduction of the color and texture of the "Colonial" brickwork of our ancestors with surprising accuracy and beauty.

Variables

These brick are just what the name indicates as to color. They are produced in red, black, brown, tan and flashed. A most pleasing and characteristic effect is accomplished by the use of these brick where "something different" is desired.

Reds

A stretcher with a kiln flash and range which produces a beautiful red tone; highly desirable for straight stretcher work. When used in conjunction with dull finish black headers, a "Harvard" effect results.

Colonials

A range of hard red brick, varying in color and shape. Especially well adapted to buildings where English bond with raked joints is to be used. This brick is also particularly suitable for garden walls, gateways and skintled brickwork.

Black Headers

Made with a dull finish to be used with Variables or Reds.

Rough Hard

A sturdy unit for foundations or interior walls with high compressive strength and low absorption.

Light Hard

A hard brick, light in color, very suitable for "backing-up" and guarding against a damp interior.

Production and Shipping Facilities

With a production of 80,000 brick per day and excellent shipping service on the Pennsylvania railroad, the Somers Brick Company is in a position to guarantee prompt delivery and freedom from annoying delays.

Services and Samples

The services of the specialists of the company are freely offered to the members of the architectural profession for consultation as to special effects which may not be covered by our regular production. Samples of brick and any other information gladly furnished upon request.

References

A few representative buildings in which our brick have been used are listed below:

Building	Architect	Kind of Brick
Moorestown Community Center, Moorestown, N. J.	Karcher & Smith	Colonials
Camden County Detention Home, Camden, N. J.	Lackey & Hettel	Reds
Haddonfield Community Center, Haddonfield, N. J.	Lackey & Hettel	Variables
Chalfonte-Haddon Hall Power House, Atlantic City, N. J.	Rankin & Kellogg	Reds
New Jersey Ave. School, Atlantic City, N. J.	Howard A. Stout	Reds
Residence, Northfield, N. J.	Russell A. Schwarter	Variables
City Hall, Ventnor City, N. J.	Vivian B. Smith	Variables
Betty Bachrach Home for Crippled Children, Longport, N. J.	Vivian B. Smith	Reds with black headers

Community House, Moorestown, N. J
Karcher & Smith, Architects

THE STARK BRICK COMPANY

Manufacturers of Stark Salt Glazed Brick

CANTON, OHIO

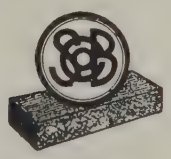
FACTORY, EAST CANTON, OHIO

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Product

STARK SALT GLAZED BRICK.

A smooth standard size (8x2¼x3⅞ in.) fire clay brick, glazed on the face, back and both ends. The glaze is a thin coating of glass fused with the body of the brick, which renders these surfaces impervious.



TRADE-MARK

Because of the ease with which they can be cleaned, Stark Salt Glazed Brick are used for a variety of special purposes, such as the walls of basements, gymnasiums, powerhouses, schools, lavatories, corridors, creameries, food product plants, laboratories, etc.

They can also be used effectively in fireplaces where the glaze makes them easy to keep clean.

Representation

In order to promptly and efficiently care for the needs of our customers, we have appointed agents in all the principal cities of the United States and Canada, who are constantly in touch with the factory.

A line from you will bring prices, samples, literature and any other information desired, from our nearest representative.

Colors

Stark Salt Glazed Brick are produced in a variety of colors. The glaze is applied during the burning process and being transparent, or nearly so, produces a very pleasing effect.

Shaded Brick—Brick as near as practicable a single color. These shades are designated by the following numbers: 50, 55, 60, 75, 80, 90, and 95. No. 50 is the light shade and No. 95 the dark.

Mingled Shades—A harmonious mixture of colors. We have three distinct mixtures as follows:

Gratones—A blend of gray colored brick.

Buftones—A blend of light buff colored brick.

Darctones—A blend of dark buff colored brick.

In addition to the above shades and blends of first quality brick, we have:

Courts—Brick having small defects (mostly handling chips), mingled in shade, light and dark.

Commercials—Brick having larger defects, including factory and kiln marks. This quality is the least expensive and is also free from crooked or warped brick. Mingled in shade, light or dark.

Nature and Uses

The process of cleaning a wall of salt glazed brick is similar to that of washing a window. Soap or washing powder and warm water are all the materials necessary. After washing, the wall should be thoroughly rinsed with clear water to avoid a cloudy effect when dry.

During the construction a little care in keeping the face of the brick free from mortar will avoid considerable expense and annoyance when cleaning for occupancy. In case the mortar has set on the face of the brick, an acid solution will assist in removing same without affecting the brick. Again it is necessary to thoroughly rinse the wall with clear water to prevent the acid from attacking the mortar in which they are laid.

Shape Brick

The illustrations on the following page show the various shapes carried in stock, and include bullnose, cap mould and cove shapes, with which almost any desired architectural effect can be produced. The 2-in. radius is standard.

Special shapes are made to order and require from two weeks to a month to produce.

Shipment of any of the standard shapes can be made immediately from yard stocks.

Our plant is one of the largest salt glaze brick manufactories in the world, having a normal capacity of three million brick per month.

Shipping Facilities

Our plant is located at East Canton, Ohio, on the Wheeling and Lake Erie Railroad, which is able to furnish abundant cars for all requirements.

References

Stark Salt Glazed Brick have been widely used throughout the United States and Canada.

A few recent jobs are listed below:

Ford Administration Building, Detroit, Mich.
Taylor-Allderdice High School, Pittsburgh, Pa.
Architectural Building, University of Michigan, Ann Arbor, Mich.
Illinois Steel Company, Chicago, Ill.
Detroit Edison Power Company, Detroit, Mich.
Minnesota State Prison, Stillwater, Minn.
Sing Sing Prison, Ossining, N. Y.
Shady Hollow Country Club, Massillon, Ohio
Hell Gate Powerhouse, New York, N. Y.
Providence High School, Providence, R. I.
Peoples Gas Light and Coke Co., Chicago, Ill.
Northern Electric Co., Green Bay, Wis., Chalk Hill, Mich.
St. Mary's Hospital, East St. Louis, Ill.
Junior High School, Bayonne, N. J.
School No. 34, Rochester, N. Y.
Little Rock High School, Little Rock, Ark.
Good Samaritan Hospital, Cincinnati, Ohio
The Animal House, Belle Isle, Detroit, Mich.
William & Mary College, Science Hall, Williamsburg, Va.
Prince of Wales Public School, Hamilton, Ont., Canada
American Tobacco Co., Reidsville, N. C.
Springfield State Hospital, Sykesville, Md.
St. Michaels College, Santa Fe, N. Mex.
West Texas Utilities Co. Powerhouse, Quanah, Tex.
Robert Gould Shaw School, Boston, Mass.
London Collegiate, London, Ont., Canada

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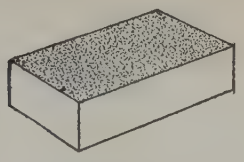
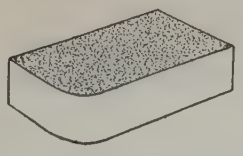
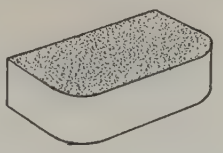
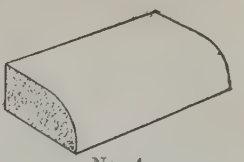
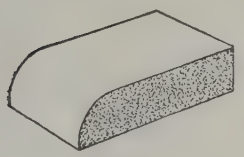

STANDARD

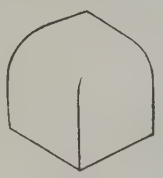

No. 1
BULLNOSE


No. 2
DOUBLE BULLNOSE

No. 3
BULLNOSE INTERNAL


No. 4
BULLNOSE STRETCHER

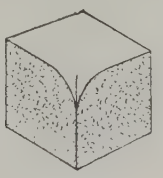

No. 5
BULLNOSE HEADER

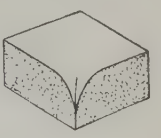

No. 6
BULLNOSE EXTERNAL CORNER, SQUARE

No. 7
BULLNOSE EXTERNAL CORNER, SQUARE

No. 8
BULLNOSE EXTERNAL CORNER, ROUND

No. 9
BULLNOSE EXTERNAL CORNER, ROUND


No. 10
BULLNOSE INTERNAL CORNER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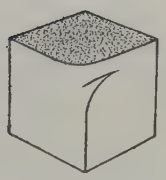
BULLNOSE INTERNAL CORNER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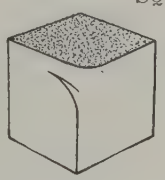
BULLNOSE SILL AND JAMB MITRE, LEFT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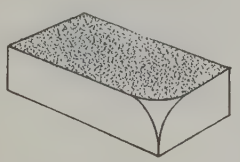
BULLNOSE SILL AND JAMB MITRE, RIGHT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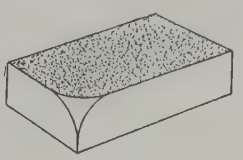
BULLNOSE STARTER, LEFT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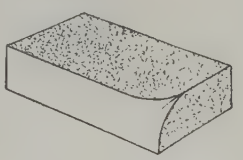
BULLNOSE STARTER, RIGHT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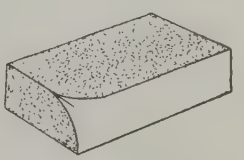
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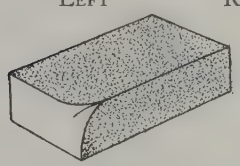
BULLNOSE MITRE, RIGHT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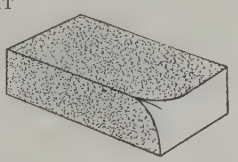
BULLNOSE HEADER MITRE, LEFT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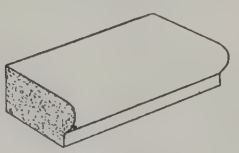
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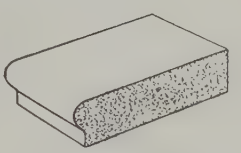
CAP MOULD STRETCHER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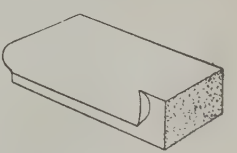
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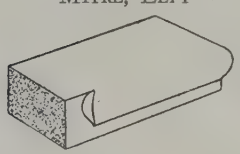
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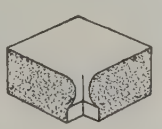
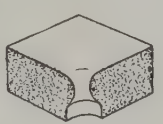

No. 24
CAP MOULD INTERNAL CORNER, SQUARE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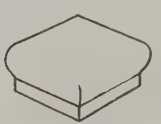
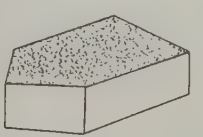
CAP MOULD INTERNAL CORNER, ROUND


No. 26
CAP MOULD EXTERNAL CORNER, SQUARE

No. 27
CAP MOULD EXTERNAL CORNER, ROUND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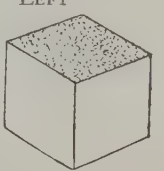
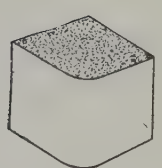
OCTAGON


No. 29
SQUARE ROWLOCK CORNER BLOCK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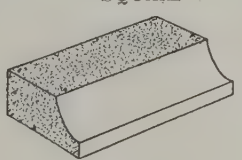
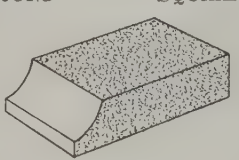
BULLNOSE ROWLOCK CORNER BLOCK


No. 31
COVE STRETCHER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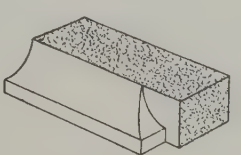
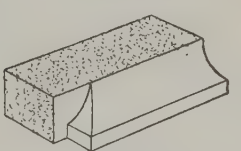
COVE HEADER


No. 33
SQUARE COVE STARTER, LEFT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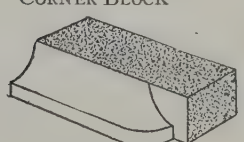
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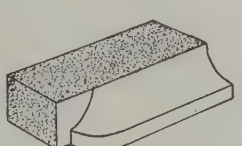
ROUND COVE STARTER, LEFT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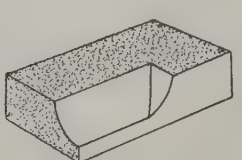
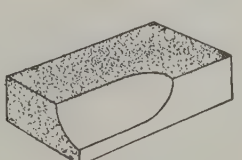

No. 37
COVE INTERNAL CORNER, SQUARE


No. 38
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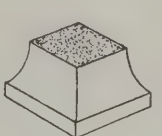
No. 39
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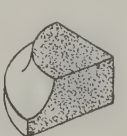
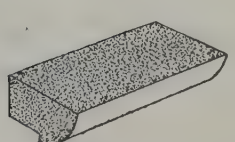
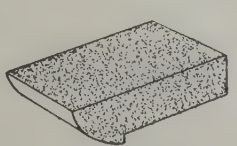
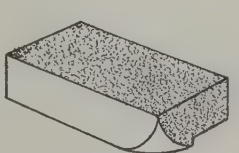
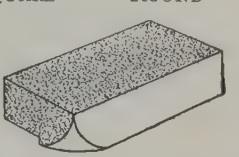

No. 40
COVE EXTERNAL CORNER, ROUND


No. 41
LINTEL BULLNOSE STRETCHER


No. 42
LINTEL BULLNOSE HEADER


No. 43
LINTEL BULLNOSE STARTER, LEFT


No. 44
LINTEL BULLNOSE STARTER, RIGHT

Standard Shapes

WESTERN BRICK COMPANY

Manufacturers of Face Brick, Common Brick, Western Haydite and Featherweight Building Units

OFFICE AND FACTORIES
DANVILLE, ILL.

REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE MIDDLE WEST

Facilities

The WESTERN BRICK COMPANY manufactures annually 120,000,000 brick and tile at its two plants.

The shale and clay supply for these factories is practically inexhaustible; fuel supply is owned by the company in sufficient quantities to last at least twenty-five years.

TRADE-MARK

Shipping facilities are unequalled, as the product is distributed from Danville over seven railroads. Plants have side track room for about 75 cars, and ordinary daily shipments, during the building season, exceed 500,000.

Over 2,000,000,000 brick have been manufactured and marketed during the past twenty-eight years.

Face Brick

In order to simplify our lines for architects, we have developed various standard blends. To meet the demand for a distinctive type of brick giving that age old effect now so much in demand, we have produced, Early American "Handmades," Old English "Handmades" and Verde-Antique "Handmades." These blends are replete in reds of various hues, and the verde-antique are blended with a moss green brick. For those who prefer lighter tones, Spanish "Handmades" in buffs, grays and pinks may be specified. Other interesting blends are University Blend, Cloisters, Doric Chicago Blend, Mossblende's, and Green Persians.

WESTERN STANDARD FACING BRICK

Colors	Gothic stippled	Doric stippled	Matte matte	Cloister smooth	Ivory smooth	Empire texture, scratched and rolled	Persian matte
Black to brown	971	871	841	410	.....	Sold in mingled shades of brown to red but percentages can be varied	Sold in mingled shades of brown to red but percentages can be varied
Brown	972	872	842	420	.....		
Brown to tan	.....	873	843	.....	1073		
Tan	.....	874	844	.....	1074		
Purplish brown	973	.....	.....	.....	.....		
Reddish brown	974	.....	.....	423	.....		
Green brown	.....	.....	.....	.....	.....		
Brown edge, red center	.....	.....	.....	430	.....		
Dark wine red	940	.....	.....	440	.....		
Red	950	.....	.....	450	.....		
Light red	955	.....	.....	435	.....		
Very light red	956	.....	.....	460	.....		
Tan to golden buff	.....	876	846	.....	1076		
Golden buff	.....	877	847	.....	1077		
Pinkish buff	.....	878	848	718	1078		
Pink	.....	879	849	719	1079		
Gray	.....	.....	.....	716	.....		
Dark gray	.....	.....	.....	713	.....		

Continued on next page

FEATHERWEIGHT "HAYDITE" BUILDING UNITS

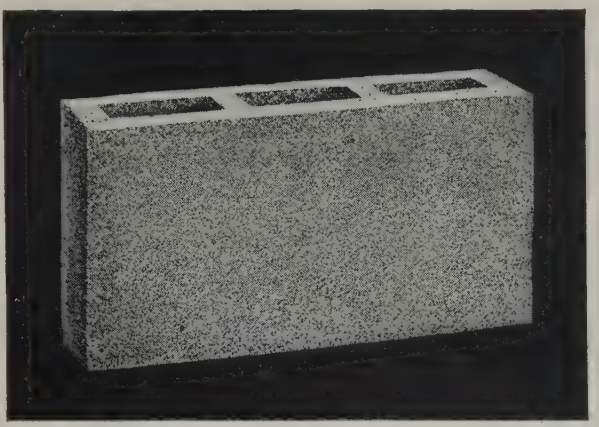
Made of Western "Haydite"

Featherweight "Haydite" building units embody all the requirements of perfect wall units and are offered to the building trade as light weight, economical fire resistant units for all types of wall construction.

Lightweight—57 lb. per cu. ft. of wall weight. 39% less than clay tile and 63% less than brick masonry.

Strength—All units heavy load bearing, meeting strength requirements of all local and State building codes.

Fire resistant—Fire resistance qualities have been completely established by Underwriters' Laboratories, Inc., of National Board of Fire Underwriters.



Featherweight "Haydite" Building Unit
4x8x16 inches

Nailing and Cutting—Nails are readily driven through wood trim into the unit and chaneling and cutting for water pipes and conduits can be done without breakage.

Insulation—Lower rate of heat conductivity than cinder concrete, clay tile or brick.

Damp and Vermin Proof—Owing to the cellular structure of the Haydite, moisture is not drawn through the unit.

Sound Insulation—Unequaled among fire resistant materials in the reduction of sound transmission. High in efficiency in the absorption of sound and especially adapted to the interior walls of auditoriums, churches and theatres.

Apply Plaster and Stucco Direct

Plaster and stucco is applied direct to the unit without lathing or furring. The unit being mechanically perfect, a large saving in amount of plaster can be made, only a thin straightening coat being necessary.

Shapes and Sizes

The unit is made in all standard shapes and sizes required by modern building practice.

Tests

Tests of this unit have been made by Underwriters' Laboratories, Inc; University of Illinois; Purdue University; University of Wisconsin; Robert W. Hunt Company; Pittsburgh Testing Laboratory; Riverbank Laboratories and Armour Institute.

Literature

Complete booklet treating all phases of the unit is available upon application to any authorized manufacturer or distributor of Featherweight "Haydite" Building Unit listed herein.

Authorized Manufacturers and Distributors of Featherweight "Haydite" Building Units

Made of Western "Haydite"

ANDERSON, IND., J. W. Bailey Company
APPLETON, WIS., Gochnauer Concrete Products Co.
AUORA, ILL., Gifford-Wood Co.
ARLINGTON HEIGHTS, ILL., Arlington Concrete Products Co.
BATESVILLE, IND., Service Coal & Concrete Products Co.
BLOOMINGTON, ILL., J. F. Affield Concrete Co.
BATTLE CREEK, MICH., Johnson-Ensing Co.
BLUE ISLAND, ILL., Chicago Haydite Building Units
CHAMPAIGN, ILL., Morris L. Hecker Company
Nelson Concrete Culvert Co.
CEDAR RAPIDS, IOWA, Concrete Products Company
DANVILLE, ILL., Western Brick Company
DECATUR, ILL., W. G. Traver Supply Co.
DAVENPORT, IOWA, Northwest Davenport Cement Block Co.
FORT WAYNE, IND., Acker Concrete Products Co.
GARY, IND., Calumet Supply Co.
FLINT, MICH., Valley Coal Co.
GRAND RAPIDS, MICH., S. A. Morman Company
INDIANAPOLIS, IND., Spicklemier Fuel & Supply Co.
JOLIET, ILL., A. W. Hays
KANKAKEE, ILL., Shidler Construction Material Co.
KALAMAZOO, MICH., Kalamazoo Haydite Tile Co.
Johnson-Howard Company
LaGRANGE, ILL., E. L. Ramm & Co.
LANSING, MICH., Lansing Cast-Stone Block Co.
MILWAUKEE, WIS., Best Block Company
OAK PARK, ILL., Concrete Building Units Co. Inc.
RACINE, WIS., Julius Sorenson & Sons
ROCKFORD, ILL., Crumb-Colton Co.
SAGINAW, MICH., Kaufmann Duntile Co.
WAUKEGAN, ILL., Babcock Concrete Block Co.

WESTERN "HAYDITE"

The Ideal Lightweight Aggregate

Western "Haydite" is a lightweight burned clay aggregate specially manufactured for use in concrete in place of sand, gravel, stone, slag or other aggregates.

Western "Haydite" is produced fom exactly the same shales as are used in the manufacture of the various grades of Western Brick, which have been used in many important buildings throughout the middle west during the past 28 years.

Western "Haydite" is burned in clinker form and then ground, screened and graded into standard commercial sizes.

Owing to its extreme lightness, it is the ideal aggregate for such pre-cast products as wall units, roof tile, laundry trays, burial vaults, conduit tile, lighting standards, telegraph poles and sewer pipe.

In reinforced concrete, a saving in steel area can be effected owing to the fact that concrete of Western "Haydite" weighs not to exceed 93 lb. per cu. ft., or 40% less than concrete with equal strength made from ordinary aggregate.

Absolute control of the sizing and grading; completely inert; free from all impurities; a preservative of metal; non-corrosive. An unlimited supply of the proper shales and fuel for many years to come together with adequate manufacturing facilities, make Western "Haydite" the ideal, dependable lightweight aggregate.

Western Brick Company maintains a service bureau to handle all matters in connection with Western "Haydite."

THE WYANDOT CLAY PRODUCTS CO.

UPPER SANDUSKY, OHIO

REPRESENTED IN ALL LEADING CITIES OF THE UNITED STATES

Product

FACE AND COMMON BRICK.
STANDARD SIZE and 4x5x12-IN. HOLLOW WARE.
SIDEWALK and TERRACE BRICK.

Composition and Manufacture of Wyandot Brick

An all-clay, genuinely sand molded brick, made from yellow clay which burns red. Variety and color flashing obtained by the location of brick in the kilns. Brick is burned to the fusion point of the clay.

Made by the same process as the handmade brick of years ago, but by machinery. Old-fashioned box molds lined with sand are used. This sand is part of the surface of brick, burned in and cannot rub off.

Ranges

Old Colony—varying shades of red, brown and gunmetal.

Sarouk—rose pink, bronze with rose hearts, lavender-blue.

Burgundy—deep wine red, plain and with purple-blue flashings.

Moss Rose—all one-color pink, with occasional very slight kiln flashing.

Wyandot Red—all one-color red, no flashing.

Elm—greenish-tan, tan and tan with pink flashing.

Commons

Hard Line—Not selected for color—vitrified—suitable for all outside purposes.

Backups—suitable for inside work only.

Contour and Texture

A slight irregularity of contour relieves it of any mechanical exactness. It has a soft, velvetv exterior over a flinty interior. Mortar adheres very readily to this surface.

Moisture Absorption

Tests from 1% to 5%.

Special Shapes

45° octagons, water tables, headers, stretchers, inside and outside returns, carried in stock.

Any type of special shape made from architects' blue prints.

Shipping Facilities

Factory is located on the Hocking Valley R. R. and the main line of the Pennsylvania.

Residence of R. A. Dress, Cleveland, Ohio
Designed by P. F. ASCHMAN, Cleveland, Ohio

Examples

Bell Telephone Building, Utica, N. Y., McKenzie, Vorhees and Gmelin, Architects
West High School, Columbus, Ohio, Howard Dwight Smith, Architect
Corning Hotel, Corning, N. Y., Thomas, Martin & Kirkpatrick, Architects
Justice Harlan F. Stone Residence, Washington, D. C., Wyeth & Sullivan, Architects
Masonic Home, Utica, N. Y., Kinne & Frank, Architects
Mark Lothrop Home, Canton, Ohio, Albrecht & Wilhelm, Architects
Notre Dame Academy, Dayton, Ohio, Howard Germann, Architect
Jewish Orphanage, Cleveland, Ohio, Morris & Weinberg, Architects (in construction)

Residence of Geo. A. Mosel, Steubenville, Ohio
Designed by W. E. LINCH, Columbus, Ohio

Latham Apartments, Columbus, Ohio
Designed by MILLER & REEVES, Columbus, Ohio

J. B. Rose Residence, Canton, Ohio
Designed by ALBRECHT & WILHELM, Cleveland, Ohio

First National Bank, Louisville, Ky.
Designed by CARL A. ZEIGLER, Philadelphia, Pa.

Trenton, N. J., Junior High School No. 4
Designed by ERNEST SIBLEY, Palisade, N. J.

ESTABLISHED 1877

THE DELAWARE CLAY COMPANY

Manufacturers of Hollow Brick

DELAWARE, OHIO

Products

HOLLOW BRICK, HOLLOW BRICK HEADERS.

Also Standard Hollow Backing Tiles, Denison Interlocking Tile; Drain Tile, 3 to 30 in. diameter, inclusive.

Hollow Brick

Delaware Hollow Brick are standard brick size of design as illustrated. Their purpose is to back-up brick walls where insulation against dampness, heat and cold is desired. Also to lighten the loads on steel work and to eliminate furring, etc.

As hollow brick represent the safe medium between solid brick and hollow tile, partaking of the advantages of both, their use provides insulation without admitting the larger units of hollow backing tiles.

Supply

Having originated, developed and introduced hollow brick in the 90's, we built in 1901 a separate, especially designed factory to make this one article exclusively. The factory has operated continuously since then, turning out annually the largest hollow brick output in the world. Specializing in hollow brick alone in large volume, this plant has become headquarters for this product throughout the country.

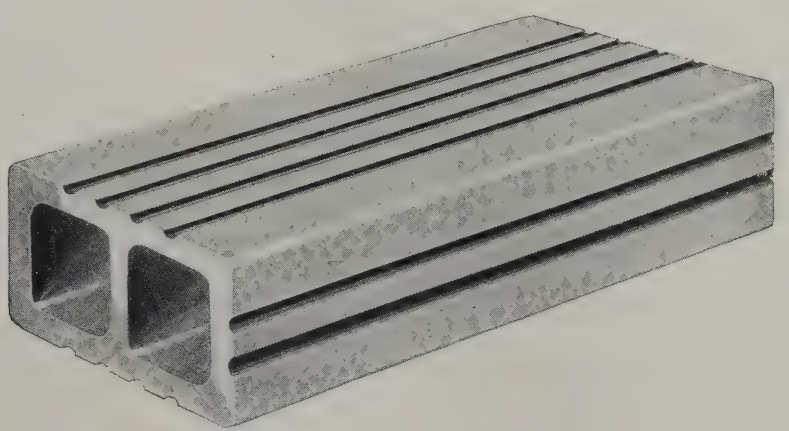
Quality

To satisfy a general preference on the part of contractors for a moderately porous hollow brick, as it aids in stabilizing the wall when laid in unfavorable weather and provides the best type of plastering surface, we manufacture Delaware Hollow Brick from clay, instead of shale or fire-clay, by a special steam-press moulding process, under extreme pressure. Sufficient compression is obtained upon walls and webs to permit comparatively large voids without sacrifice of strength, which provide maximum insulation by increased dead air cells.

Cost

Delaware Hollow Brick weigh about 3 lb. each and may be shipped long distances economically. This company maintains at all times a lower price on Delaware Hollow Brick f.o.b. factory than current price on common brick. Therefore, the architect is safeguarded in specifying them.

Headers are furnished for header courses where required.



Delaware Hollow Brick Stretcher

A Few Recent Buildings Backed Up with Our Product

Tribune Tower, Chicago, Ill.
Morrison Hotel, Chicago, Ill.
Penobscot Building, Detroit, Mich.
Union Trust Building, Detroit, Mich.
Fountain Square Building, Cincinnati, Ohio
Masonic Temple, Cincinnati, Ohio
Union Central Building, Cincinnati, Ohio
Chesapeake and Ohio Station, Ashland, Ky.
Pittsburger Hotel, Pittsburg, Pa.
Sesqui-Centennial Stadium, Philadelphia, Pa.
Industrial Trust Building, Providence, R. I.
Hotel Biltmore, Providence, R. I.
Hotel Kenmore, Boston, Mass.
Five Cents Savings Bank, Boston, Mass.
Boston Consolidated Gas Co., Boston, Mass.
Burlington High School, Burlington, Vt.
St. Stephens Cathedral, Bridgeport, Conn.

VITRIFIED CLAY PRODUCTS

CLAY PRODUCTS ASSOCIATION

111 W. Washington Street
CHICAGO, ILL.

Products

VITRIFIED SALT-GLAZED CLAY WALL COPING.
FIRE CLAY FLUE LINING.

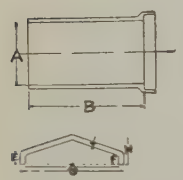
Vitrified Salt-glazed Clay Wall Coping

Vitrified clay wall coping can not wear out. Sun's heat and frost can not harm it. Moisture can not seep into and disintegrate it. Time can not discolor it.

The soft color of this wall coping blends well with almost any exterior treatment.

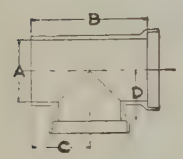
To give a smart finished look to the completed work and to insure its walls against decay for all time, specify vitrified salt-glazed clay wall coping.

Following are tables of standard sizes:



DOUBLE SLANT STYLE—STRAIGHT SECTIONS

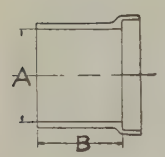
A In.	B In.	E In.	F In.	G In.	H In.	T In.
9	24	1½	¾	10¾	3¼	¾
13	24	2¼	1½	15¼	4	⅞
18	24	2½	1¾	21	6	1



T-SECTIONS

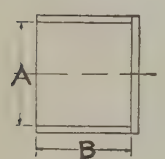
A In.	B In.	C In.	D In.
9	24	12	7¼
13	24	12	10
18	24	12	13

Dimensions C and D are approximate.



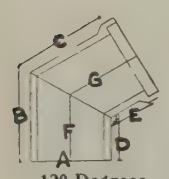
ENDS

A In.	B In.
9	24
13	24
18	24



STARTERS

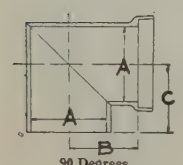
A In.	B In.
9	24
13	24
18	24



120 Degrees

ANGLES, RIGHT AND LEFT—120°

A In.	B In.	C In.	D In.	E In.	F In.	G In.
9	12	12	5¾	5¾	9	9
13	12	12	3½	3½	7¾	7¾
18	12	12	¾	¾	6½	6½



90 Degrees

CORNERS, RIGHT AND LEFT—90°

A In.	B In.	C In.
9	7¼	8¾
13	10	11½
18	13	15

Fire Clay Flue Linings

According to insurance and fire marshals' reports, at least three out of every ten residence fires start at the chimney—the unreliable chimney is the greatest single cause of residence fires. The architect can completely cut out that hazard in the work he designs by specifying fire clay flue linings for all chimneys and chimney openings and connections.

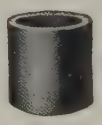
Following are tables of standard sizes:

RECTANGULAR FLUE LINING

Outside dimensions, in.	Approximate weight per foot, lb.	Minimum thickness, in.	Length, ft.
4½ x 8½	14	⅝	2
4½ x 13	19	¾	2
8½ x 8½	19	¾	2
8½ x 13	28	⅞	2
8½ x 17½	37	1	2
13 x 13	36	1	2
13 x 17½	52	1⅛	2
17½ x 17½	70	1¼	2

CIRCULAR FLUES

Inside diameter, in.	Approximate weight per foot, lb.	Minimum thickness, in.	Length, ft.
6	12	⅝	2
8	20	¾	2
10	28	⅞	2
12	39	1	2
15	54	1⅛	2
18	71	1¼	2
21	108	1⅝	2
24	130	1⅝	2

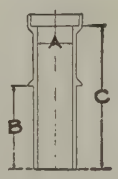


FIRE CLAY THIMBLES

Diameter, in.	Length, in.	Minimum thickness, in.
6	4½, 6, 9 and 12	⅝
7	4½, 6, 9 and 12	11/16
8	4½, 6, 9 and 12	¾
10	4½, 6, 9 and 12	⅞
12	4½, 6, 9 and 12	1

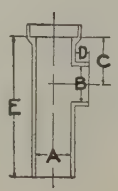
FLUE PIPE

Diameter.....in.	6	7	8
Length.....ft.	2	2	2



FLUE PIPE FITTINGS—BOTTOMS

A In.	B In. approx.	C Ft.
6	14	2
7	14	2
8	14	2



FLUE PIPE FITTINGS—OPENINGS

A B In.	C In.	D In.	E Ft.
6 x 6	8	2½	2
7 x 7	8	2½	2
8 x 6	8	2½	2
8 x 8	8	2½	2

Dimensions C, D and E are approximate.

Continued on next page

VITRIFIED SALT GLAZED CLAY DRAIN TILE

Dimensions and approximate weights

Size, in.	Thickness, in.	Approx. weight per lineal ft., lb.	Size, in.	Thickness, in.	Approx. weight per lineal ft., lb.
4	½	7	21	1⅜	90
5	½	9	24	1⅜	115
6	⅝	11	27	1¾	155
8	11/16	18	30	2	190
10	¾	25	33	2⅛	240
12	15/16	32	36	2⅜	285
15	1 1/16	50	39	2¾	375
18	1¼	70	42	3	425

VITRIFIED SALT GLAZED CLAY WALL COPING

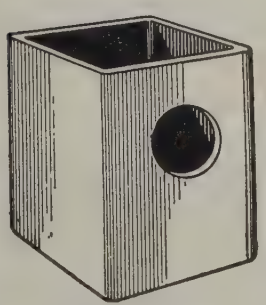
Tee Coping Starter Corners End

Width, in.	Approx. weight per ft., lb.	Length, in.	Width, in.	Approx. weight, each, lb.	Length, in.
Coping			**Tees, Right and Left**		
9	10	24	9x9	23	24
13	16	24	13x13	43	24
18	26	24	18x18	61	24
Corners Right and Left			**Starters and Ends**		
9	18	8⅞	9	19	10¾
13	23	10¾	13	34	12½
18	57	11¾	18	49	14

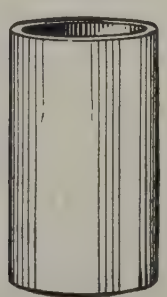
Square Flue Lining

8½ x13 in. Flue Lining with 6x8-in. Square Opening

8½ x8½ -in. Flue Lining with 6-in. Round Opening



17½ x17½ -in. Flue Lining with 8-in. Round Opening



Round Flue Lining

SQUARE FIRE CLAY FLUE LINING

	Size in.	Diam. of openings, in.	Weight per ft., lb.	Length, ft.	Dimensions, in. Inside	Dimensions, in. Outside	Thickness of shell, in.	Number brick in course
With straight, round corners	4½ x 8½	.....	14	2	.....	5 x 9	¾	5
	8½ x 8½	.....	18	2	.....	8½ x 8½	¾	6
	4½ x13	.....	20	2	.....	5 x13¼	¾	6
	8½ x13	.....	30	2	.....	8½ x13	⅞	7
	13 x13	.....	38	2	.....	13 x13	⅞	8
	8½ x17½	.....	36	2	.....	9 x18	1	8
	13 x17½	.....	45	2	.....	13½ x18½	1	9
	17½ x17½	.....	62	2	.....	17½ x17½	1⅛	10
With single round pipe openings	4½ x 8½	6	13	2	3½ x 7½	.....	¾	5
	8½ x 8½	6	17	2	7 x 7	.....	¾	6
	4½ x13	6	18	2	3½ x11¾	.....	¾	6
	8½ x13	6	27	2	6¾ x11¼	.....	⅞	7
	8½ x13	7	27	2	6¾ x11¼	.....	⅞	7
	8½ x13	8	27	2	6¾ x11¼	.....	⅞	7
	13 x13	6	37	2	11¼ x11¼	.....	⅞	8
	13 x13	8	36	2	11¼ x11¼	.....	⅞	8
	8½ x17½	6	35	2	7 x16	.....	1	8
	8½ x17½	8	34	2	7 x16	.....	1	8
	13 x17½	6	42	2	11½ x16½	.....	1	9
	13 x17½	8	40	2	11½ x16½	.....	1	9
	17½ x17½	6	61	2	15⅛ x15⅛	.....	1⅛	10
	17½ x17½	8	60	2	15⅛ x15⅛	.....	1⅛	10
With double round pipe openings	4½ x 8½	6	12	2	3½ x 7½	.....	¾	5
	8½ x 8½	6	16	2	7 x 7	.....	¾	6
	4½ x13	6	18	2	3½ x11¾	.....	¾	6
	4½ x13	8	17	2	3½ x11¾	.....	¾	6
	4½ x13	10	16	2	3½ x11¾	.....	¾	6
	8½ x13	6	26	2	6¾ x11¼	.....	⅞	7
	8½ x13	7	26	2	6¾ x11¼	.....	⅞	7
	8½ x13	8	25	2	6¾ x11¼	.....	⅞	7
	13 x13	6	36	2	11¼ x11¼	.....	⅞	8
	13 x13	8	35	2	11¼ x11¼	.....	⅞	8
	8½ x17½	6	33	2	7 x16	.....	1	8
	8½ x17½	8	33	2	7 x16	.....	1	8
	13 x17½	6	41	2	11½ x16½	.....	1	9
	13 x17½	8	40	2	11½ x16½	.....	1	9
	17½ x17½	6	60	2	15⅛ x15⅛	.....	1⅛	10
	17½ x17½	8	60	2	15⅛ x15⅛	.....	1⅛	10
With single square register openings	8½ x13	6x6	27	2	6¾ x11¼	.....	⅞	7
	8½ x13	6x8	27	2	6¾ x11¼	.....	⅞	7
	8½ x13	8x8	26	2	6¾ x11¼	.....	⅞	7
	13 x13	6x6	37	2	11¼ x11¼	.....	⅞	8
	13 x13	6x8	36	2	11¼ x11¼	.....	⅞	8
	13 x13	8x8	36	2	11¼ x11¼	.....	⅞	8
	8½ x17½	6x6	34	2	7 x16	.....	1	8
	8½ x17½	6x8	34	2	7 x16	.....	1	8
	8½ x17½	8x8	33	2	7 x16	.....	1	8
	13 x17½	6x6	42	2	11½ x16½	.....	1	9
	13 x17½	6x8	42	2	11½ x16½	.....	1	9
	13 x17½	8x8	41	2	11½ x16½	.....	1	9
	17½ x17½	6x6	61	2	15⅛ x15⅛	.....	1⅛	10
	17½ x17½	6x8	61	2	15⅛ x15⅛	.....	1⅛	10
	17½ x17½	8x8	60	2	15⅛ x15⅛	.....	1⅛	10

ROUND FIRE CLAY FLUE LINING

	Size, in.	Approx. weight per ft., lb.	Approx. length, ft.	Approx. dimensions, in. Inside	Approx. dimensions, in. Outside	Nominal area, sq. in.	Size equiv. square linings, in.
Plain, without sockets	6	12½	2	6⅜	7⅝	28.27	4½ x 8½
	8	18	2	8	9¼	50.26	8½ x 8½
	10	23	2	10	11¾	78.54	8½ x13
	12	33	2	12¾	14½	113.1	13 x13
	15	50	2	15⅞	18	176.71	13 x17½
	18	65	2	18⅞	20¾	254.47	17½ x17½
	21	95	2	22¾	25¾	346.36	.....
	24	120	2	25½	28½	452.39	.....
	27	200	2	28½	31	572.55	.....
	30	235	2	31½	34	706.86	.....
	33	300	2	34½	37	855.30	.....
	36	335	2	37½	40	1017.87	.....

THE CARNEY COMPANY

MANKATO, MINN.

DISTRICT SALES OFFICES

CHICAGO, ILL., Builders' Building — MINNEAPOLIS, MINN., Builders' Exchange — ST. LOUIS, MO., Louderman Building
CINCINNATI, OHIO — DETROIT, MICH., Book Tower

MILLS: MANKATO, MINN.; CARNEY, MINN. — QUARRIES: CARNEY, MINN.

Product

CARNEY CEMENT.

CARNEY CEMENT
for Brick and Tile Mortar

Description

THE CARNEY COMPANY has manufactured cement since 1883.

Carney Cement is unlike others used in brick and tile construction. It is made from a peculiar deposit of stone found only at Mankato, Minn. This stone contains the correct proportion of lime combined chemically, so that, when the stone is burned and ground, it needs nothing but sand and water to form a smooth working mortar.

Advantages

Carney Cement is lighter in weight and more easily handled. It is packed in cloth or paper sacks, each containing 1 cu. ft. and weighing 50 lb. Users of Carney Cement are not required to buy lime, hence labor of slaking and mixing is eliminated. Carney Cement requires nothing but sand and water in mixing.

The simple mixing formula saves time and labor and eliminates the danger of carelessness. Addition of too much sand or adulteration at the mortar box interferes with the plastic, smooth-working properties of the cement and is immediately noticed by the masons.

Because of the plastic and smoother working properties masons can lay more brick per man per day. Carney Cement lays the maximum number of brick per barrel.

Carney mortar has no waste. Mortar left over at the end of a day or when a job is delayed can be used the next day by re-tempering with water.

Carney Cement can be used winter and summer. Frost does not affect the strength of Carney mortar in the wall. Printed directions on tags attached to the cement bags provide for its proper use in cold weather.

In the wall, Carney mortar returns to its native hardness, becoming harder than the brick it joins and as the mortar is absorbed into the brick it exerts a tremendous gripping power. It makes one solid wall of masonry.

Specifications for Brick, Tile and Terra Cotta Mortar

Plain Mortar—For all brick, tile and terra cotta mortar above grade, use 1 part Carney Cement to 3 parts sand, in accordance with the manufacturer's directions attached to the cement bags. Carney Cement mortar can be used for brick walls faced with Bedford stone without danger of staining the stone.

Colored Mortar—Use a good, double strength mortar color, and mix according to manufacturer's instructions.

Descriptive Literature

Literature covering every point on Carney Cement will be sent on request.

A list of buildings near you that have been laid up in Carney Cement, together with the names and addresses of the architects and contractors, will also be sent, if requested.

Carney Cement Test

Made by G. F. Gebhardt, Mechanical Engineer, Armour Institute of Technology, Chicago

A mortar of 1 part Carney Cement to 3 parts sand was used to make 14 piers, three bricks high, with ½-in. mortar joints—size of brick 3¾x8⅛x2¼ in.; area, 31 sq. in.

A pier was tested nearly every day for 16 days, on a Standard Olsen machine. The table shows the tremendous crushing strength reached on the 16th day.

While this test is more than sufficient for all practical purposes, it by no means represents the peak strength of a Carney joint—Carney Cement never stops hardening. In older specimens, the bricks themselves have given way without a sign of fracture in the joints.

CARNEY BREAKING LOAD

Designated age, days	Actual	Sq. in.	Designated age, days	Actual	Sq. in.
1	9,000	290	9	42,000	1,355
2	10,000	322	10	45,000	1,450
3	14,000	452	11	51,000	1,645
4	15,800	510	12	55,000	1,775
5	25,000	807	14	53,000	1,710
7	29,000	935	15	55,000	1,775
8	31,000	1,000	16	56,000	1.808

A Few Buildings Laid Up in Carney Cement

American Furniture Mart, Chicago, Ill.
Book Tower, Detroit, Mich.
Brotherhood of Locomotive Engineers Building, Cleveland, Ohio
Cleveland Union Terminal, Cleveland, Ohio
Diversey Theatre, Chicago, Ill.
Federal Reserve Bank Building, Kansas City, Mo.
Harper Hospital, Detroit, Mich.
Hibbard-Spencer-Bartlett & Co., Chicago, Ill.
Louderman Building, St. Louis, Mo.
Minneapolis Municipal Auditorium, Minneapolis, Minn.
Passenger Station, New York Central R. R., Buffalo, N. Y.
Sears, Roebuck & Co., Branch Store Building, Atlanta, Ga.

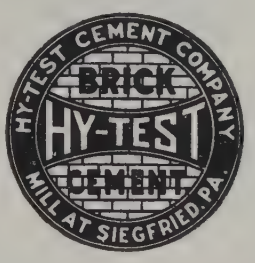
HY-TEST CEMENT CO.

Bricklayers' Cement

MAIN OFFICE
PHILADELPHIA, PA.
SALES OFFICES
NEW YORK, N. Y. WASHINGTON, D. C. BOSTON, MASS. PITTSBURGH, PA.
MILL: SIEGFRIED, PA.

Product

HY-TEST MASONS' CEMENT, a finely pulverized, plastic, smooth-working cement made especially for mortar for laying brick, tile, stone and other masonry construction.



MARK ON EVERY BAG

Advantages

Hy-Test Masons' Cement has an important property which is almost entirely lacking in portland cement, that of producing the "fat" mortar demanded by bricklayers.

The advantage of using Hy-Test is that it requires no addition of lime at the mortar box as is the case with portland cement, for it possesses the properties of producing a smooth working mortar when mixed with sand.

Architects will be quick to appreciate the fact that a mill finished cement that is self-contained and requires no addition of lime at the mortar box, will produce a more uniform quality and color of mortar than the uncertain mixtures of portland cement to which lime is added in varying quantities to suit the individual taste of each brickmason.

Strength of Hy-Test Mortar

The manufacturers guarantee that brickwork laid up in mortar under the simple directions of one (1) part Hy-Test mixed with three (3) parts clean sharp sand and clean water and cured under ordinary conditions, will withstand six times greater compression at the early period of 28 days than the highest stress on brickwork permitted by the building codes of all first class cities.

Lower Costs

In addition to these advantages, Hy-Test lowers the cost of brickwork, as it sells for substantially less than either portland cement or hydrated lime.

Composition

Hy-Test Masons' Cement is not a made-up mixture of cement and lime, nor is it a Rosendale cement. It is a true hydraulic cement made from the same raw materials as the highest quality portland cement under a fixed formula and under strict laboratory control, but by burning the raw materials lower than in portland, the desirable quality of smoothness is retained. In all other respects it compares with and accomplishes the required results in masonry construction as does portland cement.

Official Approvals and Tests

Hy-Test has been tested and officially approved by the building departments of New York, Boston, Washington, Philadelphia, and other large cities. Tests made by the Massachusetts Institute of Technology, George Washington University, and by eight other reputable testing laboratories are in evidence as to the uniformity and strength of Hy-Test.

Color

The natural color of Hy-Test is a pleasing buff, which makes it very desirable for face brick work. It can be colored in the same manner as portland cement.

Estimating Data

A barrel of Hy-Test consists of four cloth or paper bags totaling approximately 4½ cu. ft. of cement, and is ample, when mixed with ½ cu. yd. of sand, to lay 1000 brick, ⅜-in. joint.

Specifications

Mortar—Hy-Test Masons' Cement (HY-TEST CEMENT CO., Philadelphia, Pa.) or any other bricklaying cement that has been approved as equal in strength, shall be used for the mortar for laying brick and tile. Proportion the cement and sand loose, mixing one (1) part of Hy-Test with three (3) parts clean sand. The cement shall be delivered in closed bags and three (3) cubic feet of sand shall be added to each bag of cement. No counting by wheelbarrows or shovels will be permitted. In warm weather wet all brick. In cold weather use necessary cold weather precautions recommended by the manufacturer.

Appreciation

We respectfully submit that the best evidence of the merit of Hy-Test Masons' Cement is by the standing of the architects who approve and specify it, and the reputation of the contractors who have used and are using it. A partial list is given.

Architects and Contractors Who Specify and Use Hy-Test

Architects

Albert Kahn, Detroit
Graham, Anderson, Probst & White, Chicago
Rapp & Rapp, Chicago
Starrett & Van Vleck, New York
Cross and Cross, New York
Kenneth Murchison, New York
Alfred C. Bossom, New York
Horace Trumbauer, Philadelphia
Phillip H. Johnson, Philadelphia
Geo. B. Post & Sons, New York
McKim, Mead & White, New York
York & Sawyer, New York
Warren & Wetmore, New York
Thomas E. Murray, Inc., New York

Architects (Continued)

Ballinger Company, Philadelphia
Day & Zimmerman, Philadelphia
McKenzie, Voorhees & Gmelin, New York
Guilbert & Betelle, Newark, N. J.
Lockwood, Greene & Co., Boston
Blackall, Clapp & Whittemore, Boston
Benno Janssen, Pittsburgh

Contractors

George A. Fuller Company
Thompson-Starrett Company
Stone & Webster, Inc., Philadelphia
Turner Construction Co.
Starrett Bros., New York

Contractors (Continued)

John Gill & Sons, Cleveland
DuPont Engineering Co., Wilmington
Hegeman-Harris Co., New York
James Stewart & Co., New York
Foundation Company, New York
Snare Corporation, New York
Kenn-Well Construction Co., New York
William F. Kenny Co., New York
Kennedy Construction Co., Brooklyn

Engineering Department of

New York Central Railroad
Pennsylvania Railroad
Philadelphia & Reading Railroad
Central Railroad of New Jersey

KOSMOS PORTLAND CEMENT COMPANY

INCORPORATED

SALES OFFICE

Starks Building, LOUISVILLE, KY.

MILL: KOSMOSDALE, KY.

Product

KOSMORTAR and KOSMOS PORTLAND CEMENT.

Kosmortar

A very smooth working cement for masonry of all kinds. Mixed with sand and water only, by hand or machine, it is ready for immediate use. No slaking. No additions. Minimum labor.

MASON'S CEMENT KOSMORTAR EASY TO SPREAD

TRADE-MARK

Characteristics of Kosmortar

Strength—Ample for all masonry. Makes mortar of about the same strength as a 50% mixture of portland cement and lime with much better working qualities.

Appearance—The natural color of Kosmortar is a light gray. It contains nothing that will react unfavorably on mortar colors, or cause efflorescence. Joints cut clean, giving a neat effect, and saving much labor. For practical purposes it is non-staining with Bedford stone.

Durability—Kosmortar passes the same soundness test as portland cement. Every step in its manufacture is under complete control and it may be depended upon for uniformity. Joints made with Kosmortar are water repellant to a high degree.

Set—Kosmortar is made slow setting to permit placing in the wall without retempering, which is never necessary with Kosmortar under proper management.

Package—Kosmortar is packed only in multiwall paper sacks weighing 75 lb. The unit of sale is a barrel of 300 lb., which means four sacks. Directions for use on each sack.

Amount Required—This varies with the sand used and the ideas of the various bricklayers. A good average is 4 or 5 sacks of Kosmortar to 1000 brick.

Kosmortar Tests

Report of Strength Tests—Made by R. W. Hunt & Co. in February, 1928.

Tensile Strength (1 to 3 mortar briquettes):

Age 3 days	78 lb. per sq. in.
Age 7 days	128 lb. per sq. in.
Age 28 days	171 lb. per sq. in.

Compressive Strength (1 to 3 mortar cylinders):

Age 3 days	521 lb. per sq. in.
Age 7 days	624 lb. per sq. in.
Age 28 days	1019 lb. per sq. in.

Kosmortar is guaranteed to meet the Federal Specifications Board Specification, No. 443, United States Government Master Specification for Masonry Cement.

Specifications

(1) Mortar for all masonry shall consist of Kosmortar (KOSMOS PORTLAND CEMENT COMPANY, Kosmosdale, Ky.) and good mason's sand alone in the proportion of 1 sack of Kosmortar to 3 cu. ft. of sand, with only enough clean water added to give a workable consistency. Mixing is to be done by machine wherever practicable. If the mixing is by hand the Kosmortar and sand shall be mixed dry until the whole is of a uniform color and the water then added, and thoroughly incorporated by further mixing. The mortar should be used as soon as possible after addition of the water.

Note: Slaking and soaking are not only not required, but are detrimental.

(2) In cold weather the sand and water shall be heated and the work protected, if necessary, to assure setting of the mortar before the water in it freezes.

(3) Porous brick, tile, and block are to be wet sufficiently to avoid drawing from the mortar joints the water required for hydration of the cement. This is particularly important in hot weather.

(4) When mortar color is used, a volume of sand equal to that of the mortar color shall be omitted from the mix.

Morris Plan Bank, Toledo, Ohio
Bedford stone and brick laid up with Kosmortar

Below:
Walnut Hills Christian Church, Cincinnati, Ohio
Another Kosmortar job

Above:
Brass Plant Standard Sanitary Mfg. Co., Louisville, Ky.
Another typical Kosmortar job

LOUISVILLE CEMENT COMPANY

INCORPORATED

Speed Building

LOUISVILLE, KY.

Brixment Mills at Brixment, N. Y., and Speed, Ind.; Portland Cement Mills and Natural Cement Mills at Speed, Ind.; Lime Quarries and Plants at Milltown, Ind.

BRIXMENT for Masonry

Products

BRIXMENT, a mason's cement for brick, tile and stone masonry and for stuccoing buildings.

Also Speed Portland Cement, Louisville Natural Cement, Speed Chemical Lime, Speed Chemical Hydrated Lime and Speed Mason's Hydrated Lime.

For Brixment for stucco, see page B1775.

Brixment for Masonry

Brixment is a mason's cement that combines the characteristics of portland cement and lime, having both strength and plasticity. When mixed with sand and water, it makes perfect mortar for any type of brick, tile or stone masonry.

How Used—The proper mix is 1 part Brixment and 3 parts sand, measured by volume, with water added for proper consistency. Neither portland cement nor lime is necessary. The simple Brixment mix makes strong, smooth-working mortar.

Brixment can be mixed in any quantity either by hand or machine. It is ready to mix and use at once.

How to Estimate—Brixment is packed in cloth or paper sacks. Each sack contains 1 cu. ft. There are 4 sacks to a barrel.

When mixed with 3 parts of sand, a barrel of Brixment will lay between 800 and 1000 bricks, depending on the width of the joint. Therefore, 1000 bricks require 4 to 5 bags.

Uniformity—The use of Brixment is the architect's assurance that all mortar will be uniform in strength and color and that his specifications will be accurately followed. When oversanded, Brixment mortar works short and, since there is no lime in the mix, the necessary plasticity can be secured only by using the proper amount of Brixment.

Strength—The strength of Brixment mortar is greater than that required by the building code of any city for the heaviest load-bearing walls. Its strength increases with age. Its final strength is greater than that of the brick itself.

TEST BY ROBERT W. HUNT & COMPANY

Three specimens of Brixment mortar, mixed 1:3 with sand, were used in ½-in. joint between two common bricks. All were tested at the age of 28 days.

Specimen	No. 1	No. 2	No. 3
Mortar started to crush at about	20,000 lbs.	19,000 lbs.	23,000 lbs.
Brick started to crush at about	25,000 lbs.	24,000 lbs.	25,000 lbs.

TEST BY PITTSBURGH TESTING LABORATORY

Sample from warehouse of H. B. Rosenberger, Doylestown, Pa.

Fineness through 100-mesh sieve, 97.8% Fineness through 200-mesh sieve, 90.2%
Soundness in water, O.K. Soundness in air, O.K.
Initial setting time, 3 hours Final setting time, 6 hours
7-day tensile strength, 1:3 sand, 107 lbs. per sq. in. 28-day tensile strength, 1:3 sand, 232 lbs. per sq. in.

Bond—Brixment makes a stronger, tighter bond between the brick and the mortar. It is ground finer and hardens more slowly than portland, thus permitting deeper penetration and a more thorough keying into the pores of the brick.

Resists Moisture—During the process of manufacture a small amount of mineral oil is intimately mixed with Brixment. For this reason Brixment resists the passage of moisture through the mortar joint.

For Walls Below Grade—Brixment is a true hydraulic cement. This, with its water-resistance and freedom from lime, makes it ideally suited for walls below grade.

Convenient Setting Time—The manufacture of Brixment is controlled to give Brixment mortar a slower, more convenient setting time than portland cement mortar. This keeps the mortar from setting up on the board and enables the mason to strike the joints conveniently before the mortar has hardened.

Clean, Permanent Joints—Because of the slower set and unusually smooth-working quality of Brixment mortar, cleaner, neater joints can be struck. The absence of free lime keeps them from scaling, crumbling or popping.

No Efflorescence—Efflorescence is due to the presence of soluble salts in masonry materials. Brixment itself never causes efflorescence because it contains less than ½ of 1% of such salts. Even when soluble salts are present in the other materials, the water-repellent quality of Brixment resists the passage of the salts in solution and usually prevents them from coming to the surface of the mortar.

Does Not Fade Colors—Colors mixed with Brixment mortar develop and hold their full strength permanently. Brixment contains none of the acids and strong alkalis which are so frequently the cause of fading in portland cement and lime mortars.

Economy—Brixment costs less than the portland cement and lime necessary to make an equal amount of mortar. It saves labor because it requires no soaking or slaking and its plasticity enables the mason to do faster work. There is no waste of time and material because Brixment mortar sticks to the brick.

Specifications

(1) All mortar shall be composed of Brixment, manufactured by the LOUISVILLE CEMENT COMPANY, and sand. (2) The mortar shall be mixed by measure in the proportions of 1 part Brixment to 3 parts clean, sharp sand. (3) The Brixment and sand shall be mixed dry until the color of the mass is uniform. Clean water shall then be added to make mortar of the proper consistency for the work to be done. All mortar shall be mixed by machine (or by hand for small operations where machine mixing would not be practicable). (4) If mortar colors are used, they shall be mixed with the mortar in the proportion and manner specified by the manufacturer of the particular color used. (5) In freezing weather the sand and water shall be heated.

Some Brixment Buildings

Biltmore Hotel, Miami; Schultz & Weaver, Architects

Apartment, 5th Ave. at 70th St., New York City; R. Candela, Architect

Fisher Body Co. Plant, Cleveland; Albert Kahn, Architect

U. S. Railway Terminal Post Office, Chicago; Graham, Anderson, Probst & White, Architects

Children's Hospital, Pittsburgh; York & Sawyer and E. T. Mellon, Architects

CLINTON METALLIC PAINT COMPANY

Mortar Colors, Cement Colors, Protective Paints and Roofing Cement

100 Clinton Road
CLINTON, N.Y.

NEW YORK OFFICE: 19 Liberty Street. Telephone, John 3369

Products

Manufacturers of CLINTON MORTAR COLORS and CLINTON CEMENT COLORS. Also manufacturers of the following CLINTON Specialties:

Clinton Silk Fibre Elastic Slaters Roof Cement
Clinton Asbestos Furnace and Retort Cement
Metallic and Venetian Roof and Barn Paints
Clinton Hermetic-Seal Liquid Roof Cement
Clinton High Temperature Fire Brick Cement

Send for descriptive literature and prices.

Clinton Mortar Colors
Nature's Permanent Colors—Made Since 1887—at Clinton, N.Y.

Experience

Ever since 1887, the CLINTON METALLIC PAINT COMPANY has served the architectural profession and the building trade. Over 40 years of scientific research and generations of manufacturing experience are reflected in the uniform excellence of Clinton products.

Permanent and Uniform

Clinton Mortar Colors are mineral colors, as permanent as the colors in natural rock. Rigid laboratory tests keep them absolutely uniform from shipment to shipment and from year to year.

Directions for Estimating and Using Clinton Mortar Colors

To get a mortar joint of intense color it is advisable to use approximately 100 lbs. of dry mortar color per

Mortar Colored with Clinton Pompeiian Buff No. 600

Mortar Colored with Clinton Double Strength Olive Green No. 1503

Mortar Colored with Clinton Special Chocolate No. 404

Mortar Colored with Clinton Colonial Buff No. 700

Continued on next page

1000 brick laid in running or common bond, with half-inch mortar joints. If mortar joints are wider or narrower, or if a bond requiring more or less mortar per 1000 brick is used, the amount of mortar color required per 1000 brick should be increased or decreased proportionately.

Following are two formulas for mortar of deep intense color:

Cement Mortar

Clinton Mortar Color (dry)	25 lbs.
Portland cement	1 bag (1 cu. ft.)
Sand	3 cu. ft.
Hydrated lime	1/10 sack

The above is sufficient to lay approximately 250 brick in running or common bond with half-inch mortar joints.

Cement Lime Mortar

Clinton Mortar Color (dry)	30 lbs.
Portland cement	1 bucket (16 qts.)
Hydrated lime	1 bucket (16 qts.)
Sand	6 buckets (96 quarts)

The second formula is sufficient to lay approximately 300 brick in running or common bond with half-inch mortar joints.

As it is not always convenient to weigh the color on the job, we tabulate below the various shades of Clinton Mortar Color, showing in separate columns the number of quarts of dry Clinton Mortar Color (*struck measure*) which are equivalent to 25 lbs. and 30 lbs.

Caution: This table applies only to genuine Clinton Mortar Colors.

	Number of quarts Equivalent to 25 lbs.	Equivalent to 30 lbs.
Clinton Hematite Red No. 10	10	12
Clinton Mortar Brown No. 400	8½	10½
Clinton D. S. Chocolate No. 402	9	11
Clinton Special Chocolate No. 404	9	11
Clinton Colonial Buff No. 700	19	23
Clinton Pompeiian Buff No. 600	19	23
Clinton Dark Buff No. 717	16½	20
Clinton Mortar Black No. 900	18½	22½
Clinton D. S. Black No. 800	19	23
Clinton D. S. Olive Green No. 1503	17½	21

Pearl Gray Mortar may be produced by using one-eighth as much Clinton Double Strength Black No. 800 as is recommended above to produce intense black mortar.

Clinton Mortar Black No. 900 or Single Strength Black, as it is sometimes called, will not give a jet black mortar. For best work use Clinton Double Strength Black No. 800.

For cream colored mortar a cement lime mortar or a cement mortar made with white cement and sand should be used, adding about half as much Clinton Colonial Buff No. 700 or Dark Buff No. 717 as recommended above.

Many contractors get good results with smaller proportions of Clinton Mortar Colors than those above recommended. This is possible if coarse sand is used and all ingredients are mixed, remixed, then mixed again. Experience, however, proves that the amounts of color recommended will give good results under all conditions and we cannot assure satisfaction if less color is used. Money spent for a little extra color more than pays for itself, in power and wages saved at the mixer and in the owner's satisfaction with the finished job.

Clinton Pulp Colors

Many users of Mortar Color desire the colors in Pulp form. Clinton Pulp Colors are of the same high quality as Clinton Dry Colors. Further detailed information with prices will be furnished upon request.

Specification

All coloring material to be manufactured by Clinton Metallic Paint Co., Clinton, N.Y., to be delivered on the job in original packages bearing their labels, and to be used according to directions which they will furnish.

Important Notes on the Preparation and Application of Colored Stucco

1. The Portland Cement Association, 33 West Grand Avenue, Chicago, will furnish any builder, without charge, detailed practical information concerning the preparation and application of colored stucco. Their instructions have been followed in the preparation of stucco panels reproduced below. The stucco was made in accordance with the following formula:

White Portland Cement	5 bags (470 lbs.)
Hydrated Lime	1 bag (50 lbs.)
Marble Dust	16 cu. ft.
Color	A weight equal to percentage of weight of cement indicated in table and under panels.

Any suitable white sand may be used in place of marble dust.

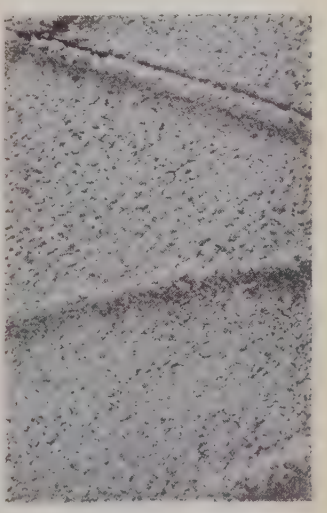
Shade	Clinton Color to be Used	Percentage of Color
Pink	Clinton Hematite Red No. 10	5 %
Pink	Clinton Red No. 82	1 %
Orange Pink	Clinton Red No. 61	1 %
Brown	Clinton Brown No. 1150	1.5 %
Deep Cream	Clinton Dark Buff No. 717	5 %
Cream	Clinton Colonial Buff No. 700	5 %
Light Yellow	Clinton Yellow No. 714	.75%
Light Green	Clinton Green No. 1502	1 %
Light Blue	Clinton Blue No. 1601	1 %

2. Any careful mechanic who will follow directions can prepare and apply colored stucco in a satisfactory manner.

3. Colored stucco appears much deeper in shade when wet than when dry. The change in color due to drying out of the stucco surface during the first few days after application must not be mistaken for fading. If Clinton Colors are used as suggested in our folder the final result should be closely similar to panels shown. Variations of fineness or color of the sand will account for such slight differences in color tone as may be noted. It is well to make up a small experimental batch, apply it, and let it dry out before proceeding with the work, thus proving that the color effect is satisfactory.

4. Write for our folder, "Color in Stucco," showing samples and giving more detailed information.

Background—No. 1502 Green 3%
Foreground—No. 61 Red 1%



No. 1601 Blue 2%

PECORA PAINT COMPANY

Mortar Stains and Sash Putty

TELEPHONE
REGENT 6130

ESTABLISHED 1862
BY SMITH BOWEN

Fourth Street and Erie Avenue

PHILADELPHIA, PA.

Products

PECORA MORTAR STAINS.
PECORA METAL SASH PUTTY.
For Calking and Glazing Compounds, see page B2191.

TRADE-MARK
Registered

Pecora Mortar Stains

Uses—A pulp or paste, *not a powder,* made in 11 standard colors. These stains are made to be mixed with lime or cement mortar or with the two combined. The stained mortars are universally appropriate and pleasing, whether used for facing exterior or interior walls and regardless of the type of structure. Stained mortar is also used for mantel facings, fireplaces and hearths, whether of brick, tile, marble, slate, or other material, and for pointing or joining stonework where a color effect is desired. Pleasing color tones may be introduced into exterior "white-wash" through the use of these stains.

Advantages—Pecora Mortar Stains are offered only in the form of a pulp or paste because this company has found after much experimental work that only in the pulp form can the stains be made to combine certain advantages.

They are absolutely fadeproof. Pecora Stains retain their original tones and the appearance of buildings is preserved as originally planned. These stains are exceptionally strong, which reduces the amount necessary for a given job and so cuts down handling. This strength also is responsible for the economy of its use and for the deep richness of tone that is obtained with Pecora Stains. The advantage of permeability in adding a pulp stain instead of hoeing dry materials into a wet mass of mortar is obvious.

The general acceptance of Pecora Mortar Stains as the standard of mortar colors is evidence that the pulp form is superior.

Properties—Pecora Mortar Stains are manufactured from carefully selected, finely ground, rich ores in combination with extenders and fixatives. These materials are dissolved in chemicals to produce a non-acid pulp. This pulp forms a chemical union with the mortar, and serves to strengthen rather than to weaken it. As the mortar sets, the colors become permanent making rich, clean tones, free from streaks and spots. Pecora Mortar Stains do not cause or increase efflorescence on the face of brick walls.

Colors—Shades below are always in stock. Special shades made to order.

Black	Windsor	Colonial drab
Brown	Red	Amber
Dark brown *(chocolate)*	Buff	Terra cotta
	Fern green	French gray

Specifications—The spotting and fading that results from the use of inferior materials, and the necessity for expensive tuck pointing as a result, may be avoided by the use of the following outline form:

All mortar to be colored or stained with Pecora Mortar Stain, manufactured by PECORA PAINT COMPANY, Philadelphia, Pa., using by measure 1 bucket of paste or pulp to 7 buckets of face wall mortar.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly. Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze before being mixed with mortar.

Note: Depending upon depth of shade desired, the following proportions per 1000 brick, ordinary stretches, will be found to approximate quantity desired:

Red, Buff, Terra Cotta and Amber—For ⅛-in. joint use 45 to 55 lb.

Brown, Windsor, Colonial Drab, Fern Green, French Gray and Dark Brown—For ⅛-in. joint use 35 to 45 lb.

Black—For ⅛-in. joint use 20 to 30 lb.

Mortar varies and takes more or less stain according to richness of lime and quality of sand. Before laying brick it is suggested that a small portion of the stained mortar should be taken from the mortar bed and dried out thoroughly to determine whether the proper quantity of stain is being used to produce the shade desired.

Literature—Booklet, sent on request, showing actual colors and giving full details and photographs of important buildings, with testimonials from architects and owners.

Pecora Metal Sash Putty

Uses—A specially prepared putty for use in metal sash only.

Advantages—Pecora Metal Sash Putty is the modern plastic product developed by this company to replace white lead, litharge and ordinary putties used in connection with metal.

It is a "special duty" putty, compounded to retain its elasticity and adhesiveness and so to take up the difference in coefficient of expansion between glass and steel.

Properties—It remains soft in the package and is immediately ready for use when removed. It is "long" and therefore does not require manipulation by the workmen. This and its ease of application reduce installation costs.

Colors and Samples—The standard shade is dark gray. Other shades are made to order. Sample on request.

Specifications—The one safe way to specify is by name: Pecora Metal Sash Putty.

References—A few of the large buildings where this material has been used by David Lupton's Sons Co., of Philadelphia, Pa., are:

Bethlehem Steel Co., South Bethlehem, Pa.
General Electric Co., Schenectady, N. Y., and West Lynn, Mass.
Fore River Ship & Engine Building Co., Fore River, Mass.
Dayton Electric Company, Dayton, Ohio
S. L. Allen & Co., Philadelphia, Pa.
Central Railroad of N. J., Elizabethport, N. J.
Keokuk Electro Metals Company, Keokuk, Iowa

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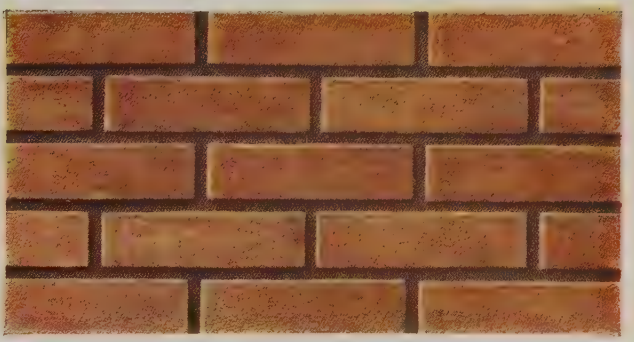
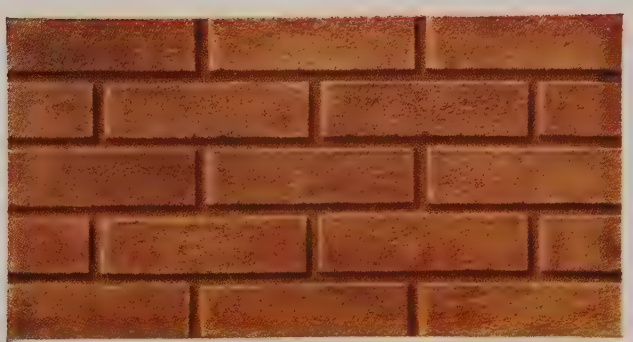
Pecora Red Mortar Stain



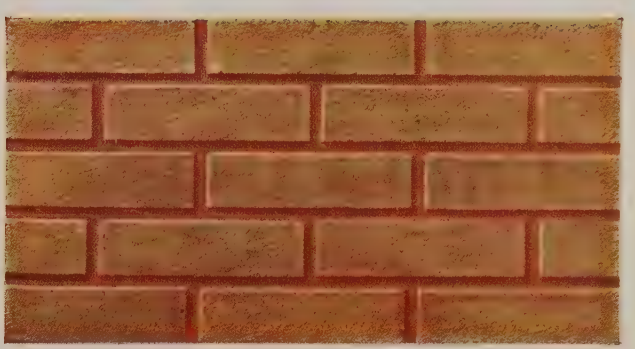
Pecora Black Mortar Stain

Pecora Black Mortar Stain

Pecora Dark Brown Mortar Stain



Pecora Dark Brown Mortar Stain



Pecora Red Mortar Stain

ESTABLISHED 1878

C. K. WILLIAMS & CO.

Manufacturers of Anchor Brand Cement and Mortar Colors

MAIN PLANT

EASTON, PA.

RAW MATERIAL AND SUPPLY PLANTS

ALLENTOWN, PA. EAST ST. LOUIS, ILL. EMERYVILLE, CAL. FLEETWOOD, PA. FRUITLAND, N. Y.
GRANITE CITY, ILL. LEHIGH GAP, PA. MALAGA, SPAIN MARTINS FERRY, OHIO MINERAL POINT, MO.
MONROE, LA.

MINES AND RAW MATERIAL DEPOSITS

ALLENTOWN, PA. EASTON, PA. FLEETWOOD, PA. FRUITLAND, N. Y. JAEN, SPAIN
LEHIGH GAP, PA. MINERAL POINT, MO. MONROE, LA. READING, PA. ST. GENEVIEVE, MO.
WYOMISSING, PA.

AGENTS IN ALL PRINCIPAL CITIES

Products

ANCHOR BRAND STUCCO COLORS.
ANCHOR BRAND MORTAR COLORS.
ANCHOR BRAND CEMENT COLORS.

Anchor Brand Cement Colors

Anchor Brand Cement Colors are very finely ground and produce clear, bright tones with a minimum of coloring material. They are used in floors, sidewalks, cast stone work, roofing and floor tile, stucco, etc., and should not be confused with mortar colors.

For Cement Floors—Although colored cement floors are comparatively inexpensive, they should never receive the treatment of a cheap floor. Colored cement, if carefully laid, finished and protected, will be found to possess all the decorative qualities of more expensive materials, along with the strength and economy of concrete.

For Stucco—The popularity of colored or tinted stucco surfaces is increasing rapidly. Directions for the use of our stucco colors will be furnished on request.

Available Colors—Our list of colors suitable for cement and stucco work is too long to publish here, but the more important numbers are given below. For special shades or tints, we will be glad to supply samples as requested.

No. 500	Red Oxide	No. 17	Dark Buff
No. 1195-B	Red Oxide	No. 1169	Brown
No. 1241	Red Oxide	No. 805	Brown
No. 305	Red Oxide	No. 269	Green
No. 690	Red Oxide	No. 271-S	Green
No. 1149-M	Yellow Oxide	No. 328	Blue
No. 5	French Yellow	No. 249	Black

Specifications for Coloring Cement Floors

Subfloors under colored cement topping should be specified as usual, although it is better to use a fairly dry mix and tamp thoroughly. Allow 1 in. for top dressing, which should be laid immediately. The following paragraphs should be incorporated in the specifications:

Cement Floor—Cement color, wherever specified, shall be Anchor Brand Cement Color, manufactured by C. K. Williams & Co., Easton, Pa., and delivered to site in original packages.

Top Finish—A top finish not less than 1 in. thick shall be applied to floors in (state part of work), topping to be composed of 1 part cement and 2 parts of sharp clean sand, free from loam, and from 3 to 10% of color, according to results desired.

Mixing—Cement, sand and color shall be thoroughly mixed before water is added. Only enough water shall be added to make a heavy paste. Mixing shall continue till the mass is absolutely free from spots or streaks of color.

Application—While base is still moist, top dressing shall be applied as follows: Trowel down about ½ in. of colored cement at a time, so as to work the air out of the mass. Build to the surface in this manner. Use the stroke board to chop the surface, as the mass will be too tough to stroke in the usual way. Take off any surplus with the trowel. Level the surface and let it lie till it becomes dull. Do not trowel until all water on the surface disappears.

Tile Effect (Optional)—48 hours after application of top finish, floors shall be cut ⅛ in. deep with a three-cornered file sharpened to a diamond point, so as to produce a tile effect in the pattern directed by the architect.

Note: Cutting floors while green will produce a ragged edge.

Protection—As soon as topping is sufficiently set, floors shall be covered with a 2-in. thickness of sawdust, which shall be kept wet for at least 2 weeks.

Cleaning and Waxing (Optional)—When protective coating is removed, the surface shall be washed with linseed oil soap, using a wire brush if necessary, to remove dirt and stains. When clean and dry, the surface shall again be covered with a 2-in. thickness of sawdust.

Just before the floor is to be put into use, it shall be polished with a floor wax approved by the architect and applied in accordance with the manufacturer's directions.

Anchor Brand Mortar Colors

The growing popularity of Mortar Colors during the past decade is largely due to the following reasons:

(1) Mortar to Match Brick—Where particular color effects are desired, such as in brick panels of contrasting or harmonizing color or for interior work, especially hearths, mantels, etc., the effects are greatly increased by coloring the mortar to match the brick. The American Face Brick Association standard specifications provide:

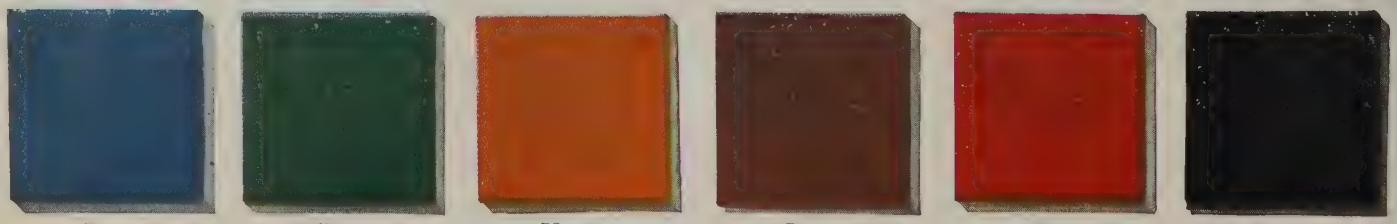
"The hearth shall be of (name) brick laid as per drawings in a 1:3 cement mortar to match the brick."

(2) For Mortar Contrasting with Brick—By laying the brick in mortar of a color and shade which will bring out the full value of brick texture and tone gradation, a beautiful effect is secured. Some combinations which have become very popular are as follows: rough texture variegated red brick with buff or chocolate mortar; red brick with black mortar; and smooth-surface light buff or yellow brick with red mortar.

(3) For "Mellowing" the Mortar—One of the principal charms of old brick buildings is the warm and mellow tone of the mortar. To reproduce the charm of half-century-old mortar, a judicious use of mortar colors will prove most satisfactory.

(4) For Color Control—The color value of sand and cement varies greatly with the source of material. Our standard specifications provide architects with an exact method of color control.

(5) One-fifth of the Brick Wall Surface Is Mortar—Proportions vary, but in the ordinary wall with ½-in. mortar joints, approximately one-fifth of the wall surface is mortar. For this reason architects realize the necessity of selecting the mortar color with the same discriminating care that is used in the choice of the brick.



BLUE GREEN YELLOW BROWN RED BLACK

Cement Floor Tile Colored with Anchor Brand Cement Colors

Continued on next page

Left

Five Range Rough Texture Brick Laid with Anchor Brand No. 19 Buff

188 lbs. Sand (2 cu. ft.)
94 lbs. Cement (1 bag)
9½ lbs. Hydrated Lime
15 lbs. No. 19 Buff

Right

Full Range Rough Texture Brick Laid with Anchor Brand No. 1151 Red

188 lbs. Sand (2 cu. ft.)
94 lbs. Cement (1 bag)
9½ lbs. Hydrated Lime
20½ lbs. No. 1151 Red

Anchor Brand Colors are manufactured in our own mills to meet the three essential requirements: *permanence of color,* so the mortar will not change its shade with age; *uniformity of color,* so that all batches of mortar in which a given color is used will be exactly alike; and *fineness of grinding,* so that the maximum coloring power is developed.

Colors—The following ten colors are standard:

No. 1151	Red	No. 19	Light Buff
No. 115	Red	No. 220	Single Strength Black
No. 1184	Brown	No. 222	Double Strength Black
No. 17	Dark Buff	No. 1174	Double Strength Chocolate
No. 18	Dark Buff	No. 257	Lime Proof Green

For special work we can supply special colors of any shade desired. Also some very good tints can be obtained by mixing the regular colors. Grays are obtained by using black sparingly, etc.

Sold in Dry Form—It is our experience that colors in the dry form are least expensive to the user and show the greatest coloring power per unit of weight.

Specifications for Anchor Brand Mortar Colors

The following paragraphs are to be inserted in the Brick Masonry specifications:

Mortar Color—Mortar color shall be Anchor Brand Mortar Color, manufactured by C. K. Williams & Co., Easton, Pa., and delivered to the site in the original packages.

Cement Mortar—All mortar for face brick work in (state part of work) shall be accurately mixed to the formula: 188 lbs. (2 cu. ft.) sand, 94 lbs. (1 bag) cement, 9½ lbs. hydrated lime, with the proper amount of Anchor Brand Mortar Color.

The exact quantity of color to be used will be decided by the architect after the construction of test panels.

Mixing—Dry color, sand, hydrated lime and cement shall be thoroughly mixed before water is added. After the water is added, mixing shall continue until the mass is absolutely free from spots or streaks of color. Mortar shall be mixed as stiff as is practicable, and batches shall be kept as nearly as possible at the same consistency throughout the job. The same proportions of ingredients shall be accurately maintained in all the batches. The kinds of lime, sand, cement and color shall not be changed after the work has begun. *See Notes (1) and (2).*

Test Panel—Test or sample panels as required by the architect shall be constructed in the same manner and of the same thickness as the finished wall. Face brick for test panel shall be laid in mortar mixed according to the formula and directions given above. After test panels are thoroughly dry, the architect will decide whether the color of the mortar is satisfactory, or whether the amount of mortar color in the formula should be increased or reduced. *See Notes (3) and (4).*

Cleaning and Pointing—When plasterer has left building, all surface brick and mortar shall be thoroughly cleaned down by applying a solution containing not more than 1 part of muriatic acid to 20 parts of water, using a stiff wire brush. Surface shall then be rinsed with clean water. All defective joints shall be pointed up at this time. *See Notes (5) and (6).*

Notes to Specifications

(1) *Lump Lime*—If lump lime is used in place of hydrated lime, it must be thoroughly slaked and allowed to cool at least 24 hours before being brought in contact with mortar colors. *Hot lime bleaches color.*

(2) *Accurate Mixing Necessary*—Lime is a strong pigment; sand and cement also have an important effect on color. It is important to measure accurately and maintain same proportions throughout the work.

(3) *Omission of Test Panel*—For smaller jobs where cost is an important consideration, the test panel may be omitted. In this case, a little of the mixed mortar may be taken from the first batch and pressed into a small cake. When this cake is dry, it can be determined whether the color of the mortar will be satisfactory.

(4) *Pigments Differ in Strength*—For this reason, a specific formula is given for the use of every mortar color.

(5) *Raking Joints*—Defer raking till mortar has begun to set.

(6) *Prevention of Efflorescence*—If mortar is mixed stiff and raking of joints deferred till mortar has begun to set, efflorescence will rarely be found. Efflorescence is in no way caused by Anchor Brand Mortar Color. It is due to the occurrence of soluble salts in cement, sand, lime, water or the brick, and is just as common in plain mortar as in colored mortar, though not so easily visible.

Special Facilities of C. K. Williams & Co.

C. K. Williams & Co. have a highly specialized organization together with mines, raw material deposits, and a plant equipment for the production of an extensive line of both natural and artificial pigments. At Easton alone, our plant buildings and storage space for raw materials cover more than 75 acres. Production of colors of maximum quality and uniformity has been the company's policy for fifty years.

Left

Five Range Rough Texture Brick Laid with Anchor Brand No. 1174 Double Strength Chocolate

188 lbs. Sand (2 cu. ft.)
94 lbs. Cement (1 bag)
9½ lbs. Hydrated Lime
15 lbs. No. 1174 Double Strength Chocolate Brown

Right

Full Range Rough Texture Brick Laid with Anchor Brand No. 222 Double Strength Black

188 lbs. Sand (2 cu. ft.)
94 lbs. Cement (1 bag)
9½ lbs. Hydrated Lime
14 lbs. No. 222 Double Strength Black

APPALACHIAN MARBLE CO., INC.

Quarriers and Manufacturers of Appalachian Tennessee Marble
Manufacturers of Foreign and Domestic Marble

KNOXVILLE, TENN.

APPALACHIAN TENNESSEE MARBLE, especially for interior use, including Appalachian Golden Vein, Appalachian Champion Pink, Appalachian Roseal, Appalachian Special Silver Gray, Appalachian Dark Chocolate, Bond Pink, Bond Tavernelle and other Appalachian colors.

Foreign and Domestic Marble.

Floor Tile, Ashlar Marble Flagstones, Tennessee Granito.

Quality

Appalachian Marbles are non-absorbing, long wearing, strong and easily workable.

	Average
Co-efficient of absorption	.047
Tensile strength (transverse to bed)	1,554 lbs. per sq. in.
Tensile strength (with bed)	1,551 lbs. per sq. in.
Transverse strength (modulus of rupture)	2,686 lbs. per sq. in.
Compressive strength	18,274 lbs. per sq. in.

These tests made by U. S. Bureau of Standards and reported by T. Nelson Dale, Retired Geologist, U. S. Geological Survey.

Standard Thickness

Appalachian Marble is cut in standard thicknesses. They are (after honing and polishing): 7/8, 1¼, 1½ and 2 inches. Other thicknesses on order.

Floor Tile

Appalachian Tennessee Floor Tile comes in 8x16, 10x20 inches and 12 inches square, standard sizes. It can also be obtained in any special sizes the architect may desire for exactly carrying out his own ideas. It can be had in a wide variety of beautiful colorings.

Appalachian floors are low in initial cost, low in maintenance cost and last the life of the building. They are easy and economical to keep clean, materially reduce the dust nuisance and make for better health. They subdue traffic noise and afford a safe, comfortable walking surface.

8x16 and 10x20-inch tile are always on hand, and shipment can be made on receipt of order.

Ashlar

Appalachian Marble tile for ashlar, either hone or polish finish, can be furnished in our standard tile sizes at prices which make marble ashlar available for the comparatively moderately priced home as well as for more pretentious structures. This is because it is one of our by-products.

Tennessee Granito

Sizes No. 1, 2 and 3 for terrazzo floors. Crushed from Bond Pink Marble, making a dark, bright Pink Tennessee Granito.

Tennessee Marble Flagstones

For sun room, terraces, garden walks and stepping stones. Can be laid in distinctive and exclusive design, in shapes just as taken from our yard.

To meet the increasing demand for such uses of Tennessee flagstones, we have provided large storage facilities and can give immediate delivery.

Price

Because of quantity production Appalachian Marbles, although as beautiful as most fine foreign marble and superior in quality to the best of them, are a great deal cheaper in price than imported marbles, as well as like quality domestic marbles.

Installation

Appalachian Marble has been manufactured exclusively by us for sixteen years. More than $1,000,000.00 of it is sold annually in England, Canada, Latin America and every state of the Union.

Many of the most noted public and office buildings, churches, schools, theaters, hospitals, stores, banks, etc., have interiors, including floors and ashlar work, of Appalachian Marble.

Foreign Marble

Our established connections with the leading foreign quarries enable us to manufacture practically any desired foreign marble at a substantial cost saving.

Prompt Shipments, Low Rates

Huge production facilities and entire absence of labor troubles insure quick deliveries. Freight rates on marble from the Appalachian mill are estimated at commodity rates to all points in the United States and Canada.

Samples

Polished samples, showing the beauty of the Appalachian Marbles, will be sent to any interested architect or contractor, upon request.

Cost Estimates and Co-operative Service

The Service Department of the Appalachian Marble Co., Inc., welcomes the opportunity to co-operate with the architect. This co-operation reaches its highest state of efficiency when architects furnish the Appalachian Service Department with blue prints of the projects upon which they are working. The Service Department is then in a position to carefully estimate on work and offer all possible co-operation.

All Marble from One Source

Though a project may contemplate the use of foreign marble in addition to Appalachian Tennessee and other domestic marble, the complete cost estimate may be obtained from the Appalachian Service Department. Obtaining all marble from one source is not only a convenience but has definite shipping and price advantages.

Marble Working Drawings

Complete marble working drawings are made up by our drafting department to be used in submitting to the architects for approval as to jointing and for the securing of accurate Building Measurements.

Catalogue

A copy of the elaborate Appalachian loose leaf catalogue, illustrated in full colors, will be gladly furnished to architects and others interested in interior marble.

CARTHAGE MARBLE CORPORATION

Producers of Ozark Gray Marble, Veined and Veinless

QUARRIES AND MILLS

CARTHAGE, MO.

Product

OZARK GRAY MARBLE:

Sawed, Planed, Turned and Cut for polished interior and exterior work.

Facilities

The CARTHAGE MARBLE CORPORATION owns eight plants and quarries which include 55 gang saws, 25 polishing machines, 15 rubbing beds, 8 diamond saws, 12 planers, 11 traveling cranes, 30 channelers and 20 derricks.

Ozark Gray Marble can be furnished by marble or stone dealers anywhere in the United States or Canada.

Color and Texture

Veined Interior—A true gray with veins varying in color sufficiently to give life and beauty to the marble.

Veinless Interior—A soft gray, fine grained, monotone marble with a tinge of buff. Uniform in color, but with enough variation to be interesting.

Ozark Marbles, either veined or veinless, can be used economically wherever it is practical to use marble, and their neutral tones blend readily with any color scheme.

Exterior—White with a tinge of gray. Because of its wearing and non-stain qualities, its use is especially recommended for steps, base course, trim or entire building. Fabricated price for the exterior is, we believe, lower than for any other marble, and only slightly higher than for ordinary limestones.

Finish—On exterior work, sand rubbed finish shows up to best advantage on ordinary work, but where a special finish is wanted, rock face, bush-hammer or tooled may be used. It is susceptible to all finishes of any natural stone or marble, but polished finish is recommended for interior finish only.

Veining—Attention is called to the fact that this Company cannot agree to furnish Carthage Marble free from veins, which are characteristic of all marbles.

Analysis

Chemical analysis shows that Ozark Gray Marble contains nothing which can in any way discolor it. It is 99% calcium carbonate and is free from iron.

Non-absorbent

The raitio of absorption of this marble is 45/100 of 1%. Such a quality is of great importance in both exterior and interior work, for stains that cannot penetrate the marble can be easily removed from the face, a feature of great value in sanitary work.

Strength

The strength of Ozark Gray Marble is such that it stands all tests subjected through various kinds of work. Its crushing strength is about 18,000 lb. per sq. in., which is considerably more than is required in any building work.

Short Specifications

Exterior Work—All cut stone to be of properly selected Carthage building stock, as furnished by the CARTHAGE MARBLE CORPORATION, Carthage, Mo. Veining averaging ¼ in. or less, if tight and sound, is permissible anywhere in the face of the marble.

All steps, door and window sills, coping and projecting courses shall be cut to lay on the natural bed. Base, belt courses, ashlar, lintels, etc., shall be set on edge. On marble set on edge, veining shall not intercept the face but clouded faces are permissible.

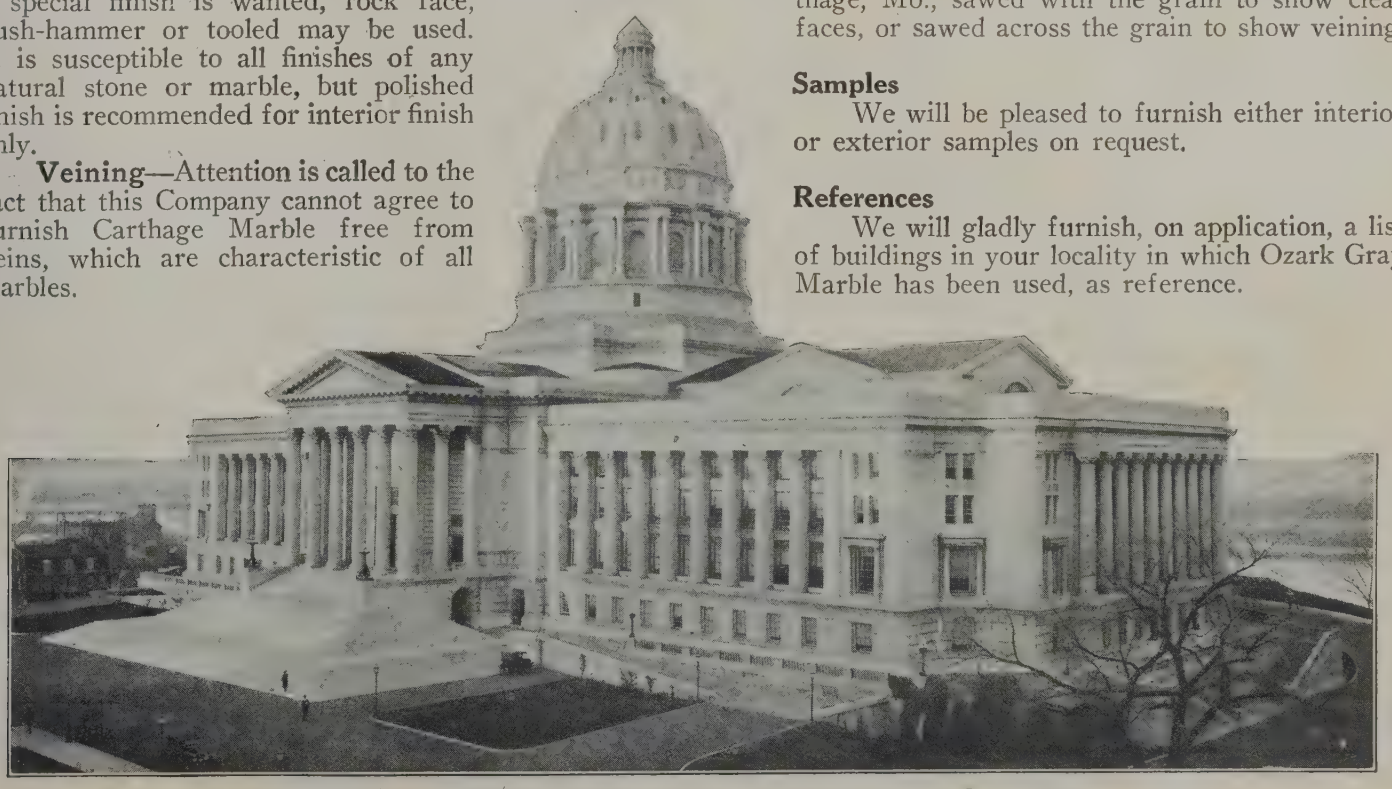
Interior Work—Marble to be Ozark Gray as furnished by the CARTHAGE MARBLE CORPORATION, Carthage, Mo., sawed with the grain to show clear faces, or sawed across the grain to show veining.

Samples

We will be pleased to furnish either interior or exterior samples on request.

References

We will gladly furnish, on application, a list of buildings in your locality in which Ozark Gray Marble has been used, as reference.



Missouri State Capitol—Ozark Gray Exterior and Ozark Gray Interior

THE GEORGIA MARBLE COMPANY

TATE, GA.

BRANCH OFFICES

ATLANTA, GA., 511 Bona Allen Building
CHICAGO, ILL., 456 Monadnock Block
NEW YORK, N. Y., 1328 Broadway—Telephone, Wisconsin 6574

Products

GEORGIA MARBLE for exterior and interior building and monumental work.

Rough quarry blocks, sawed stock or finished work in the following marbles produced by us: "WHITE," "LIGHT CHEROKEE," "SILVER GRAY," "MEZZOTINT," "CREOLE," "VERDE ANTIQUE" and "PINK."

Durability

Georgia marble, owing to its dense, flawless, crystalline formation and non-absorbing qualities, does not disintegrate. It will stand the test of time, as proved by use in many fine buildings and memorials.

Colors

"White"—This company operates four quarries of white marble ranging from almost pure white to white with more or less dark marking, known as "White Georgia" and "Kennesaw."

"Light Cherokee"—A very light gray with clouding and veins running in waves well distributed.

"Silver Gray"—A uniform pearl gray, practically free from marking.

"Mezzotint"—Gray background with rather heavy dark marking occurring in waves, between "Silver Gray" and "Creole."

"Creole"—Heavily veined and having white background with black and bluish black veining and figures.

"Verde Antique"—Ranges from medium green to dark green with light colored veins.

"Pink"—Ranges from a very light salmon to a deep old rose with very warm tints.

Physical Properties of Georgia Marble

Crushing Strength—Tests by the Ordnance Department, United States Army, show crushing strength to be from 11,000 to 16,000 lbs. per sq. in.

Analysis—Georgia marble is by analysis, over 98% pure Carbonate of Calcium.

Statuary

The "White" and "Silver Gray" Georgia marble are unexcelled for sculpture work exposed to the weather. The marble is unaffected by the most severe weather. Large sizes can readily be obtained.

Columns and Monoliths

Special attention is given to the production of long columns in one piece. The company has furnished monoliths 30 ft. long by 4 ft. diameter.

Facilities

Facilities for production and finishing are unexcelled. Eight quarries are operated, which will easily produce 1,000,000 cu. ft. per annum. The equipment of the four plants consists of upwards of 100 gang saws, 22 rubbing beds, planers, lathes, diamond saws, carborundum machines, etc.; and with an unlimited supply of marble any size order can be accurately and promptly filled.

References

A few representative buildings in which Georgia marble has been used, location, and architect or sculptor:

Exterior of Buildings

Cleveland Museum of Art, Cleveland, Ohio, Hubbell & Benes
New York Stock Exchange, New York, N. Y., Trowbridge & Livingston
Girard Trust Company, Philadelphia, Pa., McKim, Mead & White, and Furness, Evans & Co.
U. S. Post Office, Birmingham, Ala., Supervising Architect, Treasury Department
Pan American Building, Washington, D. C., Albert Kelsey and Paul P. Cret
Federal Reserve Bank, Atlanta, Ga., A. Ten Eyck Brown
Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks
Capitol Building, San Juan, Porto Rico, Ralph Carmoega
Federal Reserve Bank, Detroit, Mich., Graham, Anderson, Probst & White

Interior of Buildings

Guardian Savings & Trust Co., Cleveland, Ohio, Walker & Weeks
State Capitol, Salt Lake City, Utah, Richard Kletting
House of Representatives Office Building, Washington, D. C., Thomas Hastings and Elliott Woods
Manufacturers & Traders National Bank, Buffalo, N. Y., Furness, Evans & Co.

Monumental and Sculpture

Lincoln's Statue, Lincoln Memorial Building, Washington, D. C., Daniel Chester French
"Civic Virtue" Municipal Fountain, City Hall Park, New York, N. Y., Frederick W. MacMonnies
Pediment, National Capitol, Washington, D. C., Paul Bartlett
Du Pont Memorial Fountain, Washington, D. C., Daniel Chester French
Columbus Memorial Fountain, Washington, D. C., Lorado Taft
McKinley Birthplace Memorial, Niles, Ohio, McKim, Mead & White.

Largest Marble Building in the United States—Field Museum, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects
Exterior of this building is constructed entirely of Georgia Marble

CHARLES J. SIMON & COMPANY

Designers and Workers in Stone
Wood and Stone Carving, Sand Etching, Marble Screens

1910-1930 Brighton Road, N. S.
PITTSBURGH, PA.

Product

INLAID MARBLE MOSAIC.

Brief Description

The modern inlaid Marble Mosaic, developed and patent applied for by CHARLES J. SIMON & COMPANY, presents a new idea in marble decoration for those of discriminating taste. The process of manufacture consists of several steps. The design is first traced on the marble and then cut out to a depth of ¼ inch with special tools. In this cut is placed colored mastic which forms the design and makes an everlasting decoration in the marble.

Possibilities and Uses

The possibilities in connection with the artistic uses of this new development will be apparent at once to every architect. For walls, floors or ceilings any type of design may be carried out in marble. Any number of colors may be used, the range of combinations is almost limitless.

Emblems, panels, portraits, figures and ornaments can now be produced in marble with all the delicate coloring and shading of that beautiful stone.

Wherever the choice of materials is limited, wherever the color of marble offers the best solution of your problems, you can now have your designs executed in stone at a moderate additional cost to the plain marble.

Inlaid Marble Mosaic is especially suitable for use in altars, pulpits, floors, wainscots, banks, memorial halls, hotel lobbies, theaters, bathrooms, showrooms, etc.

Special Work

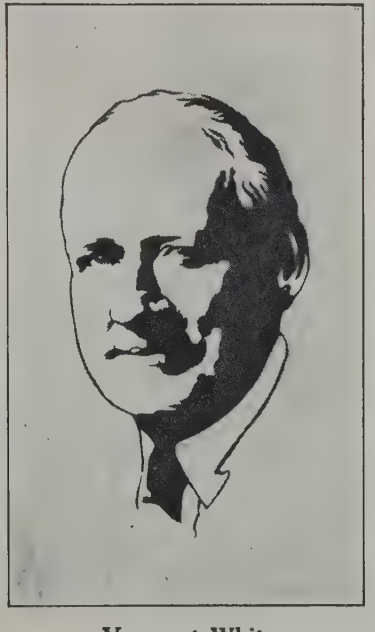
All work is done especially to order. Architects are invited to send their designs to the company for estimates of cost. The design staff of the company will be glad to co-operate in securing unusual effects.

Your local marble companies may also be consulted.

Verd Antique

Italian White

Verd Antique



Vermont White

Tennessee Pink

TYPICAL EXAMPLES OF INLAID MARBLE MOSAIC

VERMONT MARBLE COMPANY

Producers and Manufacturers of Exterior and Interior Marbles

PROCTOR, VT.

BRANCHES AND SALES OFFICES

BOSTON, MASS., 44 School Street
ALBANY, N. Y., 62 Waldorf Building
CHICAGO, ILL., 5535 No. Lincoln Street
CLEVELAND, OHIO, Hickox Building
DETROIT, MICH., % Builders & Traders Exchange, 439 Penobscot Building
CHARLOTTE, N. C., First National Bank Building
NEW YORK, N. Y., 101 Park Avenue
PHILADELPHIA, PA., 22nd and Westmoreland Streets
WASHINGTON, D. C., Commercial National Bank Building, 14th and G Streets, N. W.
SAN FRANCISCO, CAL., 244 Brannan Street
TACOMA, WASH., East End 11th Street Bridge
LOS ANGELES, CAL., 605 Roosevelt Building
DALLAS, TEX., Vermont Marble Company of Texas, 1513 Wall Street
HOUSTON, TEX., Vermont Marble Company of Texas, 920 Electric Building
SAN ANTONIO, TEX., 905 Builders Exchange Building
TORONTO, ONT., Ontario Marble Co., Ltd., 504 Manning Chambers, Corner Bay and Queen Streets

Facilities

The company has large sawing mills and finishing plants in Vermont; also finishing plants in Philadelphia, Cleveland, Chicago, Dallas, San Francisco and Tacoma. At the last-named plant is the storage yard for the Alaska marble, which can be shipped from there in rough or finished state. Alaska marble can also be supplied from any of the other plants.

Varieties

Exterior—Mountain White Danby, Imperial Danby, Highland Danby, Corona, Eureka and Pearl Gray Vermont.

Interior—*Vermont Marble*—Over 40 varieties, including white, lightly clouded and veined; gray, light green and dark green; red and black.

Alaska Marble—Several different kinds, the predominating color being pearl white veined with gray or black.

Physical Properties of Marble

Tests made by the United States Bureau of Standards show Vermont marble to have an ultimate crushing strength varying from 11,000 to 16,000 lb. per sq. in.

Tests made by the United States Bureau of Standards show that Danby Vermont marble, a variety much used for exterior purposes, absorbs about one-tenth of one per cent by weight when immersed in water.

Suggested Specifications for Exterior Marble

Material—All cut stone work shall be (insert name of variety of marble wanted).

Quality—All marble entering into the construction of the work shall be selected for uniform color. It must be free from cracks, chips, stains, or other defects upon exposed surfaces.

Samples—Before proceeding with the work the contractor shall submit a sample 4x8x2 in. of the marble he proposes to use. One face of this sample shall have (specify what finish is desired).

Joints—All marble shall be cut for $\frac{3}{16}$-in. joints.

Finish—All exposed surfaces of marble work shall have (specify desired finish).

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's approval, shop drawings showing in plan and elevation the dimensions of all stones, position of joints, and the spacing of dentils or other repeated ornament.

Cutting—All cutting must be done in a workmanlike manner and in accordance with the shop drawings referred to. All faces shall be free from winds, so as to present a true and even surface. Joints shall be at right angles to the face. Intersecting profiles shall be accurately cut. Re-entering angles of mouldings shall be cut from the solid, unless otherwise shown by the drawings. The contractor shall, where called for by the architect's drawings, cut the marble work to accommodate steel, flashings, leaders or other structural materials.

Delivery—All marble shall be crated or otherwise protected so as to be delivered at site in good condition.

Storage—All marble stored at the site shall be on cleats, off the ground, and protected where necessary from any stains from above.

Setting—Marble shall be set with a derrick and in full bed of mortar. The mortar-bed shall be kept back at least 1 in. from the face of the stones.

Mortar—Mortar for setting marble shall be composed of 1 part white non-staining portland cement, 3 parts clean, sharp sand and a quantity of hydrated lime equal to 10% of the volume of cement.

Institute of Arts, Detroit, Mich.—Vermont Imperial Danby Marble
Paul P. Cret and Zantzinger, Borie & Medary, Architects

Continued on next page

Protection—During construction, all sills, moulding, or other work liable to injury shall be suitably protected by boards which shall not be removed until the cleaning and pointing is done.

Anchors—Anchors to be of wrought iron, heavily galvanized or painted 2 coats with an approved brand of dampproofing paint and allowed to dry before using. For each stone 2 ft. long one anchor shall be used, and for each stone over 2 ft. long, at least two anchors. Provide suitable clamps at corners and such special anchors as the architect may direct. Balusters shall be doweled top and bottom with brass, copper, zinc or some other non-staining metal.

Pointing and Cleaning—All exposed surfaces of the building shall, on completion, and when directed by the architect, be cleaned with clean water only and fiber brushes. All joints shall be raked out, 1 in. back from the face, and carefully pointed with a mixture of 1 part white non-staining portland cement and 2 parts clean white sand. Joints shall be ruled with a tool of approved shape.

Vermont Interior Marble Service

We contract either for interior marble work installed or to finish and furnish it to local interior marble dealers, following whichever method will give best service to architects, contractors and owners.

Suggested Specifications for Interior Marble

Material—All interior marble shall be as follows: All toilet marble, Vermont Venoso; all corridor marble, Vermont Brocadillo. (Always insert the name of the desired grade, avoiding the too general term "Vermont Marble.")

Quality—All interior marble shall be of good quality, free from stains. Patching will be permitted only where the natural imperfections of a particular stone are subject to correction by the established usage of the industry.

Samples—Before proceeding with the work the contractor shall submit to the architect samples of all the marble specified above, 1 ft. square and 7/8 in. thick.

Finish—All floors and stair treads shall have a fine sand finish. All standing marble shall be highly polished.

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's approval, shop drawings showing proposed jointing.

Measurements—Before proceeding to finish the interior work the contractor shall verify all measurements at the building.

Cutting—The marble contractor shall do such necessary cutting and fitting to accommodate his work to other trades as is sanctioned by common usage in the trade.

Setting—All floor marble shall be set in a cement mortar of 1 part cement and 3 parts sand, adding a quantity of hydrated lime, not exceeding 10% of the volume of cement. The concrete fill must be swept and thoroughly sprinkled before setting is started. All stair treads and all standing marble shall be set in plaster of paris. All wall marble shall be securely anchored with brass, copper or aluminum wire.

When work is completed all marble shall be cleaned and left in good condition.

Classes of Work Supplied

Wainscot and interior decorative treatment generally: floor tile, stair treads, bank screens, counter tops, soda counters, electric switchboards, scale tops, lamp bases, and many other purposes.

Adaptability

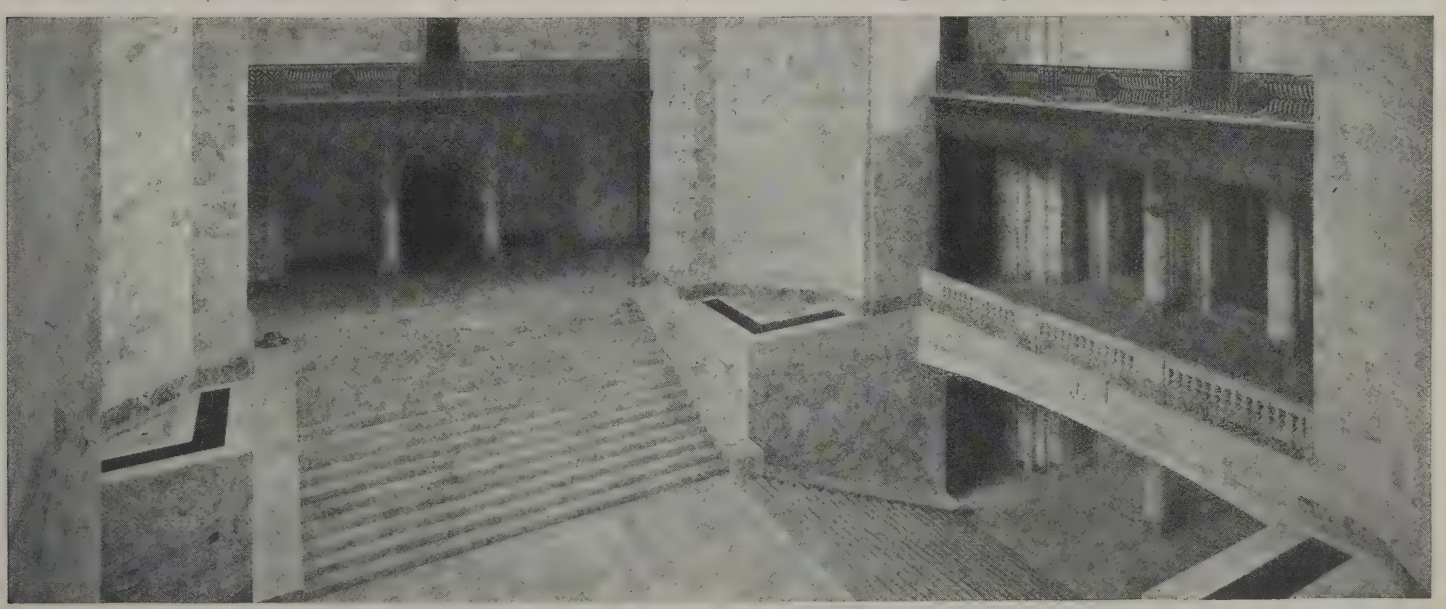
Innumerable are the ways in which Vermont marble may be applied to building construction. Nor is it merely a beautiful product. It is thoroughly sanitary as well as fireproof, though it may be readily cleaned. It needs no refinishing. Although initial cost of marble may be slightly in excess of certain other materials, in the end it is no more expensive.

Marble Exhibit in New York City

There is an exhibit of large-sized samples of our marbles at our New York office in the Architects' Building, 101 Park Avenue, to which architects, engineers, contractors and owners are cordially invited.

"The Book of Vermont Marble"

A brief compendium of our products and the best ways to use them; our facilities; a number of drawings and details showing most approved methods of construction in exterior and interior marble work, etc. Contains 65 pages, of standard architect's size. Furnished without charge to any architect upon request.



State Capitol, Olympia, Wash.—Tokeen and Gravina Alaska Marble
Wilder & White, Architects; Bebb & Gould, Associates

NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION

INCORPORATED

HARRIE H. SHERMAN, Secretary — WEBB H. SHERMAN, Field Representative

31 State Street, BOSTON, MASS.

LIST OF MEMBERS

BOOTH BROS. & HURRICANE ISLE GRANITE CO.
New York, N. Y., 208 Broadway
Branch Office, New London, Conn.

JOHN L. GOSS CORPORATION
Stonington, Me.
Sales Office, Boston, Mass., 77 Summer Street
Sales Agents:
New York, N. Y., 286 Fifth Avenue, A. LePoidevin & Co., Inc.
Philadelphia, Pa., 2302 Spruce Street, Frank Williamson
Middle Western Territory, William H. Mitchell, 30 Church Street, New York, N. Y.

MAINE & NEW HAMPSHIRE GRANITE CORPORATION
North Jay, Me.
Branch Offices:
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New York, N. Y., 100 East 42nd Street (Pershing Square Building)
Chicago, Ill., 228 No. LaSalle Street, Room 1920
Detroit, Mich., 1416 St. Clair Avenue
Minneapolis, Minn., 126 So. 9th Street
Philadelphia, Pa., 1511 Real Estate Trust Building

MARR & GORDON, INC.
Barre, Vt.
Branch Office:
New York, N. Y., 101 Park Avenue, Room 1226

MARR & GORDON OF NEW YORK
Barre, Vt.
Branch Offices:
Ausable Forks, N. Y.
New York, N. Y., 101 Park Avenue, Room 1226

MOUNT AIRY GRANITE CUTTING COMPANY
Mount Airy, N. C.

NEW ENGLAND GRANITE WORKS, INC.
Westerly, R. I.
Branch Offices:
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Pittsburgh, Pa., 302 Commonwealth-Annex Building
Jay R. Wells, Representative
Cleveland, Ohio, 406 The 2341 Carnegie Building
H. L. Walters Company, Representative
Philadelphia, Pa., 34 South 16th Street
Edward A. Jeffery, Representative
Detroit, Mich., 1416 St. Clair Avenue
W. A. Munger, Representative

NORTH STATE GRANITE CO.
Mount Airy, N. C.
Branch Office:
New York, N. Y., 30 East 42nd Street
C. C. Jenkins, Representative

THE NORTH CAROLINA GRANITE CORPORATION
Mount Airy, N. C.
Branch Offices:
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C. C. Jenkins, Representative
Chicago, Ill., 127 No. Dearborn Street
Charles H. Gall, Representative
Philadelphia, Pa., 615 Witherspoon Building
George E. Scranton, Representative

ROCKPORT GRANITE COMPANY
Rockport, Mass.
Branch Offices:
Boston, Mass., 31 State Street
New York, N. Y., 21 Park Row
A. G. MacInnis, Representative
Chicago, Ill., 860 Builders Building
J. D. Duffy, Representative
Philadelphia, Pa., 614 Penfield Building
Frank H. Shilling, Representative
Cleveland, Ohio, Schofield Building
R. L. Queisser & Co., Representative
New Orleans, La., Maritime Building
J. C. Bartley, Representative

J. D. SARGENT GRANITE COMPANY
Mount Airy, N. C.
Branch Offices:
New York, N. Y., 30 East 42nd Street
C. C. Jenkins, Representative
Chicago, Ill., 127 No. Dearborn Street
Charles H. Gall, Representative
Philadelphia, Pa., 615 Witherspoon Building
George E. Scranton, Representative

THE JOHN SWENSON GRANITE COMPANY
Concord, N. H.
Branch Offices:
New York, N. Y., 101 Park Avenue
F. A. Fichtel, Representative
Chicago, Ill., 533 Marquette Building
George B. Jameson, Representative
Cleveland, Ohio, 414 Newman-Stern Building
Exum M. Haas, Representative
Detroit, Mich., Polk Directory Building
J. W. Rollinson, Representative

WOODBURY GRANITE CO., INC.
Burlington, Vt.
Branch Offices:
New York, N. Y., Lexington Avenue, 43rd and 44th Streets, The Graybar Building
Chicago, Illinois

ASSOCIATE MEMBERS

H. E. FLETCHER COMPANY, West Chelmsford, Mass.
LOVEJOY GRANITE COMPANY, Milford, N. H.
A. LE POIDEVIN & CO., INC., 286 Fifth Avenue, New York, N. Y.

Products of the Members

Granite—Rough, Dressed, and Polished—for Commercial, Public, Monumental, and Residential Buildings; for Memorials, Ornamental Public Improvements, Landscape Work, Mausoleums, and Monuments.

Granite—Rough and Dressed—for Sea Walls, Dry Docks, Bridges, Foundations, and similar construction.

Granite—Ashlar, Rubble, Flagging, Riprap, etc. Rock Faced and Seam Faced Granite.

Continued on next page

CLASSIFICATION OF BUILDING GRANITES

Quarried and cut by Association Members

White, Gray, Lavender, Pink, Red, Green, Buff, Brown

Name of granite	Producer and manufacturer	Location of quarry	Grain	Color	Technical classification
Bethel White	Woodbury Granite Co., Inc., Burlington, Vt.	Bethel, Vt.	Coarse inclined to medium	White faintly mottled with gray	Quartz-monzonite
Mount Airy	North Carolina Granite Corp., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	North State Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	Mt. Airy Granite Cutting Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	J. D. Sargent Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Chelmsford White	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Medium	Very light gray	Muscovite-biotite
North Jay	Maine & New Hampshire Granite Corp., North Jay, Me.	North Jay, Me.	Fine	Very light gray	Biotite-muscovite
Chelmsford Gray	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Fine	Light gray	Muscovite-biotite
Milford, N. H.	Lovejoy Granite Co., Milford, N. H.	Milford, N. H.	Fine inclined to medium	Light gray	Quartz-monzonite
Concord	John Swenson Granite Co., Concord, N. H.	Concord, N. H.	Fine to medium	Light to medium gray	Muscovite-biotite
Connecticut White	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Waterford, Conn.	Fine	Medium buff gray, hammers light	Quartz-monzonite
Westerly Blue-White	New England Granite Works, Inc., Westerly, R. I.	Westerly, R. I.	Fine	Bluish gray	Quartz-monzonite
Barre (Light, Medium and Dark)	Marr & Gordon, Inc., Barre, Vt.	Barre, Vt.	Fine to medium	Light bluish gray, medium bluish gray and dark bluish gray	Biotite
Woodbury Gray	Woodbury Granite Co., Inc., Burlington, Vt.	Woodbury, Vt.	Medium	Medium gray	Biotite
Rockport Gray	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Medium gray, slight bluish green tinge	Hornblende
Chelmsford "Bulfinch"	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Fine to medium	Light grayish buff	Muscovite-biotite
Somes Sound	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Mt. Desert, Me.	Coarse inclined to medium	Light grayish buff	Biotite
Goss Pink Deer Isle	John L. Goss Corp., Stonington, Me.	Crotch Island, Stonington, Me.	Coarse	Pinkish, lavender tinted, medium gray	Biotite
Conway Pink	Maine & New Hampshire Granite Corp., North Jay, Me.	Redstone, N. H.	Coarse	Light pink mottled with large gray and small black spots	Biotite
Jonesboro	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Jonesboro, Me.	Coarse inclined to medium	Pinkish gray	Biotite
Red Westerly	New England Granite Works, Inc., Westerly, R. I.	Westerly, R. I.	Medium inclined to coarse	Reddish gray, speckled with black	Biotite
Moose-a-bec Red	Rockport Granite Co., Rockport, Mass.	Jonesport, Me.	Coarse	Dark reddish gray with white and pinkish feldspar	Biotite
Ausable Mottled-Green	Marr & Gordon of New York, Barre, Vt.	Ausable Forks, N. Y.	Coarse	Light grayish green, coarsely mottled with black and bluish spottings	Anorthsite
Rockport Sea-Green	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Dark olive-green-gray with black spottings	Hornblende
Conway-Green	Maine & New Hampshire Granite Corp., North Jay, Me.	Redstone, N. H.	Coarse	Dark yellowish-greenish-gray with black spottings	Biotite-hornblende
Rockport Seam-Face	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium	Dark yellow-brown, bright rust-brown, light yellow-brown	Hornblende

Continued on next page

Granite and Its Architectural Qualifications

Natural Qualifications

Granite has exceptional strength and durability, is practically non-absorbent, and indefinitely withstands exposure to climate and weather. It is available in a wide range of colors and textures and has inherent beauty and character to be found in few other materials.

Granite may be cut into any form desired and dressed in a great variety of finishes. It takes a high and durable polish which will withstand long exposure to the weather. It may be carved with as much refinement of detail as desired. Granite is pre-eminently suited by Nature for exterior architectural uses, and its natural qualifications are unsurpassed and rarely equalled by any other building stone.

Description

Granite is technically described as a holocrystalline, granular rock of igneous origin. The essential constituents are quartz and a potash feldspar. The principal accessory mineral is usually either mica or hornblende. Other minerals occur in small quantities, but are generally secondary to those mentioned.

The accessory mineral, mica, occurs in two forms—black mica or biotite, and white mica or muscovite. The hornblende in building granite is usually black or a very dark green.

Granites are technically classified by the predominating accessory mineral. The most common varieties of building granites are known as biotite, muscovite, biotite-muscovite, muscovite-biotite, hornblende, biotite-hornblende, and quartz-monzonite granites.

As a general rule the color of granite is determined by that of its feldspars, and the hardness by the quartz and feldspars, varying according to the proportion and hardness of the feldspars.

Colors and Textures—The granites produced by Association members include many shades of gray, lavender, pink, red, green, brown, buff and white.

Natural texture varies according to the distribution and size of crystals of the constituent minerals. Granite is graded, as to grain, by the size of its feldspar crystals, from very fine to very coarse. The size of crystals or coarseness of grain has practically no bearing on the structural qualities, but gives to granite the variety of texture which adds greatly to its architectural possibilities.

Physical and Chemical Tests

The standard building granites produced by Association members so far exceed all ordinary architectural requirements as to physical and chemical properties, that specific data on tests have little or no bearing upon the relative architectural merits of the different granites.

In confirmation of this the following extracts from a statement prepared by George F. Laughlin of the United States Geological Survey are appended:

"Physical tests have supplemented actual experience in the use of granite by showing that it exceeds the requirements for the tallest and most exposed buildings to a great degree. With this fact demonstrated, the actual results of strength and porosity tests are of little significance; far less than an accurate knowledge of the component minerals and their state of preservation as revealed by the microscope."

"Only when monuments of solid masonry and of unusual height are to be erected or when paving stone for extremely heavy traffic is to be laid, do crushing tests of granite need any consideration."

"Transverse breaking strengths of granite are also quite adequate to support any load that they are expected to support in buildings."

"Unweathered granites such as are supplied to the high class building trade are for all practical purposes absolutely impervious, except close to the surface of blocks where minute cracks have been developed during splitting or tooling."

"The time necessary for unweathered and properly fabricated granite to show appreciable effects of weathering in buildings is too long to cause concern except for monumental structures intended to last for thousands of years."

"Chemical analyses of granite, as usually recorded, are of little or no value from the builder's standpoint. For proper interpretation they require microscopic study. Such study supplemented by examination of the granite in the quarry and in the building, will disclose the essential facts regarding weathering qualities and other important questions."

Standards of Quality

It will be noted under "Physical and Chemical Tests" that these standard building granites come well within all possible requirements of architectural use, so that standards of material are unnecessary. The cutting properties of the granites from different quarries vary quite materially and it would be very difficult to define standards of workmanship.

Quality of workmanship has been graded by usage into three classifications, which, while somewhat elastic and difficult to define exactly, are pretty well established and recognized by the manufacturers.

Monumental Building Grade—For permanent buildings designed to perpetuate public pride or civic spirit, where utility and economy are subordinate to architectural merit, such as State house, courthouse, library or public memorial.

Good Commercial Grade—For high class buildings designed both for utility and to express something of the character, dignity and stability of the occupancy, such as banks or insurance buildings, high class office buildings, churches, schools, etc.

Ordinary Commercial Grade—For buildings where architectural appearance is subordinate to utility and governed by economic considerations. Workmanship will meet requirements of structural safety, but not carried beyond the point of a good appearance to the casual observer.

Booklet of Color Plates

The Association has published a 24-page booklet, titled "Architectural Granite," which contains twenty-one color plates of some of the principal building granites produced by Association members.

These color plates serve a two-fold purpose—they give at a glance some idea of the great range in colors and textures available in standard American granites, and they also serve as preliminary samples for making preliminary selections for specific jobs, thereby avoiding the necessity of securing actual samples until final selection is to be made.

When color in granite is under consideration it should be borne in mind that, as a rule, polishing produces a darker tone and brings out the color of each component mineral crystal, while a hammered finish gives a much lighter tone to the granite and softens the colors of the contrasting minerals.

This booklet, "Architectural Granite," is a reprint of our catalogue in the twenty-first edition of SWEET'S ARCHITECTURAL CATALOGUE and will be sent on request to any one desiring a copy for their files.

Continued on next page

A Service Fulfilling the Recommendations of the American Institute of Architects

Institute Advocates Knowledge of a Material to Develop Better Design in That Material

For a number of years the various chapters of the American Institute of Architects have advocated closer relations between the architect, designer and craftsman, and a more intimate knowledge of materials and methods of working them, so that better architecture may be produced.

In New York and other cities, parties of architects and their assistants have visited the shops of various trades and obtained first hand knowledge of how various materials are worked, their possibilities and limitations. This is valuable both to manufacturer and architect, and especially helpful to the draftsman.

The Research and Information Bureau of the Association Supplies Information on Granite

Several years ago the National Building Granite Quarries Association, representing a majority of the best known granite quarries, decided that all possible information regarding granite and its economic use should be collected and made available to architects and users. This would involve considerable expense, and to be of maximum benefit should be unbiased, continuous and representative of the best experience and practice available. Such work can be done more efficiently by the Association than by individual members, and the Research and Information Bureau was therefore set up in the Association.

As a result of this co-operative undertaking, a fund of reliable and useful information, which a few years ago was not generally known outside the trade itself, has been made available to architects, designers and specification writers.

Granite Well Known from Earliest Times As a Lasting Material

Years ago, before cost was such an important factor, granite was almost always used in the finest buildings because of its well-known lasting qualities. It could be cut to as fine detail as marble, and would hold the sharpness of cutting and withstand the ravages of time and exposure to the elements indefinitely.

Many of the oldest important buildings in this country are of granite and stand today as monuments to the architects and builders of earlier days, despite their long exposure to our great variation in climate. In countries like Egypt, where the climate is most favorable to exposed materials, granite monuments have endured for thousands of years.

The Sympathy of the Designer for His Material

The greatest asset of the true designer is complete sympathy for the material in which he designs. Granite is a hard, crystalline material, not as easily worked as limestone, marble or sandstone, and not adapted to the same cutting process used on the softer stones. Consequently, while granite can be worked to as fine detail as these softer stones, the cost in labor for such work would naturally be greater.

With this in mind, the Association is seeking to show how equally good effects can be produced in granite as given by the finer details in the softer stones, without excessive or, in some cases, prohibitive cost. Granite should not be detailed in the same manner as softer stone unless cost is of no consideration to the designer, but with due regard to details best suited to its aesthetic qualities and the most economical methods of cutting.

How Economies Can Be Effected in Detailing for Granite

The Natural Possibilities of Granite

Granite lends itself most economically to treatment in broad surfaces, in which the color and grain of the granite itself and the many surface finishes, from rock faced to polished, provide aesthetic values exceeding most other stones.

Treatment and Relative Cost of Flat Surfaces

In order to appreciate why and how various surface treatments vary in cost, it is essential to know how the finishes are produced. For a complete description of the regular granite finishes see page A281. Rock face is the cheapest, requiring practically no work on the face itself. Polished finish, which brings out all the color and beauty of the granite, is the most expensive, but possesses qualities not obtainable in any other stone or material.

Relative Cost of Flat and Moulded Surfaces

There is a fairly definite relation between the cost of flat surfaces and mouldings, a knowledge of which will be found very valuable when preparing moulded granite details. This relation is fully explained and illustrated in Plates "A" and "B" on the two following pages.

The use of the "Member System" for estimating mouldings was known and understood only by the trade itself until the Association undertook to explain it to architects and designers for the purpose of eliminating unnecessary cost in moulded granite details.

Studies in Granite

A series of plates, entitled "Studies in Granite," is being published by the Association for the information and use of architectural designers and draftsmen. This series is divided into three groups. Plates I to XXV inclusive deal with granite projects designed by contemporary architects. Plates XXVI to XXXIV inclusive are based upon old world masterpieces in stone and illustrate modification of original details to economic granite practice. Plate XXVIII, on page A279, is typical of this phase of the series.

Plate XXXV, illustrated on page A289, starts a third phase now being prepared for publication. These are original designs illustrating the exceptional adaptability of granite to the modern trend of building construction.

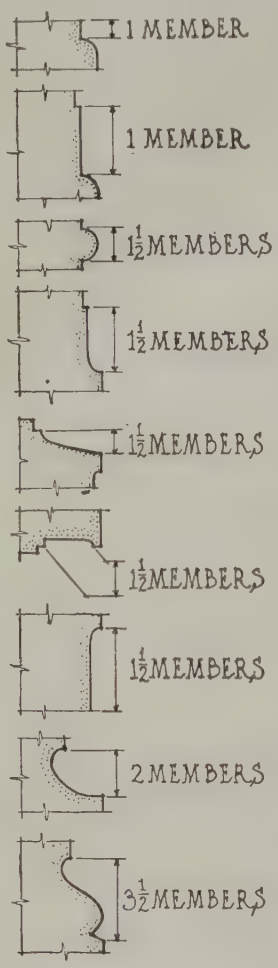
These plates have been rendered by a man well known to the profession, and will make a valuable addition, we believe, to the architect's library. A set of plates I to XXV inclusive will be sent on request to any architect, designer or draftsman, and, if desired, his name will be added to our mailing list for the later plates when ready for distribution.

Continued on next page

DETAILING FOR GRANITE

The use of granite is often restricted because of its cost as compared with freer working stones. The cost of granite need not be so frequently prohibitive if certain facts are considered by the specification writer and the designer.

The cutting of mouldings on granite work involves a greater amount of expensive hand labor than on other classes of work. Mouldings lend themselves to reasonable modification and the cost savings possible are well worth careful consideration when detailing for granite. Some knowledge of the method generally used in estimating cost of cutting granite mouldings will give the designer a good idea as to the relative cost importance of moulded details.



The "Member System" for Estimating Granite Mouldings

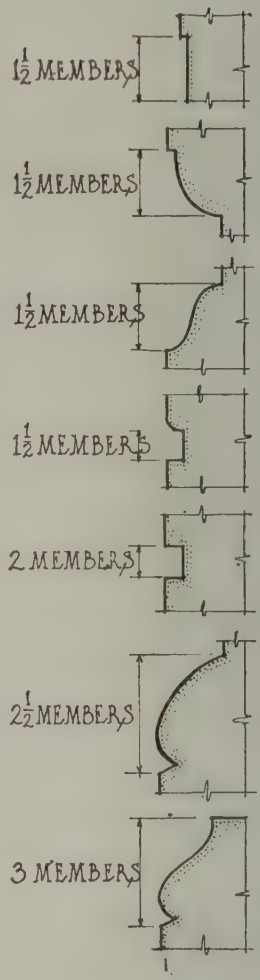
The so-called "Member System" is generally used in estimating cost of cutting granite mouldings.

The profile of a moulded section is first divided into units called "members," a "member" being a more or less arbitrary unit in which the edges, contour, changes in direction and width between edges are taken into consideration.

In counting the number of "members" in any given profile, no hard and fast rules can be laid down, but 4 in. of any contour is the maximum to be counted as a single member. Several basic member counts are illustrated here, and from these practically any ordinary moulded profile may be built up and counted.

To estimate the approximate cost per lineal foot of a moulded profile, multiply number of "members" by the unit of "member" cost per lineal foot and add the cost of plain face displaced by the membered surface at its unit cost per square foot.

The unit cost per lineal foot of "member" varies with grade of granite and finish, as do the unit costs per square foot of plain surface. For approximations, one lineal foot of "member" may be considered equal to a square foot of plain surface for any given granite or finish.

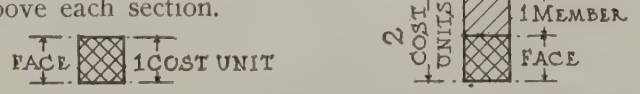


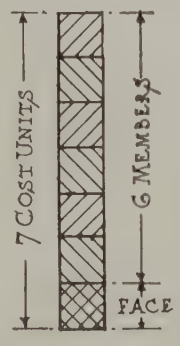
Relative Cost of Plain and Moulded Faces

The cost per lineal foot of a moulded surface, as explained above, is approximately:

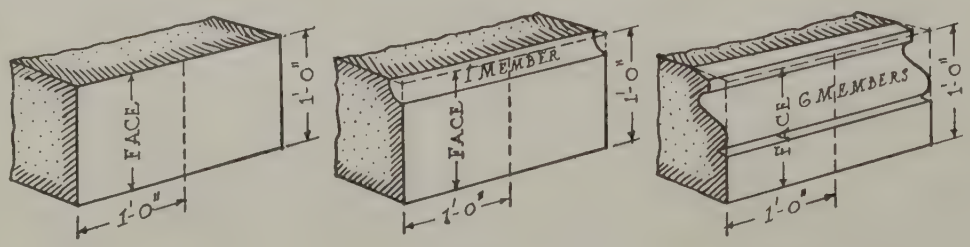
Area of Face @ Face Unit + Number of Members @ Member Unit

The example below visualizes the application of this rule in making relative cost comparisons. Three granite sections are shown of equal face area. "A" has no members; "B" has one member; "C" has six members. The relative cost per lineal foot is illustrated by the squares above each section.





COST PER LINEAL FOOT



(A.) (B.) (C.)

PLAIN AND MOULDED SECTIONS OF EQUAL FACE AREA

Assume cutting cost unit for plain face and for members is $1.50. Applying this unit to these examples, the surface cost per lineal foot of "A" = $1.50; "B" = $3.00; "C" = $10.50. From this example the relative cost effect of superfluous "members" is quite apparent.

The designer, when detailing for granite, can quickly apply this principle to any moulded section under consideration.

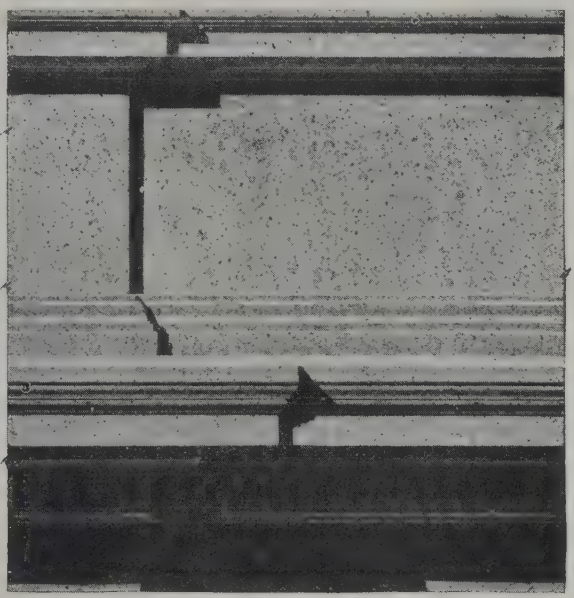
PLATE A

Continued on next page

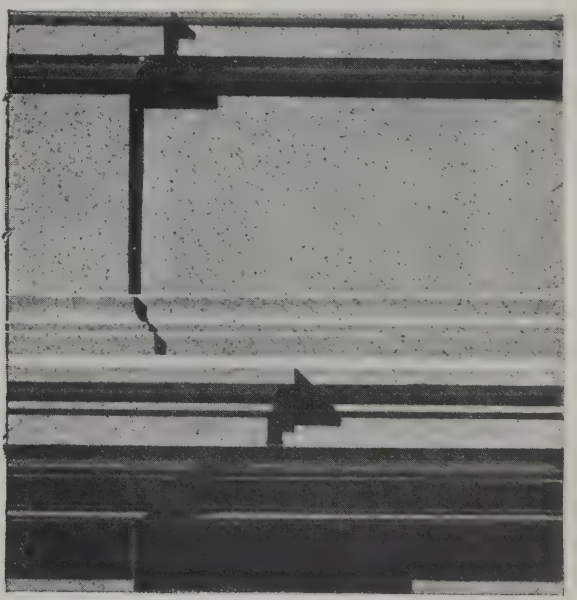
DETAILING FOR GRANITE

Simplification of Moulding—Applied to Specific Detail

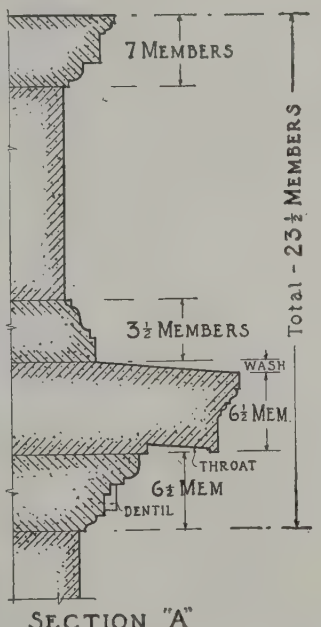
The details below are taken from Plate XXVIII —Studies in Granite, illustrated on second page following. Profile "A" is as originally detailed, while "B" shows suggested modification for economy. The approximate saving is worked out below, showing that intelligent study of granite detail may produce material economies without seriously affecting aesthetic values.



ORIGINAL PROFILE "A"



PROFILE AS MODIFIED "B"



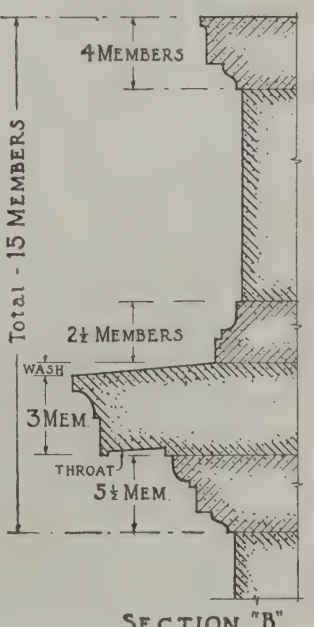
SECTION "A"

Comparison Between Sections Showing Difference in Cost

Profile "A" equals 23½ members + dentils
Profile "B" equals 15 members
Saving: "A" — "B" equals 9 members + dentils

Assume that one member costs $1.50 per lineal foot, and dentils at $3.00 each. The approximate saving then is $12.75 for members and $9.00 for dentils, or a total saving of $21.75 per lineal foot.

Apply this to the perimeter of the building and the total speaks for itself.



SECTION "B"

Other Studies and the Co-operation of Members of the Association

The Association has prepared comparative studies in modification of detail for economy, which are published as part of our series of "Studies in Granite" in the form of Plates, similar to Plate XXVIII, as follows:

Plate XXVI—Main Entrance to Farnese Palace, Rome.

Plate XXVIII—Entrance to Palazzo Sciara di Carbognano, Rome.

Plate XXX—Entrance to Palazzo Negroni, Rome.

Plate XXXII—Entrance to Casino of Papa Giulio's Vineyard, Rome.

Plate XXXIII—Entrance to Habitation Building, Casino of Papa Giulio.

Plate XXXIV—Window, Casino of Villa di Papa Giulio.

The representatives of the Association, or the local representatives of its various member companies, are always glad to give practical advice, from the granite man's viewpoint, as to best and least expensive types of granite construction and detail. For the architect to avail himself of this service may save him considerable time and expense in revising shop drawings after bids are taken and costs found to be excessive.

PLATE B

Continued on next page

Information Regarding the Association of Interest to the Architect and Specification Writer

The Association and Its Purpose

The chief aim of this Association is to further the use and sale of granite for building purposes by extending the knowledge of its many qualities and merits, and by establishing means of closer co-operation between the producers of granite and the architects and general building public.

Real Service to Architects

The Association, through its Research and Information Bureau and its field men, offers a convenient and unbiased service to architects and others interested in the use of granite for permanent construction.

This service is freely offered wherever it may assist in the logical and proper use of granite or help to solve the economic and aesthetic problems which may arise when the use of granite is under consideration.

The Research and Information Bureau

This department has been developed to collect and disseminate useful and reliable information concerning granite. This information is being gathered constantly from within and without the industry and the Association has become the clearing house for the best information available.

Study and research is being carried on concerning the different granites available for architectural uses, the chemical and physical properties of granite, problems in economic detailing and production, experience and good practice in actual use.

Architects, and others interested in the use of granite, are invited to make use of the services of this department freely and all requests for information pertaining to granite will receive willing and careful attention.

The Field Service of the Association

Qualified representatives of the Association are in the field calling upon architects for the purpose of making available the facts and information accumulated by the Research and Information Bureau. Timely and unbiased information may be had through the field service. Economic points as to design, detail and specification of granite work may be discussed and quickly settled.

The field men will be glad, when requested, to obtain information which may not be immediately available, and to assist the architect and specification writer in every way possible in connection with the use of granite.

The Association can render most valuable service when a project is in its preliminary or initial stages. The architect need not hesitate to discuss a project with our representative at any time, and if for any reason he wishes to avoid premature publicity he need only so indicate and the matter will be treated as strictly confidential until such time as information concerning the project may be properly reported to our member companies.

Service of Representatives of Member Companies

The member companies of the Association maintain sales offices and representatives in many of the larger cities. These men are experts on granite and well qualified to render definite and valuable services to architects and specification writers in their districts.

Accurate and reliable information may be secured by consulting these representatives when any specific project is under consideration, and they are always willing to furnish samples of their granites or to submit preliminary or final estimates upon specific work.

Permanent Exhibits of Granite and Finishes

The Association maintains permanent exhibits of the various standard building granites, produced by its member companies, at the following convenient addresses:

Architects Samples Corp., 101 Park Avenue, New York
Master Stone Cutters Assn., 220 So. 16th Street, Philadelphia
National Building Granite Quarries Assn., 31 State Street, Boston

Here will be found the various colors and textures from which architects may make selections of granite for any specific project.

Here also are displayed complete sets of samples illustrating the regular building granite finishes, which the Association has adopted as standard. The selection and specification of finish for any specific job by reference to these standards, will assure definite and mutual understanding as to just what is wanted.

A model "Study in Granite" is included in the New York exhibit, illustrating the possibilities of combining various colors and textures, using standard granites.

Architects and the general building public are invited to inspect these exhibits when considering the selection of materials or finish.

Securing Estimates and Samples

The Association does not quote prices, but requests for preliminary or final estimates on granite work will be transmitted to interested members and estimates promptly obtained.

Plans and specifications for specific work may be sent in to the Association office and made available to its members for estimating purposes. Architects and contractors are invited to avail themselves of this service, which has proved its value and frequently produces bids which might not otherwise have been secured.

Requests for samples will be transmitted to members producing the kind and quality of granite desired, and information will be furnished as to where specific colors and qualities of granite may be obtained, whether produced by Association members or non-members.

The Association Code of Ethics

The Association stands for fair practice in bidding and advocates that bids, tendered in good faith in accordance with plans and specifications, should be fairly considered and used, both as a matter of principle and in order that the best interests of all parties concerned may be assured.

Uniform Proposal and Contract Forms

Uniform Proposal and Contract Forms for granite work have been prepared and adopted by the Association. The terms and conditions are fairly standardized and the equity of both parties has been carefully studied and protected.

These printed Association forms have been in use for several years and have met successfully the test of application. Two forms of contract are provided, one for the granite work "Set in Place" and one for the work "f.o.b." These Contract Forms are recommended by the Association for general use on granite work, and copies will be sent for inspection upon request.

Responsible Competitive Estimates

The Association, through its reports to members concerning prospective work and bids desired, stimulates competitive bidding, backed up by responsible concerns operating the best organized and equipped plants in the granite industry.

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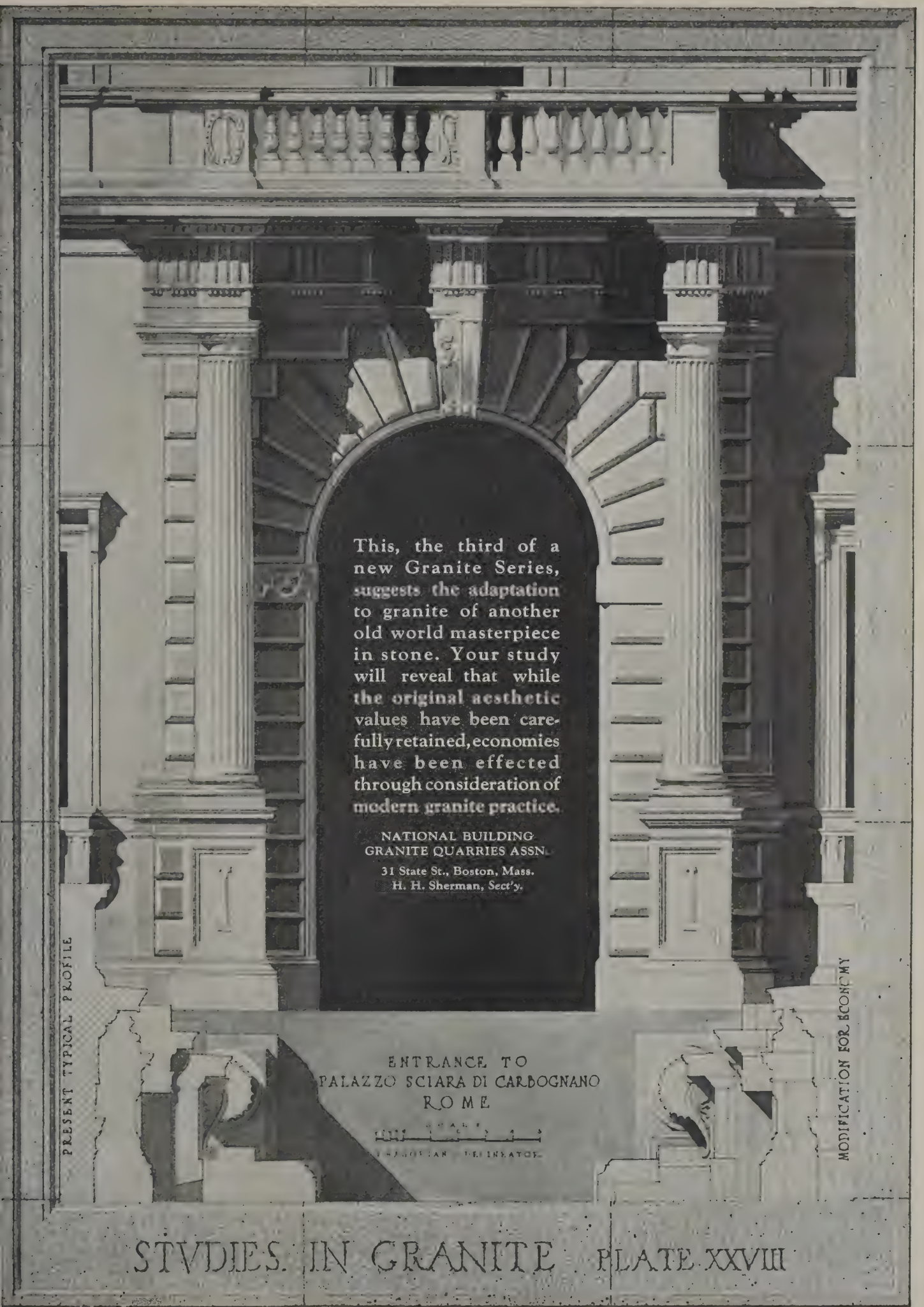

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Architects and contractors, who advise the Association concerning bids desired, undoubtedly will secure a larger number of responsible, competitive bids, with a minimum of effort and expense. Requests for bids, with information as to closing dates, are transmitted to the member companies upon receipt, and bids are sent direct to architect or contractor by those bidding.

The Association has no control over or responsibility for prices made or quoted by its members, and has no knowledge as to who are bidding or the amounts bid until after the bids are delivered and opened by the recipient on the date set for closing.

Financial and Production Responsibility of Individual Members of the Association

To meet successfully the demands of modern building construction, the granite producer must fulfill very definite requirements as to financial responsibility, type of organization, and adequacy of quarries and finishing plants.

Association members have been and are the leaders in developing their financial organization and production facilities to meet these exacting requirements. They can furnish unquestionable references as to past performance and responsibility, and are entitled to preferential consideration wherever building granite is under consideration.

In granite, as in other materials, bids are submitted and contracts undertaken by concerns which lack the experience and ability to execute them satisfactorily, and whose quarries and plants are inadequate to meet the requirements. These facts should be carefully considered when awarding the granite contract. Bids tendered by Association members should receive especial consideration on the ground that contracts based upon them will be satisfactorily executed.

Adequate and Dependable Quarries

In selecting granite for building purposes, the ability of the quarry to produce the quantity, sizes and quality of granite desired is the first essential. The quarry must be so equipped that its output may be handled and shipped at a rate to meet the cutting requirements, not only for the work under consideration, but all the work which may be simultaneously under contract.

The Association quarries, without exception, meet the above requirements. They are all quarries of established reputation and have been developed to meet the requirements of quantity production.

Modern Cutting and Finishing Plants

Granite is delivered to the finishing plant from the quarry in rough blocks—some already split to approximate dimension sizes, and others to be drilled and split to dimension, or sawed into slabs.

Modern building granite plants must be well equipped with up-to-date machinery and appliances for handling and manufacturing granite in considerable quantity, efficiently and with first class workmanship.

Included in the essential equipment of a modern granite finishing plant are saws, carborundum machines, polishing machines, pneumatic surfacing machines, turning lathes, sand blast, pneumatic hand and carving tools, and pneumatic drills. The handling equipment must be adequate and speedy, and arranged to serve the producing machinery and hand workers, and to handle the storing and loading, efficiently and safely.

The handling, machinery, sawing and polishing of granite requires power in large quantities. Adequate and dependable power is therefore a most important essential, and adequate blacksmith shops, carpenter shops and repair shops are also necessary accessories to a properly equipped plant.

Handwork is required in finishing the average type of architectural granite work, and a good journeyman granite cutter is one of the most skillful craftsmen in industry today. Modern tools and machinery have relieved this craftsman of a great deal of laborious and time consuming work, but his skill of hand and eye is as indispensable today as when the Egyptians cut their granite temples.

Association plants include the largest and best equipped plants of their kind in the country. They have been established for considerable periods and a "home guard" of skilled workmen has been built up to supply their steady demand for first class men. These are important factors in the superior ability of Association plants to fulfill both the quality and quantity demands for architectural granite work and entitle them to preferential consideration.

Each Member Has An Experienced Organization

Without a properly managed and experienced organization, even an adequate quarry and well equipped finishing plant will not ensure satisfactory execution of contracts.

Association members have built up organizations having the necessary experience and ability to put through whatever they may undertake. Their estimators have the benefit of actual cost figures covering a wide variety of executed work, thereby removing much of the guesswork and chance taking, because of which many a job is skimped and botched. Their draftsmen are the best trained men to be had and their knowledge of practical stereotomy, skill in layout and accuracy in figures may be counted upon to discover, in advance, errors in vital dimensions or impractical points in construction or jointing, thereby avoiding delay and expense to all concerned.

Experienced and practical salesmen constitute a service as well as a sales force, and the co-operation they are able to offer is frequently of no small importance in the securing of reliable preliminary estimates and in consultation as to practical economies possible.

Importance of Proper Planning and Supervision in the Mill

The planning and routing of work through the mill and its consistent and thorough inspection while in process and at completion, due to well trained and experienced plant management, is all reflected in expedited erection at the building and a minimum of interference with the progress of the work of other trades.

Inadequate or inexperienced plant management and supervision usually goes hand in hand with inordinately low bids, and poor workmanship, delayed and muddled deliveries, expensive tie-ups and delays to other trades on the building itself, usually follow as a natural consequence, and more than eat up any supposed savings.

The Association's Relation to Member Companies

The Association is maintained by its member companies as a vital and necessary extension of their individual organizations, to carry on collectively those important services which make for efficiency and economy and are alike beneficial to the users and producers of granite generally.

Continued on next page

Information as to Various Granite Finishes

Description of Regular Surface Finishes, Arranged in Order of Relative Cost

The surface finishes most frequently used for granite on building work are:

Rock faced, pointed, pean-hammered, four-cut, six-cut, eight-cut, rubbed, honed and polished. These terms are frequently misunderstood and sometimes misapplied.

The following brief description of finishes most generally used is therefore given:

Rock Face—Generally the least expensive finish, but with decorative as well as utilitarian value.

The relative cost varies with the grade of work required.

The grades vary from ordinary split or quarry face ashlar with split or roughly squared beds and joints, to carefully quarried faces having practically uniform projection, and with joints and arrises as carefully and accurately cut as for hammered work, and sometimes with rusticated or tooled margins.

Pointed Work—Coarse, medium, fine and machine pointed are the four general distinctions for pointed work, with many special types for certain texture effects.

Hand pointing and machine pointing differ slightly in general appearance, machine pointing being generally more uniform. Special pointing is generally more expensive than the standard grades. In general, the point depressions in fine pointing will be approximately $\frac{3}{8}$ in. apart, medium and machine pointing $\frac{5}{8}$ to $\frac{3}{4}$ in., and coarse pointing 1 to $1\frac{1}{4}$ in.

Where special pointing is required, a sample should first be prepared under the architect's supervision. Beds, joints, and arrises will conform to the character of use and grade of pointing.

Pean-hammered—Adapted to rougher work, such as steps, curbings, house or mill sills and thresholds, or to portions of high class work not exposed to the eye. Pean-hammering is coarser and less regular than four-cut and the point marks are not entirely eradicated by the axing.

Four-cut, Six-cut, and Eight-cut—These finishes are produced by bushing with the patent "bush-hammer." This is a hand-hammer with patent head having two opposite jawlike openings about $\frac{7}{8}$ in. wide, into which are firmly bolted sets of four, six or eight cutting blades as the case may be.

Four-cut work is frequently and erroneously specified as four cuts to the inch. Actually the four-cut hammer leaves nearer five cut marks to the inch, as four cutting blades are clamped into a $\frac{7}{8}$-in. jaw; six-cut and eight-cut are likewise incorrectly specified as six cuts to the inch or eight cuts to the inch.

In bush-hammered finish the resultant surface has the appearance of being uniformly corrugated to the fineness determined by the number of cuts used, but while the bushing is kept parallel and in the required direction the bush marks are not necessarily continuous or mechanically precise.

Six-cut and eight-cut finishes are simply continuations of the four-cut process, each finer hammer being used consecutively until the required finish is reached.

Pneumatic surfacing machines are also used for bushing, especially on all larger surfaces, following practically the same routine as required for hand bushing. Sawed surfaces are also bushed under the surfacing machines, in which case much of the preliminary preparation is avoided.

Ten-cut and Twelve-cut—These finishes are also produced, but less frequently used on regular building work, being more applicable to small memorials or special work. Texture and character are emphasized by the coarser finishes.

Rubbed and Honed—Produced by grinding a pointed or sawed surface under the polishing wheel. The grade of rubbing is determined by the extent to which this grinding is carried and the abrasive used; from coarse-rubbed, with small surface scratches, adapted to work requiring fine smooth finish but not close to the eye, to honed finish, which is the last stage just before glossing, with velvet smooth surface, practically free from scratches.

Polished Finish—Produced by glossing, under a heavy, felt coated wheel, a surface previously rubbed and honed. A durable and mirrorlike polish requires that the grinding and glossing processes be carried to their extreme stages, leaving a surface free from scratches, dull spots, or "stun marks" from the tooling.

Under modern methods practically every standard granite may be polished to a satisfactory gloss, suitable and durable for most ordinary requirements. Generally the harder granites and those containing the least mica content take the best and most durable polish.

Hand Polishing—Small surfaces and mouldings generally have to be rubbed, honed or polished by hand at considerable extra expense over machine work or cut work of similar character. On work where cost is the dominant factor portions necessitating hand rubbing or polishing should be avoided wherever possible.

Selecting the Finish

The following general suggestions will indicate methods of selection, which depend on the type and design of building, and color and texture of the granite.

Large scale work: rock face, pointed and the coarser cuts. Small scale work: the finer cuts.

Rock face, pointed, pean-hammered, and four-cut for economy, and rock face and pointed for decorative effect in conjunction with hammered work and other materials.

Six-cut for average work, combining economy with good architectural effect.

Polished for base courses, portions subject to traffic stain, lower stories where exposed to smoky atmosphere, and for decorative effect.

Rubbed or honed where fine finish is required and for softened tone and texture effects.

Polished finish is practically impervious to stain or weather. Fine finishes will keep clean longer than coarser finishes, particularly where subject to atmospheric dirt and dust.

The possibilities of combining different grades of finish are almost unlimited, and combinations of different granites are used extensively with splendid architectural results.

Standard Grades of Surface Finishes

The half-tone reproductions on the next two pages illustrate the standard grades of surface finishes most commonly used on exterior building granite work. The reproductions are full size and have been prepared from a standard light gray granite but are much darker than the actual granite to bring out more clearly the different finishes.

The relative cost of the different finishes runs approximately in the same order as the reproductions are numbered, with rock face as the less expensive and polished as the most expensive.

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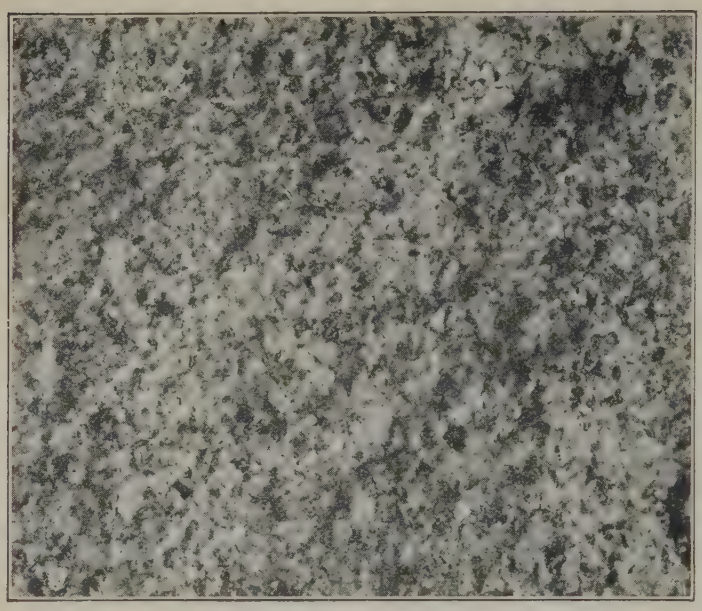

Plate No. 1. Rock Face

Plate No. 4. Medium Pointed

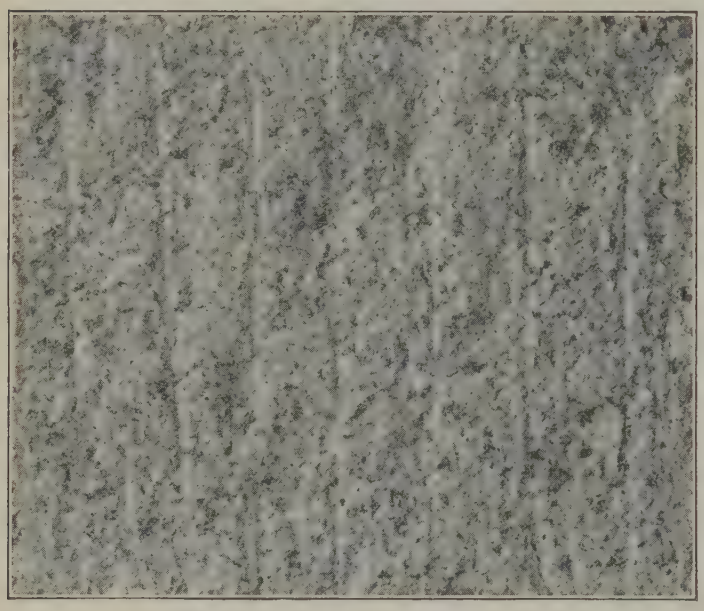

Plate No. 2. Pean-hammered

Plate No. 5. Fine Pointed

Plate No. 3. Coarse Pointed

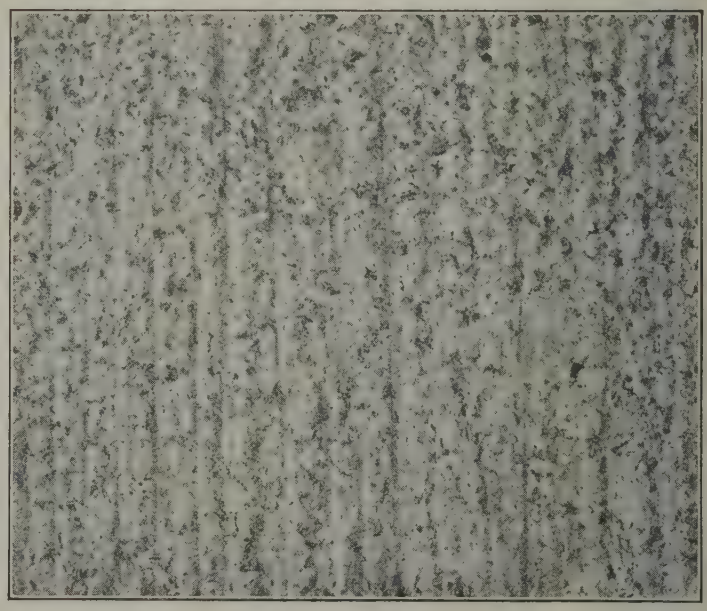

Plate No. 6. Four-cut

Standard Grades of Finishes for Exterior Building Granite Work

Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

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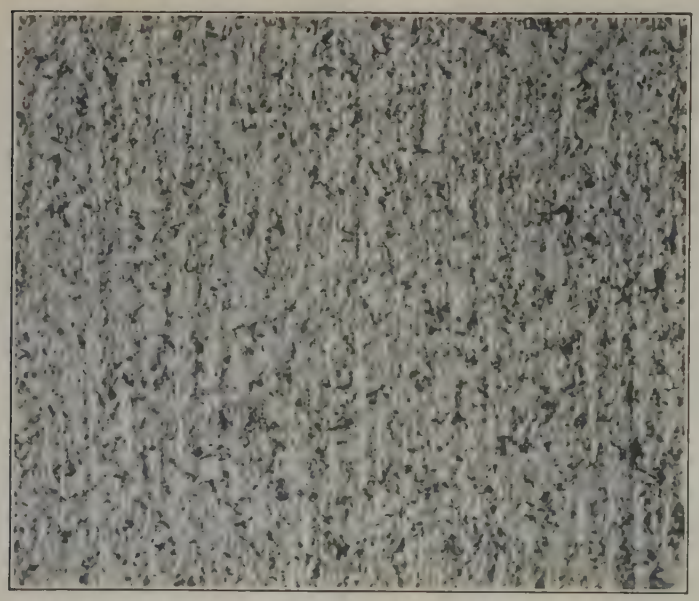

Plate No. 7. Six-cut

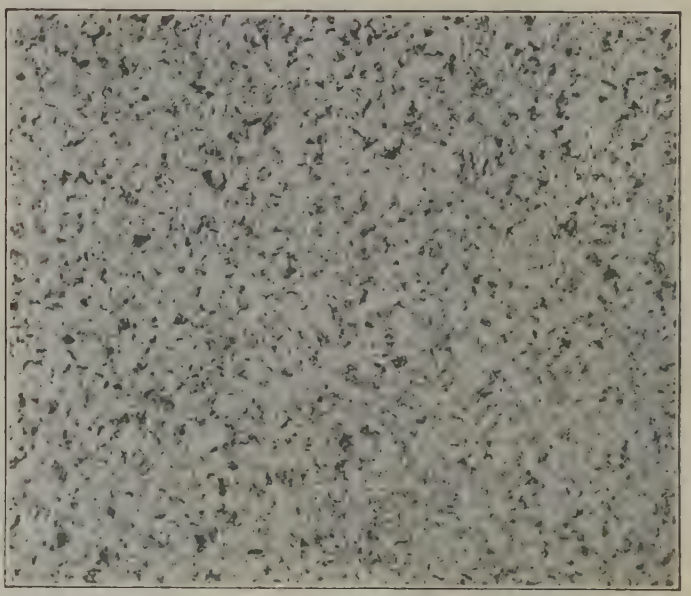

Plate No. 10. Rubbed

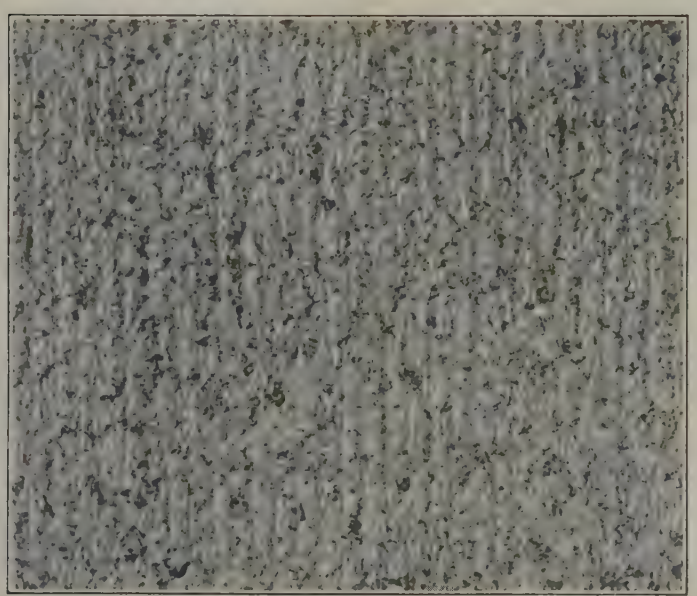

Plate No. 8. Eight-cut

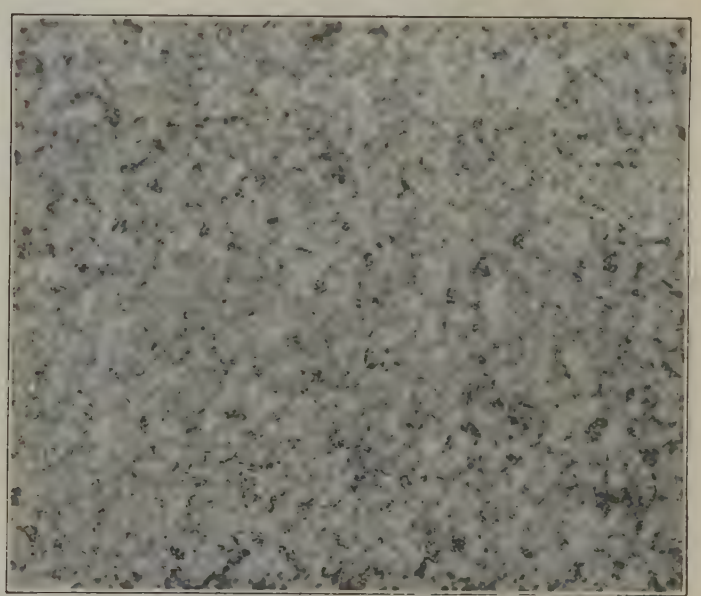

Plate No. 11. Honed

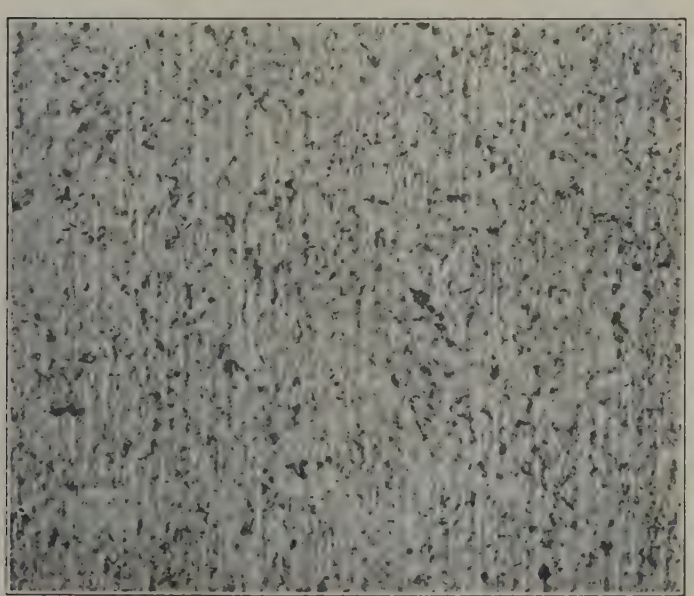

Plate No. 9. Ten-cut

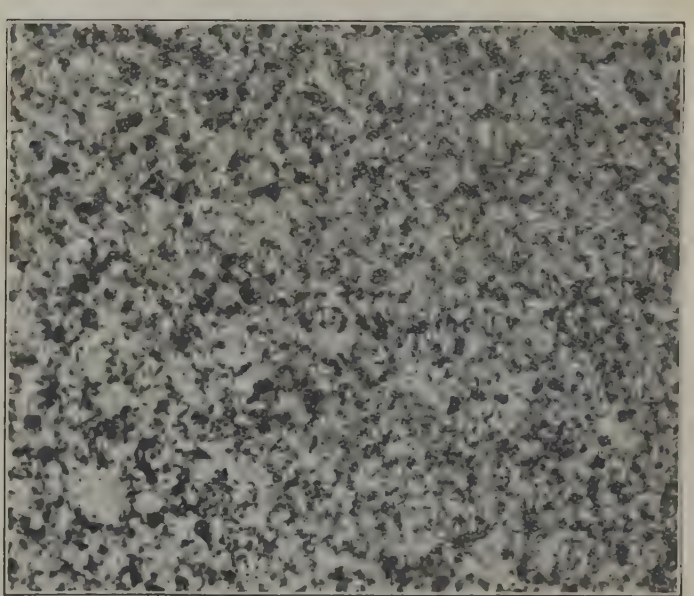

Plate No. 12. Polished

Standard Grades of Finishes for Exterior Building Granite Work

Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

Continued on next page

Practical Notes on Granite Specification and Design

The use of granite is often restricted because of excessive cost over other stones. The cost need not ordinarily be prohibitive if certain fundamental facts are taken into consideration by the specification writer and designer.

In Regard to Specifying Finishes and Color

The cost of granite work will be materially reduced if reasonable variations in tone and texture, characteristic of most quarries, are permitted, eliminating only the too sharply defined and obvious deviations, such as unsightly knots and clearly defined stripes.

The finer cuts are often specified where coarser finish would be fully as appropriate and considerably less expensive. Rock face and the pointed finishes may frequently be used with good effect and at reduced cost. Sawed finish, or sawed and lightly steeled or sanded, is effective and economical for plain surfaces.

Treads of steps and platforms, as a safety measure as well as economy, should not be finer than four-cut. Machine pointed is even more practical and less expensive. For inexpensive steps sawed treads and split risers are effective and practical.

Beds and Joints Deserve Attention

A surprising percentage of the total cost of granite work is in the cutting of beds and joints. Elimination of unnecessary requirements here will produce material savings. Bush-hammered edges and unnecessary fullness of beds and joints add unnecessary expense.

We recommend ¼ in. as the minimum allowance for beds and joints on monumental building work. On work of coarser finish and texture, ⅜-in. and even ½-in. joints are adequate and effective. For more massive masonry even larger joint allowances are both good practice and more economical.

Granite Carving and Models

Granite can be carved with the same delicacy of treatment and detail as much softer and less durable stones. The pneumatic carving tool, in the hands of a skilled granite carver, has made it possible and practical to carve granite to almost any extent desired.

In the preparation of details and models for granite carving, three points should be considered: the color and texture of the granite; location in the building as to distance from the eye; and location as to sunlight.

Color and *texture* regulate to a material extent the decorative value of the detail produced. Delicate detail would generally be wasted on a coarse grained granite having strongly contrasting mineral constituents. In a fine grained, light colored granite, or a granite of light, uniform tone regardless of grain, delicate details would appear more nearly in their true values.

Distance from the eye should obviously regulate the character of detail and treatment, both from the aesthetic and economic viewpoints.

Location as to sunlight is generally the least considered point of all. The relative light and shade values of different exposures should regulate to some extent the character of detail and mass.

Granite Versus Less Durable Material

Before ruling out a superior material like granite because of supposedly prohibitive cost, greater latitude should be permitted in stock, finish, jointing and detailing than in any less durable material which might otherwise be substituted. Unsightly discoloration and disintegration of the less durable material will soon efface what little extra detail may be retained by the substitution, and its ultimate good appearance and architectural value be entirely destroyed. The crudest of granite work maintains its superior qualities indefinitely, and good granite work remains a joy forever.

A Few Cost Saving Pointers

The cost of granite work may be materially reduced by a study of the countless minor details from the viewpoint of economical production. A few pointers are given below as typical examples, and a study of the various granite plates illustrated in this catalogue will suggest others.

Projections—Avoid projections on courses which might otherwise be sawed or machine surfaced.

Jointing to Save Stock and Hand Cutting—Cornices and similar courses can often be jointed to permit sawing or machining of the flat surfaces and to save stock. Internal angles, cut in the solid, should be avoided by jointing-up.

Avoid Raised Seats and Lugs—Raised seats and lugs on balustrade base, platforms, sills and thresholds are expensive. Keep to flat surfaces where possible, using depressed lugs if necessary.

Rustications, Rabbets, Checks and Drips—Detail to be carbo-sawed rather than for hand cutting.

Steps and Platforms—Avoid unnecessary bedding to exact height by allowing at least 2 in. between top of concrete and bottom of stone. Four-cut or machine point treads.

Area Coping—Four-cut or machine pointed top and split face is economical and usually adequate. Omit rabbets for grilles, substituting iron brackets. Eliminate lock joints and substitute dowels.

Balusters—Substitute round for square plinths on turned balusters. Bed to slope of base to avoid raised seats.

Simplification of Moulding—By eliminating unnecessary members and unimportant minor details will reduce cost materially. A study of the section on Detailing on page A275 and Plates "A" and "B" on pages A276 and A277 will be helpful in this connection.

Eliminate Guesswork in Estimating—Make plans, details and specifications as complete and clear as possible and ensure closer and more intelligent estimates.

Detail for Granite—Detailing for stone, regardless of whether it is to be of granite, marble or limestone, is responsible for much of the extra cost of granite. Best results will be secured if details are made specifically for granite. The Association can render real service here if consulted while details and specifications are under way.

The New Sand Blast Method of Carving and Surface Treatment

The attention of architects and designers is directed to a recently developed method of producing ornament and treating surfaces on granite by use of the sand blast. This process has been used considerably in the memorial granite industry, but has not, as yet, been extensively applied to architectural building work.

We believe, once its possibilities are recognized and understood, that progressive architects and designers will quickly appreciate its aesthetic and economic value, and that through their creative ability a distinct new type of ornamentation may be developed and especially adapted to modern American structures.

The description of the process and sketches illustrating a few very simple forms of application to granite work on the following page are offered merely as an aid to visualizing the basic principles of the process as already developed in the memorial field. The experienced designer will quickly grasp its scope and limitations from this presentation.

Continued on next page

THE SAND BLAST PROCESS AND ITS APPLICATION TO GRANITE CARVING AND SURFACE TREATMENT

The Sand Blast Process Described

This process has well been termed a "harnessing of the sand storm," for the sand blast is controlled at will to the etching of unique and beautiful ornaments. The cutting medium is white silica sand, or similar abrasive, driven through a controlled nozzle at very high velocity by compressed air, under absolute control of the operator.

The face of the stone to be "blown" is covered by a rubberlike composition about ⅛ in. thick, termed "dope" or "glue" in the trade. This "dope" is then cut away from the parts to be etched, forming, in effect, a stencil of the outline or ornament.

The sand blast etches away the granite thus exposed to the depth required in a remarkably short time. After the stenciled design is "blown," the blanket of "dope" is removed from the stone, revealing a remarkably clean cut intaglio possessing a unique texture and beauty impossible to duplicate by any other means.

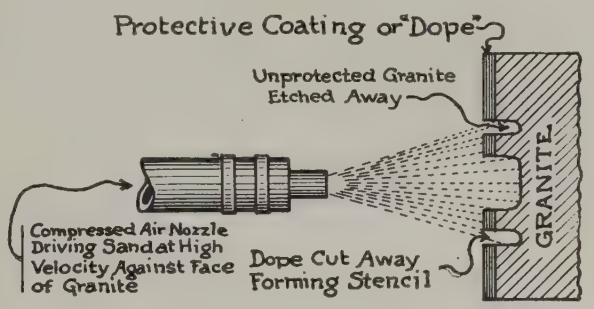

Diagram Showing Principle of Sand Blasting Process

Surfaces may also be etched in a similar manner to a moderate depth to produce sinkages and unique texture effects having almost limitless possibilities.

This, in brief, is the process. There are many variations in technique, and combinations of blowing, re-doping and re-blowing, by means of which a skillful operator may produce effects in shading, variable depths and texture which have unrealized possibilities of application and development.

Simple Forms of Application

The sketches below illustrate a few typical forms of application, from which the basic principles of sand blast ornament, as developed in the memorial granite industry, may be visualized. Applications of these simple principles to architectural ornament may be developed to any extent desired.

While the sinkage produced by the etching is relatively slight as compared to regulation carving, the sharpness of its cuts and the unique tone and texture of its surfaces in contrast with hammered or polished surfaces, produce effects which cannot be duplicated by any other method.

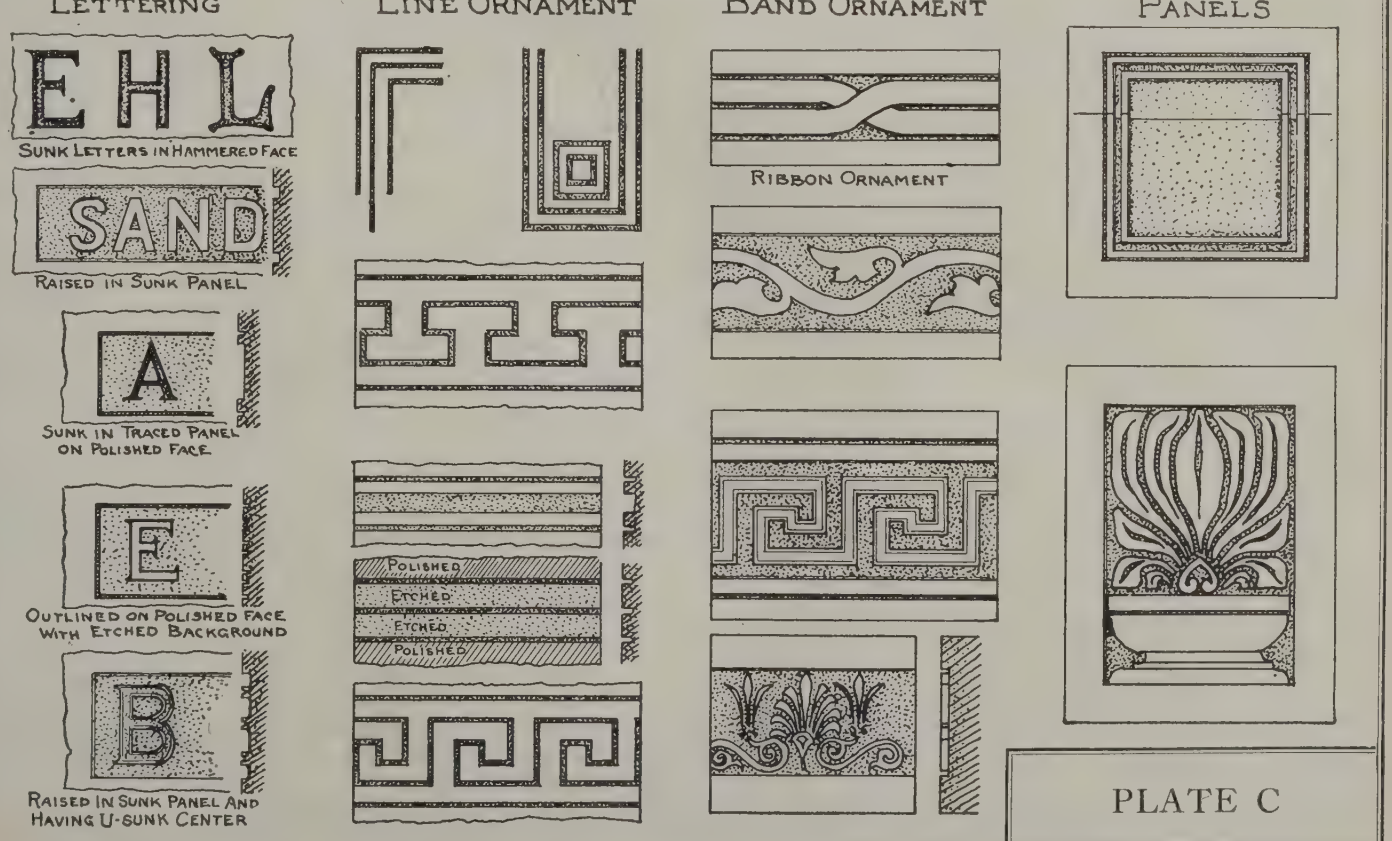

PLATE C

Continued on next page

Granite Specifications (Complete Form)

Section 1. General Conditions—All work included under the specifications for granite is to be subject to the general conditions hereinbefore written for the entire work.

Section 2. Material—All granite shall be of compact structure, hard and practically non-absorbent, and equal in durability and strength to the best granite of the kind required. Granite shall be (mention color, tone and grain) and of the kind designated as (mention name) granite from quarries at (mention location).

Granites designated as (mention names and quarries), will also be considered.

In submitting estimates, the contractor shall state the name of granite, and quarry, upon which his proposal is based.

Section 3. Quarry and Plant—Granite must be obtained from approved, well-known quarries having capacity and facilities for furnishing the quantity, sizes, and quality of granite required, and the cutting and finishing must be done by firms properly equipped to produce the finished material without causing delay in the progress of the work.

Evidence to this effect must be submitted if required by the architect.

Section 4. Quality—All the granite shall be selected to meet the requirements of these specifications and shall be absolutely sound and free from seams or other defects which would impair its strength.

Exposed surfaces shall be free from spots, stain, discoloration, knot formations, spalls, chips or other defects, which would impair the appearance of the work, except that in inconspicuous places a reasonable number of knot spots or texture variations inherent to the particular granite proposed may be permissible if the samples showing the maximum of such characteristics be submitted to, and approved by, the architect.

In quarrying the granite the blocks shall be so selected that any variations in color permitted by the architect will be uniformly distributed throughout the exposed surfaces of the walls and other portions of the work.

If granites from different quarries are used such granites shall be similar in texture and shall satisfactorily match in color and tone throughout the work.

Section 5. Work Included—The work to be done by the contractor under the heading of Granite shall include the furnishing, delivery and setting in place and completion of all granite work as required by the drawings and herein specified.

The work generally shall include (state portions of work to be of granite).

Note: State any portions or special features which are not to be of granite or not to be included in this contract.

Section 6. Shop Drawings—The granite contractor shall prepare all necessary shop drawings, showing the bedding, bonding, and jointing of all the granite work and typical and special anchoring of same. The dimensions and setting number of each granite stone shall be indicated upon the drawing which shall be submitted and approved by the architect as required under general conditions. No cutting shall be done or work completed except from shop drawings which have been approved by the architect.

Section 7. Corner Stone*—The granite contractor shall furnish and set where indicated on the drawing (or as directed) a corner stone of the required dimensions, having an inscription cut thereon in accordance with the drawings and recessed to receive the copper box to be furnished by the (general contractor).

Section 8. Samples—After the award of the contract two samples of each kind of granite required 8x8x2 in., showing the extreme variation in quality, color and texture that will occur in any granite which will be used, shall be submitted to the architect.

Upon approval of these samples, one of each shall be returned to the granite contractor for use at the quarry or plant and the other retained by the architect for comparison with work at the building.

Samples shall be dressed on the face and one edge to show finish required by the specification; opposite face may be split or dressed to the approximate size called for or may be dressed to another of the specified finishes called for.

Section 9. Finishes—The exposed surfaces of the granite shall be dressed as indicated on the drawings or specified herein.

In general, surface finishes shall be as follows: From 2 in. below grade to level (state level or course) shall be dressed with best (state finish—as polished, six-cut, eight-cut) work; from level (state level) to level (state level) shall be dressed with best (state finish) work; and from level (state level) to top of parapet shall be dressed with best (state finish) work.

Note: State here any exceptions to the above such as "treads of steps or platforms shall be ..... finish"; "back of parapet and coping courses shall be ..... finish," etc.

The cut marks of all bush-hammer work shall be vertical except as noted.

Soffits shall be bushed at right angles to the face.

Faces of key blocks and voussoirs shall be bushed (state whether vertical or radial).

Top surfaces of window and door sills, steps, copings, washes and projecting courses shall be bushed at right angles to the nosing.

Moulded surfaces shall be bushed parallel to the direction of the mouldings.

Note: Mention other specific instructions on direction of bushing.

Section 10. Cutting—All exposed surfaces must be out-of-wind, free from waves, projections or depressions, and faces of granite in the same plane must be absolutely flush at joints. Arrises must be cut sharp and true to square or pattern and continuous with adjoining arrises.

Slight inequalities which may occur in setting shall be trimmed to the proper surfaces and refinished equal to the original finish.

Section 11. Beds and Joints—Beds shall be horizontal and shall be cut full and square for a distance of at least 2 in. back from the face, from which point they may fall off not to exceed 1 in. in 12 in.; and shall be reasonably free from large depression and cuppings, which might impair the stability of the work.

Joints shall be dressed at right angles to the face for at least 1½ in. back from which point they may fall away, not to exceed 1½ in. in 12 in.

Backs of granite stones shall be scabbled or split to approximate vertical surfaces which shall not vary more than 1 in. in 12 in. from the true vertical, nor vary more than 1 in. either way from the thickness called for on the drawing.

Section 12. Jointing—The jointing of the granite work shall be as shown on the drawings and no additional joints will be permitted except upon written consent of the architect. The joints shall be uniformly ¼ in. in thickness.

Section 13. Bonding—The bonding of various portions of the work shall be as shown on drawings. Alternate courses of granite shall bond at least 4 in. with the backing except where otherwise shown. No granite stone shall have less than 4-in. bed; projecting courses shall have beds equal to the projections unless otherwise shown. Where brick backing is required the granite shall not go closer than 4½ in. to the inside of the brick wall. Where granite facing occurs at grades it shall extend nowhere less than 4 in. below grade unless otherwise shown.

Section 14. Reveals and Returns—Reveals of all openings, unless otherwise shown shall be cut solid without vertical joints.

Returns shall be not less than indicated on the drawings.

Mitering of granite stones at corners will not be permitted.

Section 15. Mouldings—Granite stones forming continuous moulded courses shall be of uniform profile on the face with continuous unbroken lines absolutely flush at the joints and with the surfaces free from projections or depressions and out-of-wind.

Section 16. Washes and Drips—All exterior projecting granite stones and all exterior sills, steps, platforms, coping and other stones with exposed top surfaces, shall be cut with a wash on top. Where other work is built upon such granite stones, they shall be cut with raised seats and lugs to form level beds for work built upon them.

All projecting granite stone, such as sills, cornices, copings, etc., shall have a groove drip cut on the underside unless otherwise detailed.

All exterior door sills shall be cut with raised thresholds unless otherwise shown.

Section 17. Miscellaneous—Mouldings and projections must not be subjected to pressure; and granite stones having projecting members which have weight of any kind bearing upon the upper surface shall have seats cut to bear such weights; and in all cases the edges of mouldings or projections must be kept free from pressure.

*If required.

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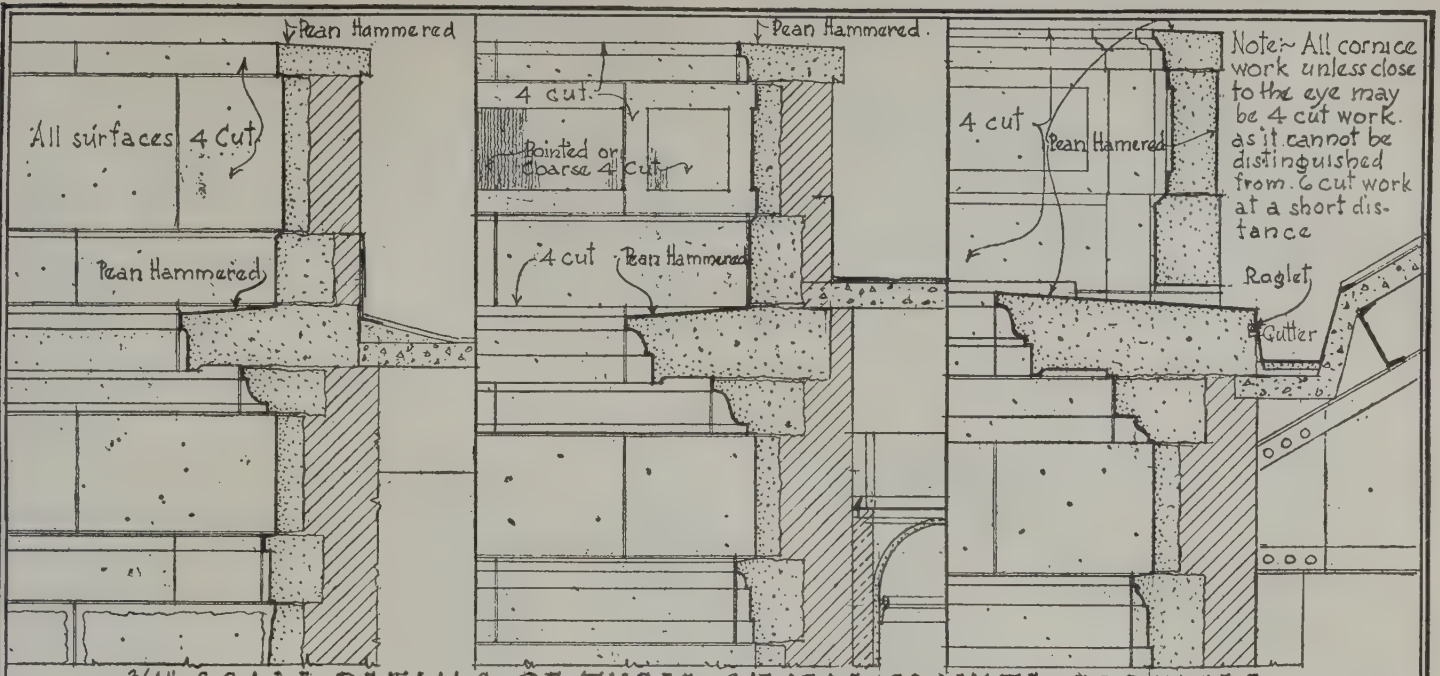
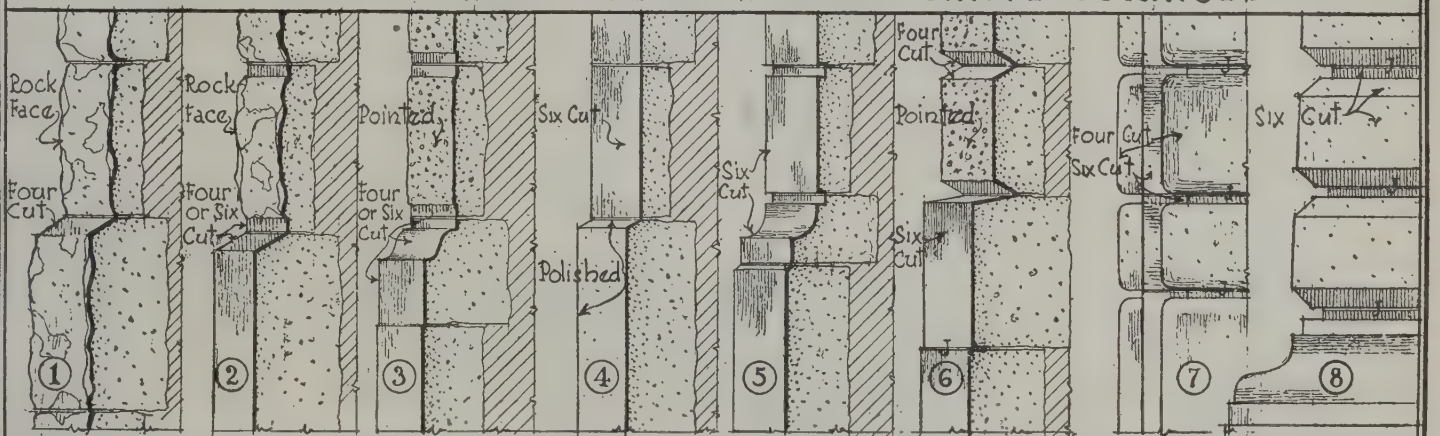
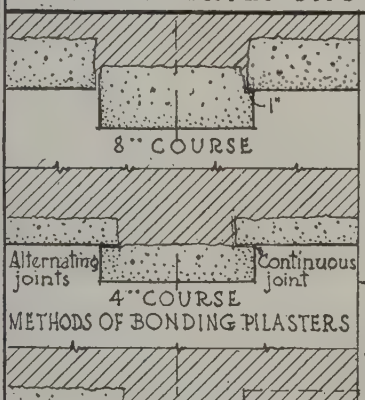


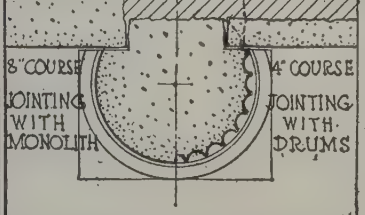
3/4" SCALE DETAILS OF THREE SIMPLE GRANITE CORNICES



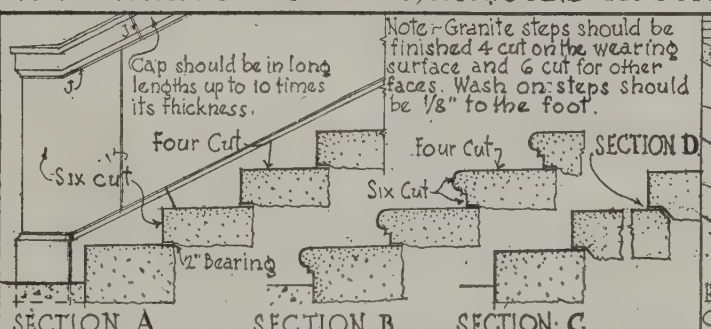
3/4" SCALE DETAILS SHOWING VARIOUS SURFACES, BASES AND RUSTICATIONS FOR GRANITE



METHODS OF BONDING PILASTERS

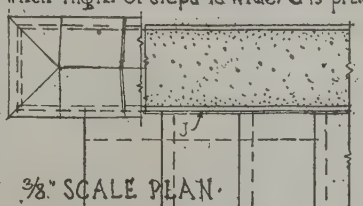


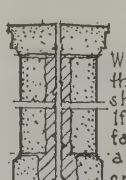
3/8" SCALE PLANS OF BONDS OF PILASTERS & COLUMNS



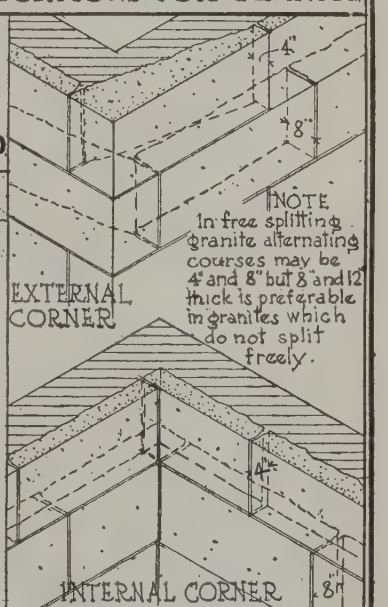
SECTIONS SHOWING BEARINGS FOR GRANITE STEPS

Note bearings shown at **C** & **D** are used to prevent sliding of stones when flight of steps is wide; **C** is practical and less expensive than **D**





3/8" SCALE DETAILS OF TYPICAL STAIR CONSTRUCTION



1/4" SCALE DETAILS SHOWING BONDING OF CORNERS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	TYPICAL GRANITE DETAILS SHOWING PRACTICAL METHODS OF CONSTRUCTION	SCALE:- 3/8 & 3/4 EQUAL 1'-0" DATE:- JUNE-20	DRWG 3

Continued on next page

Specifications (Continued)

Reglets shall be cut for flashing and counterflashings as required.

Section 18. Models—Full size plaster models of all ornamental and carved work, shall be furnished to the granite contractor as hereinbefore specified.

Where necessary for the proper execution of the work, models will be delivered at the plant of the granite contractor free of expense to him, to be used by him for the purpose of roughing and such carving as may be done at the plant, the granite contractor to carefully preserve these models for re-shipment to the building if required. The expense of handling and re-crating for shipment at the plant to be borne by the granite contractor.

Section 19. Roughing for Carving—No roughing for carved work is to be done from drawings but from approved models only. Sufficient stock in all cases shall be left for the carving and the granite shall be roughed to suitable form and condition for the carver. The cutter and carver shall co-operate in the method of securing the proper roughing for ornamental work.

Section 20. Carving*—Carving may be done at the site either before or after the granite is set or the work may be delivered at the site already carved.

In case the carving is done at the plant or at the site before being set in place, this contractor shall do all necessary refinishing or retouching to make the carving conform to the models and to the satisfaction of the architect. All carved ornament shall be executed by hand by skilled carvers in a spirited and artistic manner and in strict accordance with the approved models.

Where carving is done after the work is set all necessary staging and protection shall be furnished by the general contractor, and if required the models shall be hoisted into position and properly secured to the scaffolding for the convenient use of the carvers by the general contractor.

Inscriptions, lettering or numerals if required shall be clean cut and in accordance with the models, if provided, or otherwise with the full sized details of same. The incised surfaces of lettering shall be cut smooth and accurately to the full depth and section shown on the models or drawings.

Section 21. Crating and Shipping—This contractor shall properly crate the finished granite for shipment, the crating being so constructed as to properly protect the edges and surfaces of the exposed portions of the work during shipment and handling prior to setting same. Due precaution shall be taken to use crating material which will not stain or discolor the exposed surfaces of granite; and especial care shall be used to protect and suitably note any delicate portion where extra care should be observed in handling.

The finished granite properly crated shall be carefully loaded for shipment by this contractor who shall exercise all necessary precautions in loading to withstand the usual hazards in transit.

Section 22. Precaution Against Stain—Special precautions shall be taken in the setting to guard against possible seepage through the joints of moisture from the mortar or material used in backing up the granite work, which will cause discoloration around the face joints or surface of the granite.

At least 12 hours before the granite is set, all surfaces not exposed shall be thoroughly coated with an approved dampproof compound to within 1 in. of the exposed face. After the granite is set, and before backing up, another coat of the same dampproofing compound shall be applied to the back for the special purpose of covering the backs of the mortar joints.

The painting of the granite may be omitted with the approval of the architect when it is definitely known that the setting mortar will not stain the granite, but the backs of the mortar joints should be dampproofed in any event to guard against seepage.

If the first coat of dampproofing is applied at the mill, the setting numbers must be painted conspicuously over the dampproofing.

The granite shall at all times be protected from stain and upon delivery at the site shall be kept stacked on timber or platforms at least 4 in. above the ground, until set in place in the wall.

Under no circumstances shall salt be used for thawing out lewis-holes or otherwise in connection with the granite work.

*Note: If carving is to be done by others than the granite contractor same should be noted here—and this specification modified to suit conditions.

Section 23. Setting—Each granite stone shall be brushed clean and drenched immediately before being set. Each piece shall be carefully bedded in a full bed of non-staining mortar and tapped home with a wooden mallet to a full and solid bearing.

The face of the granite work shall be kept free from mortar at all times.

Granite facing shall not in any case be built up more than two courses ahead of the backing and no stone having a greater width of bed than the one below it shall be set until the lower course is backed up.

All surplus mortar shall be immediately raked out to a depth of at least 1 in. and every precaution taken to prevent stones bearing upon the edges.

Sills, etc., subject to pressure, shall be bedded only at the ends.

The cement in the mortar used for setting all granite work where the joint is exposed to the weather shall be made waterproof with a satisfactory waterproofing compound, mixed with the mortar.

The sand used in all setting mortar shall be such as to cause no stain or chemical action with the cement.

Section 24. Anchors, Dowels, etc.—All bolts, expansion bolts, anchors, ties, etc., required in the setting of the granite work, will be furnished to the granite contractor.

All ashlar shall be anchored to the backing with heavily galvanized wrought iron anchors ¼x1¼ in. turned down into the granite 1¼ in. and extending into the backing 8 in. if the thickness of wall permits; the end to be turned up 1½ in. into the backing. There shall be at least two anchors to every stone whose length exceeds its height and in general there shall be not less than two anchors to each superficial square yard of ashlar.

Note: Special anchoring for heavy cornices and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, and columns, etc., should be suitably described or shown according to the requirements of the work.

Section 25. Boxing and Protection—All granite work must be protected from damage during the progress of the work and until the completion of the building.

The general contractor shall provide the necessary protection, covering all projections, top surfaces, angles, etc., protective boxing to be securely fastened in position and securely nailed throughout with galvanized iron nails. No lumber or material to be used which would in any way stain or deface the granite work.

All necessary forms, centers, scaffolding, etc., required by the setter or carver to be furnished by the general contractor.

Section 26. Pointing and Cleaning—After the completion of the granite work or at such time thereafter as all liability from stain of other operations on the building is passed, and when there is no danger therefrom, the whole of the granite work shall be carefully cleaned down, removing all dirt, mortar, stains, and other defacements.

The use of wire brushes, acids or solutions which might cause discoloration will not be permitted.

All face joints shall be raked out to a depth of not less than 1 in., brushed clean, thoroughly wetted, and filled with pointing mortar and then carefully jointed. The pointing mortar must be packed solidly into all joints, completely filling the same; and the form of joint shall be as directed by the architect.

Vertical joints in the top courses of uncovered cornices having a projection of 8 in. or more shall be filled with mortar by grouting to within 3 in. of the top of the granite, then calked with picked oakum and filled with molten lead, calked against the edges and slightly convex at the top—taking care that the oakum is kept at least 2 in. away from the face and top of granite.

Joints in the upper surfaces of projecting stones which are not so protected and in all platforms, steps and coping, shall be raked out at least 2 in. deep and thoroughly grouted flush with the surface of the granite.

Pointing and cleaning shall start at the top and be continued until such work is completed.

Section 27. Defective Work—No patching or hiding of defects will be permitted. Defective granite stones shall be replaced with perfect ones, except in extreme cases where a stone has been damaged through no fault of the granite contractor, and where it is possible and practicable to remedy the defect without in any way impairing the appearance, strength or durability of the work—and then only with the approval and under the supervision of the architect—and where a satisfactory allowance has been agreed upon which shall be deducted from the contract price.

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Specifications—Short Form

The following short form of Granite Specifications has been prepared by the Association for use where a comparatively small amount of granite is required, but where the standards of workmanship and other essentials should conform to the same requirements set forth in detail in the complete form printed on two preceding pages.

(1) **Work Included**—The work to be done shall include the furnishing, delivery, and setting of all granite work required by the drawings and specified herein. (State portions of work to be of granite and note any exceptions about which there might be any question.)

(2) **Material**—The granite shall be sound and of good quality, free from defects which would impair the strength, durability, or appearance of the work, and equal to the approved sample. In estimating, the contractor shall state the name of granite and quarry, upon which his proposal is based. The following granites will be considered: (mention color, tone and grain) granite from (mention locality).

(3) **Samples**—Submit in duplicate, for the architect's approval, samples of the granite showing the extreme variation in quality, color and texture to be used under the contract, and showing the specified finishes.
(State size of sample required.)

(4) **Shop Drawings**—The granite contractor shall prepare all necessary shop drawings, showing in detail the jointing, bonding, and construction of the granite work, and special anchoring. These shall be submitted to and approved by the architect before any cutting is done.

(5) **Finishes**—The exposed surfaces of the granite shall be finished as indicated on the drawings or specified herein.
Note: State finishes desired.

(6) **Cutting**—All exposed surfaces shall be out-of-wind, free from waves, projections, or depressions, and flush at the joints. Arrises shall be cut sharp and true to square or pattern, and continuous with adjoining arrises.

(7) **Bed and Joints**—Beds shall be cut full and square for at least 2 in. from face, and may fall off not to exceed 1 in. in 12 in., reasonably free from large depressions. Joints to be full and square at least 1½ in. from face, falling off not to exceed 1½ in. in 12.

(8) Backs of granite shall be scabbled or split to approximately vertical surfaces.

(9) Jointing shall be as shown on approved drawings, and ¼ in. in thickness.

(10) **Bonding**—Shall be as shown on approved drawings, with no bed less than 4 in. Projecting course shall have beds at least equal to projection, unless otherwise shown.

(11) **Mouldings**—Shall be cut with uniform profile throughout their lengths, in conformity with full size details, with lines true and straight, and flush at joints.

(12) **Washes and Drips**—Washes shall be cut on stones whose top surfaces are exposed, unless otherwise shown. Projecting stone shall have groove drip cut on underside.

(13) Raised seats or lugs shall be cut where stone work rests on projections or washes, and raised thresholds shall be cut on exterior door sills.

(14) Reglets shall be cut for flashing where shown or required.

(15) **Models**—Full size plaster models of all ornamental and carved work shall be furnished to the granite contractor, who shall preserve these models for re-shipment to the building, if required.

(16) **Roughing for Carving**—This shall be done from approved models only, leaving the stone in suitable form and condition for the carving.

(17) **Carving**—All carved ornament shall be executed by skilled carvers, in a spirited and artistic manner, and in strict conformity with the approved models.

(18) **Crating and Shipping**—The finished granite shall be properly crated for shipment, to protect the surfaces and edges of all exposed work.

(19) **Precaution Against Stain**—Precaution shall be taken at all times to protect the granite from stain.

(20) Under no circumstances shall salt be used for thawing out lewis-holes, or otherwise in connection with the granite work.

(21) (If dampproof painting is required, specify requirements here.) After setting, the backs of all mortar joints shall be suitably dampproofed to prevent moisture from the backing seeping through the joints.

(22) **Setting**—The setting of the granite work shall be done by competent, experienced stone setters, and in strict accordance with the approved drawings and specifications.

(23) Each granite stone shall be brushed clean and thoroughly drenched immediately before setting and carefully bedded in a full bed of non-staining mortar. The granite facing shall not be built up more than two courses ahead of the backing, and the faces shall be kept free of mortar at all times.

(24) All surplus mortar shall be immediately raked out to a depth of at least 1 in. Sills, etc., subject to pressure shall be bedded only at the ends.

(25) Where a joint is exposed to the weather, it shall be made waterproof by mixing a satisfactory waterproofing compound with the mortar.

(26) The sand used in all setting mortar shall be such as will cause no stain, or chemical action with the cement.

(27) **Anchoring**—The granite shall be anchored to the backing with galvanized iron anchors, ¼x1¼ in., turned down into the granite 1¼ in., extending 8 in. into the backing if possible, and turned up into the backing 1½ in. There shall be two anchors to each stone whose length exceeds its height and, in general, not less than two anchors to every superficial yard of ashlar. All anchors, bolts, ties, etc., shall be furnished to the granite contractor.
Note: Special anchoring for heavy cornices, and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, columns, etc., should be suitably described or shown according to the requirements of the work.

(28) **Boxing and Protection**—All the granite work shall be protected by the general contractor during the progress of the work and until the completion of the building. No lumber or material shall be used which will in any way stain or deface the granite work.

(29) **Centers and Scaffolding**—All necessary forms, centers, scaffolding, etc., required by the setter or carver, will be furnished by the general contractor.

(30) **Pointing and Cleaning**—After all liability from stain or damage from other operations on the building is passed, the granite work shall be carefully cleaned, removing all dirt, mortar stains and other defacements. The use of wire brushes, acids, and solutions which might cause discoloration, will not be permitted.

(31) All face joints shall be brushed out, thoroughly wet with clean water, and carefully pointed as directed by the architect.
Note: See Long Form for special treatment of vertical joints in uncovered cornices, and joints in upper surfaces of projecting stones.

(32) **Defective Work**—No patching or hiding of defects will be permitted.
Defective stones shall be replaced with perfect ones, unless otherwise directed by the architect.

ESTABLISHED 1889 INCORPORATED 1924

DEACON BROTHERS, INC.

JOHN R. DEACON, MANAGER

Manufacturers, Cutters and Finishers of Building and Monumental Granite

307-323 Centre Street
QUINCY, MASS.

Materials

We use in manufacturing, the various Quincy Granites from the quarries situated in our home city and granites from other New England quarries.

We make a specialty of carrying a supply of slabs of Goss Pink Deer Isle Granite sawed, polished, and ready to be cut into store fronts and base courses.

Facilities

Our plant is the largest in the city, occupying a whole city block and consists of a modern cutting plant, polishing mill, and saw house.

We are situated so that we can easily ship by rail or water (from Boston) to any point in the United States, and locally by our own motor transportation within 150 miles.

Organization

We are known as the "Quality Manufacturers" on account of the quality of work we produce.

The polish on granite produced at our plant is of the highest gloss obtainable. This quality is *maintained at all times.*

The firm was founded in 1889 by the late William H. Deacon and has been operated continuously by the same family to this day.

Estimates

Estimates on granite work and samples on request.

The Palmer House, Chicago, Ill.
Granite used in the lower courses of this hotel was furnished by DEACON BROTHERS, INC.

A Few Representative Installations

BUILDING	ARCHITECT
Hotel Statler, Boston, Mass.	George B. Post & Sons, Boston, Mass.
Palmer House, Chicago, Ill.	Holabird & Roche, Chicago, Ill.
First National Bank, Northampton, Mass. / Granite Trust Co. Bank, Quincy, Mass.	J. Williams Beal Sons, Boston, Mass.
Southwestern Bell Telephone Co. Building, St. Louis, Mo.	Mauran, Russell & Crowell and I. R. Timlin Associated
Hibernia Bank Building, New Orleans, La.	Favrot & Livaudais, Ltd.
Union League Club Building, Chicago, Ill.	Mundie & Jensen, Chicago, Ill.
Houston-Post-Dispatch Building, Houston, Tex.	Sanguinet, Statts, Hendrick & Gottlieb, Houston, Tex.
City Savings Bank & Office Building, Alliance, Ohio	Simons, Britain & English, Inc., Alliance, Ohio
National Mount Wollaston Bank, Quincy, Mass.	Thomas M. James Co., Boston, Mass.
Pontiac Michigan Central Office, Detroit, Mich.	Smith, Hinchman & Grylls, Detroit, Mich.
J. A. Mercier Office Building, Detroit, Mich.	Donaldson & Meir, Detroit, Mich.
The Corning Building, Hartford, Conn.	Whiton & McMahon, Hartford, Conn.

Numerous J. J. Newberry store fronts throughout the United States

COLD SPRING GRANITE COMPANY, INC.

Quarriers and Producers of Granite

GENERAL OFFICES AND PLANT
COLD SPRING, MINN.

SALES OFFICES

MINNEAPOLIS, MINN., 724 Baker Building
CHICAGO, ILL., 228 No. LaSalle Street
CLEVELAND, OHIO, 1060 Hanna Building
ST. LOUIS, MO., 2042 Railway Exchange Building
NEW ORLEANS, LA., 1009 Maison Blanche Building
ATLANTA, GA., Bona Allen Building

Products

Owners and producers of
COLD SPRING RAINBOW GRANITE.
COLD SPRING PEARL PINK GRANITE.

Chemical Analysis

Silica	62.15%	Lime	2.27%
Alumina	19.41%	Phosphorus	.13%
Iron oxide	2.99%	Magnesia	trace

Absorption Test

4-23-24 to 4-30-24

Weight air dry, grains	Weight after immersion of one hour, grains	Weight after immersion of one day, grains	Weight after immersion of one week, grains	Total gain in weight, grains	Per cent gain
1944	1945.5	1945.5	1945.5	1.5	.07

The weight is the same after a week as it is after an hour. Gain in weight appears to be due to surface moisture only; no moisture being absorbed.

Uses

Building construction of every kind. Facings, doorways, steps, window trim, stairways, sills, floor tile, columns, mantels, fountains, and all other structural and memorial purposes.

Quarries

Located within convenient proximity to the cutting plant in Cold Spring, Minnesota. Are fully developed and completely equipped with the best and most modern quarry machinery available. The drilling and broaching system of quarrying is used exclusively, instead of blasting, which eliminates all possibility of shattering. The size of blocks obtainable is limited only by the restrictions of railroad transportation. Our derricks have lifting capacity of more than 100 tons. The granite is not affected by weather conditions and quarries and finishing plant operate throughout the year.

Finishing Plant

Our cutting plant is one of the largest and best mechanically equipped in America. Capable of handling promptly and efficiently contracts of any size. Have capacity for handling single pieces of more than 75 tons. Modern gang saws, circular carborundum saws, planers, and various kinds of up-to-date machines are employed in the production of cut granite in this plant and many different finishes are produced entirely by machinery, thereby effecting substantial savings over the old and expensive hand methods. A large stock of blocks, also sawed and polished slabs, from one inch in thickness up, is maintained at all times, assuring prompt delivery of finished work.

Service

The COLD SPRING GRANITE COMPANY, INC., having in its production, estimating, sales, drafting, traffic and other departments, men experienced and trained in their respective lines and with a sincere desire to co-operate in the fullest measure with architects and contractors, offers a complete and efficient service in the use of Granite.

Preliminary estimates, information, and samples will be gladly furnished without obligation.

An illustrated catalogue containing detailed and technical information will be mailed upon request.

Cold Spring Rainbow Granite

Is variegated in color, of a warm general tone ranging from deep black to dark red, but containing, as its name implies, all the colors of the rainbow in beautiful and varying combinations. It is of fine texture and one of the hardest granites produced. Takes a high and permanent polish, is suitably adapted to fine carving and ornamentation. It is truly distinctive and outstanding among all granites. It is especially desirable for columns and interior as well as exterior work.

Cold Spring Rainbow Granite Columns
St. Basil's Church, Chicago, Ill.
J. W. MCCARTHY, Architect

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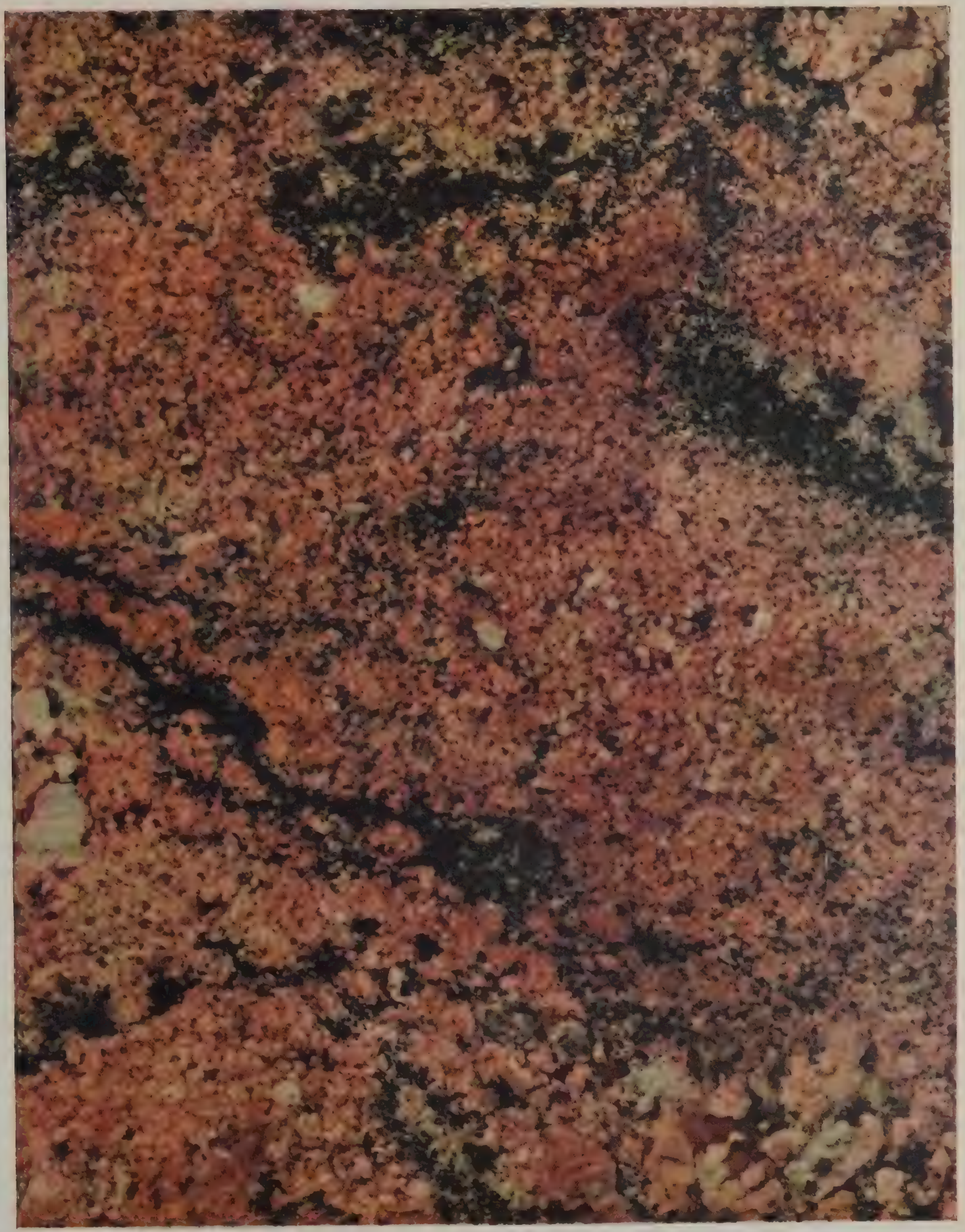

Cold Spring Rainbow Granite

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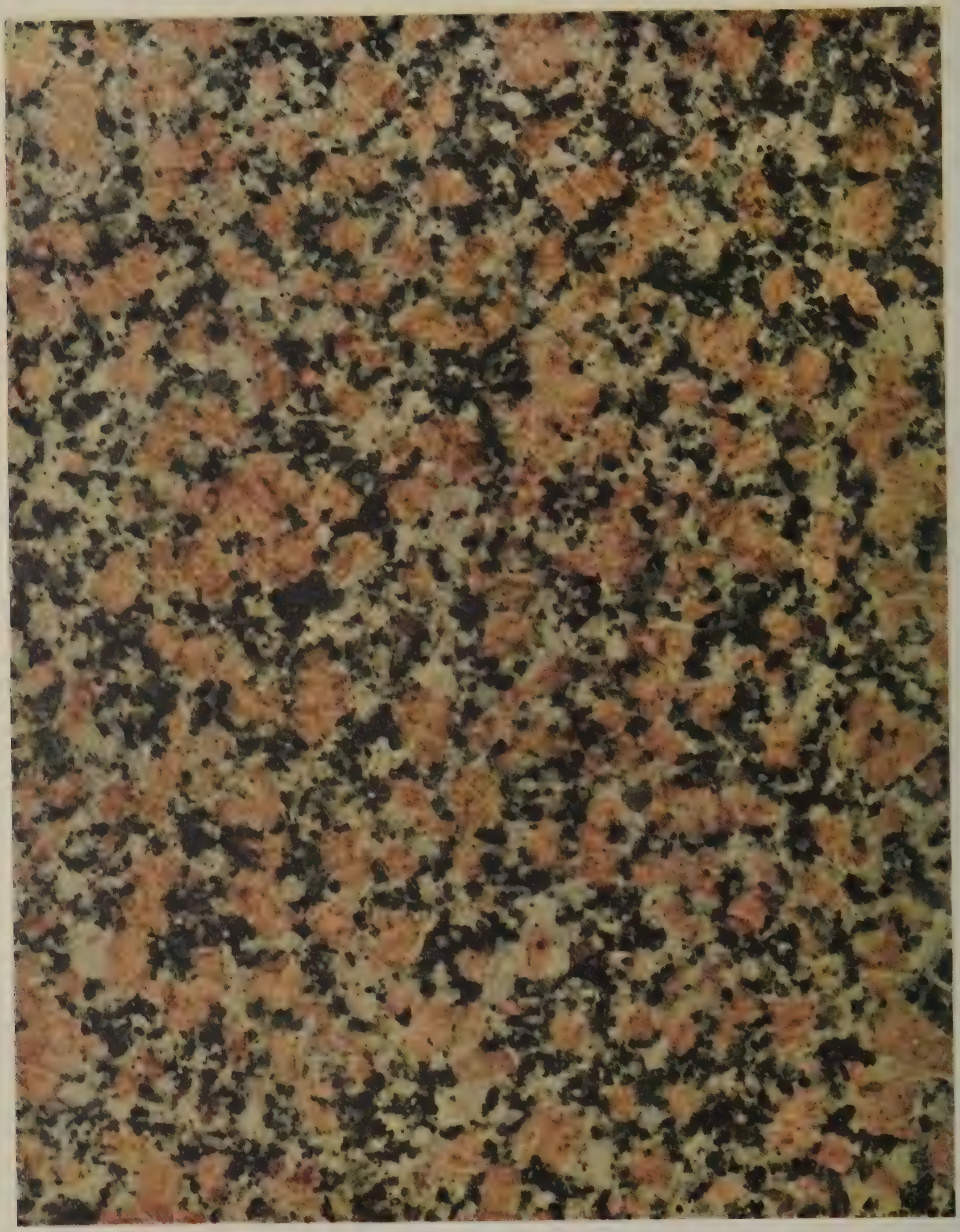

Cold Spring Pearl Pink Granite

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Cold Spring Rainbow Granite Used in the Following Buildings

Building	Location	Architect
Hemenway Building	Boston, Mass.	Shepard & Stearns
Hartford Gas Company	Hartford, Conn.	Buck & Sheldon
J. E. Simpson Building	Washington, D. C.	W. S. Plager
Southland Hotel	Norfolk, Va.	Peebles & Ferguson
Pro Patria Statue, Indiana War Memorial	Indianapolis, Ind.	Walker & Weeks
Watts Building	Birmingham, Ala	Warren Knight & Davis
Walthall Hotel	Jackson, Miss.	N. W. Overstreet
Bankers Guarantee Title & Trust Co.	Akron, Ohio	Good & Wagner
St. Mary's Church	Shelby, Ohio	Howard W. Germann
Holy Name Church	Columbus, Ohio	Edward A. Ramsey
St. Louis University Medical Building	St. Louis, Mo.	Widmer Engineering Co.
Dallas National Bank Building	Dallas, Tex.	Coburn, Smith & Evans
Stuart Building	Lincoln, Neb.	Davis & Wilson
Pickwick Theatre	Park Ridge, Ill.	Zook & McCaughey
St. Basil's Church	Chicago, Ill.	J. W. McCarthy
David Stott Building	Detroit, Mich.	Donaldson & Meier
American State Bank	Saginaw, Mich.	Robert B. Frantz
Sacred Heart Cathedral	Superior, Wis.	Louis Preus
Baker Building	Minneapolis, Minn.	Larsen & McLaren
Fidelity Building	Duluth, Minn.	Thomas J. Shefchik
Petroleum Building	Oklahoma City, Okla.	Layton, Hicks & Forsyth
Skirvin Hotel	Oklahoma City, Okla.	Layton, Hicks & Forsyth
Oklahoma Natural Gas Building	Tulsa, Okla.	A. M. Atkinson

Cold Spring Pearl Pink Granite

Of medium texture, rich and pleasing color tones consisting of a combination of pink, buff, pearl, white and black which blends into almost any architectural setting. It is exceedingly hard, takes a high and permanent polish, and is impervious to stains or discolorations. Hammered finishes produce a warm gray tone. Lends itself readily to fine carving and other forms of ornamentation.

Cold Spring Pearl Pink Granite Columns, St. Joseph's College and Academy, St. Joseph, Minn.
George P. Staudaher, Architect

Cold Spring Pearl Pink Granite Used in the Following Buildings:

Building	Location	Architect
Cadillac Building	Boston, Mass.	Albert Kahn
New York Central R.R. Passenger Station	Buffalo, N. Y.	Fellheimer & Wagner
Gallinger Hospital	Washington, D. C.	Municipal Architect
Koppers Building	Pittsburgh, Pa.	Graham, Anderson, Probst & White
Maccabees Building	Detroit, Mich.	Albert Kahn
City Hall	Columbus, Ohio	Allied Architects Association
Union Central Life Insurance Building Annex	Cincinnati, Ohio	Garber & Woodward
Scottish Rite Cathedral	Indianapolis, Ind.	Geo. F. Schreiber
Louisville National Bank & Trust Company	Louisville, Ky.	St. Louis Bank Building & Equipment Co.
Marx & Bensdorf Building	Memphis, Tenn.	Hanker & Cairns
Chamber of Commerce	Jacksonville, Fla.	Roy A. Benjamin
Calcasieu National Bank	Lake Charles, La.	Favrot & Livaudias
Roosevelt Hotel	New Orleans, La.	Favrot & Livaudias
Southwestern Bell Telephone Building	Dallas, Tex.	Lang & Witchell
Fort Worth Club Building	Fort Worth, Tex.	Sanquinett, Staats & Hedrick
First National Bank Building	Del Rio, Tex.	Willis & Jackson
First National Bank Building	San Jose, Calif.	Willis & Jackson
Home Telephone & Telegraph Building	Pasadena, Calif.	John & Donald Parkinson
Youngs Market Building	Los Angeles, Calif.	C. F. Plummer
U. S. Post Office	Missoula, Mont.	James A. Wetmore
Oklahoma Gas & Electric Building	Oklahoma City, Okla.	Layton, Hicks & Forsyth
Alexander Building (2)	Tulsa, Okla.	Leland I. Shumway
Courthouse	Kansas City, Mo.	Wight & Wight
Federal Reserve Bank	St. Louis, Mo.	Mauran, Russell & Crowell
Missouri Pacific Office Building	St. Louis, Mo.	E. M. Tucker
New Bismarck Hotel	Chicago, Ill.	Rapp & Rapp
U. S. Post Office and Courthouse	Des Moines, Iowa	Jas. A. Wetmore
Schroeder Hotel	Milwaukee, Wis.	Holabird & Roche
Cathedral Rectory Building	St. Paul, Minn.	Maginnis & Walsh
City Hall	Duluth, Minn.	Thos. J. Shefchik

THE DOLBEN QUARRIES

Weymouth Seam Face Granite

DOLBEN & COMPANY

7 Water Street

BOSTON, MASS.

QUARRIES AT WEYMOUTH, MASS.

Address All Correspondence to Boston Office

Products

SEAM FACE GRANITE ASHLAR.

SPLIT FACE GRANITE ASHLAR.

Seam Face Flagging and Stepping Stones; Special Arches, Lintels and Sills, cut according to drawings; Jambs, Quoins, Steps, Copings, etc., of special sizes for trimming walls faced with ashlar.

Facilities

The facilities of this company are adequate to handle operations of any kind.

Nature of Stone

A true granite of great strength, found in nearly upright sheets of various thicknesses. Seams between these sheets provide faces for the blocks into which the stone is cut. Permanent in texture and color.

Split face granite is produced by splitting blocks after quarrying. Surface is generally a little rougher than seam face. Splits evenly and requires no dressing or pointing.

Colors of Stone

The range of colors is wide, and includes grays, buffs, tans, browns, greens, and purple.

Color of seam face ranges from light gray to dark brown and purples. Color of split face granite is warm gray. Color group is optional.

Sizes

The blocks are produced in varying sizes.

The faces range from 4 to 14½ inches in height, thickness from 4 to 8 inches, and lengths are random.

Uses and Cost

The natural stone for churches, country residences and public buildings, it can be obtained in the texture and color desired at moderate prices.

Method of Laying

This granite is especially adapted to three and four-head ashlar work, and equally well to coursed ashlar.

The quarry cost per square foot is the same for either method of laying, but laying cost is lowest for coursed ashlar and highest for three-head.

Estimates and Samples

Estimates and samples are supplied promptly to architects, owners and contractors.

Flagging

For paving of courts, terraces and garden walks or other landscape features there is no stone equal to seam face granite. It is generally used in irregular shapes but can be cut to rectangular. Thickness is under 4 inches and surfaces have the full range of seam face colors.

St. Joseph's Church, Bridgeport, Conn.
JOSEPH JACKSON, New Haven, Conn., Architect

Immaculate Conception Church, Holyoke, Mass.
D. R. BARIBAULT, Architect

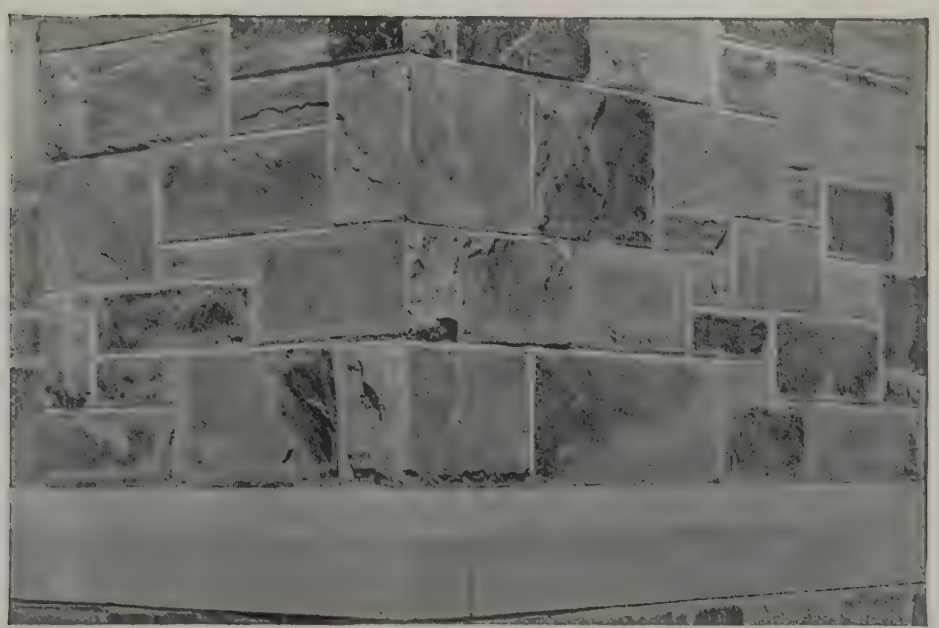
Continued on next page

Medium and Light Shade Ashlar

Gray, green, buff and tan with 20% split face stone. A warm color group but of light average shade

Quarry Run Ashlar

Full range of seam face colors, including gray, buff, tan, brown, green and purple



Corner Work

Combination of various colors of seam face and split face granite with limestone

Reference Buildings and Their Architects

First Swedish Lutheran Church, Brockton, Mass., Charles C. Coveney, 184 Boylston Street, Boston, Mass.
Vincent Astor Residence, Port Washington, N. Y., Delano & Aldrich, 126 E. 38th Street, New York, N. Y.
First Unitarian Church, Reading, Mass., Adden & Parker, 177 State Street, Boston, Mass.
St. Joseph's Church, Bridgeport, Conn., Joseph Jackson, 30 Whitney Avenue, New Haven, Conn.
Blessed Sacrament Church, Worcester, Mass., John W. Donahue, Springfield, Mass.
St. Anthony's Church, Revere, Mass., Edward T. P. Graham
St. Mary's Church, Uxbridge, Mass., John W. Donahue
Holy Cross Cathedral, Holyoke, Mass., John W. Donahue
Immaculate Conception Church, Holyoke, Mass., D. R. Baribault
Rectory, Our Lady of Victory, Jersey City, N. J., McKenna & Irving, 15 Park Row, New York, N. Y.
Temple Ohabei Shalom, Brookline, Mass., Blackall, Clapp & Whittemore, 31 West Street, Boston, Mass.
First Methodist Church, Rutland, Vt., Woodbury & Stuart
Church of Our Lady of Angels, Worcester, Mass., George Haynes
Wise Centre Building, Cincinnati, Ohio, Fechheimer & Thorst
Severance Hall, Wellesley College, Wellesley, Mass., Day & Klauder, and Coolidge & Carlson, Associates
St. John's Church, Brunswick, Me., Chas. R. Greco
Stone Hall, Wellesley College, Wellesley, Mass., Chas. M. Klauder, Philadelphia, Pa.
Residence, Weston, Mass., Eric Kebbon, New York, N. Y.
St. Paul's Church, Edgewood, R. I., Ambrose Murphy
St. Coleman's Church, Brockton, Mass., E. T. P. Graham
Mt. Carmel Church, Worcester, Mass., Raymond Gorami
Notre Dame Church, Worcester, Mass., D. R. Baribault
Star of the Sea Church, Marblehead, Mass., Maurice P. Meade, Boston, Mass.
Regis College, Weston, Mass., T. Edw. Sheehan, Boston, Mass.

JOHN L. GOSS CORPORATION

Producers of "Goss Pink Deer Isle Granite"

QUARRIES AND HOME OFFICE
STONINGTON, MAINE
SALES OFFICE, 77 Summer Street, BOSTON, MASS.
SALES AGENTS
NEW YORK, N. Y., A. Le Poidevin & Co., Inc., 286 Fifth Avenue PHILADELPHIA, PA., Frank Williamson, 2302 Spruce Street
MIDDLE WESTERN TERRITORY, Wm. H. Mitchell, 30 Church Street, NEW YORK, N. Y.

Product

Goss Pink Deer Isle Granite, for buildings, memorials and general construction, polished, hammered, pointed or rock-faced.

Trade-name

Deer Isle granite has been used for many years under a variety of names, such as Greens Landing, Stonington Pink, Maine Pink, Crotch Island, Deer Island, and others, and has been produced by a number of quarries operating in the Deer Isle district from time to time.

The Crotch Island quarry of John L. Goss Corporation was opened in 1870, and has been operated continuously to this day. Thorough development insures the same high quality of stock for years to come. To distinguish the product of this one quarry from that of all others, and to identify it as a standard of quality, the name "Goss Pink Deer Isle" was adopted.

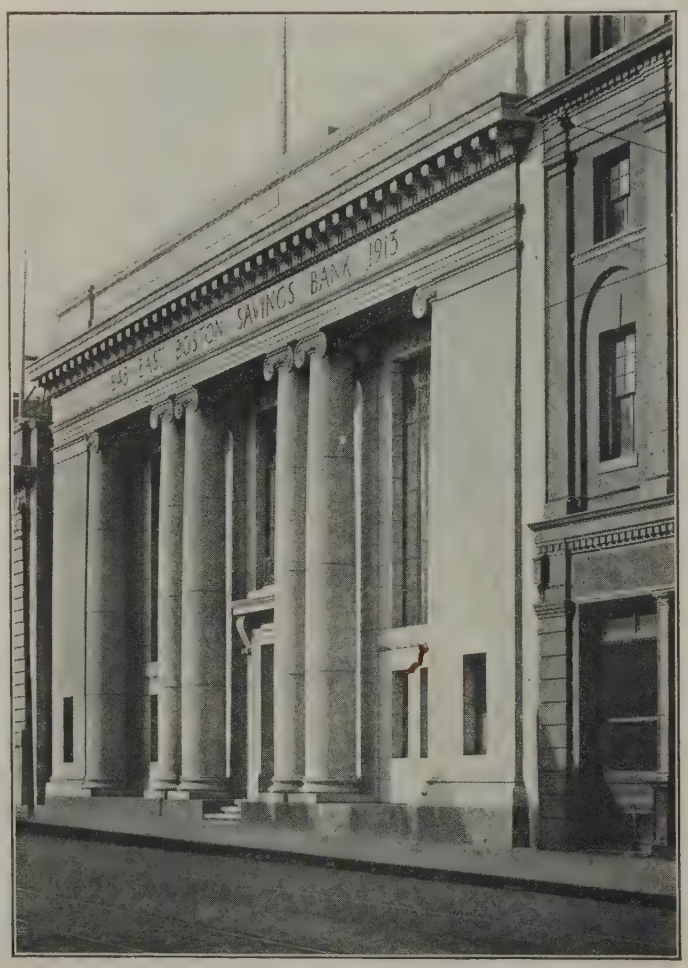
Service Available

Any responsible manufacturer or dealer can supply this material. The rough granite is shipped to finishing plants all over the country, which are equipped to furnish all classes of work. A large number of plants carry stocks on hand, and the quarry always stands ready to supplement these with prompt shipments of any sizes, shapes or quantities. We will be pleased to assist you in getting in touch with subcontractors in position to handle your particular project to best advantage, or to give preliminary estimates.

Facilities for Production

The natural advantages of the quarry site—a free working formation, so located that the product travels the short distance to our tidewater dock by gravity—are supplemented by the best of modern equipment: derricks, compressors, air tools, etc., which are constantly being improved, replaced and kept up-to-date.

This makes it possible to give prompt deliveries on large or small orders, and to furnish monoliths of any size that may be desired. We ship by water directly from our quarry dock to seaport cities, or deliver to the railroads at Rockland, Me.; Portland, Me.; Boston, Mass.; Philadelphia, Pa., and Wilmington, Del.



East Boston Savings Bank, East Boston, Mass.
Thomas M. James, Architect
Granite by John Harrington

Color and Texture

The natural scale color plates on the following page show polished and hammered surfaces. Rock-faced work has a tone between the two but with a very rugged character. For base courses, especially where subjected to accumulation of dirt or stain, we recommend a polished surface. A rubbed or honed finish gives some of the same advantages but is without the high gloss. For most general purposes, and especially in connection with moulded members or carved details, a hammered finish is advised. A pointed surface is an interesting but inexpensive finish with strong texture.

Compressive Strength

Tests by the United States Ordnance Department give a compressive strength of 23,620 pounds per square inch. This is well above all structural or code requirements.

Advantages

Goss Pink Deer Isle granite is readily available in any quantities at all times. It can be specified by name without losing the advantages of competition since it is so generally distributed. The rough material is a small part of the cost of the finished work, and any number of competing bids can be obtained on each project.

It is especially desirable in combination with other materials. The warm delicate shade harmonizes well with limestone, bronze, brick and other granites. It lends itself well to bold rock-faced work, tooled or carved details, or to polishing.

It is a peculiar characteristic of this granite that it retains its freshness for a long period and does not readily become soiled or discolored. This is a most useful quality in and around cities where there is an excess of soot and smoke.

Specifications

We suggest that you use the form recommended by the National Building Granite Quarries Association on another page of this book, inserting the finish desired, and in place of Section 2—"All granite shall be Goss Pink Deer Isle Granite from the quarry of John L. Goss Corporation at Stonington, Maine.

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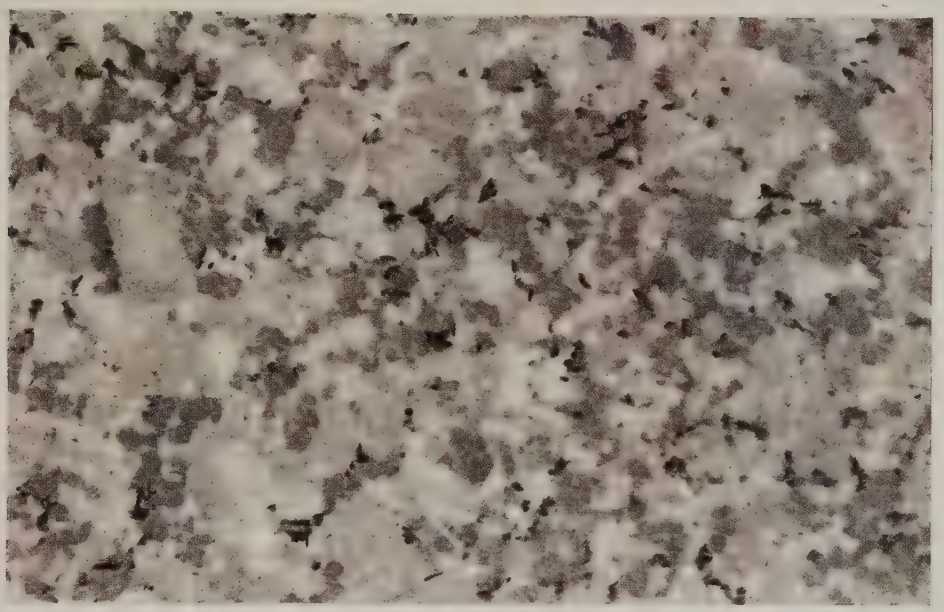
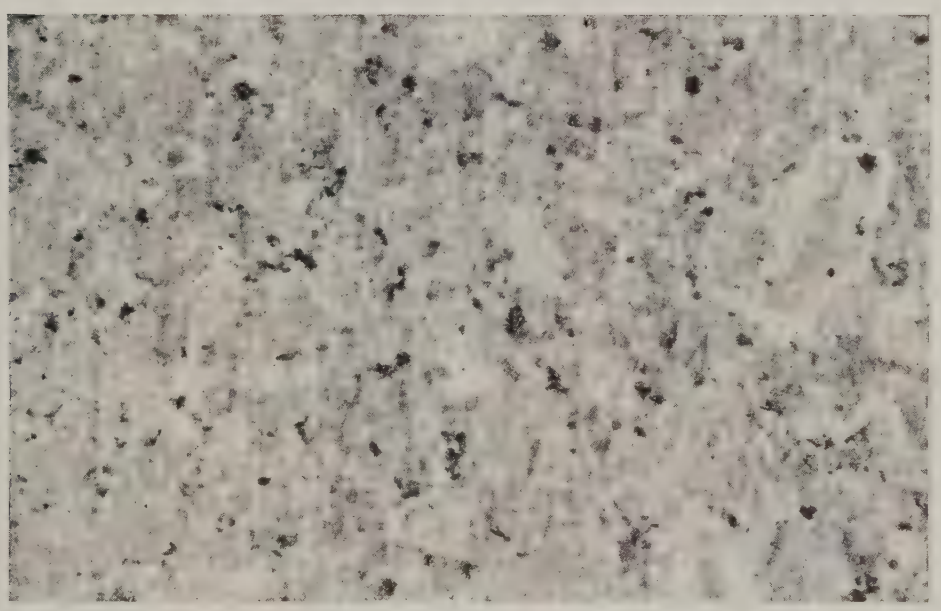


Goss Pink Deer Isle Granite (Polished Finish)



Goss Pink Deer Isle Granite (Hammered)

References

Building	Architect
Stevens Hotel, Chicago, Ill.	Holabird & Roche
Federal Reserve Bank, Boston, Mass.	R. Clipston Sturgess
Lafayette Building, Philadelphia, Pa.	John T. Windrim
Evans Memorial Galleries, Boston, Mass.	Guy Lowell
Insurance Co. of North America Building, Philadelphia, Pa.	Stewardson & Page
Neils Esperson Building, Houston, Texas	Eberson & Eberson
Phillips Memorial Tower, Andover, Mass.	Guy Lowell
Security Trust & Savings Bank, Los Angeles, Cal.	John Parkinson
Public Ledger Building, Philadelphia, Pa.	Horace Trumbauer
East Boston (Mass.) Savings Bank	Thomas James
Pilgrim Memorial Tower, Provincetown, Mass.	Willard T. Sears
South Office Building, State Capitol, Harrisburg, Pa.	Arnold W. Brunner
Industrial Trust Building, Providence, R. I.	Walker & Gillette
Beacon Trust Co., Boston, Mass.	Arthur H. Bowditch
New York State Office Building, Albany, N. Y.	Sullivan W. Jones
Salem Fields Entrance, Brooklyn, N. Y.	Percy W. Darbyshire
Tompkins County War Memorial, Ithaca, N. Y.	LeRoy P. Burnham
Fountain of Oceanus, Estate of John D. Rockefeller, Pocantico Hills, N. Y.	Welles Bosworth
Drexel Bank Building, Philadelphia, Pa.	Day & Klauder
Security Building, Miami, Fla.	Robert Greenfield
Mutual Trust Co., Philadelphia, Pa.	Heacock & Hokanson and The Ballinger Co.
Merchants National Bank, New Bedford, Mass.	Adden & Parker
New York State Office Building, New York, N. Y.	Sullivan W. Jones
Fountain Memorial to Pilgrim Women, Plymouth, Mass.	McKim, Mead & White

H. E. FLETCHER COMPANY

Producers of Granite

WEST CHELMSFORD, MASS.

Products

CHELMSFORD WHITE GRANITE.
CHELMSFORD GRAY GRANITE.
CHELMSFORD "BULFINCH" GRANITE.
MILFORD (N. H.) GRANITE.

DIMENSION, CUT, RUBBLE and CRUSHED GRANITE for buildings, bridges, roadways, sea-walls, docks and dams.

DIMENSION GRANITE, in carloads for mausoleum and monumental work.

PAVING BLOCKS, CURBING, SEWER INLETS and CRUSHED GRANITE for municipal work and for "FLETCHERMIGHT" pavement.

Chelmsford White Granite

A grayish-white granite which weathers well and is widely used for building and bridge work.

Chelmsford Gray Granite

A well-known standard light gray granite for building and memorial work.

Weathers equally as well and is finer grained than Chelmsford White.

Both granites, when bush-hammered, are almost unequalled in retaining their light, almost white color even after years of exposure.

Chelmsford "Bulfinch" Granite

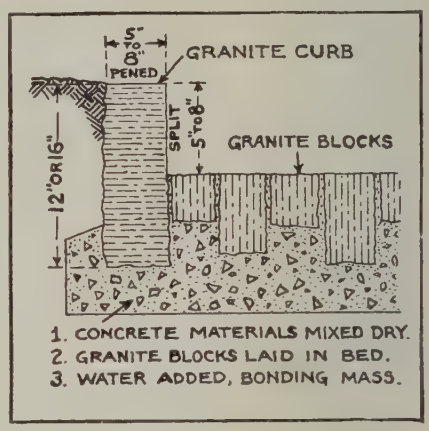
A varied light grayish-buff colored granite used for many years in Colonial structures. A notable example is University Hall, of the Harvard University group at Cambridge, Mass., designed by Bulfinch and built in 1813. This famous building stands today, an example of the splendid weathering qualities of Chelmsford Granite. Chelmsford "Bulfinch" Granite has been used in recent additions to this group.

Paving Blocks and Curbing

We are one of the principal producers of paving blocks and curbing, and make a specialty of delivering curbing on the street in correct position for setting and in the shortest possible time.

"Fletchermight" Pavement

We are presenting to the attention of the public a new pavement, called "Fletchermight" after a vote by the road builders of America. This is designed for heavy motor traffic on main trunk highways, and is protected by patent No. 1,573,923, Feb. 23, 1926. The sketch at right shows the general construction and use of granite curbing with this pavement.



Facilities

Nearly fifty years of expert quarry development has produced free quarry faces containing millions of feet of clear granite, all available for immediate quarrying under numerous derricks. With unexcelled railway facilities, and adequate cutting plant, this means that the largest contracts can be easily and promptly handled. We do no polishing work at this plant, but are in a position to furnish saw blocks to polishing plants for quick delivery.

Organization and Service

Our organization has been built up of men having long experience in granite production and includes business, traffic and technical experts who have made intensive study of the requirements for giving satisfaction and service to purchasers of our products.

Recent Contracts

Camden Anchorage and Plaza, Philadelphia and Camden Bridge
Soldiers and Sailors Memorial Bridge, Harrisburg, Pa.
Market Street Bridge, Wilkesbarre, Pa.
New York Port Authority Bridges, New York and New Jersey
Hartford County Building, Hartford, Conn.

The H. E. Fletcher Quarry at West Chelmsford

ESTABLISHED 1826

GRANITE RAILWAY COMPANY

Quarriers of Granite Railway Syenite

1535 Hancock Street, QUINCY, MASS.

The Company

In 1826 the GRANITE RAILWAY COMPANY was organized and chartered by the Commonwealth of Massachusetts, for the dual purpose of quarrying stone and transporting it by railway to the Neponset River, whence it was taken by vessels to all parts of the Atlantic coast from Maine to Louisiana. The railway which was built in 1826 was *"The First Railway in America."* For a half century the Company operated both its quarries and railway, then it gave up its railway and devoted its entire energies to the quarrying side of the business.

Bunker Hill Monument
Construction started 1826

Syenite

Railway granite is really a syenite composed of quartz, feldspar and hornblende and takes its name from Syene in upper Egypt where the similar stone so extensively used by the ancient Egyptians was quarried. The hornblende makes it very hard and durable. Even after a hundred years of such a variable climate as is found in New England, Railway Syenite fails to show the slightest trace of disintegration. Two good examples of this are Bunker Hill Monument and Minot's Ledge Light.

The syenite from the quarries of the GRANITE RAILWAY COMPANY is taken from strata far below the surface of the ground. Every block is closely examined, and any that is not perfect in color and texture is discarded. Two standard shades of color, dark and extra dark, give the architect a choice permitting considerable flexibility in chromatic design.

The Quincy syenite first used in buildings was selected for its hardness and its permanence. While stone polishing is one of the oldest arts, the methods were at first rough and crude, making the cost of polishing too great to permit of the use of large polished surfaces in building construction. It was early recognized, however, that Quincy syenite when polished presents a uniquely beautiful surface, unusually dark in color, yet with far more lively a sparkle than is ordinarily associated with so dark a material. The beauty of this polished surface, together with the contrasting gray of the hammer-finished stone, led gradually to a larger and larger part of the output of the Quincy syenite being used by monument manufacturers.

In recent years changing conditions once more offer an opportunity to the architect to obtain new distinction of design by the use of this same Granite Railway stone which was so widely used for structural purposes two, three or four generations ago. Not only does the modern steel-framed building permit the use of much thinner veneers than was feasible in the days when masonry walls were all bearing walls, but also the methods and machinery for polishing stone have so improved that it is now possible to polish large surfaces of granite at greatly reduced cost. At the same time saws have been devised which enable the granite manufacturers to cut the solid block into veneers of almost any thickness desired. Owing to its hardness and strength, and the ease with which it can be cleaned by simple washing, polished Granite Railway syenite is especially adapted for use as a facing on the lower stories of buildings that are subject to the dirt of the streets and likely to be chipped by the wear and tear of passing traffic.

The beautiful dark color of its polished surface contrasts well with lighter stone in upper stories. As the setting for windows and doorways, for bronze and iron grill work, for marble carving or panels, polished Granite Railway syenite provides a background which brings out the contrasting detail subordinating its own intrinsic beauty.

Service to Architects

THE GRANITE RAILWAY COMPANY desires to place its skill and knowledge of the possibilities of syenite granite at the service of the architect and contractor. It welcomes, therefore, inquiries about the use of granite in any way. The knowledge of the various applications of syenite possessed by this company enables it to suggest economical and efficient new ways of using its granite both in the ashlar and in the massive block. In fact, new uses for the employment of syenite granite are constantly being developed. Let us solve your problems.

Recent Buildings

Some of the most recent examples of the use of Granite Railway syenite in modern building construction may be seen in the Parker House, Boston, Mass.; Palmer House, Chicago, Ill.; National Mt. Wollaston Bank, Quincy, Mass., and the McCrory Five and Ten Cent Stores, Dayton and Youngstown, Ohio.

Photo by W. A. Bradford

Minot's Ledge Light, Boston Harbor Built 1855-60 with Railway Granite

Showing Gateway to the Quarry, and on the Left, Part of the Original First Railway in America

GRANITE MANUFACTURERS ASSOCIATION OF MOUNT AIRY

MOUNT AIRY, N. C.

MEMBERS

J. D. SARGENT GRANITE COMPANY
Mount Airy, N. C.
Branch Offices:
30 East 42nd Street, New York, N. Y.
615 Witherspoon Building, Philadelphia, Pa.
127 No. Dearborn Street, Chicago, Ill.

NORTH STATE GRANITE COMPANY
Mount Airy, N. C.
Branch Office, 30 East 42nd Street, New York, N. Y.

THE NORTH CAROLINA GRANITE CORPORATION
Mount Airy, N. C.
Branch Offices:
30 East 42nd Street, New York, N. Y.
127 No. Dearborn Street, Chicago, Ill.
615 Witherspoon Building, Philadelphia, Pa.

MOUNT AIRY GRANITE CUTTING COMPANY
Mount Airy, N. C.

Products

DIMENSION GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

POLISHED and TURNED GRANITE.

GRANITE PAVING BLOCKS, STREET CURBING, CROSSWALK, RUBBLE, CRUSHED GRANITE and RIP RAP.

The Association and Its Object

The aim of this Association is to jointly promote the use of Mount Airy granite for all purposes where granite is adapted. The individual members will cooperate with architects, engineers, contractors or owners in matters relating to the use of granite, samples, specifications, estimates, etc.

Quarry Production

The quarries were first opened in 1889, the first shipment being made in July, 1890; the output for that year being 135 carloads and has increased rapidly to a maximum output of 3500 carloads in one year.

Cutting plants and offices are located at the base of the Mount Airy quarries and are equipped with the latest improved machinery for the manufacture of granite, including electric traveling cranes, polishing machinery and turning lathes with individual motors, sand blast and carborundum machines, also compressed air for the pneumatic surfacing machines and hand cutting tools. These plants, taken together with the unlimited supply of rough granite available, enable large contracts to be executed in quick time.

Geographical Location

The Mount Airy quarries are well situated in reference to shipping, being about an equal distance from New York City, New Orleans and Chicago; which fact guarantees a reasonable transportation cost on their material to points throughout the East, South and Middle West. These quarries are served by the Southern Railway and have a nearby connection with the Norfolk & Western Railway.

Patterson Memorial, Dayton, Ohio

Owing to natural advantages peculiar to Mount Airy quarries, Dimension Stone of unusual size is easily obtained, only limit being that of railway transportation.

Facilities

The Mount Airy quarries are located one miie east of the Town of Mount Airy, N. C., and have 70 acres in exposed granite area.

Moulding and Carving

Owing to the composition of Mount Airy granite, it is especially adapted for fine moulding, carving and sculpture work, attested by reference to the following:

Pennsylvania State Monument, Gettysburg, Pa.

Column Capitals of the North Western Life Insurance Building, Milwaukee, Wis.

Column Capitals and Panels of the Municipal Building, New York, N. Y.

Continued on next page

Colors and Texture of Mount Airy Granite

Mount Airy granite, *"The Granite of Individuality,"* is a very light gray, almost white, biotite granite of medium texture. Feldspar, quartz and mica characterize the granite megascopically.

The feldspar is nearly white, while the quartz is a blue gray and the mica black and very evenly distributed, giving an appearance of decided strong character when hammer dressed.

The composition of Mount Airy granite is indicated by the following Chemical Analysis:

SiO_2	70.70
Al_2O_3	16.50
Fe_2O_3	2.34
MgO	0.29
CaO	2.96
Na_2O	4.56
K_2O	2.45
FeS_2	0.09
Total	99.89

Weight per cu. ft..... 165 lbs.
Water absorbed per cu. ft..... 0.33 lb.
Crushing strength....23,068 lbs. per sq. in.

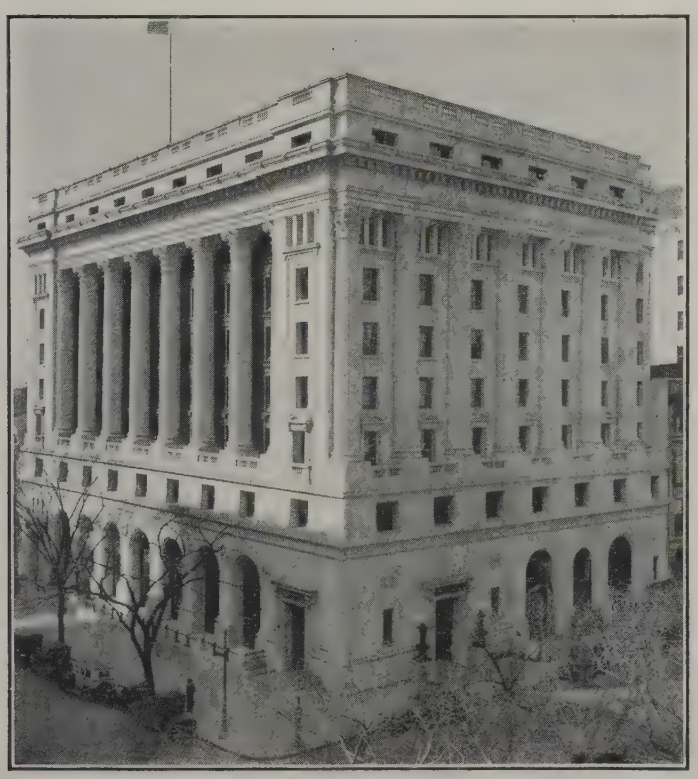
From Bulletin No. 2, page 155, North Carolina Geological Survey, "The building and ornamental stones of North Carolina." Joseph Hyde Pratt, State Geologist.

Estimates and Samples

A complete organization is maintained by each member of this Association for furnishing estimates, setting plans, details, etc., on short time.

Preliminary estimates cheerfully furnished on request of architect or contractor.

Samples of Mount Airy granite will be furnished on request, and advice as to grade or style of finish desired.



Union Trust Building, Washington, D. C.
Walter G. Peter and A. B. Mullett & Co., Associate Architects

Complete Information on Granite

For detailed information, including complete granite specifications, see the pages of the National Building Granite Quarries Association in this volume.

Mount Airy Granite

References

Buildings

Lincoln Deposit & Trust Company, Altoona, Pa.
Citizens & Southern Bank, Augusta, Ga.
Merchants National Bank, Allentown, Pa.
Winona Savings Bank, Winona, Minn.
Isherwood Hall, U. S. Naval Academy, Annapolis, Md.
State Office Building, Richmond, Va.
Agriculture Extension Building, Raleigh, N. C.
Dry Dock No. 3, Navy Yard, Philadelphia, Pa.
Courthouse, Washington, D. C.
Guilford Courthouse, Greensboro, N. C.

Bridges

Arlington Memorial Bridge, Washington, D. C. (under construction)
Fall Creek Bridge, Indianapolis, Ind.
Rock Creek Bridge, Washington, D. C.
Delaware River Bridge, Philadelphia, Pa.

Public Mausoleums

Rose Hill Mausoleum, Chicago, Ill.
Valhalla Mausoleum, St. Louis, Mo.
The Memorial Mausoleum, Reading, Pa.
Rose Hill Mausoleum, Hagerstown, Md.
Lakeland Mausoleum, Lakeland, Fla.
Wheeling Mausoleum, Elm Grove, W. Va.

Private Mausoleums

Sharer Mausoleum, Alliance, Ohio
Stadelman-Grant Mausoleum, Akron, Ohio
Cone Mausoleum, Greensboro, N. C.
Hoerner Mausoleum, New Orleans, La.
Ward Mausoleum, Brooklyn, N. Y.
Myer Cohen Mausoleum, Nashville, Tenn.
Dodge Mausoleum, Detroit, Mich.
Packard Mausoleum, Columbus, Ohio
Studebaker Chapel, South Bend, Ind.
Warden Mausoleum, Fredericksburg, Va.
Geist Mausoleum, Ravenswood, Ill.
S. Z. Poli Mausoleum, New Haven, Conn.
Wege Mausoleum, Columbus, Ohio
O'Brien Mausoleum, Cincinnati, Ohio

Monuments

McConnell Shaft, Carthage, N. C.
General Julian S. Carr, Durham, N. C.
General Nathaniel Greene, Guilford Battle Ground, N. C.
Victory Monument, Danville, Ill.
Oak Park and River Forest Monument, Illinois
Galbraith Memorial, Cincinnati, Ohio
Acacia Spire, Masonic Cemetery, Chicago, Ill.
Masonic Monument, North Shore Cemetery, Chicago, Ill.
World War Memorial, Tenafly, N. J.

HARRISON GRANITE COMPANY, INC.

4 East 43rd Street, NEW YORK, N. Y.
WORKS, BARRE, VT.
STUDIOS
CHICAGO, ILL., 809 Fine Arts Building DETROIT, MICH., 1212 Majestic Building PITTSBURGH, PA., 6663 Aylesboro Avenue
MINNEAPOLIS, MINN., 3529 Hennepin Avenue SYRACUSE, N. Y., Syracuse Hotel

Products

MEMORIALS of all kinds in GRANITE, MARBLE and BRONZE, ranging from monumental pieces of public interest to the simplest of private tributes.

Mortuary Art

Individual tastes are as diversified as the art itself but, whether the desired effect is dignified elegance or impressive simplicity, we are truly prepared to serve the best interests of our clients in an efficient and able manner.

Design and Architectural Departments

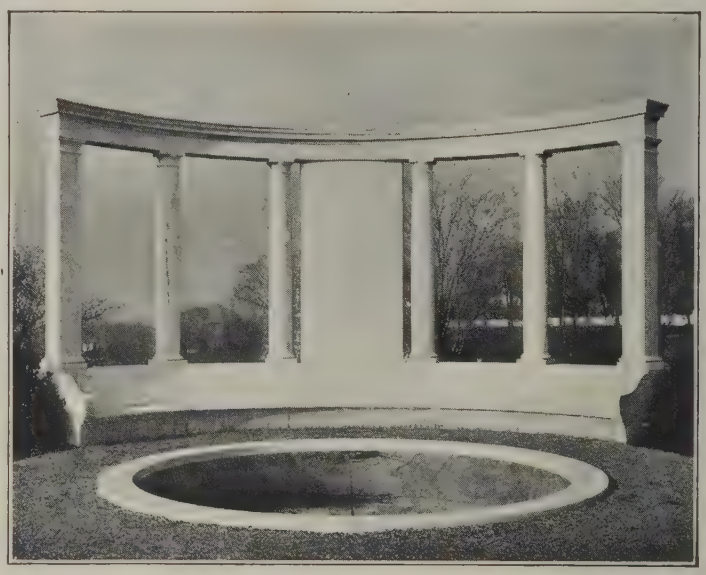
Wide experience in our field has fitted us to offer design suggestions, sketch studies, etc., and we are glad to co-operate with the architect by placing the facilities of these departments at his disposal.

Construction and Erection Facilities

Eighty years of "knowing how," careful personal supervision, and our complete and extensive cutting facilities enable us to set and maintain a high standard of workmanship and design.

The Harrison plant is electrically equipped and contains all the modern tools and appliances necessary to the production of well-finished, artistic monuments.

Our erection facilities are of the best and this work is entrusted only to those who have demonstrated their ability to grasp and execute the lofty concept of the architect who designed the monument they are to build.



Tribute to the Hon. W. Murray Crane, Former Senator and Governor of Massachusetts
R. H. DANA, Architect

Leeds Mausoleum
JOHN RUSSELL POPE, Architect

S. HASKEL & SONS, INC.

Producers of "Shastone" Special Granites

97-115 Harrison Place and 96-114 Ingraham Street

BROOKLYN, N. Y.

Products and Services

"SHASTONE" GRANITES for building exterior work, memorials, mausoleums and monuments.

FOREIGN GRANITES from Norway, Sweden, Finland and Labrador.

GRANITE CUTTING and SHAPING.

POLISHING, a specialty.

"Shastone"

The world's selected granites, foreign or domestic, noted for their beautiful colors, flawlessness, durability and all other fine qualities which make their use adaptable for highest grades of monumental and architectural purposes.

The illustration is a reproduction of the famous American Radiator Building, situated in the heart of New York. The use of "Shastone Black" at the base and first three stories, added so much to the external beauty of this modern cathedral of commerce.

"Shastone" polished granites have demonstrated their ability to resist the action of the elements in any climatical condition, are non-absorptive and non-staining. They are therefore specially commendable for all exterior decorative work and memorials, which are subject to dust and dirt.

The trade-mark shown above is a guarantee for quality and genuineness. Every stone that leaves the firm's yards bears the "Shastone" trade-mark.

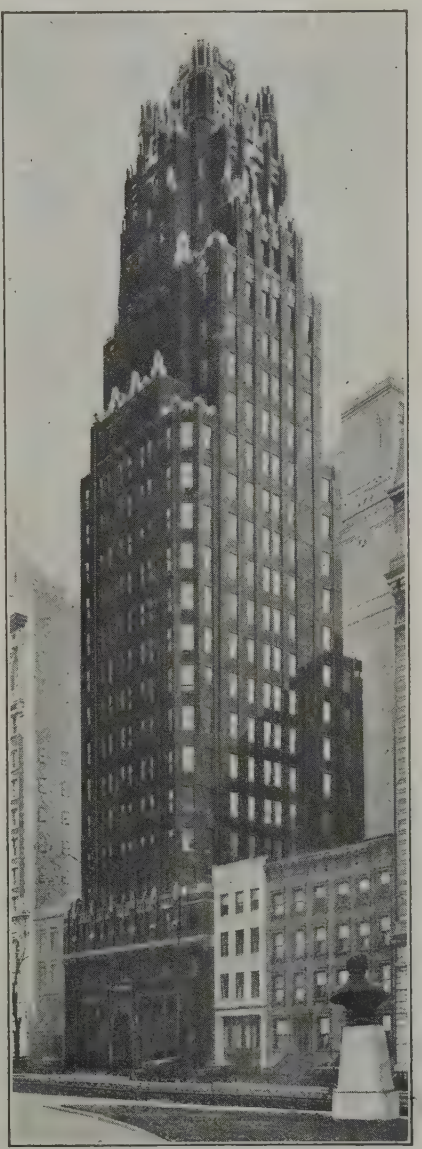
Polishing

"Polish Expresses the Beauty of Granite."

It is the genuine polished surface of granite that is the effective means of preservation and preventive of surface deterioration against the action of the elements and staining from dust and dirt.

Shastone Polishing Plant—Our polishing plant is one of the largest in the world. It is equipped with every imaginable device for the production of a high class polish. Our polishing machines, singularly devised by our engineering department, cannot be surpassed by any other polishing machines in the world and have made it possible for us to bring down the cost of polishing equal to that of ordinary hammering.

The cost of polished granites for exterior decorative purposes which hitherto has been almost preventive has now been decidedly moderated and has therefore popularized their use.



American Radiator Building
RAYMOND M. HOOD, Architect
The exterior work at the base and first three stories of this modern cathedral of commerce is "Shastone" Black Swedish Granite as specified by the architect. It harmonizes and is an integral part of this example of modern structural design

Colored Granites

We carry in stock both foreign and domestic granites of a large variety of colors (white, black, gray, red, green, etc.).

We are prepared to furnish all details, descriptions, prices and recommendations on the special requirements of any architect or contractor.

Location and Shipments

Conveniently located in Brooklyn, we are able to make prompt deliveries in any quantities, as required. We are also prepared to make shipments to any part of the country. We furnished the granite for numerous buildings all over the United States and Canada.

Architect's Service

We are at all times prepared to co-operate with the architect in his problems and will cheerfully furnish estimates on work contemplated or in construction.

NEW ENGLAND GRANITE WORKS, INC.

WESTERLY, R. I.

BRANCH OFFICE: Room 501, 12 East 41st Street, NEW YORK, N. Y.

REPRESENTATIVES

PHILADELPHIA, PA., Edward A. Jeffery, 34 South 16th Street
PITTSBURGH, PA., Jay R. Wells, 302 Commonwealth-Annex Building
CLEVELAND, OHIO, H. L. Walters Co., 406 The 2341 Cornegie Building
DETROIT, MICH., W. A. Munger, 1416 St. Clair Avenue

Westerly Granite

Westerly Granite is available in several colors; blue, gray, pink and red. All are capable of hammered or polished finish and are desirable where carved ornament or letters are used. It is especially recommended where excellence of workmanship and permanence are desired.

Other Granites

Concord Granite, light gray, and Deer Isle Granite, pinkish gray, are available in large sizes and quantities.

Quincy Granite, dark gray, is available for polished work for near-black effect.

Products in Granite

Building granite.

South County Public Service Company, Westerly, R. I.
Jackson, Robertson & Adams, Architects
Westerly Granite used here

Public and private memorials.

Mausoleums.

Quarries and Plant

Located at Westerly, R. I., on the main line of the New York, New Haven & Hartford R. R., we have ample quarry facilities and complete manufacturing plant for finishing granite work of every description.

Skilled craftsmen are supported by the most modern equipment.

Organization

Our complete organization is prepared to submit preliminary costs, economical construction and specification data, as well as samples showing colors and finishes.

References

Travelers Insurance Company, Hartford, Conn., entire exterior, Red Westerly Granite; Donn Barber, Architect.

Mutual Trust Company, Philadelphia, Pa., three stories Deer Isle Granite; Heacock & Hokanson, The Ballinger Co., Architects.

Colonial Trust Company, Pittsburgh, Pa., Red Westerly Granite; F. J. Osterling, Architect.

Greater Penobscot Building, Detroit, Mich., first story Polished Gray Westerly Granite; Smith, Hinchman & Grylls, Architects.

Hartford National Bank and Trust Company, Hartford, Conn., alteration two stories on six-story Blue Westerly Granite Building; Dennison & Hirons, Architects.

State Office Building, Providence, R. I., Red Westerly Granite basement; Jackson, Robertson & Adams, Architects.

Harkness Mausoleum of Concord Granite, Woodlawn Cemetery New York, N. Y.
George B. Post & Son, Architects

NORTH STAR GRANITE CORPORATION

Quarriers and Fabricators of Granite for Building Purposes

MAIN OFFICE, DRAFTING ROOMS, PLANTS AND QUARRIES

ST. CLOUD, MINN.

CHICAGO OFFICE: 105 S. Dearborn Street

Granites Obtained from Our Quarries

"Original Minnesota Pink"—Coarse grained. Used extensively on building work. Reasonable in price. Crushing strength over 20,000 lb.

"Pioneer Dark Gray"—A very good dark granite.

"Indian Red" or "North Star Red"—Very good where color is wanted.

Modern Machinery for Fabrication

Our plant is equipped with the latest type circular saws, carborundum machines and other fabricating machinery. Excellent service is rendered to contractors on building granite.

Prices, samples, suggestions gladly given gratis to architects.

Fisher Building, Detroit, Mich.

ALBERT KAHN, Architect

There are four stories of polished "Original Minnesota Pink" Granite in this structure. Granite was quarried in three and a half months and manufactured in three plants in record time. The contract was awarded on Nov. 1st, 1927, and the last car of granite shipped before the end of May, 1928. This is only the first unit—there will be another one the same as this, then the center portion with a tower of fifty-six stories

Partial List of Buildings on Which "Original Minnesota Pink" Granite Has Been Specified and Used During the Past Two Years

Fisher Building, Detroit, Mich.
Albert Kahn Inc., Architects

Bank of Galesburg, Galesburg, Ill.
Child & Smith, Chicago, Ill., Architects

Talcott Building, Rockford, Ill.
Howard Shaw, Chicago, Ill., Architect

Bartel Realty Co. Building, Richmond, Ind.
John Hagel, Indianapolis, Ind., Architect

Bank and Office Building, Pittsburgh, Pa.
H. Hornbostel, Erie, Fisher, Wood Co., Architects

Mid-City Trust & Savings Bank Building, Chicago, Ill.
Perkins, Fellows & Hamilton, Architects

Liberal Arts Building, University of N. D., Grand Forks, N. D.
Jos. Bell DeRemer, Architect

Long Beach Office for Illinois Bell Telephone Co., Chicago, Ill.
Holabird & Roche, Architects

Muskegon Chronicle Building, Muskegon, Mich.
Albert Kahn, Detroit, Mich., Architect

Consumers Power Co's Office Building, Flint, Mich.
Commonwealth Power Corp. Eng. Dept., Architects

Store and Apartment Building, St. Louis, Mo.
Otto J. Kreig, Architect

Theatre and Office Building, Detroit, Mich.
C. Howard Crane, Architect

Office and Garage Building, Fort Worth, Tex.
W. G. Clarkson & Co., Architects

Fountain Theatre, Cincinnati, Ohio
Thos. W. Lamb, New York, N. Y., Architect

Frontenac Building, Minneapolis, Minn.
Larsen & McLaren, Architects

Ohio Bell Telephone Building, Cleveland, Ohio
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio, Architects

Ladies of the Sacred Heart School, Chicago, Ill.
Hellmuth & Hellmuth, St. Louis, Mo., Architects

Eaton Tower, Detroit, Mich.
Louis Kamper, Architect

Northwest Tower Building, Chicago, Ill.
Perkins, Chatten & Hammond, Architects

Piggott Office Building, Hamilton, Ont.
Bernard H. & Fred Prack, Architects

Huron County Bank Building, Norwalk, Ohio
Bond-Hubbard, Chicago, Ill., Architects

Mincks Hotel Building, Tulsa, Okla.
A. C. Fabry, Architect

Elmhurst State Bank, Elmhurst, Ill.
Jarvis Hunt, Charles Bohasseck, Chicago, Ill., Architects

PLYMOUTH QUARRIES INCORPORATED

Specialists in Ashlar

755 Boylston Street
BOSTON, MASS.
SHIPPING POINT: EAST WEYMOUTH, MASS.

Products

ASHLAR, in Seam Face and Split Face Granite.

FLAGGING and STEPPING STONES, in Seam Face Granite.

Seam Face Ashlar

The geological formation of our material is unique in that the rock mass has been sheared and tipped, so that it now stands in vertical sheets. The seepage of vegetable and mineral solutions through the seams between sheets has produced a wide range of coloring on the faces of the seams ranging from the natural gray through buffs, tans, yellows, greens and browns to a very dark brown and dusty purple.

By using the face of the seams as the exposed face of the stone in the building, a very interesting texture and coloring is obtained, and since these are the result of natural causes, a permanent and natural effect of age is immediately obtained on new construction together with the feeling of strength characteristic of granite.

The seams in the quarry have in no way affected the strength of the granite, which together with the fact that our granite is practically non-absorptive, make it an ideal building material.

Split Face Ashlar

Our Split Face Ashlar is obtained by splitting the blocks and using the split face as the exposed surface. The texture is somewhat rougher than Seam Face, but is not a rock face in any sense.

Although the variation in color is not as wide as in Seam Face, the Split Face colorings, ranging from the grays through the light tans and buffs to the light browns, give life and warmth to this material.

Where Seam Face and Split Face Granite Can Be Used

Plymouth Quarries products, both Seam Face and Split Face, can be used for all purposes for which ashlar is suitable: walls, both exterior and interior; jambs; lintels (if not too large); slip sills; steps, etc.

Flagging and Stepping Stones

Flagging and stepping stones can be obtained only in Seam Face. The surface is sufficiently smooth to be very suitable for both interior flooring and for garden walks, etc., and has all the variety of color of the ashlar.

Allow at least 5 in. for bed and flagging.

Thickness and Height of Ashlar

The thickness of the ashlar varies from 4 to 8 in. thick.

In height it is generally used from 5½ in. to 1 ft. 1 in. rises, though higher rises can be obtained, if desired, in limited quantities.

Cost of Ashlar

The natural seams in this formation together with our organization and equipment enable us to produce a granite ashlar at a minimum cost, so that we can compete with local stone over a very extended area.

First Presbyterian Church, Glens Falls, N. Y.
CRAM & FERGUSON, Architects — EDWARD F. MINER, Builder

College of Dominican Fathers, River Forest, Ill.
WILFRED E. ANTHONY, Architect — FRANK A. O'HARA, Builder

Continued on next page

No. 15 Seam Face and Split Face

Three and four-head work with splay joints using about half small stones; half split face and half seam face, with a wide variety of color if desired

No. 6 Seam Face Ashlar of a Rough Face with 15% Split Face

Replica of Harkness Memorial, Yale University. Interrupted course ashlar. James Gamble Rogers, Architect.

Colors: gray, tan, buff, dull purple, brown, yellow

No. 2 Seam Face Ashlar of a Very Smooth Surface

Three-head work with splay joints.

Colors: gray, tan, buff, dull purple, brown, yellow. Can be restricted if desired

No. 3 Coursed Ashlar with a Few Interruptions

A very wide range of color which may be restricted if desired

Continued on next page

No. 5 Sappy Split Face Laid in Interrupted Course Ashlar

Of a true surface, no projections over 1 in.

Replica of St. Vincent Ferrer Church, New York, N. Y., Bertram G. Goodhue, Architect.

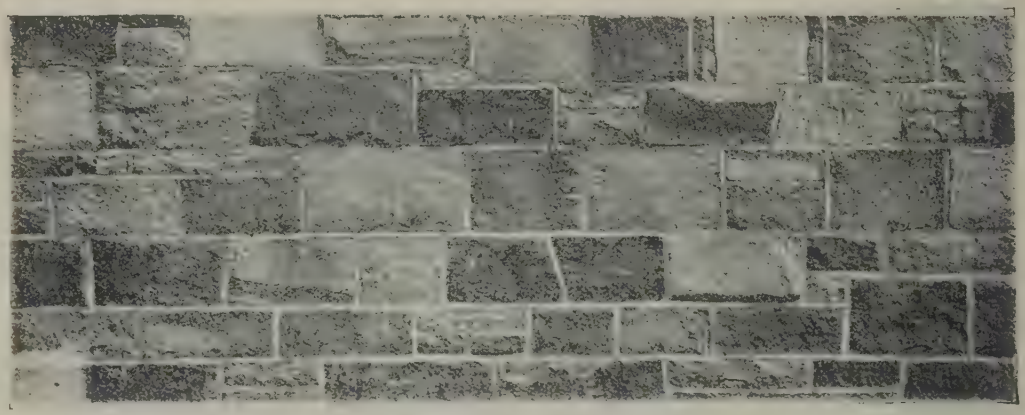
Colors: Several shades of brown

No. 7 Split Face Sappy, Gray and Sappy and Gray Mixed

Coursed with occasional interruptions. True split face, projections not over 1 in.

Replica of Church of the Sacred Heart, Jersey City, N. J., Cram & Ferguson, Architects.

Colors: gray and several shades of brown



No. 17 Seam Face and Split Face in Equal Proportions

Replica of First Presbyterian Church, Glen Falls, N. Y., Cram & Ferguson, Architects.

Average texture bright colors eliminated

References

The following are a few of the buildings where our material has been used:

Harkness Quadrangle, Yale University, New Haven, Conn., James Gamble Rogers, Architect

Lawyers' Club and Dormitory, Ann Arbor, Mich., York & Sawyer, Architects

Jefferson Avenue Presbyterian Church, Detroit, Mich., Smith, Hinchman & Grylls, Architects

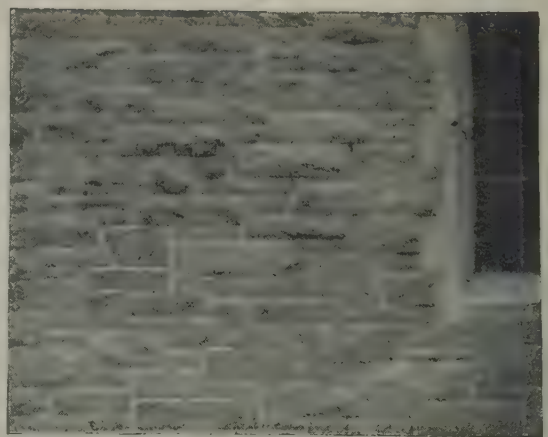
Swedenborgian Church, Bryn Athyn, Pa., Bryn Athyn Studio, Architects

Temple Beth-El of Borough Park, Brooklyn, N. Y., Shampan & Shampan, Architects

St. Mary's Church, Stamford, Conn., O'Connell & Shaw, Architects

Queen of the Holy Rosary Cathedral, Toledo, Ohio, Comes, Perry & McMullen, Architects

Epworth-Euclid Methodist Episcopal Church, Cleveland, Ohio, Bertram Grosvenor Goodhue Associates, Architects



Split and Rock Face. Colors: Gray to Sappy. Three and Four-head Work with Splay Joints

Continued on next page

Specifications

The following specifications are our standard and are intended to so describe the material that it will meet the requirements of ashlar work in general, either artistically, structurally or economically.

Changes in our standard sizes, limitations in color and changes in the manner of cutting can of course be made within reasonable limitations.

Ashlar—Squared up as to rise and length ready to set with beds, builds and joints formed with pitching tool.

Rises—5½ to 11½ in. with smaller stones for jinks if required.

Lengths—One and one-half times the rise or more.

Thickness—Random from 4 to 8 in., averaging 6 in.

Heads or Corners—Split or rough pointed with returns of 4½ to 8½ in. or more.

Reveals of Jambs, Lintels and Arches—Split or rough pointed and cut ½ in. less than actual reveal leaving joint for plumbing frame, etc.

Sills—Slip sills without lugs seam face wash split face rise.

Color and Texture—Seam face: color, quarry run or restricted; texture smooth, average or rough.

Split face: color gray, sappy and mixed; texture, projections up to 1 in.

Cutting

We seldom cut to a setting plan as we have found from experience that although pleasing effects as to distribution of sizes may be obtained, it is difficult to interpret color and a more pleasing result as to both sizes and color is obtained by having the setters at the job interpret the architect's ideas.

Setting

We have a construction department with a thoroughly competent organization for setting our material and the cut stone trim, and we will either quote on setting or give any help we can to contractors bidding on the setting.

Handling Material

Ours is a very tough close grained granite and is not easily chipped or broken. We have found that the stone may be dumped from a dump truck with little if any breakage and at a considerable saving in hauling cost. Special stones such as sills, lintels, arches, etc., or any stone cut to plan should not be dumped. Nearly all of the stones are one-man stones and the largest can easily be lifted by two men.

Mortar

We have found the following to be a good setting mortar with our stone. One part cement to 3½ or 4 parts sand with lime equal to 15% to 20% of the volume of cement added. This mortar should be well mixed and wet enough to be plastic but not as wet as soft stone mortar, as the granite is practically non-absorptive. Joints should be well raked out and pointed with mortar of 1 cement to 2½ to 3 of sand and 5% to 10% lime. Non-staining cement is not necessary with our stone.

Joints

Our material is not a cut stone and is usually used as ashlar where a comparatively informal effect is desired. The joints should not be less than ½ in. and in general should be about ¾ in. with slight variations allowed.

Anchors

The variation in thickness of our material gives a good masonry bond if the setters are at all careful. In nearly every city our ashlar is considered as part of the bearing wall in general, anchors are not necessary.

Tests

Compression tests on our material made at the U. S. Arsenal, Watertown, Mass., Sept. 5, 1910 show 35,000 to 40,000 lb. per cu. in. for our gray granite and 26,000 to 27,000 lb. per cu. in. for colored granite.

The following extracts are from a report on the Plymouth Quarries made by Prof. W. O. Crosby and Dr. G. F. Loughlin, of the Department of Geology of the Massachusetts Institute of Technology.

Quality—The feldspar is nearly as hard as steel, and is free from soft kaolin spots, such as would cause pitting on exposure to the weather. It is a very important fact that the jointing of the granite does not tend in any slightest degree to make it shaly or impair its strength.

Fire Resistance—Flame tests demonstrate that this granite, and especially the seam face variety, is, to a good degree, proof against the scaling and cracking to which granites in general are so subject on exposure to fire.

Absorption—While the absorption is remarkably low for the seam face granite, the fresh, or white granite is virtually non-absorptive. The low absorption ratio makes freezing tests wholly unnecessary; and this conclusion is fully confirmed by an examination of the natural ledges, which are singularly free from distintegration or scaling due to frost action.

Buffalo Country Club, Buffalo, N. Y.
Bley & Lyman, Architects

ORGANIZED 1864

ROCKPORT GRANITE COMPANY

ROCKPORT, MASS.

BRANCH OFFICE: 31 State Street, BOSTON, MASS.

REPRESENTATIVES

PHILADELPHIA, PA., Frank H. Schilling, 614 Penfield Building
CHICAGO, ILL., J. D. Duffy, 860 Builders Building
NEW YORK, N. Y., A. G. MacInnis, 21 Park Row
NEW ORLEANS, LA., John C. Bartley, Maritime Building
CLEVELAND, OHIO, R. L. Queisser & Co., Schofield Building

QUARRIES: ROCKPORT, BAY VIEW AND PIGEON COVE, MASS.; JONESPORT, ME.

Products

Rockport Gray (Light, Medium and Dark), Rockport Sea Green and Moose-A-Bec Red Granites for the better class of buildings and memorials.

Seam Face Granite for residences and churches.

Also Granite for bridges and sea-walls; Granite Paving Blocks and Crushed Stone.

Rockport Granite

Rockport Granite—"The Granite of Character"—is a true hornblende granite, resembling in composition the Egyptian granite of which the ancient obelisks and sarcophagi were built. It is strong beyond all possible requirements, and is decidedly hard and tough. It is remarkably free from impurities, is practically impervious to moisture or stain, and will withstand indefinitely the action of frost and weather.

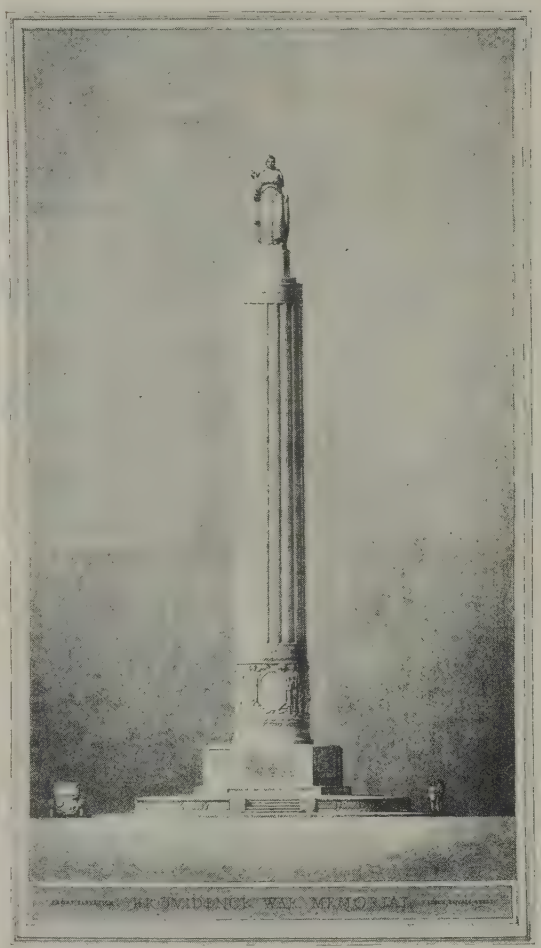
One of the outstanding qualities of Rockport Gray and Rockport Sea Green Granites is the exceptionally high and durable polish which they take, due largely to the hornblende in their mineral composition.

Rockport Gray Granite—Is available in light, medium and dark gray shades, with a medium to coarse and even grained texture.

Rockport Sea Green Granite—Has practically the same physical properties as the gray. In color it is dark olive green, spotted with black. It is especially beautiful in polished finish, although used extensively for hammered work as well.

Moose-A-Bec Red Granite—Is a beautiful dark reddish gray, biotite granite, with a mixture of white and pinkish feldspars. It has a coarse, even grained texture, and takes a beautiful polish. While slightly more expensive than the gray or green, its coloring makes it very desirable where a richly colored granite is wanted.

Rockport Seam Face Granite—Is available in a mixture of light to very dark reddish, rusty browns, and makes wonderfully attractive ashlar work for residences, churches, etc. Unlike most seam face granites, the color runs deep into the stone and it can therefore be used for headers, sills, steps, etc., as well as for ashlar surfaces.



Providence War Memorial, Providence, R. I.
Paul P. Cret, Architect C. P. Jennewein, Sculptor
Entire Memorial of Rockport Moose-A-Bec Red Granite

Facilities

The plants and quarries, comprising more than 800 acres, are located at Rockport, Bay View and Pigeon Cove, Mass., and Jonesport, Me. The company also owns its own docks, and a fleet of vessels, including sloops, schooners, barges, towboats, and lighters. With facilities for both rail and water shipment, the company is in an exceptional position to render first class service, both to seacoast and inland points.

In the several quarries are located forty large power derricks, many of which are of 75-ton capacity and over. Drilling is done with modern appliances using compressed air or steam. The quarries and plants at Rockport, Bay View, and Pigeon Cove are interconnected by rail and heavy capacity motor trucks.

The cutting plants are well equipped with modern tools and appliances, pneumatic tools and drills, pneumatic surfacing machines, lathes, etc. The large modern polishing plant is completely equipped with polishing wheels, polishing lathes and pendulum polishers.

In normal operation, from 600 to 800 men are employed by the Company.

Color Reproductions, Samples and Estimates

The color reproductions of our granites, on the following page, are submitted for preliminary selections. They are full size as to texture, and approximate as to color. Samples will be furnished to architects on request. Opportunity is solicited to submit prompt and reliable estimates from plans and specifications.

References

The following are a few typical projects in which Rockport granites have been used:

Winters National Bank, Dayton, Ohio, Frank Hill Smith, Inc., Architects—Rockport Sea Green Granite

Seaboard National Bank, New York, N. Y., Alfred C. Bossom, Architect—Rockport Gray Base and Polished Sea Green Columns

Soldiers and Sailors World War Memorial, Pittsfield, Mass., Augustus Lukeman, Sculptor—Rockport Sea Green Granite

Mellon National Bank, Pittsburgh, Pa., Trowbridge & Livingston, Architects—Rockport Gray Granite

Scott County Savings Bank, Davenport, Iowa, Clausen & Kruse, Architects—Rockport Light Gray Granite

Federal Reserve Bank, New Orleans, La., Rathbone DeBuys, Architect—story-high base, Rockport Light Gray, Polished

Bases for Mestrovic Sculptures, Congress Street Plaza, Grant Park, Chicago, Ill., Holabird & Roche, Architects—Rockport Sea Green Granite, Polished

Providence War Memorial, Providence, R. I., Paul P. Cret, Architect; C. P. Jennewein, Sculptor—Moose-A-Bec Red Granite, Hammered

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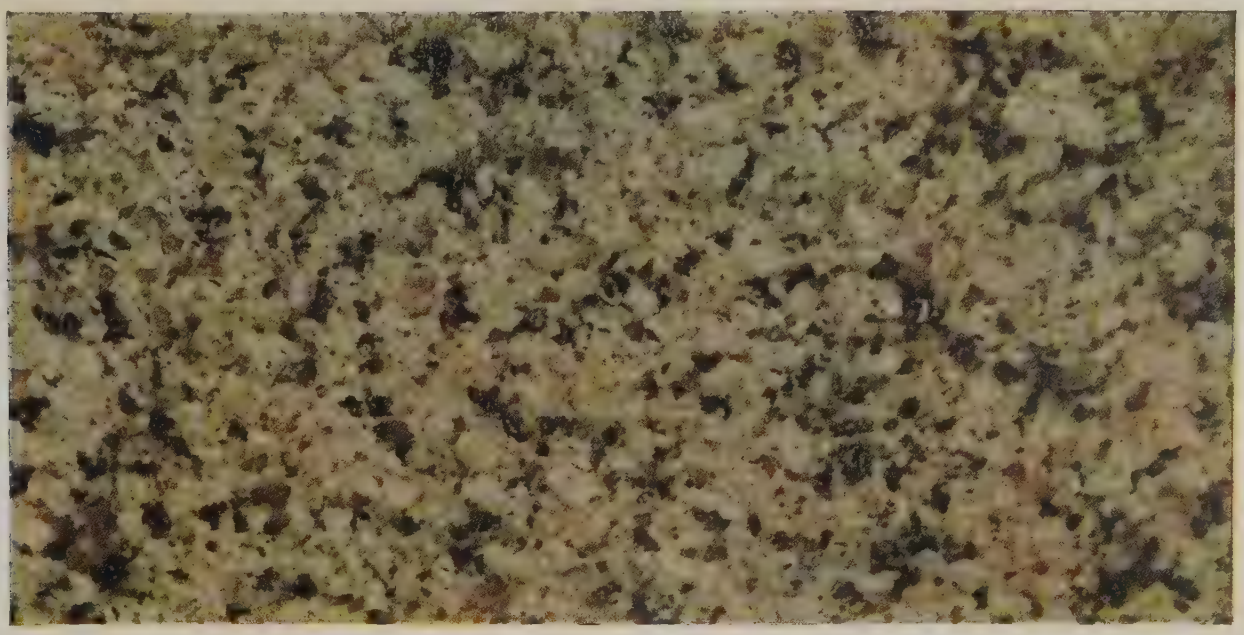
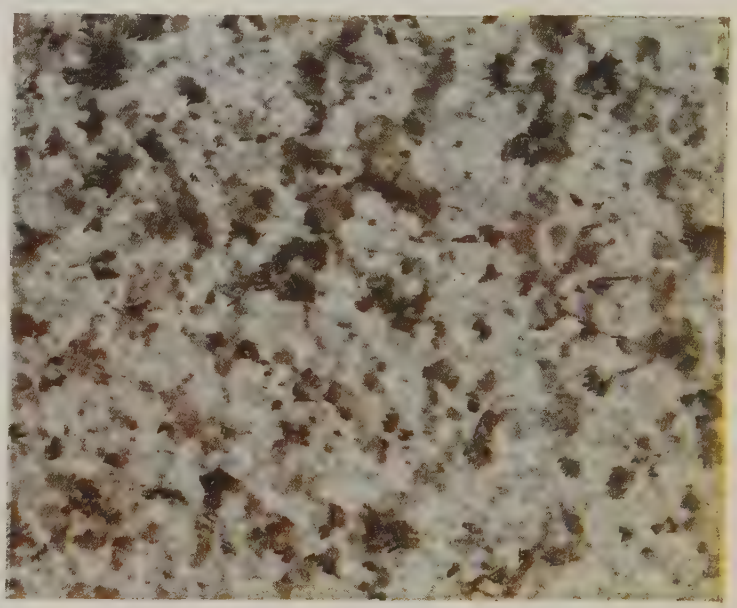


Rockport Sea-Green Polished

Rockport Gray Hammered



Rockport Gray Polished

Moose-A-Bec Red Polished

THE JOHN SWENSON GRANITE CO.

CONCORD, N. H.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue
CLEVELAND, OHIO, 414 Newman-Stern Building
CHICAGO, ILL., Marquette Building
DETROIT, MICH., 712 Polk Directory Building

Products

SWENSON GRAY GRANITE.
SWENSON ANTIQUE GRANITE.
ROUGH, DRESSED and POLISHED GRANITE for Buildings and Memorials.

Swenson Gray Granite

A warm toned, light gray granite, of fine to medium grain and of even texture. It is technically known as "muscovite-biotite" granite. The soft brownish color of the muscovite crystals, blended with the light gray of the quartz, feldspar and finely distributed biotite crystals, produces the warmth and pleasing texture which make this granite especially attractive and desirable.

Swenson Antique Granite

A special variety of granite which is meeting with enthusiastic approval. The delicate blending of brown and gray gives the warm, antique character to the granite which one associates with fine, old ivory.

Strength, Durability and Working Qualities

The high crushing strength of our granite, indicative also of its other high grade qualities, especially adapts it for exterior uses. Watertown Arsenal tests give this granite a crushing strength of 30,830 lb. per square inch square to the rift, and 23,860 lb. parallel to the rift.

As to durability and weathering qualities, few materials can offer more convincing proof. We refer to two splendid examples of Concord Granite exposed to the rigors of New England climate for over a century, namely the State Capitol at Concord, N. H., erected in 1816-1819, and the Old State Prison erected at Concord in 1812. Quoting Dr. Geo. P. Merrill, Curator of Geology, U. S. National Museum, "both buildings are in admirable state of preservation, and evidently, so far as the stone is concerned, good for centuries to come."

The fast working qualities of both our standard gray and antique granites contribute materially to maximum economy in production. Again quoting Dr. Merrill, one of the remarkable features of Concord Granite "aside from its color, texture and freedom from flaws, pyrite and other injurious constituents, is the remarkable ease with which it can be worked."

Greenpoint Savings Bank, Brooklyn, N. Y.
FRANCIS GEORGE HASSELMAN, Architect
Swenson Gray Granite used for the exterior

Facilities and Economy of Operation

Our present quarries, in active operation over sixty years, have been carefully developed and modernly equipped for large scale and economical production.

In our cutting plant it has been our constant study to make this the most up-to-date and efficient granite plant in the country. The equipment includes sawing, polishing, turning and handling equipment of the most modern character, also a completely equipped sandblasting department. Dust removal systems, installed throughout the plant, provide exceptionally healthy working conditions, giving us the pick of skilled workmen. This, combined with a fast working granite and efficient plant facilities, ensure the best of workmanship and service at minimum cost.

Services

Our Concord, New York, Chicago, Cleveland and Detroit offices are always prepared to render estimating or consulting service. Samples of our granite, finished as desired, will be furnished on request.

We are prepared to handle any type of granite work, whether it involves highly skilled and intricate handwork or the more modern type adapted to maximum use of machine processes.

For general information on granite, its economical use, design and specification, see the catalogue in this section of SWEET'S ARCHITECTURAL CATALOGUE of the National Building Granite Quarries Association, of which we are a member. Samples of our granite and the standard building granite finishes are displayed in the Association exhibits in New York, Philadelphia and Boston.

Sandblast Carving and Ornament

We are experienced and well equipped for sandblast work. See the Association pages for description of this process and its interesting possibilities.

References

Our Concord Granite has been used for many years in fine buildings and memorials in all parts of the country. We will gladly furnish a list of such projects most accessible for your inspection and reference on request.

ESTABLISHED 1874

PERRY BROS. GRANITE CO.

Designers, Quarry Operators and Cutters of Concord Granite

CONCORD, N. H.

BOSTON, MASS., Little Building
DETROIT, MICH., 2539 Woodward Avenue
WASHINGTON, D. C., P. O. Box 4013
NEW YORK, N. Y., Room 2843-A, Grand Central Terminal Building
PHILADELPHIA, PA., 1121 Fillmore Street
CINCINNATI, OHIO, 602 Mercantile Library Building
CLEVELAND, OHIO, Hunkin-Conkey Building

Concord Granite

Composition—A holocrystaline, granular rock composed of quartz, a potash feldspar, and muscovite-biotite (potassium and magnesium iron mica). The feldspar crystals being very small, the granite is of very fine grain.

Color—The color of the granite is blue gray, the shade being determined by feldspars in the quarry.

Quality and Usage—Being of a very fine grain and of especially high quality, Concord granite is primarily used for buildings of artistic merit and imposing design, such as memorials, public buildings, mausoleums and other structures of a permanent character.

Production—The cutting plant—one of the largest and best equipped in the United States—is located near our quarries at Concord, N. H., enabling us to turn our large quantities of polished, dressed and rough granite in a comparatively short length of time.

Shipping Facilities—We are located on the Boston & Maine R. R., with connections with the Boston & Albany R. R., the Central Vermont Ry., and the New York, New Haven and Hartford R. R., thus making possible the shipping of our granite to any part of the United States and Canada.

Advice on Proposed Work

Our designers will be glad to consult with you regarding the cutting of designs and the reduction of cost.

Unnecessary expense may be avoided by considering the finish of the stone for different parts of a building and the adaptability of design to cutting methods generally employed, depending on the location and the exposure of the granite to smoke and dirt, and its position as regards visibility to the public eye.

Estimates and samples gladly submitted on request.

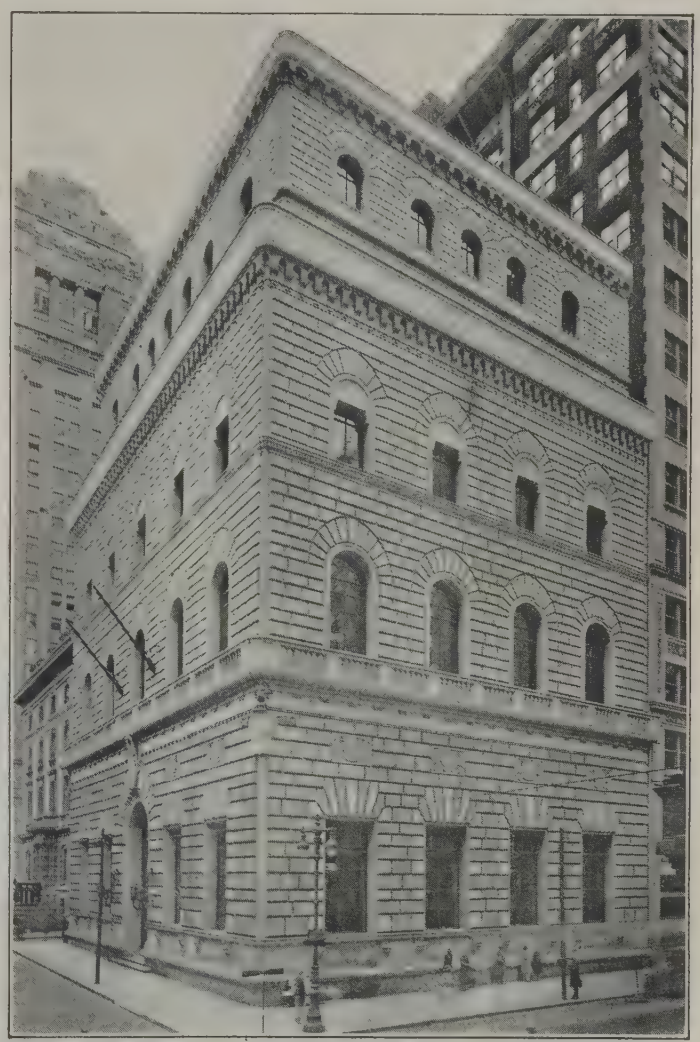
Partial List of References

Boston, Mass.

Theodore Roosevelt School
Prince District School
Washington-Allston School
Curb for Boston Chamber of Commerce Building
Police Station, Division No. 2
Health Unit Building
Pilgrim Court Apartments
Police and Fire Station
School Street Trust Company
Boston Museum of Fine Arts, Western Art Wing
B. P. O. Elks' Building
George Robert White Health Unit Building No. 7
Consolidated Gas Company
Goodyear Tire & Rubber Company
Nurses Home, Boston City Hospital
Roxbury High School for Boys, Roxbury, Mass.

Philadelphia, Pa.

Abbott's Alderney Dairies, Inc.
Oak Lane Trust Company
Lancaster Avenue Title & Trust Company
Fleischmann Building
Belmont Trust Company Bank Building
Atwater Kent Manufacturing Company Building No. 1
Rittenhouse Plaza Apartments
Shriners Hospital for Crippled Children
Broad Street National Bank
Bell Telephone Building, 19th and Arch Streets
Boy's Catholic High School
Curb for Scottish Rite Temple
Apartment Hotel, 17th and Locust Streets
Restaurant and Office Building, 16th and Chestnut Streets
Drexel & Company Bank Building, 15th and Walnut Streets
Beth El Sisterhood Building
Lawyers Building
Sacred Heart Parish School
Funfield Recreation Center Building
William Penn Title & Trust Company
Forrest Theater



One of the Largest Granite Contracts Furnished in 1926—Drexel Bank Building, 15th and Walnut Streets, Philadelphia, Pa.

DAY & KLAUDER, Architects, and DAYLE & CO., General Contractors, Philadelphia, Pa.

PERRY BROS. GRANITE CO., Granite Manufacturers

New York, N. Y.

Public Schools Nos. 117, 60, 100, 36, 47, 107, 99, 108, 205 116, 125, 215, 212, 180, 97, 210, 217
James Monroe High School
James Madison High School
High School of Commerce
Mother A. M. E. Zion Church
Hamilton Avenue Sewer
Bank Building, 21st Avenue and 86th Street
Flatlands Avenue Sewer
95th Street Apartment House
Fort Hamilton Parkway and 60th Street Sewer
Bay Ridge Savings Bank Building
Public School No. 52

Detroit, Mich.

Calvert Lithographing Company
Ralsar Apartments
National Bank of Commerce
Detroit Life Insurance Building
R. L. Polk Building
Smith-Bridgeman Store Building
St. Catherine's High School and Auditorium
First State Bank

WOODBURY GRANITE CO., INC.

Quarriers and Finishers of Woodbury Gray and Bethel White Granites Standard for Buildings, Monuments, Memorials and Mausoleums

BURLINGTON, VT.

BRANCH OFFICES

NEW YORK, N. Y., 1258 Graybar Building — CHICAGO, ILL., 734 Builders Building

HARDWICK, VT. — BETHEL, VT.

QUARRIES: BETHEL, VT., WOODBURY, VT.

Products

Woodbury Gray, the standard building granite.

Bethel White, the whitest and one of the hardest granites.

Woodbury Gray

This granite has come to be recognized as one of the three or four granites in this country accepted as standard building granites. It is of a medium grain and medium gray in color. Its technical classification is biotite.

Bethel White

Bethel White has the distinction of being the whitest and one of the hardest known granites. It is ideal for the highest type of buildings, memorials and mausoleums. Its grain is coarse inclined to medium and is of a beautiful warm white faintly mottled with gray. It is technically classified as quartz-monzonite.

Quarries and Cutting Facilities

The quarries of the Company are three in number. Two are located at Bethel, Vermont, where the beautiful Bethel White is produced. The largest plant of the three, at Woodbury, Vt., produces Woodbury Gray granite.

The production of Woodbury Granites demands the full facilities of the two largest cutting plants in Vermont. Located at Hardwick and Bethel, these plants have banker space for 900 granite cutters and carvers, with attendant helpers and clerical force. With our new facilities for cutting, our production will be increased many times over.

Post Office Building, Washington, D. C.
Erected of Bethel White Granite
D. H. Burnham & Co., Architects

NEW DELIVERY SERVICE OF INTEREST TO ARCHITECTS

By means of new processes for the finishing of granite, adopted by this company for commercial production, we are now able to produce and deliver granite in a fraction of the time that was required by the old hand methods. With a properly run job and orders placed promptly, we can deliver granite as soon as required.

Some of the machining and methods of producing granite by us under the new processes have been used to some extent by monumental granite cutters. We are taking the lead in adapting new machinery to commercial uses. From this it can be seen that the Company is in a most strategic position with regard to the delivery of granite on short notice.

Our new method of finishing granite produces surfaces in kind and character superior to any produced by the old hand method and the time required to produce the finish is greatly reduced.

The ability of a quarry and organization to supply sufficient granite for a large job is of vital importance to the architect who specifies granite. Woodbury granites have been used for years and are a recognized standard for fine granite work.

Although thousands of feet of both Woodbury Gray and Bethel White have been taken from our quarries, the quarries are among the largest granite deposits in the country and contain a sufficient amount of the finest granite for years and years to come.

Continued on next page

WOODBURY GRANITE FOR FINE BUILDINGS, MONUMENTS AND MAUSOLEUMS

Quality and Quantity

The granites quarried by Woodbury Granite Co., Inc. are of the finest quality and suitable for monumental, public, commercial and residential buildings. Woodbury Gray granite, under Government test, withstood a pressure of 20,836 lbs. before its particles separated and the stone crushed.

The State Geologist of Vermont, in specifying the size of a monolithic column of Woodbury Gray says, "It is doubtful if a larger shaft can be obtained at any quarry in the world than upon this mountain."

The great ledges of Woodbury show that large sheets of gray can be measured on the quarry face 20 and 30 feet in depth, 200 feet in length and extending back into the ledge without seam or flaw.

The Reputation of Woodbury Granites

Woodbury granites are so well known to the Architectural profession that they hardly require a description. They have been used for the last 40 years for all kinds of U. S. Government, State and Municipal Buildings as well as private residences where the finest and most enduring material was desired. As to how the granite stands up and what its general appearance is after exposure for a number of years, we can refer you to examples within a short distance of your office.

The Grading of Standard Granites

Granites are graded according to the following characteristics: Color, hardness, grain and workmanship. The color is determined by its feldspar, the hardness by the quartz and feldspar and the proportion and hardness of the feldspar govern the grade of hardness. The grain is graded from very fine to very coarse according to the size of the feldspar crystals. The size of the crystals give to granite its various natural textures but do not affect its structural qualities.

Classification of Workmanship

Commercially the qualification of workmanship obtainable with these granites has been graded by usage into three classifications:

Monumental Building Grade—For buildings monumental in character, where architectural merit predominates over utility and economy, such as national, state and city government buildings, court houses, libraries, public memorials, etc.

Commercial Grade A—For high class buildings designed for utility, dignity and stability, such as banks, insurance and office buildings, churches, schools, etc.

Commercial Grade B—For buildings designed for utility and economy, the workmanship will meet all structural requirements and present a good appearance.

Mary Baker Eddy Memorial in Bethel White Granite

Swope Memorial in Bethel White, Kansas City, Mo.

BLOOMINGTON LIMESTONE COMPANY

GENERAL OFFICES

BLOOMINGTON, INDIANA

BLOOMINGTON LIMESTONE COMPANY Is a Consolidation of the Following Concerns

THE CHICAGO AND BLOOMINGTON STONE CO.
MAPLE HILL QUARRIES CO.
THE BLOOMINGTON LIMESTONE CO.
HOADLEY-CLINE CO.

BRANCH OFFICES

NEW YORK, N. Y. PHILADELPHIA, PA. DETROIT, MICH. CHICAGO, ILL.
CINCINNATI, OHIO TORONTO, ONT.
BROOKLYN, N. Y., W. H. GILL & SON., 186 Remsen Street

Product

INDIANA LIMESTONE, in such recognized grades as: Select and Standard Buff, Select and Standard Gray, Variegated and "Old Gothic."

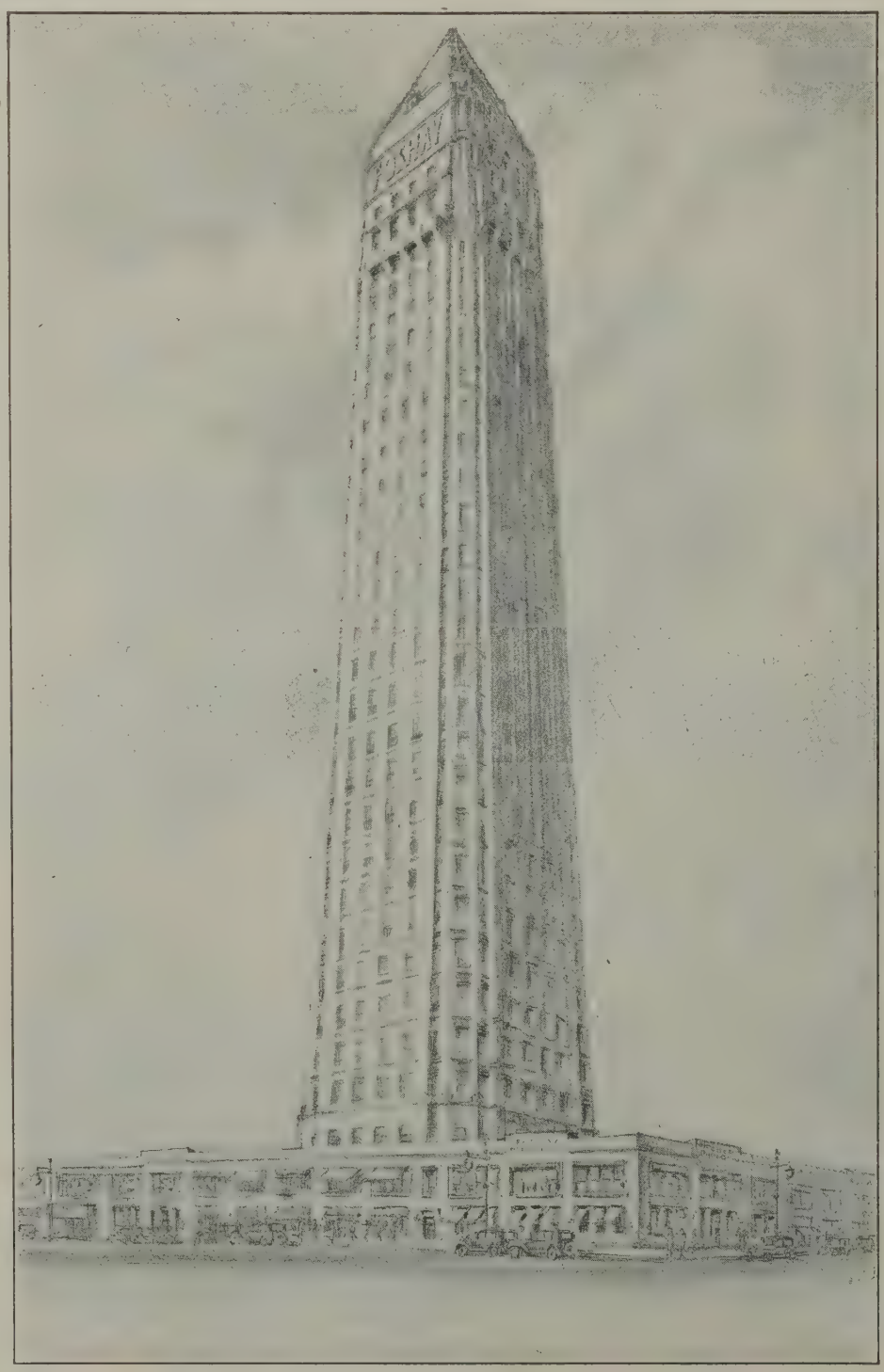
Facilities

BLOOMINGTON LIMESTONE COMPANY operates proven quarry properties consisting of 497 acres located in Monroe County (Bloomington District), Indiana. These properties are already producing approximately 3,000,000 cubic feet of Indiana Limestone annually.

Two sawing mills and two cut stone plants are operated by the BLOOMINGTON LIMESTONE COMPANY, having a capacity of approximately 30,000 cubic feet of finished cut stone per month.

Service

Architects, general contractors and owners are invited to write to us for any information or special service which the extensive experience of members of our organization may enable us to render; with the assurance that such request will not entail annoying sales follow-up on our part.



A Few of the More Recent Contracts

Foshay Tower, Minneapolis, Minn.

Hotel Lincoln, New York, N. Y.

National Bank of Commerce, Houston, Texas

Shortridge High School, Indianapolis, Ind.

Hotel Victoria, New York, N. Y.

St. Cecilia's Church, Cincinnati, Ohio

Left:

The Foshay Tower, Minneapolis, Minn.

MAGNEY & TUSLER, Minneapolis, Minn., and HOOPER & JANUSCH, Chicago, Ill., Architects

MAURICE SCHUMACHER, and NATIONAL CONTRACTING COMPANY, Minneapolis, Minn., Contractors

This thirty-two story tower building, patterned after the Washington Monument, is noted for its unique design and excellence of execution throughout. In keeping with the plan to make the Foshay Tower one of the most beautiful buildings in the Northwest, the BLOOMINGTON LIMESTONE COMPANY'S Indiana Limestone was specified throughout

100 YEARS OF SERVICE

ST. PAUL STONE QUARRIES CO.

Pioneer Quarriers and Manufacturers

OFFICE, QUARRIES AND MILL

ST. PAUL, IND.

REPRESENTATIVES IN FOLLOWING CITIES

CHICAGO, ILL. CINCINNATI, OHIO CLEVELAND, OHIO COLUMBUS, OHIO DETROIT, MICH.

Product

St. Paul Stone, a non-absorbent, non-staining extremely dense "Blue-white" Crystal Limestone. Not to be confused with sandstones, hard or standard Indiana limestone. We invite comparison of the physical analysis with that of other stones.

ST. PAUL STONE
IMPERVIOUS-DURABLE
Retains its original Color indefinitely

CHEMICAL ANALYSIS

Calcium carbonate	70.54%
Magnesium carbonate	20.53%

CHEMICAL ANALYSIS (Continued)

Silica	6.57%
Alumina	1.33%
Iron oxide	0.71%

PHYSICAL DATA

Specific gravity	2.69
Weight per net cu. ft.	168 lb.
Compressive strength parallel to bed	25,700 lb. per sq. in.
Perpendicular to bed	24,400 lb. per sq. in.

Adaptability

Due to our product's unique and individual ability to retain always its original color in place (minus honing and polishing) at or above the grade line, it is particularly adapted for base course and step work, together with such items as door and window sills, platforms, flagging, curbing, coping, chimney caps, etc.

Besides machine cut stone, our product is available in any quantity for rustic work such as hand cut steps, rock-faced ashlar and any other stone need, be it landscape or architectural; for the finer types of churches, residences, etc., where a true marble appearance that will remain is especially desirable.

Facilities

The architect may specify "St. Paul Stone" for any purpose with full assurance that this company with its modern equipment specially adapted to working this hard close grained stone will deliver it promptly, cut ready to set. Samples and estimates sent upon request.

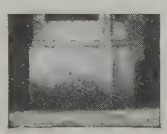
Specification Notes

Need not to be other than a paragraph mentioning where our stone is desired. We will comply with the usual stone specification in every other way. Savings can be made at the job by omitting waterproofing, non-staining cements, etc. Any hard stone finish is applicable to "St. Paul Stone." We recommend smooth finishes, bush-hammered 4 to 12 cut with or without margins, etc.; for rustic work, rock-face and pick pointed.

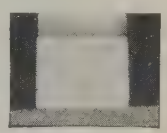
Low Cost

St. Paul Stone is more expensive than sand or lime stones but less costly than granite (to which its durability favorably compares); the user will appreciate the opportunity our product affords.

St. Paul Stone assures an enduring building free from unsightly stains and deteriorating moistures which are conspicuous because close to the eye.



Porous Stone Base



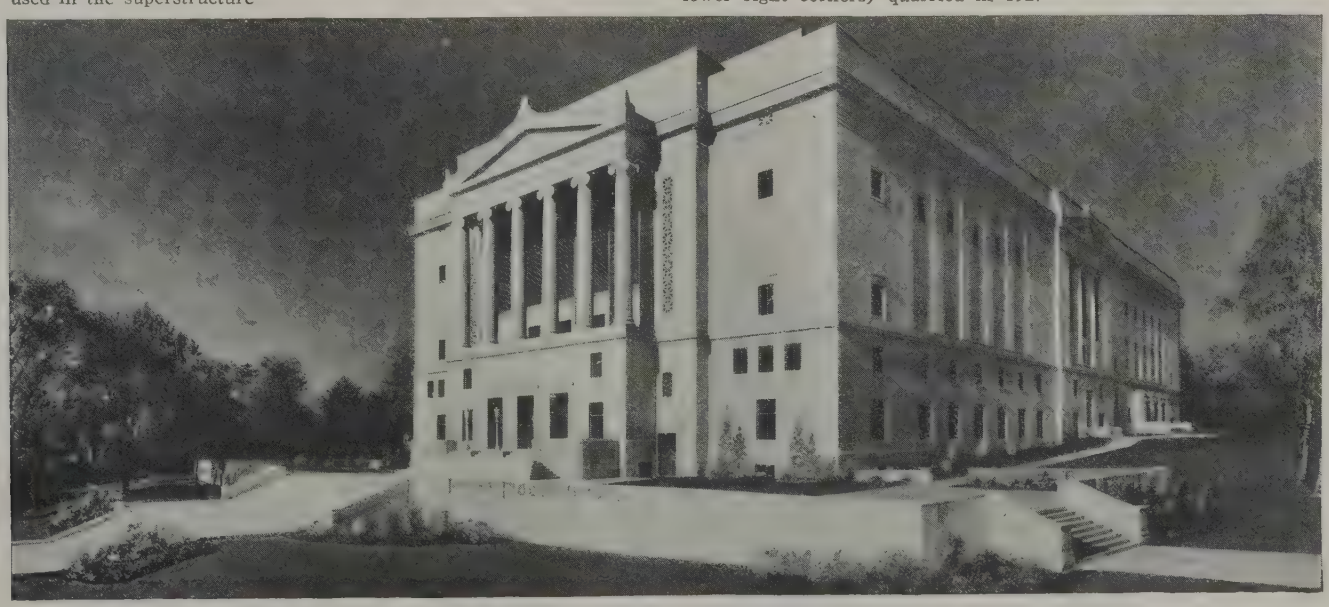
St. Paul Stone Base

Main Entrance of the Masonic Temple (Below)

Showing "St. Paul Stone" steps, balustrade, platform, sills, plinths, flagging, etc. Note its harmony with, and protection of, the Indiana limestone used in the superstructure

Retains Its Original Color Indefinitely

Unloading coal on St. Paul Stone rough flagging steadily for 30 years. Compare their color with cars of block stone (upper left and lower right corners) quarried in 1927



Masonic Temple, Dayton, Ohio

Herman & Brown, Architects, Dayton, Ohio

All flagging, retaining walls, balustrades, steps, base course, etc., below first floor window sill line is St. Paul Stone

INDIANA LIMESTONE COMPANY

(Capitalized at Over 46 Million)

An Organization to Serve the Users of Indiana Limestone—

"The Nation's Building Stone"

GENERAL OFFICES AND ARCHITECTS' SERVICE BUREAU

BEDFORD, IND.

EXECUTIVE OFFICES: Tribune Tower, CHICAGO, ILL.

PRINCIPAL SALES OFFICES

Sales Offices Have Now Been Established in the Following Cities, Through Which Every Effort Will Be Made to Render the Most Efficient Service to the Users of "The Nation's Building Stone"

ATLANTA, GA.	CINCINNATI, OHIO	DETROIT, MICH.	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
BEDFORD, IND.	CLEVELAND, OHIO	KANSAS CITY, MO.	PHILADELPHIA, PA.	SYRACUSE, N. Y.
BOSTON, MASS.	DALLAS, TEX.	MINNEAPOLIS, MINN.	PITTSBURGH, PA.	WASHINGTON, D. C.
CHICAGO, ILL.	DES MOINES, IOWA	NEW ORLEANS, LA.	ST. LOUIS, MO.	TORONTO, ONT., CANADA

BRANCHES OF SERVICE BUREAU

NEW YORK, N. Y. CHICAGO, ILL. DETROIT, MICH. KANSAS CITY, MO.

The Properties and Plants of the Following Twenty-four Concerns, Which Embrace All the Largest and Oldest Indiana Limestone Producing Companies Located in the Bedford and Bloomington, Indiana District, Were Acquired and Are Now Operated by This Company

INDIANA QUARRIES COMPANY
STRUBLE CUT STONE COMPANY
THE CONSOLIDATED STONE COMPANY
W. McMILLAN & SON
FURST-KERBER CUT STONE COMPANY
STAR STONE COMPANY
DOYLE STONE COMPANY, INC.
HOOSIER CUT STONE COMPANY
NATIONAL STONE COMPANY
CRESCENT STONE COMPANY
MATHERS STONE COMPANY
SHEA & DONNELLY COMPANY
J. HOADLEY & SONS CO., INC.
HOADLEY STONE COMPANY
HUNTER VALLEY STONE COMPANY
THE MONROE COUNTY OOLITIC STONE CO.
THE IMPERIAL STONE COMPANY
INTER-STATE CUT STONE COMPANY
CLEAR CREEK QUARRIES COMPANY
JOHN A. ROWE CUT STONE COMPANY
C. D. DONATO CUT STONE COMPANY
BOWMAN-KING STONE COMPANY
BROOKS CUT STONE COMPANY
UNITED INDIANA STONE COMPANY

Product

INDIANA LIMESTONE (which is often called "Bedford Stone").

Gray (or Blue), Buff and Variegated (or mixed); also certain other varieties, including "Old Gothic"—a grade showing interesting texture and color-tone variations; also the rough Sawed-four-side Indiana Limestone of Short-length stock for Random Ashlar, range work and other informal types of Ashlar Facing for moderate cost buildings.

See complete listing of classifications under the present system of grading the product on following pages.

Indiana Limestone

Indiana Limestone is a *natural stone,* not a manufactured product. It is a fine even-textured non-crystalline limestone of beautiful soft color-tone, ranging in the various grades from a somewhat grayish buff, on through silver gray to a medium-toned gray of slightly bluish cast. The massive deposit forming the ledges in the hills of Southern Indiana, from which this fine, easily worked, yet durable and permanent stone is quarried, constitutes one of the most wonderful and probably the most useful, of building stone deposits in the world. An interesting booklet, Volume 1 of the Indiana Limestone Library, which describes the stone and its structural qualities, will be sent free upon postal request.

Cost

The cost of this stone compared with substitute products is always such as to make it economically available for use in all classes of buildings—especially store fronts and small commercial buildings, schools and institutional work—as well as for larger and more monumental work for which a natural stone is always used.

The rough sawed strip stone makes it in every way suitable for use in decidedly moderate cost houses.

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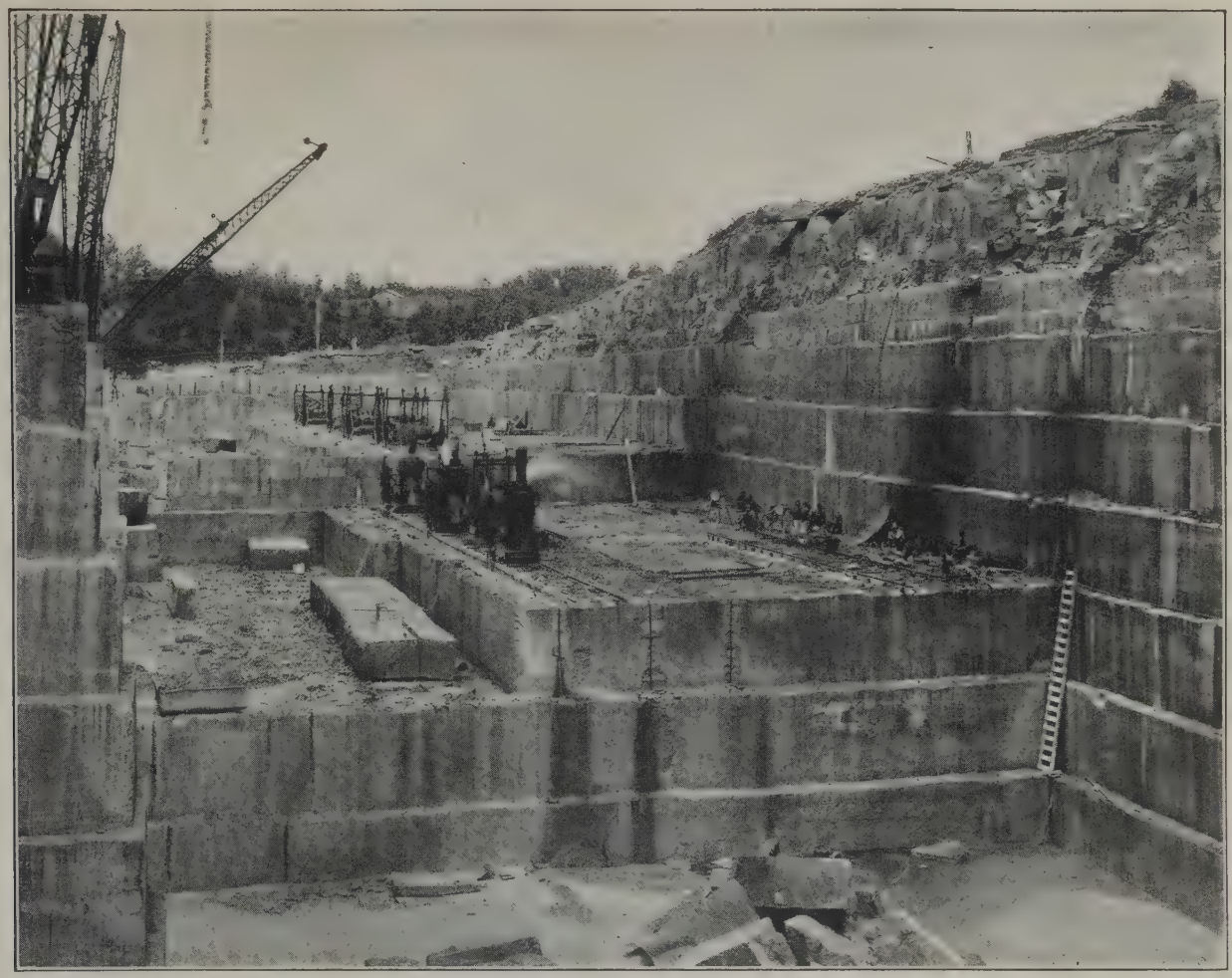

Ledge at the Indiana Limestone Company's Dark Hollow Quarry

The largest single ledge in operation in the Limestone district, measuring 1400 ft. long, 140 ft. wide and 60 ft. deep. This will cube 11,760,000 ft., approximately 20,000 large car loads of Indiana Limestone.

The New Company's Facilities

Indiana Limestone is found only in two counties of the state of Indiana (Lawrence and Monroe).

The INDIANA LIMESTONE COMPANY owns, approximately, 6,600 acres of land, of which over 1,600 acres are proven stone land available for immediate quarry development.

Engineers estimate that at the present rate of production and shipment, there is sufficient stone in these proven areas for seventy years' operation.

INDIANA LIMESTONE COMPANY has a quarrying capacity of 16,000,000 cu. ft. per year, a sawed stone capacity of 6,000,000 cu. ft., and a cut stone capacity of 3,000,000 cu. ft. per year.

Millions of dollars are invested in machinery, equipment, buildings, and a network of railway tracks.

The entire production operation is handled with precision and efficiency, more like large-scale manufacturing than quarrying, as quarrying is ordinarily carried on. This enables the industry to give rapid delivery and most satisfactory service, regardless of the quantity of material required, or the size or number of contract operations.

The merging of these vast limestone interests into one well-financed and properly managed organization is in line with the whole trend of modern large-scale business, the object of which is to secure the benefits of quantity production and the efficiency that goes with this method. More effective co-operation with the architectural and building professions, and the production of Indiana Limestone at a price that would make it more attractive to the public, were the principal ideas behind the consolidation.

Practically all of the long established and proved quarries from which this dependable stone has been produced for generations are owned by this company.

Transportation Facilities

Owing to the fortunate central location of quarries and unsurpassed railroad facilities, Indiana Limestone can be transported to all points in the United States and Canada with exceptional promptness and at minimum cost.

Distribution of Stocks

Good sized stocks of Indiana Limestone are carried by cut stone contractors in nearly all the principal cities of United States and Canada.

It is a standard product available in quantity for prompt deliveries at all times.

Architects Service Bureau

Architects and builders are cordially requested to make free use of the Architects Service Bureau of the company as a source of reliable information regarding its product, its most effective and economical use and for assistance on any problems pertaining to structural design and use of Indiana Limestone in building construction.

The activities of this Technical Department are chiefly educational, comprising investigation and research work, publicity, technical service and assistance to the architectural profession, to the trade, and to others directly interested in the use of the product.

Continued on next page

Selection of Most Suitable Material

The selection of the kind or grade of stone to be used for a particular building often does not receive the careful consideration which it deserves. When a building is intended to become the art or cultural center of a community, its administrative headquarters, or the realization of the life-dream of some influential citizen, it is natural to think that only the very best is good enough. In such cases, there is a temptation to specify the fine-textured "Select" or what is really selected stone, the highest in cost, for all parts of the work. This is rarely necessary or desirable.

All grades of Indiana Limestone are equal—in-so-far as soundness is concerned. The production processes employed in a cut stone mill, further, are such as will automatically eliminate any blocks or pieces that contain planes of weakness, as in the average run of work the stresses set up in machining the stone and in handling it by the travelers from one machine to another, are greater than would be permitted in building, and serve to test effectively all of the stone as it passes through the various milling operations that are employed to shape and prepare it for its position in the building.

For many types of structures, especially for sawed-finish wall facing, the "Old Gothic" grade, which is decidedly low in cost is the most fitting to use. The moderate cost Variegated grade is suitable for all purposes, either for trim or for all-stone faced buildings.

During the past few years the proportionate use of the gray stone on account of its fine, close, even texture has been rapidly increasing. Many architects now prefer and specify it regularly, on account of its density, uniformity and fine weathering qualities, together with dignity and pleasing color-tone which becomes progressively lighter in shade with the passing years. It most effectively resists the accumulation of grime and in appearance is the nearest approach to a costly light-colored fine grain granite that it is possible to obtain in the field of an easy-working, moderate cost building stone.

Architects will never regret specifying this material for their best work, as exemplified by some of the finest buildings in America that have been constructed of it.

The well-known Oolitic Limestone of Indiana, formerly called Bedford Stone, is commercially available only in Lawrence and Monroe Counties, and the architect should protect both his client and himself against substitutes. All of the long established and proven quarries from which this dependable stone has been produced for generations are located within these two counties, a majority of them owned and operated by the Indiana Limestone Company.

Colors and Textures

The Indiana Limestone Company classifies its product by color-tone and texture and recommends the use of these terms to indicate the character of stone required.

Regular classifications are as follows:

Select Gray	Select Buff
Standard Gray	Standard Buff
Coarse Gray	Coarse Buff

Variegated

Special classifications are as follows:

Rustic Buff	Special Hard Gray
Old Gothic	Special Hard Buff

Buff Statuary Stock

Other specialties, ranging in color-tone from very light, almost a cream white, to distinctly dark, are also usually available, samples of which will be furnished by the Company upon request. A general description of the various grades and recommendations as to their selection and employment is given below.

Architects should remember that the classification established by the former Indiana Limestone Quarrymen's Association which, with minor changes in the system of grading, was adopted by this company, is for their direct benefit and the protection of their clients in the specifying of Indiana Limestone.

"Select" Stock (Either Gray or Buff)—"Select" stock is the average finer grained stone. It is more uniform in color-tone and texture than standard and is finer in texture than is required for the average run of exterior work. "Select" stock is suitable for the finer class of exterior work in monumental buildings and especially for entrances and those portions of a building that are within ready range of vision, also for carving, interior work and other particular uses. The use of this grade is also recommended for carving, important entrance and other prominent features of commercial and various other types of buildings in which standard or the coarser textured grades are otherwise employed. "Select" stock as produced by the quarries may contain some fine streaks of crystalline calcite and minor variations in texture that do not impair the strength or appearance of the finished stone or that can be eliminated readily from appearing on the face of stonework in the finished building.

"Standard" Stock (Either Gray or Buff)—"Standard" stock is the average product of the quarries and constitutes the bulk of the total output. It is thoroughly sound stone, having some variation in color-tone and texture. It may contain some streaks of calcite or slightly coarse grained formation, but such variations in this grade are confined with reasonable limits in the grading of the quarry blocks that will usually make it impossible to determine in the finished work at a short distance any difference between the general appearance of this and "Select" stock. Stone of the "Standard" classification is suitable for all purposes in the regular run of building work.

"Coarse Stock" (Either Gray or Buff)—This stock is the average coarse grained stone having a greater variation in color-tone and texture than "Standard," somewhat shelly in formation and may contain some pit holes, but is not as variable, coarse or open in texture as "Rustic."

"Coarse" stock is suitable for large cornices and other boldly detailed work in the upper part of any building, the lower part of which is built of "Standard" or "Select." It is also recommended for the cut work, trim, etc., in combination with sawed ashlar of "Rustic" or "Old Gothic" stock.

"Variegated" Stock—The "Variegated" stone is an irregular mixture of the gray and buff produced from the blocks that are quarried where the buff and gray color-tones adjoin in the quarry, showing some variation in color-tone as well as in texture. Such material, when cut up for building purposes, will, in the finished work, produce pieces of each color-tone and a small percentage of stone with both color-tones in one piece. It is unusually effective in giving variety to plain surfaces and is a desirable class of material for trim as well as for wall facing.

"Variegated" stock will embrace stone that will range in texture from a fair grade "Standard" to "Select," and consequently will include some stone containing streaks of crystalline calcite and shelly formation that do not make the quarry blocks too coarse or variable to be used for the average run of cut stone work, trim, etc. The coarser grained and more variable of the "Variegated" stone is included in the "Old Gothic" Classification.

Where only a uniform fine grained selected grade of "Variegated" stock is desired, "Variegated Statuary Stock" may be specified. This is not a regular classification and is not included in price list or segregated in the stock piles. Stone of this character is usually available in moderate quantities, and will be furnished on special order only at a differential in price covering the cost of selecting the quantity required from the stacks.

"Rustic" Stock (Buff Only)—"Rustic" stock is the coarser grained stone, having an interesting, more or less open shelly texture, with a varying amount of crystalline calcite intermixed, some of which will have a decidedly coarse somewhat honeycomb formation; some of it is likely to be darker in color-tone, and some of it is quite hard, due to the size of grain and amount of calcite that it contains. It is therefore coarser and more distinctive in texture, showing a wider range of granular formation and more variation in color-tone than any other grade, except "Old Gothic."

This grade is particularly suitable for the sawed ashlar facing of walls, for which purpose it may be to advantage combined with trim of either "Variegated," "Standard," "Coarse" or "Select" stock. "Rustic" stock is not generally recommended in place of "Standard" or other grades for any portions of a building on which there is much molded work and cutting, on account of its texture and hardness and the consequent greater cost of cutting this kind of stock.

"Old Gothic" Stock—This class of stone is unselected as to color and texture, and embraces the gray, buff and variegated stone, which, although varying in texture from medium fine to distinctly coarse, will generally be of fairly coarse texture, containing shelly formation with both white or dark crystalline streaks, and streaks of calcite, shelly matter, crowfeet, etc., that do not affect the structural soundness of the stone. It has the widest range of variation in color-tone and texture and is recommended especially for all forms of rough-sawed masonry field work; range work, random ashlar, etc.

Buff Statuary Stock—This grade covers only the very fine uniform grain buff stock as produced by certain quarries in comparatively limited quantities. It is not a regular grade and is sold principally for sculpture and carved doorways, tracery, sculptured panels, memorials and elaborate interior work, for which purposes the higher cost of this stock is fully warranted. For all exterior work with the possible exception

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of occasional pieces of statuary, fine tracery or intricate carving, "Select" stock available at lower cost will be found eminently satisfactory.

"Special Hard" Stock (Either Gray or Buff)—"Special Hard Gray" and "Special Hard Buff" are especially adapted for base or grade courses, steps and platforms, buttresses, floor tiling, terrace paving, and other work that is subject to abrasion, or constant wear under foot traffic; for which purposes these special grades of stone are principally recommended. This class of stone is not recommended in place of the regular classes for the average run of work, such as ashlar, trim, etc.

Ease of Working

No other commercial stone is so easily worked as Indiana Limestone. In spite of its great strength it can be freely sawed, planed, turned and carved, and be otherwise worked by machinery, as well as by hand.

Physical Characteristics

Indiana Limestone is *non-crystalline*; the aggregate filler and matrix are all pure carbonate of lime.

Chemical Analysis (Average)

Carbonate of lime	97.23%
Carbonate of magnesia	1.20%
Silica	.74%
Alumina	.56%
Oxide of iron	.15%
Water and loss	.12%
	100.00%

Physical Data on Indiana Oölitic Limestone

Average weight (dry)	144 lb. per cu. ft.
Average absorption by weight	4.6%
Average crushing strength seasoned stone	from 6000 to 8000 lb. per sq. in.

It is not a hard or brittle stone, and can be cut with equal ease in any direction. For all practical purposes it is considered a free stone, having no evidence of cleavage plane. It possesses far greater strength than required for any ordinary building purpose, the seasoned stone having an average crushing strength as given above and a remarkably uniform modulus of rupture value, whether tested parallel to or at an angle with the grain, making it safe for long lintels, etc. It is unnecessary to set this stone on its natural quarry bed.

Indiana Limestone is to all intents and purposes fireproof. It calcines above 1500° F. and will not spall, crumble, split nor check at temperatures up to 1000° F. when drenched with cold water.

Possessing a wonderful internal elasticity, adapting itself without damage to extreme temperature changes and other conditions of permanence that exist in modern building structures, it is for this reason alone particularly well adapted to use both in building masonry and as a facing material in the colder northern sections of the United States and in Canada.

Permanence

Durability and resistance to atmospheric action is proved by the exposed quarry ledges that are centuries old and by many fine existing structures of considerable age. The soft light color-tones are permanent, and no other building material remains clean so long or better resists the accumulation of grime from the smoke-laden atmosphere of manufacturing cities.

Many fine monumental and commercial buildings in the South and in Canada may be referred to as attesting the beauty, adaptability, permanence and genuine value of this fine natural building stone under varied climatic conditions.

Finishes

Any hand-tooled, machine, or sawed finish, including rubbing and honing, may be applied, except bush hammering and other so called "hardstone" finishes which are used only infrequently for special purposes.

Additional information on finishes will be found in the service publications of the Company.

Uses

Indiana Limestone, to the extent of many millions of cubic feet, is used each year for all classes of buildings. A large proportion of the United States Government buildings have been built of this stone.

Many of the finest office buildings, banks, stores, and other commercial structures, churches, school and college buildings, residences, apartments, as well as monumental buildings of all sorts have been built of Indiana Limestone.

It is unsurpassed as a material for residence trim, and for the trim of schools, factories and industrial buildings of all types where it is used in walls of brick or other native stone.

The finer grades of Indiana Limestone are much used for interior work in churches, public buildings, fine residences, etc. The fine grained buff stone, when in place, can scarcely be distinguished from the caen stone of France; and having much greater strength and durability is conceded to be its superior.

The finest and most elaborate carved work, both interior and exterior, is easily, beautifully and permanently expressed in this material.

It is widely used for the larger kinds of architectural sculpture and statuary groups, gateways, pergolas and memorials with most gratifying effects. For such uses, the practically unlimited size of the perfect units which may be had is a great advantage. Monolithic columns, up to any size which can be transported, are always obtainable.

In addition to its regular use as cut stone for the various purposes already enumerated, it is also used in the rough-sawed form, for masonry facings, forming the field work of walls trimmed with cut stone, as described on the next page.

An example of this class of usage in church building is illustrated on the fourth following page.

In engineering, Indiana Limestone is extensively used where an architectural effect is desired for walls, piers, bridge abutments, etc., and especially for the balustrades and trim of bridges built of other masonry, or of reinforced concrete.

Literature and Samples

Literature useful to architects in the form of service publications, including technical information, construction details, service plates, etc., is constantly being prepared, and as published will be furnished gratis to those requesting it.

Samples of the stone will also be furnished to architects and others interested.

Data on anchorage, setting mortars, stain-prevention and cleaning, and other related subjects will be furnished on request.

Every architect should have on file a copy of the latest edition of the Indiana Limestone Specification Manual.

All architects should also obtain a copy of the new specifications for random ashlar masonry.

Rough-sawed Indiana Limestone

Rough-sawed Indiana Limestone in "Old Gothic" and Short-length "Variegated" or other classifications is one of the Company's more recent developments

Continued on next page

for the facing and building of moderate cost masonry walls.

The wall construction and facing schemes that are embraced within the class of random ashlar, range work, etc., as covered by this specification, are many and varied in detail and effect, and cover a wide field of usage in buildings of various types. These forms of stone-faced wall construction are especially adaptable for church, scholastic and institutional buildings of all kinds, as well as for residences, and, in fact, for all other classes of buildings for which a somewhat informal architectural style is considered most suitable.

The architect will find these forms of construction are decidedly economical and possess advantages that are worthy of careful study.

On account of the saving in labor that is afforded by the use of material already squared to the exact height and thickness of the different units required by the particular jointing scheme adopted, ashlar of this rough-sawed limestone will frequently be found less costly and more effective in the finished building than walls built of or faced with cheap local stone; especially so, as the facing units may be dimensioned to fit and bond with the brick or tile backing units; also by reason of the easy working qualities of Indiana Limestone, which make possible the breaking and trimming of the sawed stone strips to the proper lengths at a minimum of labor cost.

The Rough-sawed, "Old Gothic," "Variegated" and "Rustic" Indiana Limestone in strip form gives the architect a wider range of choice in the employment of stone for the facing of buildings, by filling the gap that has heretofore existed between the regular cut stone ashlar, on the one hand, and the rougher types of wall such as field stone or rubble work and other forms of rock-faced masonry, on the other. It also affords a means of using stone in an economical manner for buildings of moderate cost, for which any form of cut stone facing, however desirable, might be considered as involving an unwarranted increase in cost.

Send for Random Ashlar booklet and for further information and data address the Architects' Service Bureau at Bedford, P. O. Box 308.

Tribune Tower, Chicago, Ill.
JOHN M. HOWELLS and RAYMOND M. HOOD, Associated Architects

Preface to Standard Form of Cut Stone Specifications for Indiana Oolitic Limestone

For the convenience of architects and others using this specification, it has been prepared and published both in loose leaf typewritten form and in folder form, and *will be mailed free to architects on receipt of postal request.*

It is particularly important that the Company's bulletins in reference to setting mortar, sand for setting and pointing mortar, flashing and calking of projecting members, detailing of stone in connection with reinforced concrete and the protection of cut stone at time of delivery, during and after erection, also be carefully studied.

Note: It being more or less usual for cut stone to be furnished to the contractor either f.o.b. cars at destination or delivered alongside curb at the building site by trucks or teams, the specification is so arranged that either the setting only, or the delivery and setting, may be readily separated under an entirely separate "Setting Contract."

Specification for Cut Indiana Limestone

(1) Work Included—The work under this contract shall include all labor and material for the furnishing of cut stone work in accordance with the drawings and as hereinafter specified.

(2) Description of Stone—All Limestone specified or shown on drawings shall be ..... Indiana Oolitic Limestone building stock, free from all defects that would materially impair its strength, durability or appearance, and within the range of variation of color and texture represented by two samples approved by the architect.

Specially graded stone, acceptable as to hardness and color, as per samples to be submitted, shall be employed where indicated on drawings, for ..... and all other positions in contact with the soil or exposed to direct wear.

Wherever the terms "Indiana Limestone" or "Limestone" occur in this specification, they specifically refer to and shall imply "Indiana Oolitic Limestone" quarried in Lawrence or Monroe Counties, Indiana, all such stone to be from a quarry the product of which has been tested at the U. S. Bureau of Standards for physical properties and weathering with satisfactory results.

(3) Finish—The finish on exposed surfaces generally, except where tooling or carving is indicated, shall be smooth, machine-dressed, showing no tool marks.

(4) Samples—The contractor shall submit to the architect two samples which shall be typical of

Continued on next page

War Memorial, Southampton, L. I., N. Y.
Goodwillie & Moran, Architects
One of the many recent fine monuments constructed of Indiana Limestone

the extremes which the contractor proposes to furnish. Samples to be about 3½ in. wide by 7 in. long by about 1 in. thick, produced with the large faces cut across the grain of the stone, the finish specified to be indicated on the large faces and at least two of the edges to be rock-face. Similar samples shall be provided when "Special Hard" stone or any other grade of stock is specified for certain positions in the building.

All samples shall be labeled or otherwise clearly marked with the grade of the Limestone, the name of the contractor submitting them, and with the statement: "Samples of Indiana Limestone to be furnished for the ..... Building."

(5) Standard Practice—The standard practice established by the former Indiana Limestone Quarrymen's Association of Bedford, Indiana, shall govern, except where this is in direct conflict with the specific intent of the architect's detail drawings. Bidders not familiar with these standards relating to grading, cutting, setting and anchorage practice, etc., are cautioned to inform themselves regarding them.

The architect reserves the right to approve the sub-contractors for both the cutting and setting of the stone, before this portion of the work is awarded.

(6) Cutting and Setting Drawings—The cut stone contractor shall prepare and submit to the architect for approval, complete cutting and setting drawings, in triplicate, for all of the Limestone work under this contract and no stone shall be cut until these drawings are approved by the architect. Such drawings shall show in detail the sizes, sections and dimensions of stone, the arrangement of joints and bonding, anchoring and other necessary details.

These drawings shall be based upon and follow the drawings and full size details prepared by the architect, except where it is agreed in writing that changes be made. Each stone indicated on these drawings shall bear the corresponding number marked on the back or bed with a non-staining paint.

(7) Bonding and Anchorage—All projecting stones, except where otherwise shown as anchored to the structure, and so provided for by details on setting drawings, shall have beds in the wall at least 1 in. greater in depth than their maximum projection.

Moulded projecting courses, unless shown as secured by suitable anchorage or steel supports, shall have not less than four-sevenths (4/7) of their cubic contents inside the face of wall. There shall be "through" or bond stones wherever indicated on approved cut stone drawings.

Provision for the proper anchoring, doweling and cramping of work in keeping with standard practices, also for the support of stone by shelf angles and loose steel, etc., when required, shall be clearly indicated on the setting drawings.

(8) Details for Lintels, etc.—Lintels, architraves and other members spanning openings, whether supporting a superimposed load or only their own weight, shall be of the proportions and sectional area that will provide an ample factor of safety based on the average ultimate breaking strength of the stone specified.

(9) Carving and Models—All carving shall be done under this contract by skilled carvers in a correct and artistic manner, in strict accordance with the spirit and intent of the architect's sketches, or from plaster models provided or approved by the architect.

All carving to be executed.....

Contractor shall include in his estimate the sum of..... to be expended by the architect for the models that are required.

(10) Cutting—All stone shall be cut accurately to shape and dimensions and full to the square, with jointing as shown on approved "cutting and setting" drawings. All exposed faces shall be cut true. Beds and all joints shall be dressed straight and at right angles to the face, unless otherwise shown, and except where otherwise shown or noted on drawings the joints shall have a uniform thickness of ¼ in.

The patching or hiding of defects will not be permitted.

Washes shall be as deep as practicable and drips of sufficient width and depth to shed water shall be provided on all projecting stones and courses.

Raglets for flashing, etc., shall be cut in the stone where so indicated on the drawings.

Moulded work shall be carefully executed from full size details, supplied by the architect, and must match perfectly at joints. All arrises shall be sharp and true.

Quoins, pier and pilaster stone shall be checked at back as indicated.

All columns shall be accurately cut with the entasis shown on drawings. All pilasters to be cut straight without entasis or taper.

(11) Back Checking and Fitting to Structural Frame—Stone coming in contact with structural work shall be back-checked as indicated on the general drawings, and where shown resting on structural work shall have beds shaped to fit the supports.

(12) Lewis Holes and Cutting for Dowels, Anchors, Cramps, etc.—Holes and sinkages shall be cut in stones for all anchors, cramps, dowels, etc., called for under this specification or indicated on the "cutting and setting drawings."

Lewis holes shall be cut in all stones weighing more than 100 lb. No lewis or other holes shall be cut in exposed washes or come closer than 2 in. to the exposed face of the stone.

(13) Cutting and Drilling for Other Trades—This contractor shall do all cutting and drilling of stone for electric conduits, piping, leaders, etc., required for the installation of the work of other trades, as shown on the details for cut stone work.

(14) Field Cutting—Specify in detail any field cutting that will be required.

(15) Loading and Shipment—The Cut Indiana Limestone shall be carefully packed for rail or wagon transportation, with exercise of all reasonable and customary precautions against damage in transit.

All cut stone under this contract shall be delivered promptly as ordered and in the sequence in which it is to be set.

Setting Cut Stone

(16) Work Included—Contractor shall refer to the preceding specification for Cut Indiana Limestone for more detailed information regarding the cut stone that is to be set under this contract; also refer to "General Masonry," "Sheet Metal Work," "Roofing" and "Carpentry" specifications for references to other work that must be executed in conjunction with this work.

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(17) Delivery and Storage—All Indiana Limestone delivered f.o.b. cars at destination under ..... contract shall be carefully unloaded and delivered to the building site.

The cut stone shall be handled throughout by competent workmen and by such methods as will guard against soiling, mutilation or snipping in transit to and upon delivery at the building site.

The stone shall be stored at the building site on planking set so that the stone will rest entirely clear of the ground, and be protected by proper means from damage to arrises and from contact with anything which would result in the accumulation of dirt, dust, soot, mud, grease and other staining or disfiguring elements. The stone shall be covered with tarpaulin, stout non-staining paper or boards during extended periods of storage at destination or building site.

(18) Setting Mortar—All Indiana Limestone shall be set in a carefully prepared non-staining mortar. (See Alternate Mortar Clauses ("a"), ("b") and ("c") which follow.)

Note: The following three alternate setting mortar clauses; one for a cement mortar, one for a 50-50 mortar and one for a lime mortar, any one of which may be used according to conditions which make each one the more appropriate for the particular piece of work. The lime mortar clause is recommended principally for what may be referred to as all lime mortar masonry jobs in which that type of mortar is to be used for laying up backing as well as for setting stone facing.

The 50-50 mortar clause is recommended both for setting of stone in masonry walls where another type of mortar is to be used in laying up backing, and for light walls in which it can be used both for setting the stone and laying up backing.

The cement mortar clause is always to be recommended for both setting and parging the back of stone, where a cement mortar made of ordinary cement, either Portland or brick masons of any questionable kind, is to be used in backing masonry and especially for the enclosure walls of skeleton frame structures where both a strong mortar is desirable and where a dense reasonably impervious mortar that will protect the stone where it is built in place against concrete column and beam construction or fireproofing is all important. For that reason preference is usually given to use of a cement of the non-staining type either containing or mixed with a suitable integral waterproofing, as the most practical and effective means of protecting stone from staining effects of moisture coming through from backing or structural work in back of limestone facing.

(a) Cement Mortar—All Indiana Limestone shall be set in a carefully prepared non-staining mortar composed of 1 part of approved brand of non-staining cement, to 3 parts of sharp, clean washed sand, with the addition of ⅛ part of hydrated lime.

(b) Cement-Lime Mortar—All Indiana Limestone shall be set in a carefully prepared non-staining mortar composed of ½ part of approved brand of non-staining cement, ½ part of hydrated lime or lump lime paste to not over 3 parts sharp, clean washed sand.

(c) Lime Mortar—All Indiana Limestone shall be set in a carefully prepared non-staining mortar composed of 1 part of hydrated lime or lump lime paste, to not over 3 parts sharp, clean washed sand with the addition of non-staining cement in an amount equal to at least 15% by volume of the lime used.

When lump lime is to be used, paste shall be made from the best quality of freshly burned lump lime, slaked with cold water and screened through a ⅛-in. mesh screen into a settling box, following the practice employed in preparing lime for plastering. Lime putty thus prepared shall stand in settling box not less than one week and then be mixed with sand and properly stacked to age; cement to be added and thoroughly worked into mixture in small batches just prior to its use for setting of cut stone.

Note: The following clause will apply for all three types of mortar.

The sand must be *washed* entirely free from loam, silt, vegetable matter, salts and all other injurious substances, and shall be screened if containing pebbles or coarse grains that would interfere with the proper bedding and jointing of the work. The water shall not be alkaline and must be clear and devoid of salts and injurious elements.

(19) Scaffolding—The scaffolding required for the use of all trades, including scaffold for the proper execution of the cut stone work, will be furnished and erected by the masonry contractor.

(20) Centering—The wood centering required for the proper setting of cut stone work will be furnished and erected by the carpentry contractor.

(21) Anchors and Dowels—All anchors, cramps, Lewis anchors, etc., required by setting drawings or necessary for the proper erection of the work shall be included under stone setting contract. Except where otherwise specified, all anchors shall be of iron, thoroughly galvanized after they have been bent to shape.

Anchors for ashlar and face work generally shall be the standard ⅛ x 1-in. ashlar anchor or be of equivalent cross section, one anchor to each stone over ½ sq. ft. in area and at least two anchors to all stone over 2 ft. long or more than 3 sq. ft. in superficial area.

All dowels required for light stone work shall be made of standard heavy brass pipe of the size required.

(22) Grade Course—Where Limestone extends down to grade line, stonework above grade shall be protected by a properly installed layer of approved non-staining impervious material.

(23) Setting Cut Stone—The Indiana Limestone shall be set accurately in accordance with the requirements of the drawings. Before setting, all stone shall be *washed clean on all sides* and, if required, shall be scrubbed with fibre brushes using only soap powder and water and then be thoroughly rinsed with clean water. Just prior to setting, all stone shall again be sponged or drenched on all sides with clean water.

All stone shall be properly set, by competent stonesetters, true to line and level, with full flushed joints, filling all anchor holes.

All beds and vertical joints shall be ¼ in. in width, except where otherwise indicated. Wood wedges may be used only where necessary to prevent the crushing of mortar under heavy blocks, and shall be thoroughly soaked before use.

Mortar shall be raked out ¾ in. from the face of the stone to allow for pointing; excepting for such parts of the work as may best have the joints pointed or grouted full as set. The stone as set shall be sponged off along all joints.

Steps shall be set with a slight pitch to the front.

The ends only of lugged sills shall be bedded with mortar, balance of joint to be left open until pointed.

Heavy stone or projecting courses shall not be set until the mortar in courses underneath has hardened, all projecting stone to be securely propped until the wall above them is built.

All cornices, copings and projecting belt courses and all stones forming gutters, etc., shall be set with the vertical joints unfilled. The exterior profile of these joints shall then be caulked with rope yarn or picked oakum and be filled solid from above with a mortar grout composed of 1 part non-staining cement and 1 part fine white sand, mixed in small quantities, and of as thick a consistency as can be poured into the joints. Grout shall be stirred vigorously until used.

Splashing exposed faces of stone with mortar shall be avoided, and any splashings be immediately removed with a clean sponge and water.

(24) Parging and Backing Up—The backs of all stones and the sides of bonding stones shall be parged with the setting mortar not less than ½ in. thick before backing is built. *The first course of brick backing in direct contact with stone shall also be laid with the setting mortar.* Where the stone occurs as a facing applied direct to previously erected structural members, both back of stone and face of structural work shall be plastered with setting mortar and any space left

Twin Cities Plant, Ford Motor Company, St. Paul, Minn.
Albert Kahn, Architect
Interesting example of usage for Industrial Building

Continued on next page

to be grouted where this is required, to insure a thoroughly filled back-joint.

(25) Protection of Finished Work—Contractor setting cut stone shall co-operate with the carpentry contractor, who will furnish and erect the necessary protection for sills and all projecting stonework. All steps and platforms shall be protected with boards during the entire period of construction.

(26) Replacement of Damaged Stone—No defective stone, and no broken, spalled, patched or otherwise damaged stone shall be set without first obtaining the architect's approval. All damaged stone shall be recut or repaired, if approved, or be replaced by the contractor free of cost to the owner.

(27) Pointing—All face joints shall be raked and brushed out clean to a depth of at least ½ in., carefully removing any wedges and loose mortar so that pointing will be continuous, and after a thorough wetting of the stone the joints shall be pointed flush with mortar consisting of 1 part non-staining cement, 2 parts clean white sand and sufficient cold lime putty to make as stiff a mixture as can be worked.

(28) Cleaning—The face of all stonework under this contract shall be properly cleaned down upon completion; if necessary, this cleaning shall be done by scrubbing with soap powder boiled in clean water, applied vigorously with stiff fibre brushes, adding clean, sharp, fine, white sand to the soap and water mixture, drenching all exposed surfaces of stone with clear water after cleaning.

The use of wire brushes or acids of any kind will not be permitted under any circumstances for cleaning the stonework.

Specification for Random Ashlar Wall Facing of either Sawed-finish "Old Gothic" or Short-length Indiana Limestone (Note A)

All exterior wall facing, except cut stone trim which is elsewhere provided for under the heading of "Cut Stone Work," shall be of ["Old Gothic"] ["Variegated"] Indiana Limestone, laid up in random ashlar, using the stone of varying textures, sawed on four sides in the several heights required to lay up the work as indicated on the (detail) drawings, with the finish as it comes from the saw. (Notes B and C.)

This facing shall be bonded to the backing as shown, having at least one bonding stone 4 in. thicker than facing to each (Note D) ..... sq. ft. of wall, and the units shall be arranged to bond properly with the cut stone quoining at corners, window jambs, etc., and to fit in generally with the bonding scheme of cut stone trim throughout.

All stone for this purpose shall have faces square and be sawed from blocks having a length of not less than 3 ft. 6 in., and shall be broken up and jointed on the job to sizes required (Note E). All stone shall be set with level beds, shoving each block on to a full bed of mortar. End joints shall be (*vertical*) and be properly staggered, and shall be worked off square with face of stone (Note F). All joints shall be ..... thick (Notes G and H), weathered joints well filled with setting mortar struck full to the face of stone as the blocks are set, and each block shall be carefully backplastered with a thick coat of the same mortar as that used for setting.

All mortar droppings adhering to stone shall be immediately removed and the face of stone along all joints be sponged off clean as the work is set.

The specification for setting mortar and for backing up of stone should follow (Note I).

Explanatory Notes—

Note A—This specification should preferably be included under a separate heading of its own, as given above, or be made a part of the general masonry specification, under such a subheading, so as not to form a part of or be confused with the specification for cut stonework.

Note B—This Sawed-four-side, "Old Gothic" or "Variegated" may also be used where a rock face random ashlar is required. In such cases, for a 4-in. thick ashlar facing, the stone would be sawed to a thickness of 10, 11, 12 in., or more, according to the amount of rock required on face, and then be split apart on the job giving two rock-faced slabs with sawed beds and backs. After strips have been jointed off to required lengths, the rock-face is pitched off to a line parallel with back.

Or, as an alternate, sawed slabs may be used for rock-face work, involving a little more labor at the building but costing less than Sawed-four-side material f.o.b. the quarry.

Note C—Where the desired design has not been fairly well indicated on the drawings, it is advisable to add the following clause to the first paragraph:

"The length of Random Ashlar units generally shall not be less than one and one-half times their height" (except for closures and except where a long effect is desired) "nor more than three and one-half times their height."

Note D—The requirement for bond stones will vary somewhat with the ashlar design and unit height of units employed, and a small section of the wall should be carefully detailed to determine this. These units should generally be worked out in multiples of the brick or hollow tile backing units. Under usual conditions, one bond stone in from 8 to 12 sq. ft. of wall is considered sufficient.

Note E—The stone stock of any grade furnished under the Short-length classification will vary from 3 ft. 6 in. to 5 ft. 11 in. in length. Where greater length of stock is required the ashlar must be cut from full dimension quarry blocks, and the regular grade must be specified, as the Short-length classification will not apply.

Note F—This provides for the more regular and usual form of random ashlar. Where the irregular form with angular end joints is desired, omit word (*vertical*) and substitute either the words (*irregular*) or (*hammer broken*).

Note G—It is not practicable nor desirable to require joints less than ⅜ in. thick for wall facing of this rough-sawed material, and this thickness is recommended as the minimum, ½-in. joints to be specified for the ordinary run of work. For rock-face work or where a rougher effect is desired, a wider joint than ½-in. is often preferable. For rough, irregular work, where end joints are not vertical but are pitched off at an angle with the bed, fairly wide joints should be specified. It is not intended that joints be raked out and pointed later but that work be laid by masons with a full joint struck off flush, or weathered, at the time of setting.

Note H—A struck weathered joint, finished as the stone is set and requiring no pointing up later on, is specified, as it is considered the most appropriate type of mortar joint for this character of stone work.

As an alternate to this, especially when the joints are not very wide and it is considered advisable to accent them, a slightly raked out joint may be specified. For a raked joint, especially if wide, an unusually stiff mortar is sometimes necessary.

Note I—Where the use of a lime mortar is impracticable for any reason, a lime-cement or cement-lime mortar, made with a non-staining cement, should always be used.

Ordinary gray portland cement should not be used, because of its detrimental effect on any natural stone and on account of the frequently resultant staining of the limestone. A lime or lime-cement mortar, similar to that employed for cut stone work, is recommended for this work and for parging or immediate backing up of it.

Particular mention of careful backplastering in connection with the setting of all cut stone trim, should be made in the specification for that portion of the work.

Santa Monica Church, Santa Monica, Cal.
A. C. Martin, Architect
An example of rough-sawed random ashlar

SHAWNEE STONE COMPANY

SUCCESSOR TO THE CENTRAL OOLITIC STONE COMPANY

Indiana Limestone

CHICAGO OFFICE
2120-2140 South Kedzie Avenue
CHICAGO, ILL.

TELEPHONES
LAWNDALE 8940, 5490

QUARRY AND MILL: BLOOMINGTON, IND.
GENERAL OFFICES: Citizens' Trust Building, BLOOMINGTON, IND.

Quarry

Our production of Indiana Limestone this year 1928 will be in excess of 1,000,000 cu. ft. in grades and quantities about as follows:

Shawnee Select Manhattan Buff	58%
Shawnee Carrara	20%
Shawnee Oriental	5%
Shawnee Variegated	10%
Shawnee Rustic Buff	5%
Shawnee Travertine	2%

Our quarry is served by the great Illinois Central Railroad Co. This service, with the 1,000 ft. stacking tramway that we maintain, enables us to hold on hand in reserve at all times from 400,000 to 500,000 cu. ft. of stone, assuring architect and owner of the delivery and service they require.

Facilities

Our mill, located in the heart of the Indiana Limestone district, modernly equipped with electrically operated machinery of the latest approved type, offers excellent facilities for the prompt and efficient execution of contracts of any size.

Quality

The policy of this company is to see that no work leaves its mill not thoroughly executed in a workmanlike manner, and that the grade of stone is in accordance with the specifications and equal to approved sample submitted.

Samples

To interested parties and prospective buyers will be sent, express prepaid, on request, samples of ordinary size to any part of the United States or Canada.

Estimates

Requests for quotations on stone work are solicited and will be given prompt attention.

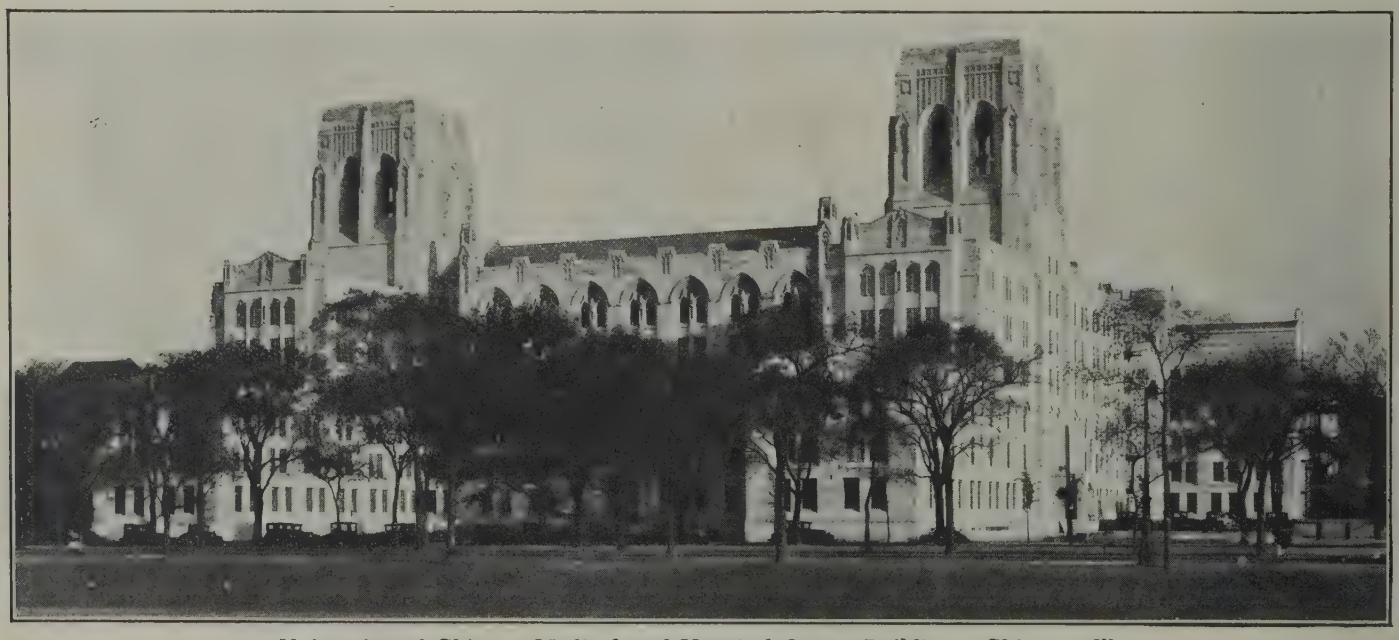
Co-operative Service

This company has an organization composed of men thoroughly experienced in their respective lines, and will gladly give information or render service to the architect, owner, and general contractor when called on. Prompt and satisfactory attention will be given to all inquiries and attractive quotations made at all times.

References

This company has executed the stone work for some of the prominent buildings of the country, and points with satisfaction and pride to its references. Some recently completed contracts follow:

London Guarantee & Accident Building, Chicago, Ill., Alfred S. Alschuler, Chicago, Ill., Architect
Union Trust Building, Cleveland, Ohio, Graham, Anderson, Probst & White, Chicago, Ill., Architects
S. W. Straus Building, Chicago, Ill., Graham, Anderson, Probst & White, Chicago, Ill., Architects
Illinois Life Insurance Building, Chicago, Ill., Holabird & Roche, Chicago, Ill., Architects
First National Bank, Detroit. Mich., Albert Kahn, Detroit, Mich., Architect
Washington Building, Washington, D. C., Coolidge, Shepley, Bulfinch & Abbott, Boston, Mass., Architects
City Hall, Columbus, Ohio, Allied Architects' Assn., Columbus, Ohio
Mutual Life Insurance Building, Baltimore, Md., Parker, Thomas & Rice, Baltimore, Md., Architects
Memorial Union and Tripp Commons Building, Madison, Wis., Arthur Peabody, Madison, Wis., Architect
Houston National Bank, Houston, Tex., Hedrick & Gottlieb, Inc., Houston, Tex., Architects
Central Row Building, Hartford, Conn., Voorhees, Gmelin & Walker, New York, N. Y., Architects
Other references gladly supplied on request.



University of Chicago Medical and Hospital Group Buildings, Chicago, Ill.
COOLIDGE & HODGDON, Chicago, Ill., and Boston, Mass., Architects
We cut and furnished the stone set in the wall for group of buildings here shown

AMERICAN BLUE STONE COMPANY

Producers of Genesee Valley Blue Stone

101 Park Avenue, NEW YORK, N. Y.

QUARRIES AND MILLS: AMBLUCO, WYOMING CO., N. Y.

Products

GENESEE VALLEY BLUE STONE, a New York State blue stone for architectural exterior and interior building construction.

NATURCLEFT FLAGGING.

For AMBLUCO Non-slip Treads, Landings, Flooring, Thresholds and Wall Base for interior and semi-interior uses, see pages A784-786.

Facilities

This company was organized and opened its first quarry in 1899, now having well developed quarries on its own property of about 200 acres located at Ambluco, Wyoming County, N. Y. The blue stone is taken out to a depth of 100 ft. from the top of the ground.

Mills and yards are equipped with the most modern machinery so that large volumes of business can be shipped without delay. This blue stone is handled by dealers in principal cities east of the Mississippi River. Samples are displayed with the Architects Samples Corporation, 101 Park Ave., New York.

Genesee Valley Blue Stone

Color and Texture—A distinctive uniform shade of light blue, blending well with adjacent light colored surfaces, or giving a sharp clean contrast with dark materials. It is of a fine grain and even texture, being made up mostly of pure hard quartz as shown below.

MINERALOGICALLY CONSIDERED

Fine hard sand, mostly quartz	70%
Clay, as binding material	28%
Water	2%

In this blue stone, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface, which makes the stone slip-proof and very durable.

Strength, Weight and Fire Resistance—Few, if any, stones have a greater crushing and transverse strength than this blue stone. Likewise, the stone has high tensile and shearing strengths.

The following table gives its crushing strength, as compiled from tests made by the United States Ordnance Department:

CRUSHING STRENGTH

Rockport granite (Kidder's Hand Book)	17,750 lb. per sq. in.
Vermont marble	Average 13,500 lb. per sq. in.
Genesee Valley blue stone	19,970 lb. per sq. in.

Although of great density it weighs only approximately 150 lb. per cu. ft. when cut ready to set.

It offers great resistance to extreme heat, and the dielectric strength test is among the highest of all natural stones.

Durability—Specimens of this blue stone have been critically and carefully analyzed by eminent mineralogists and pronounced one of the most durable of all stones. In abrasive tests it excels most other stones. Like all stones, it should be cut to set on its natural bed.

It is said by one who has been in the business all of his life and who has made careful study of the stone edifices in Europe, that this Genesee Valley Blue Stone is very much the same as the stone in the architecturally famous stairway of the court in the Bargello Palace, Florence, Italy.

CHEMICAL ANALYSIS

Silica	76.50%
Alumina	14.75%
Oxide of iron	6.35%
Water	2.00%
	99.60%

Adaptability—This blue stone has substantially all the good qualifications of the old genuine North River blue stone which has practically been out of the market since 1912, and has several advantages over such blue stones of the reedy rock character. Genesee Valley Blue Stone is a liver rock and does not produce natural split flagging and curbing. The sheets of stone in these AMBLUCO quarries, being of unusually low levels, represent early deposits and are, therefore, much harder and more compact than stone quarried from higher levels. The quarry blocks are from 2 to 4 ft. thick, permitting ashlar and base courses to be set on the natural bed with face against the grain, which condition rarely or never exists with other blue stones.

Cutter and Sawed Face Ashlar

Even more artistically effective than seam face granite, cutter face (vertical seam face) blue stone ashlar has been worked into buildings of the early American farm house and English Tudor styles. The cutter faces are permanently and beautifully stained many colors and soft shades, producing an old tapestry design when laid random. Also the combination of sand sawed and shot sawed faces furnishes a pleasing relief from the smooth planed and rubbed finishes.

Foundation Beds, etc.

Genesee Valley Blue Stone is unexcelled for engine, motor, pump, etc., foundation caps. It is also especially good for shelves and uprights of underground vaults. Garden seats and sundials are frequently made of it.

Specification Suggestions for Exterior Use

It is essential that Genesee Valley Blue Stone be specified, and better to guard against the substitution of inferior blue stones, mention this company's name and address as producers.

Specifications should require all blue stone (as well as most other stones) to be thoroughly seasoned and to be cut so as to set on its natural bed, especially when used for grade courses.

The practical finishes, in order of their costs are: Sand sawed; shot sawed; rock face; wet sand rubbed; fine axed (6-cut); horizontally (machined) tooled; and vertically (hand) tooled. This blue stone also takes most any finish applied to a natural stone. The sand sawed finish, showing no saw marks, is very uniform and brings out the character of the stone. This is produced by a slow process and does not burn or bruise the surface of a stone as does planing and axing.

Naturcleft Flagging

A natural split flagstone of delightful range in colors not produced but sold by us. Specify AMERICAN BLUE STONE COMPANY'S Naturcleft Flagstone.

Co-operative Service

Our organization, through its members' lifelong experience with blue stone, offers its knowledge in an impartial manner, unbiased by thought of personal profit.

THE BRIAR HILL STONE CO.

Producers of Golden Buff and Variegated Sandstone

GLENMONT, OHIO

Briar Hill Golden Tone Sandstone

Briar Hill Golden Tone Sandstone—rough blocks, semi-finished, ashlar, stone-brick or cut and carved ready to set in accordance with plans and specifications.

BRIAR HILL GOLDEN TONE SANDSTONE
TRADE-MARK

Readily available in practically every locality.

Varieties—Golden Buff, Light Variegated and Dark Variegated, or in any desired combination.

A wonderful range of colors, all tinged with a beautiful subdued golden tone.

Use color, too, when you build with stone.

Adaptability—Suitable for all classes of buildings, both for interiors and exteriors; effective as trim for seam face granite, field stone, brick or stucco, and especially adapted to gothic architecture, because of its easy working qualities.

Durability—Briar Hill Sandstone is permanent in texture and color. Positive proof of this is offered by an old church at Glenmont, cornerstone of which is illustrated below. Built of stone from this quarry in 1857, the original tool marks remain clean cut and sound. Age merely mellows the beauty of this colorful stone.

Physical and Chemical Properties—Results of physical and chemical analyses, compression, freezing and absorption tests gladly furnished on request.

Quarry—Our vast quarry holdings insure a practically unlimited supply of this stone. Production is 50% golden buff, 30% light variegated, 20% dark variegated. It can be furnished in any height for column drums, etc.

Facilities—Our quarry and mill are thoroughly equipped with modern machinery, capable of handling any size project. Prompt, efficient execution of contracts assured at all times.

Price—Although distinctive and yielding infinite color resources to the architect's skill, Briar Hill Stone is reasonable in cost. It is, therefore, economically available for all classes of buildings.

References

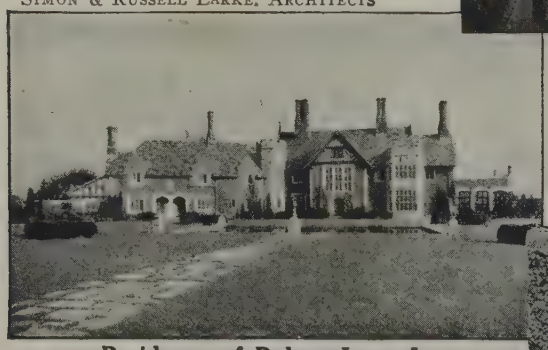
Some representative buildings (with architects) in which Briar Hill Sandstone has been used:

Harkness Memorial Quadrangle, Yale University, James Gamble Rogers
Washington Loan & Trust Co., West End Branch, Washington, D. C., Arthur B. Heaton
Mecca Temple, New York, N. Y., J. K. Knowles Estate and Clinton & Russell.
First National Bank, Boston, Mass., York & Sawyer
Leonard Hall, Kenyon College, Gambier, Ohio, Abram Garfield
Trinity College, University of Toronto, Toronto, Ont., Darling & Pearson
Seaboard Airline Railway Office Building, Norfolk, Va., Neff & Thompson
President's Residence, Ohio State University, Columbus, Ohio, Jos. N. Bradford
San Diego Trust & Savings Bank, San Diego, Cal., Wm. Templeton Johnson
M. M. Van Beuren Residence, Middletown, R. I., H. T. Lindeberg
First National Bank Building, Charlotte, N. C., Lockwood, Greene & Co.
Olivet Institute, Chicago, Ill., Perkins, Fellows & Hamilton
Central Farmers Trust Co. Bank, West Palm Beach, Fla., Arthur Loomis Harmon
University of Detroit, all buildings on new campus, Malcomson & Higginbotham
Edsel Ford Residence, Detroit, Mich., Albert Kahn
Alfred G. Wilson Residence, Rochester, Mich., Smith, Hinchman & Grylls
Harkness Hall, Yale University, Delano & Aldrich
W. E. Scripps Residence, Randall Beach, Mich., Clarence E. Day
Immaculate Conception Church, Waterbury, Conn., Maginnis & Walsh
Fordson High School, Fordson, Mich., H. J. Keough
Temple Beth Israel, Portland, Ore., Herman Brookman and Morris H. Whitehouse
Wardman, Shannon & Luchs Office Building, Washington, D. C., Arthur B. Heaton
Academy of Medicine, New York, N. Y., York & Sawyer
Stuart Duncan Residence, Newport, R. I., John Russell Pope

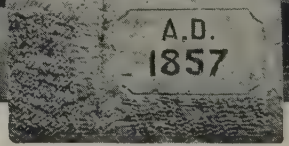
Cataract National Bank, Niagara Falls, N. Y.
SIMON & RUSSELL LARKE, ARCHITECTS

Interior of Trinity Chapel, Catholic University of America, Washington, D. C.
MAGINNIS & WALSH, ARCHITECTS

Robert Oakman School, Fordson, Mich.
H. J. KEOUGH, ARCHITECT



Residence of Robert Law, Jr., Port Chester, N. Y.
DWIGHT JAMES BAUM, ARCHITECT



Cornerstone Old Church, Glenmont, Ohio

Dayton Art Institute, Dayton, Ohio
EDWARD B. GREEN & SONS and ALBERT HART HOPKINS, ARCHITECTS

Continued on next page

Briar Hill Dark Variegated

Briar Hill Light Variegated

Federal Reserve Bank, New York, N. Y.
York & Sawyer, Architects

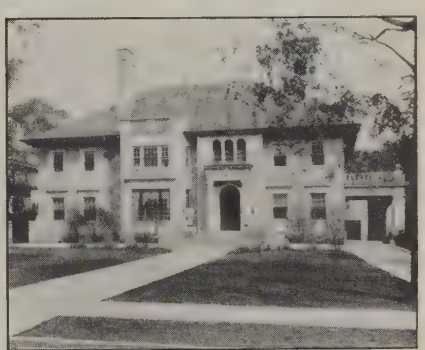
Briar Hill Golden Buff

Color Illustrations about ¼ actual size

Mecca Temple, New York, N. Y.
Clinton & Russell, Architects

Madison Hotel, New York, N. Y.
Rouse & Goldstone, Architects

Entrance Detail—Harkness Quadrangle, Yale University
James Gamble Rogers, Architect



Edward F. Fisher Residence, Detroit, Mich.
Richard H. Marr, Architect

Leonard Hall, Kenyon College, Gambier, Ohio
Abram Garfield, Architect

St. Joseph's Episcopal Church, Detroit, Mich.
Nettleton & Weaver, Architects

Continued on next page

Briar Hill Ashlar

THE wall shown above in actual colors is built of stone which is furnished in any desired heights and random lengths suitable for a number of different patterns in broken coursed ashlar, or straight coursed ashlar in varying heights.

While the wall pictured is of split faced ashlar, this material may also be obtained with sand or shot sawed face.

This stone is ready to set with very little additional labor by the mason on the job.

Write us for prices—you will be agreeably surprised.

Example of Briar Hill Sawed Face Ashlar

SCIENCE BUILDING, UNIVERSITY OF DETROIT
MALCOMSON & HIGGINBOTHAM, ARCHITECTS

Residence of A. H. Tashjian, Cleveland, Ohio

WALKER & WEEKS, ARCHITECTS

THIS IS A TYPICAL ILLUSTRATION OF ONE OF THE MANY USES OF BRIAR HILL ASHLAR IN THE CONSTRUCTION OF FINE HOMES

Continued on next page

Briar Hill Stone Brick

Illustrated in actual colors on this page.

Cut to the size of ordinary face brick *or in random lengths varying from 6 inches to 36 inches*, this flexible building material combines the warmth and color of Briar Hill Sandstone with the ease and simplicity of laying of any standard building brick, and prices are very reasonable.

Bricks of Briar Hill Sandstone have high compressive strength, low moisture absorption, and can be laid with ordinary lime and portland cement mortar with absolutely no danger of staining.

Specials, such as paving brick sizes, or the long, thin slabs sometimes used in country house work, are also available at reasonable cost.

We solicit inquiries from architects and will be glad to work out special sizes or color combinations for out-of-the-ordinary projects.

Write for samples and prices in your locality.

Observe particularly, please, the cut stone trim of Briar Hill Sandstone, which has been tooled and sand-blasted to impart the mellow charm of primitive craftsmanship and incalculable age. A house of stone with this treatment has apparently weathered storms, sheltered and protected succeeding generations for centuries.

THE TAYLOR STONE COMPANY

Producers of Scioto Sandstone

McDERMOTT, OHIO

Scioto Sandstone

Scioto Sandstone is generally described as being a dense, fine-grained silica stone, possessing an unusually high compressive strength. Its widespread popularity for both exterior and interior construction insures a distribution that makes it readily available in practically every locality.

Scioto Sandstone ranges in color from a blue or pearly gray to a deep golden buff, the individual colors being designated as Blue, Gray, Buff and Tammany. The latter stone was so named because of the pronounced stripes which give it marvelous beauty.

Scioto Sandstone's durability is portrayed in some of the structures pictured here; the Cincinnati building, built in the eighteen seventies, was sandblasted in 1927 and revealed not a single flaw, or evidence of disintegration. At Buena Vista, Ohio, stands a house which was built in 1803. After 125 years, the rough hewn walls are in perfect condition, even the tool marks remaining sharp and clean.

Cincinnati-Covington Bridge, Cincinnati, Ohio

Scioto Sandstone production is assured for countless years to come, because of the well nigh inexhaustible supply in our great quarry. Every modern facility has been employed in our quarry, our enormous seventeen gang mill, and our finishing department, to assure our patrons quality workmanship and excellent service.

Scioto Sandstone, possessing many superior qualities, readily recognized and appreciated by the architect and builder, is nevertheless reasonable in price, whether furnished in the block, sawed, planed, or cut ready to set.

Chemical Analysis

Silica	88.5%
Alumina	5.9%
Oxide of Iron	1.7%
Moisture	2.1%

Public Library, Portsmouth, Ohio

Jewish Temple, Portsmouth, Ohio

Albany Avenue Bridge, Atlantic City, N. J.

Interior of St. Vincent's Church, New York, N. Y.

Courthouse, Calgary, Alta., Can.

Business Block, Cincinnati, Ohio

Adaptability and Advantages

Scioto Sandstone is adaptable to all types of architecture. It has long been recognized as a superior stone for bridge construction because of its great strength; that its warm tones produce an incomparable effect in interior construction, is evidenced by its selection for exclusive interior use in four of New York City's greatest cathedrals; because of its fine-grained denseness it produces the finest detail in intricate carvings; it is a highly desirable stone for general trim, and unusually attractive for random ashlar work.

Calcium — Magnesium — Oxide — Titanium Traces.

Crushing Strength—10,500 lb. per sq. in.

Specifications for Scioto Sandstone

This stone shall be of uniform texture and color throughout, and shall be free from rust streaks, checks or seams. It shall be a hard, dense, fine-grained silicious stone, comprising at least 86% silica, with not over 6% alumina content, and have a compressive strength of not less 10,000 lb. per sq. in.

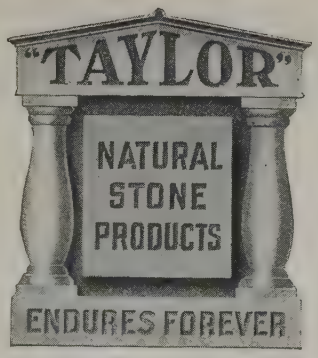
To guard against inferior substitution, we respectfully suggest that, "Scioto Sandstone, produced by THE TAYLOR STONE COMPANY," be specified as the comparative standard.

Continued on next page

Special Products of Enduring Stone

These creations of our master designer are offered as being worthy of your earnest consideration in your efforts to choose those finishing touches so essential to maximum beauty in modern architecture.

Scioto Sandstone possesses those necessary qualities of rich texture, warm tones, great strength and durability, which are essential to pleasing effect and lasting satisfaction.

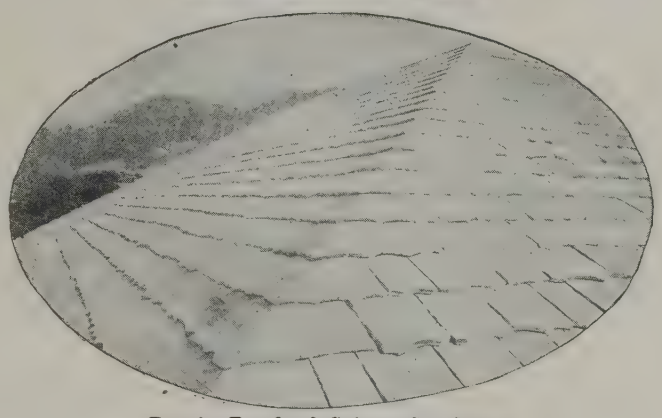


Distinctive Scioto Sandstone Rustic Roof

Nature's own crowning glory for the finer types of residential and public constructions. A trifle more expensive than other roofing materials, but worthy of the difference because of its greater beauty, individuality, and everlasting life. Unsolicited words of praise from prominent architects who have inspected Scioto Sandstone Roofs, indicate to us that in the development of this product, we have succeeded in filling a long felt need for a practical roofing material of unusual distinctiveness. Your discriminating clients seeking ultra exclusiveness will surely recognize the superiority of "Taylor" natural stone roofing.

Scioto Sandstone Roofing is furnished in slabs of a convenient size for handling, ½ to ¾ in. thick, with top and bottom surfaces sawed true.

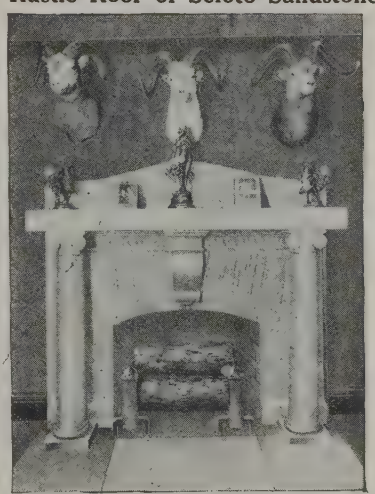
These slabs of beautiful blue, buff, gray, and tammany colors, may be easily scratched and broken to produce any dimension, and practically any desired effect.



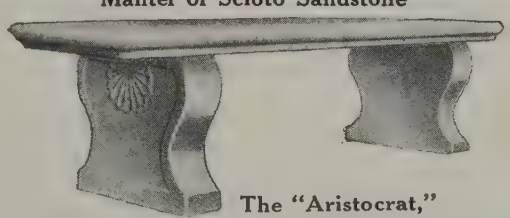
Rustic Roof of Scioto Sandstone

Garden Seats and Flagstones

Scioto Sandstone garden seats have met with instant approval wherever introduced. Although we have standardized on two designs that have proven the most popular, we can promptly furnish seats of any design. Our *"Natural Surface"* flagstone in rich but harmonizing colors of blue and buff, is particularly adaptable to rustic settings, while our sawed surface flagstone lends itself with pleasing effect to more formal surroundings. The proper complement of "Taylor" seats and flagstone walks will enhance the beauty of the most magnificent garden.



Mantel of Scioto Sandstone



The "Aristocrat,"
Hand Carved Sandstone Garden Seat

Unmatchable Mantels of Scioto Sandstone

Nature was the artist who placed the beautiful stripes in our "Tammany" stone, thereby giving us an incomparable material for mantel construction. The stately mantel pictured here is one of our several standard designs, which have been developed to meet the taste of the most discriminating, and lend complete harmony to modern or periodic styles of interior decoration. "Tammany" stone is featured in our mantels, but we can furnish mantels in our blue, buff, or gray stone.

Floors of Scioto Sandstone

Ideal for solariums, corridors, vestibules, etc. Due to its dense fine-grained texture, it will dress down to a razor-hone finish and hold shellac or varnish better than wood. The harmonizing colors of buff, blue, gray and tammany may be incorporated in many attractive designs.

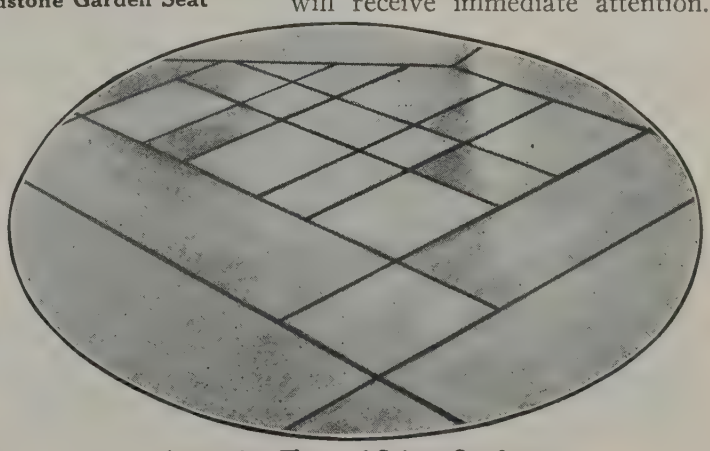
Catalogues

Individual catalogues covering in detail each of the products listed here, will be gladly mailed to you promptly upon receipt of your request. It will be a pleasure for us to furnish samples of Scioto Sandstone, give prompt quotations, and otherwise assist you in every way possible. Please consider us at your service.

Specialty Work

We are in position to promptly execute any special work not here referred to. Your inquiries will receive immediate attention.

Garden Walk and Seats of Scioto Sandstone



Attractive Floor of Scioto Sandstone

GEORGE WASHINGTON STONE CORPORATION

Aquia Freestone—Quarries Opened 1685

WASHINGTON, D. C.

QUARRIES: AQUIA, VA. SAW-MILL: ALEXANDRIA, VA. CUT STONE PLANT: WASHINGTON, D. C.

Product

AQUIA FREESTONE, beautifully colored and warm toned for both exterior and interior use; Blocks, Slabs, or Cut and Carved, ready to set in accordance with plans and specifications.

Description

Aquia Freestone is an arkose sandstone of the lower cretaceous period with its matrix harder than its crystals. This makes it tough but not hard. It is easily carved with great precision to a hairline edge which it holds tenaciously. Being crystalline in structure it is not affected by frost. It is unaffected by atmospheric acids and it withstands seaside conditions. The deposit is a homogeneous mass, so blocks of *any size* can be obtained, the only limitation being that of transportability. *Aquia Stone* has warm pleasing qualities and blends beautifully with brick. It also makes an attractive trim for other stones. It makes beautiful stepping stones and flooring, which are non-slipping when wet, and some exquisite mantels have been made of it. Where it has been used in a semitropical climate it gives off no glare. It is primarily an exterior stone, but for interior use it gives a *warm* and inviting effect.

Color

Aquia Stone has the *charm* of *color*. It has a dull tan background with here and there patches of color ranging from cream to reddish-brown which take the form of clouds if cut with the bed but if cut across the bed, the color shows in wavy veinings. In some of it these veinings shorten into speckles. The colors are *warm* in tone, being rather Moorish in effect, and a mass of the stone gives an effect of *rare elegance* which, with age, mellows like an old painting.

Durability

Architects build for a lifetime—*Aquia* has proved to be good for many lifetimes. Hundreds of gravestones of this stone bearing dates in the seventeenth and eighteenth centuries are perfectly preserved and what severer test could be given any stone than to have a 4-in. slab exposed on five sides withstand the elements for over 200 years? We can show many a perfect arris on our stone after 150 years. At the quarry there are many century old pick-marks left by slaves on a quarry face over which a stream of water flows and they are no more obliterated than if they were put there yesterday. Frost, freezing and thawing have failed to obliterate these pick-marks. Our quarrying operations are carried on throughout the winter and we have had no losses through the freezing and bursting of the stone. When in 1856 the present heavy cast iron dome of the Capitol was to be placed on the old *Aquia Freestone* walls and foundation, which were originally designed to support only the former wooden dome which was copper sheathed, the Army Engineers called in to report on the safety thereof, stated that the stone was 75 times stronger than was necessary and much stronger than the stone under the domes and towers of certain European Cathedrals, including St. Peter's in Rome and St. Paul's in London. The stone comes from the oldest quarries in the country.

Facilities

Our quarry, mill and cut stone plant have ample capacity for the largest buildings. They are equipped with modern machinery and give prompt and efficient service.

Tests

Results gladly furnished on request.

References

Since the completion of our mill less than three years ago the following are a few of the buildings in which *Aquia Freestone* has been used:

BUILDING AND LOCATION	ARCHITECT
Harkness Hall, Yale University, New Haven, Conn.	Delano & Aldrich
Gallery of Fine Arts, Yale University, New Haven, Conn.	Egerton Swartwout
Knights of Columbus Home, Baltimore, Md.	Geo. R. Callis, Jr.
Federal American National Bank, Washington, D. C.	Alfred C. Bossom
Fort Lincoln Chapel, Washington, D. C.	Horace W. Peaselee
National Bible Institute, New York, N. Y.	McKenzie, Voorhees & Gmelin
National Bank of North Philadelphia, Philadelphia, Pa.	W. H. Lee
Immaculate Conception Church, Philadelphia, Pa.	Paul Monaghan
Chapel, Princeton University, Princeton, N. J.	Cram & Ferguson

The Capitol, 1792-1831

Harkness Hall, Yale University, 1926

ZENITHERM COMPANY, INC.

A Universal Building Material for Interior and Exterior Walls and Floors

GENERAL SALES OFFICE AND FACTORY
390 Frelinghuysen Avenue
NEWARK, N. J.

NEW YORK OFFICE
110 East 42nd Street
NEW YORK, N. Y.

CHICAGO OFFICE
612 No. Michigan Avenue
CHICAGO, ILL.

BOSTON OFFICE
102 South Street
BOSTON, MASS.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Zenitherm, the Material and Its Uses

Zenitherm has all the dignity and massiveness, without the coldness, of stone. It has all of the convenience of wood since it can be nailed, sawed, drilled and screwed.

Zenitherm is made of a combination of selected wood fibre and highest quality calcined magnesium oxide. This is treated with a weatherproofing binder and subjected to hydraulic pressure in steel moulds. The pressure is maintained until the mass sets into a dense slab, which is not only highly fire resistant but is exceptionally low in absorption. It does not distort or shrink. The process is covered by patents and its production is under factory control. There is no substitute having the specific advantages of Zenitherm.

Qualities and Properties

Zenitherm is impervious to frost or any climatic conditions. Constant physical characteristics together with low thermal conductivity make Zenitherm preferable as a permanent material insuring comfort, beauty, durability, weather resistance and safety in its fireproof qualities.

Zenitherm becomes tougher with age. It wears better than many grades of marble. It is kept clean by washing with soap and water. Zenitherm is odorless and verminproof. It contains nothing to decay or rot. It costs less than stone. Zenitherm is usually installed by carpenters.

Uses

Zenitherm is used for interior or exterior walls, floors, fireplace facings, wainscot, arches, panels, sills, stair treads, risers, string, base, walks, et cetera.

Standard Colors

Zenitherm is made in 14 standard colors: natural buff, gold, pink, olive, drab, light grey, stone grey, light brown, dark brown, red, green, blue, black.

The fact that Zenitherm is available in different shades gives the architect ample opportunity to secure beautiful and permanent effects. Colors are obtained by pigments, *not dyes.*

Standard Sizes

Zenitherm is made in sixteen standard sizes. Other sizes can be furnished according to specifications. Prices on application. All wall material is ⅝ in. in thickness. Floor material ¾ in. Cove base measures 4¾ in. from top of base to finish floor. Straight plain base, any height desired. Stair treads 1¼ in. in thickness. Risers ¾ in. in thickness.

STANDARD SIZES

Width, in.	Length, in.	Width, in.	Length, in.	Width, in.	Length, in.	Width, in.	Length, in.
5½	5½	5½	47½	8½	23½	15½	15½
5½	11½	8½	8½	8½	47½	15½	17½
5½	17½	8½	11½	11½	11½	17½	23½
5½	23½	8½	15½	11½	17½	17½	47½

Standard Mouldings and Trim

Zenitherm standard mouldings are made for use in conjunction with Zenitherm Walls. There are twelve different designs available. Zenitherm mouldings and trim to match ashlar surfaces afford a wide range in style, and assure a finish correct in design and effective in treatment.

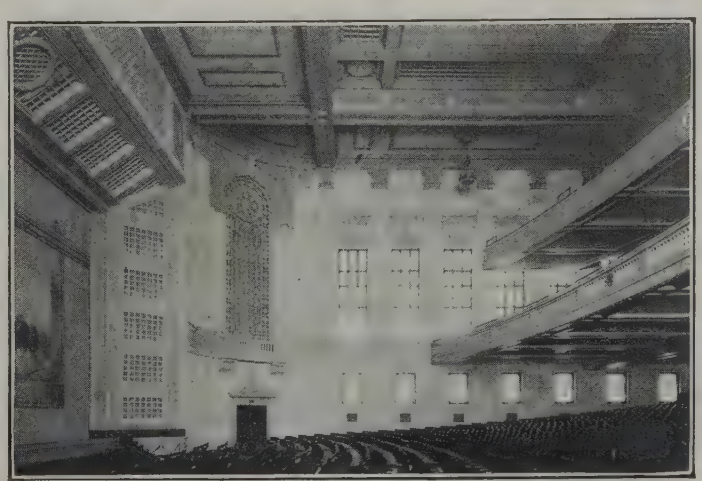
Corner Pieces

Zenitherm solid corners are manufactured to eliminate the appearance of joining and edge mitering. They carry out completely the effect of solid stone for columns, pilasters, beams, returns, reveals, quoins, et cetera. Where Zenitherm corner pieces are used, all edge mitering or joining is eliminated and installation costs are reduced to a minimum.

Installation

Zenitherm presents no difficulties of installation. The blocks, cut into standard sizes at the factory, are simply nailed with galvanized finishing nails to furring or brown coat of plaster or mortar for ashlar surfaces. Zenitherm Floors follow the standard methods of installing floor materials. Any competent carpenter can lay Zenitherm Floors and erect Zenitherm Walls if a reasonable amount of care is exercised.

Our "Contractors' Folder" gives full information and helpful suggestions to make the installation of Zenitherm a simple task. A copy furnished on application.



Zenitherm Walls, McFarlin Memorial Auditorium, Southern Methodist University, Dallas, Texas
R. H. Hunt Company, Architects

Literature for Architects, Their Clients and Contractors

We have several booklets and folders available which we shall be glad to mail on request.

Included among these publications are "Zenitherm Walls"; "Zenitherm Floors"; "Contractors' Folder"; "Architects' Manual"; "Zenitherm Defined"; "Color Chart"; "Folio of Patterns"; "Folder of Mouldings."

Continued on next page

Specifications for the Proper Installation of Zenitherm

The following specifications are recommended for architects' use. They are designed to cover all possible uses of Zenitherm.

Specifications for Zenitherm Floors

Zenitherm Floor on Wood Underfloor—

(Include in Carpentry Specifications)

(1) Furnish and install in the following portions of the work, Zenitherm Floors as manufactured by the ZENITHERM COMPANY, INC., Newark, N. J., laid strictly in accordance with the following specifications and the manufacturer's directions.

Note: List here the portions of the work that are to have Zenitherm Floors and specify the sizes and colors of blocks to be used.

(2) ***Preparatory Work***—Before laying the Zenitherm Floors, this contractor shall see that all wood underfloors are level and true ¾ in. below the finish floor level; boards to be securely toe-nailed to prevent warpage. Any depressions in the floor are to be removed by the use of a skim coat of Zenitherm Bedding Compound and Zenitherm Blocks are to be laid immediately after this skim coat is applied. Wood underfloor on new work should be tongue and groove flooring not over 4 in. wide, driven tight, well nailed, true and level.

(3) When the underfloor has been properly prepared, Zenitherm Blocks, ¾ in. thick, shall be nailed directly to the underfloor. As the blocks are laid, butter edges of blocks with Zenitherm Pointing Compound and squeeze up tight, wiping immediately from the face any surplus compound that oozes out. Use 6d hot-dipped galvanized finishing nails, setting nails ⅛ in., and fill nail holes with Zenitherm Pointing Compound. (Use ⅛ in. skim coat of Zenitherm Bedding Compound for solidity.)

Zenitherm Floor on Concrete Underfloor—

(Include in Tile Work Specifications)

Note: Under the heading, "Concrete Work," provision should be made for leaving the concrete underfloors *level* and *true*, 1 in. below finish floor level. On new concrete work, top coat need only be screeded or floated to a level 1 in. below finish floor level. Troweled surface not needed or desirable.

(4) Furnish and install in the following portions of the work, Zenitherm Floors as manufactured by the ZENITHERM COMPANY, INC., Newark, N. J., laid strictly in accordance with the following specifications and the manufacturer's directions.

Note: List here the portions of the work that are to have Zenitherm Floors and specify the sizes of blocks and colors to be used.

(5) ***Preparatory Work***—This contractor shall inspect the portions of the work where the Zenitherm Floors are to be laid and see that the underfloor is level and true, 1 in. below the finish floor level. Any depressions are to be brought to proper level by the use of Zenitherm Bedding Compound.

(6) Over the level and true underfloor spread a ¼-in. thick layer of Zenitherm Bedding Compound as the blocks are laid. Butter the Zenitherm block on two edges with Zenitherm Pointing Compound and set block in position, taking care to keep the Compound off of the finished surface of the blocks. Allow finished floor a minimum of six hours for setting.

Note: Where large blocks are to be used (47½x5½ in., 47½x8½ in., 47½x17½ in., or 17½x23½ in.), paragraph 7 should be used, especially on such floors as those in department stores, where heavy trucks loaded with merchandise are used.

(7) In the following portions of the work, this contractor shall drill the concrete floor and insert hardwood dowels, two dowels for each Zenitherm Block. The blocks are to be nailed to these dowels with 6d hot-dipped galvanized finishing nails, setting nails ⅛ in. and filling nail holes with Zenitherm Pointing Compound. This nailing is in addition to the bedding, specified under paragraph 6.

(8) ***Border***—Zenitherm Border shall be laid in the same manner as specified for Zenitherm Floors, in the following portions of the work:

(Insert here the areas affected)

(9) ***Base***—Zenitherm Base, of the height indicated on drawings or specified herein, shall be set in the following portions of the work:

(Insert here the areas affected)

(10) Base shall be set in 47½ in. lengths, in blocks ¾ in. thick and secured to grounds with 6d galvanized finishing nails. Set nails ⅛ in. and fill nail holes with Zenitherm Pointing Compound.

(11) ***Stairs***—Zenitherm stair treads and risers (and strings) shall be laid as follows:

Note: On wood stairs, Zenitherm should be specified as above for Zenitherm Floors over wood underfloor. On concrete stairs, Zenitherm Treads should be specified exactly as for floors over concrete. On iron stairs, specify as follows: Insert toggle bolt through hole in iron step; countersink it and fill hole to surface of tread or riser with Zenitherm Pointing Compound. If it is possible to get under the stairs, drill hole through the iron and fasten with wood screw. Instead of using toggle bolts, where iron pan is sufficiently thick iron treads can also be drilled and pan or support tapped to receive screw-bolt.

Specifications for Zenitherm Walls

Zenitherm on Interior Walls—

(Include in Carpentry Specifications)

(12) Zenitherm Walls and wainscot shall be provided in the following portions of the work:

Note: If Zenitherm Floors have not been previously specified, paragraph 13 should be used instead of paragraph 12.

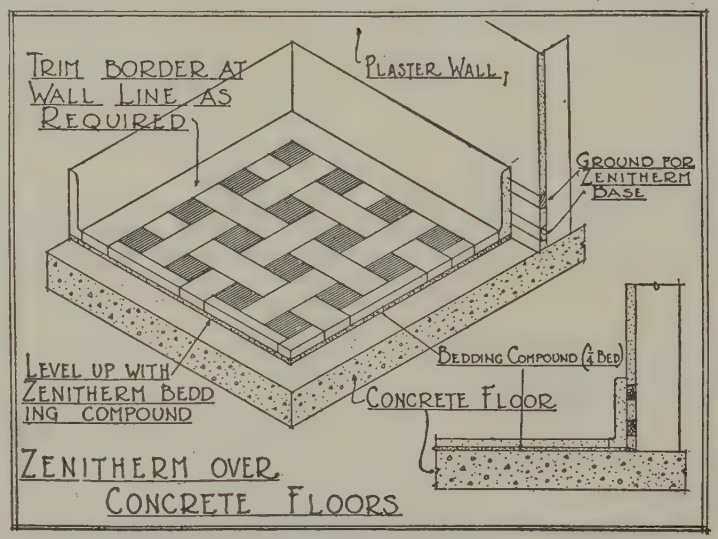
(13) Furnish and install in the following portions of the work, Zenitherm Walls (and wainscot) as manufactured by the ZENITHERM COMPANY INC., Newark, N. J., laid strictly in accordance with the following specifications and the manufacturer's directions:

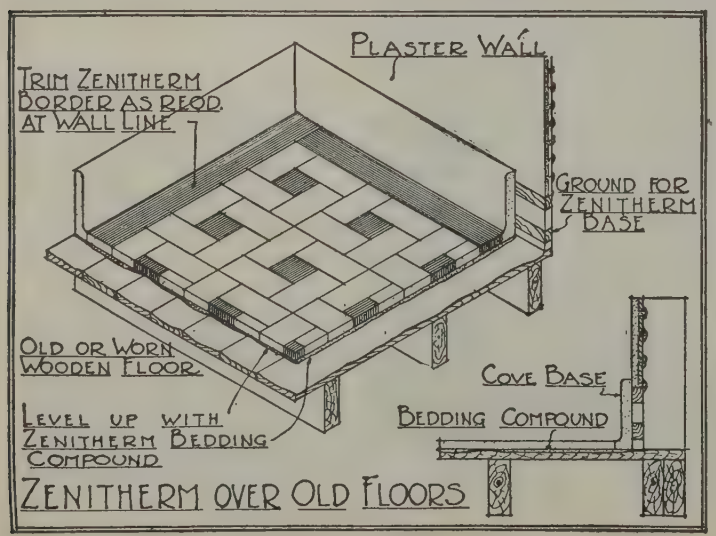
(Insert here the areas affected)

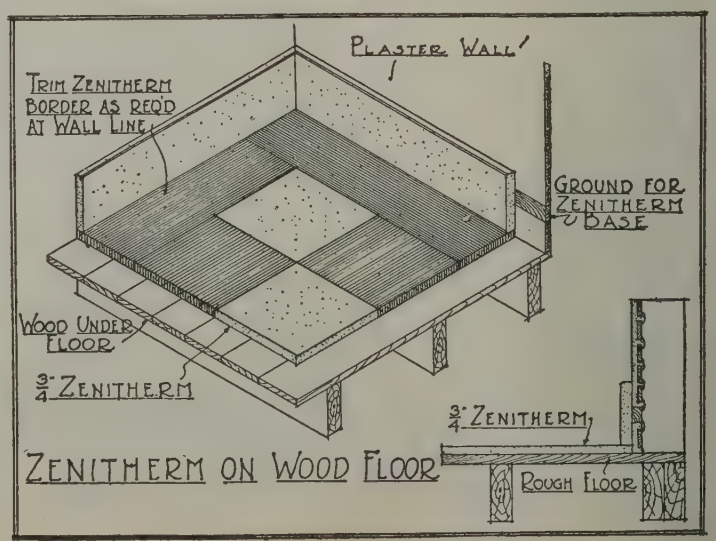
(14) Before applying the Zenitherm, this contractor shall see that all wall surfaces are true and plumb.

Note: Paragraph 15, 16 or 17 should be used, depending upon the type of joint desired.

(15) Zenitherm Blocks shall be ⅝ in. thick and have ⅛ in. (or ¼ in.) chamfered edges to form V joint when laid up close. All slabs shall be laid absolutely level and true.







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(16) Zenitherm Blocks shall be ⅝ in. thick and have straight and square edges and shall be laid absolutely level and true to form ⅛ in. (or ¼ in.) open joint. All joints shall be pointed with Zenitherm Pointing Compound.

(17) Zenitherm Blocks shall be ⅝ in. thick and have straight and square edges and shall be laid absolutely level and true with butt joints. All edges of block shall be buttered with Zenitherm Pointing Compound before setting the next block, all excess Compound being wiped from the face of the finished block.

(18) ***Bathrooms***—The wood backing around tubs and shower stalls shall be covered with a layer of heavy waterproof paper, applied like flashing at rim of tub or shower pan, and the Zenitherm nailed with 6d galvanized finishing nails driven at an angle, nails to be set ⅛ in. and the nail holes to be filled with Zenitherm Pointing Compound. Pointing Compound shall be buttered to fill along edges of blocks when erecting.

(19) On Concrete, Hollow Tile or Masonry Walls Using Furring—

Note: It is recommended, for the sake of economy, that wood nailing blocks be provided when the wall is erected, to which attach ⅞x3 in. furring strips.

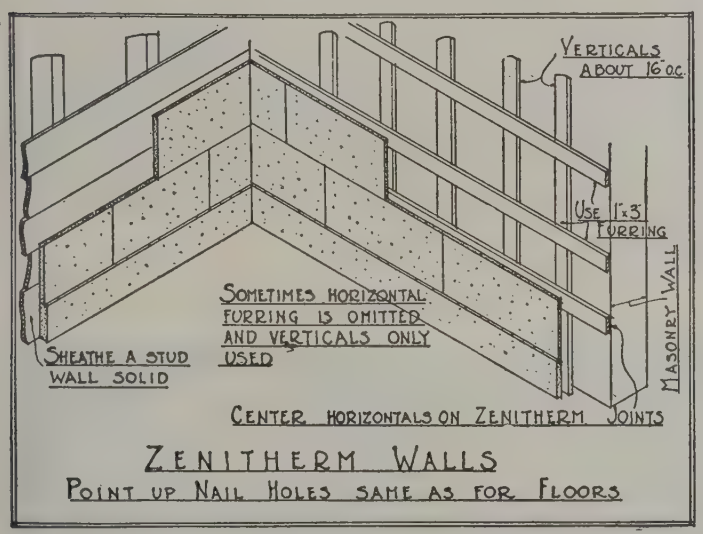
(20) Zenitherm Blocks shall be nailed to furring strips with 6d galvanized finishing nails as above specified.

(21) Center all horizontal joints of Zenitherm Ashlar on furring strips and, where double furring is used, center horizontal joints on horizontal furring strips.

Note: If close joint is specified, butter edges of slab with Zenitherm Pointing Compound. Point open joints as specified under paragraph 16.

(a) Alternate—Secure furring for Zenitherm with expansion bolts.

(b) Alternate—On hollow tile walls, secure vertical furring with toggle bolts about 18 in. on centers. Apply horizontal furring as above.



(22) On Cinder Nailing Block or Gypsum Block Walls, Without Furring—

Note: Under the heading, "Plastering," provision should be made for this contractor to apply a skim coat of haired brown coat of gypsum plaster or mortar sufficient to bring the wall plumb, true and straight, either ¾ in. or ⅝ in. behind base and cornice margin, depending on the thickness of the Zenitherm to be applied. Point nail holes as above.

(23) Zenitherm shall be face-nailed in the usual manner, the nails being driven at an angle directly into the supporting wall.

(24) On Brick, Concrete, Hollow Tile or Masonry Walls, Without Furring—

Note: Under the heading, "Plastering," provision should be made for this contractor to apply a minimum ¾ in. coat of haired brown coat of gypsum plaster or mortar, bringing wall perfectly true, plumb and straight, either ¾ in. or ⅝ in. behind base and cornice margin, depending on the thickness of the Zenitherm to be applied.

(25) Before applying the Zenitherm, this contractor shall see that brown coat of gypsum plaster or mortar is thoroughly set and dry, true, plumb and straight.

(26) Nail Zenitherm with hot-dipped galvanized finishing nails, driving nails through face of Zenitherm at an acute angle into the brown coat (Specify 3d nails for ¾ in. thick brown coat; 4d for brown coat thicker than ¾ in.) Use 4, 6 or 8 nails, according to size of block. Butter edges of Zenitherm Blocks while erecting, with Zenitherm Jointing Compound. Set nails ⅛ in.; point nail holes with Zenitherm Pointing Compound.

Zenitherm on Exterior Walls—

(Include in Carpentry Specifications)

(27) ***Frame Construction***—Cover sheathing with waterproof building paper, nail Zenitherm Blocks to sheathing with 6d galvanized finishing nails. Set nails ⅛ in. and fill holes with Zenitherm Pointing Compound.

Note: If close joint is specified, butter edge of block with Zenitherm Pointing Compound and squeeze into place before nailing, wiping off excess compound. Point open joints as specified under paragraph 16.

(28) ***Masonry Construction***—Nail ⅞x3 in. furring strips to wood plugs, or metal wall plugs, set in masonry wall. Nail Zenitherm Blocks to furring strips with 6d galvanized finishing nails, set nails ⅛ in. and fill holes with Zenitherm Pointing Compound. Center all vertical joints of ZenithermAshlar furring strips where single furring only is used. Center horizontal joints on horizontal furring strips where double furring is used.

Note: (a) If close joint is specified, butter edges of block with Zenitherm Pointing Compound. Point open joints as specified under frame construction.

(b) Alternate—Secure furring for Zenitherm with expansion bolts.

(c) Alternate—On hollow tile walls, secure furring with toggle bolts about 18 in. on centers vertically.

Crane Company Showroom, Philadelphia, Pa.
RALPH B. BENCKER, Architect
Zenitherm Floors and Walls

Prominent Installations

Residences

Col. Arthur O'Brien, Washington, D. C.
E. T. Stotesbury, El Mirasol, Palm Beach, Fla.
William Wallace White, Pelham, N. Y. (exterior)
Jesse L. Livermore, Great Neck, N. Y.
J. DuPratt White, Nyack, N. Y.

Public Buildings

Hollywood Memorial Church, Hollywood, Cal.
Crane Co. (over forty cities)
Wrigley Building, Chicago, Ill.
Equitable Trust Building, New York, N. Y.
State Street Bridge, Chicago, Ill. (exterior)
Bioren & Co., Philadelphia, Pa.
Memorial Art Gallery, Rochester, N. Y.
Hawaiian Pineapple Building, Honolulu, Hawaii
Premier's Residence, Tokyo, Japan

Prominent Architects Specifying Zenitherm

Fred T. Ackerman
Walter Ahlschlager
Dwight James Baum
Alfred C. Bossom
Frank Irving Cooper
Delano & Aldrich
Dodd & Richards
Lang & Witchell
J. W. Northrop, Jr.
Hoggson Brothers
Voorhees, Gmelin & Walker
McKim, Mead & White
Robert J. Reiley
James Gamble Rogers
Starrett & Van Vleck
Warren & Wetmore
Wight & Wight
Taylor & Levi

THE DECORATIVE STONE CO.

Producers of Cut Cast Stone

PLANT AND MAIN OFFICE

Chapel Street and Blatchley Avenue

NEW HAVEN, CONN.

NEW YORK OFFICE, 51 East 42nd Street

DEXTONE

TRADE-MARK

Product

DEXTONE—a cut cast stone of great strength and durability. Its individual characteristics make it an ideal stone, either for trim in conjunction with brick or rough stone, or for entire buildings. It has been extensively used in this manner for banks and other monumental buildings.

It is offered on the merit of its own individual good qualities and not as a cheap substitute for any other material.

Pioneer in Producing Cut Cast Stone

This company has been one of the pioneers in the development and scientific manufacturing of cut cast stone and is just proud of its twenty-five years of progressive growth. Good stone can only be produced where the thorough methods employed in its manufacture are carefully and conscientiously carried through. It requires special machinery and an organization with a thorough knowledge of the material to produce the finest stone.

METHODS USED IN PRODUCING DEXTONE

The Importance of Sizing and Proportioning of the Aggregates

In order to make a cast stone in which the aggregate will be uniformly distributed throughout its entire mass, it is necessary to separate the sizes and reproportion them so that the same amount of each size is used in each mix.

The illustration shows the various sizes of aggregate which are used in the manufacture of Dextone. A battery of electrically vibrated screens makes it possible to use the exact amount of each size necessary to form a uniformly dense mixture. By means of this scientific proportioning the voids are reduced to a minimum and the stone materially strengthened.

The use of crusher-run aggregate should never be permitted. Where crusher-run (ungraded) aggregates are used it is not possible to obtain the uniform density and hardness which is a characteristic of Dextone.

Note: A large percentage of dust (80 mesh and under) is found in all crusher-run aggregates. Manufacturers without screening facilities are, of course, unable to separate out this undesirable size. Its use will give a cast stone the dead, chalklike appearance common to all inferior grades of cast stone. It is one of the commonest causes of crazing.

Dextone Is Cast in Sand Moulds

By this method any excess water is immediately taken up in the sand, and within a few moments after casting, a mixture is in place in which the water content has been reduced to a minimum without having lost, until that time, its workability. This conforms in principle to the best practice recommended by the Portland Cement Association.

Importance of Water Control

Accurate control of the amount of water is an important factor in the production of a hard, dense stone. In the production of Dextone the water for each mix is automatically controlled thereby insuring the use of the correct amount. Note in the colored plates the perfect distribution of the aggregate as a result of this water control. This careful control is typical of the precise methods employed in the production of Dextone.

Two Weeks' Minimum for Curing

Too rapid drying out of unseasoned stone is another prevalent cause of loss of strength and crazing.

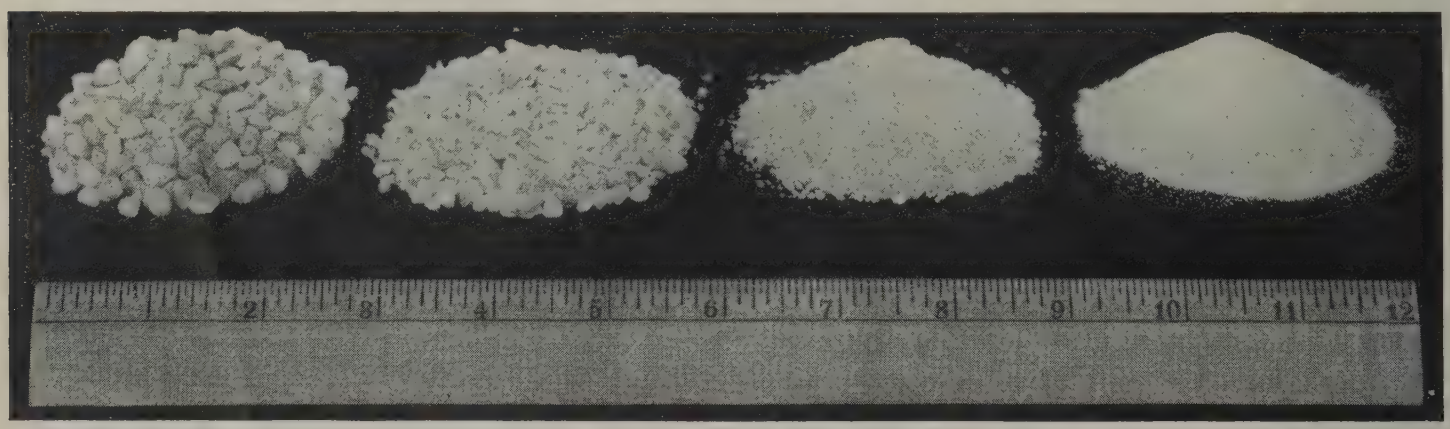


Fig. (1) Coarse
Suitable for mixtures where granite effect is desired. Stones in which this size is used show marked increase in strength.

Fig. (2) Standard
The body aggregate of all standard mixes, the smallest coarse aggregate allowable in any full strength cast stone

Fig. (3) Fine
A clean, sharp, fine aggregate which gives the mixture necessary workability. It is sized to close limits

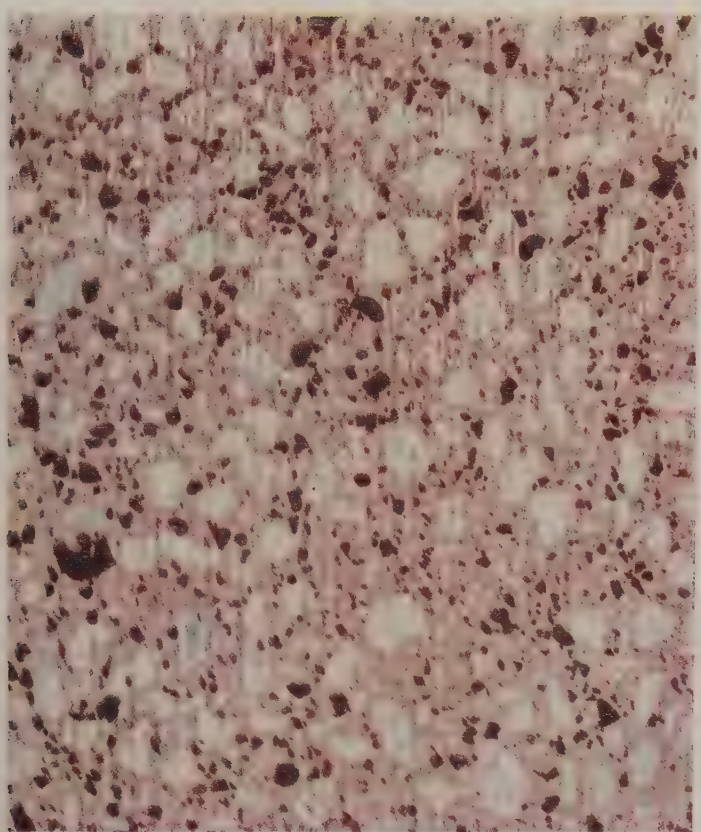
Fig. (4) Dust
Worthless as an aggregate and unsuitable for any full-strength cast stone. None of this size is used in the composition of Dextone

Continued on next page

Representative Samples of DEXTONE

Plymouth Gray

Milford Brown



Connecticut Pink

Ohio Variegated

Continued on next page

Representative Samples of
DEXTONE

Kentucky Light Gray

Indiana Buff

Old English

Quinnipiac Russet

Continued on next page

CAST STONE SHOULD BE CUT AFTER CASTING

The Reason for Specifying and Requiring "Cut Cast Stone"

In order to make sure that all irregularities in the castings are removed, all stones are made not less than ¼ in. oversize and after a proper period of curing are then cut down to exact size and profile by carborundum planers. In so doing, the film of rich cement and fine aggregate, which always settles to the face of a cast and is one of the principal causes of hair cracking as found in ordinary cast stone, is removed. The dense solid aggregate of the stone is clearly exposed. Where this operation is performed, it becomes increasingly importtan that the aggregates which are thereby exposed be uniformly graded and show a uniform distribution on all faces. These two factors of aggregate selection and cutting from oversize castings are the two major elements of all good cut cast stone. Specifications must distinctly call for stone to be cast oversized and cut if the result shown in Fig. 1 is desired.

All Dextone Is First Cut to Finished Size by Machinery Before Applying Final Texture

The cutting of the stones from rough to finished size and exact profile is done by carborundum cutting planers and rubbing machines. This method, although more costly than other methods, is absolutely necessary in the production of high grade cut cast stone. Only by this process are the sharp arrises, true profile, exposure of the aggregate and other characteristics of cut cast stone obtained. *These same cutting operations are necessary regardless of the ultimate surface treatment.*

Cutting to finished size should be regarded as a manufacturing operation separate and distinct from the ultimate surface texture which it is desired to obtain. Architects should demand in their specifications that all stone should first be prepared in this manner. *This operation adds to the cost of production but it is of such importance that this additional cost should be considered a necessity and not a matter of choice.*

On cheaper grades of stone the finished texture is often executed without first removing the film which causes fine hair cracks to develop. The difference between the two finishes is readily recognized and should be given due consideration when comparing the cost of Dextone with other materials.

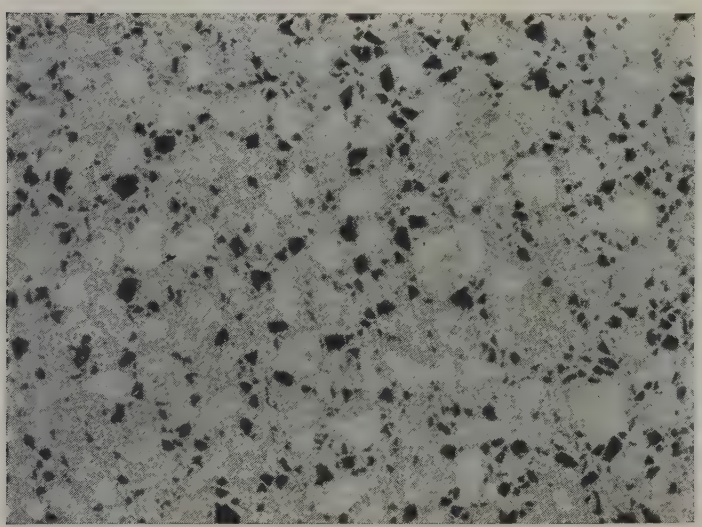


Fig. 1. Dextone with Aggregate Exposed by Machine Cutting
A representative piece of Dextone, from which ¼ in. of the cast surface has been cut. The lively, clean-cut, rocklike appearance of this stone is characteristic of a well-made cut cast stone. No cracks will develop in the surface of this stone

Fig. 2. Appearance of the Same Stone Before Cutting
A stone of the same mixture as Fig. 1, which has been finished by hand rubbing without removing the outside ¼ in. This surface will develop hair cracks common to poorer grades of cast stone

Some General Notes to Be Considered When Specifying Cut Cast Stone

We are frequently asked by architects to match some natural stone such as limestone or sandstone. It is a simple matter to match any color tone required but we do not recommend trying to match the texture by using fine aggregates only. Cut cast stone should be used according to its natural characteristics which require graded aggregates in certain proportions to produce the best stone. We discourage the efforts to match the nature of fine grain stones by requiring fine aggregates only. The resulting product does not conform to the high standard for which Dextone stands.

The essential points to cover in a specification for cut cast stone are as follows:

(1) Aggregates must be sized by screening and proportioned to produce maximum density. Crusher run aggregate not allowed.

(2) Must be made by the wet-poured process and in sand moulds.

(3) Stone must be of the same composition throughout and not faced.

(4) Mixed materials must be constantly agitated until placed.

(5) All stone must be made at least ¼ in. oversize on exposed surfaces, and then cut to correct size.

(6) Specify method of setting carefully as poor setting will ruin any stone job.

(7) Quotations to be based on Dextone Vermont White with hand bush-hammered finish, manufactured by The Decorative Stone Co., New Haven, Conn. (Substitute here other color or finish if desired.)

(8) All surface tooled finishes shall be applied after first being planer rubbed.

State amount added or deducted and name of manufacturer in case other make is estimated.

Note: In this specification no mention has been made of sand finish, acid treated, brushed, gothic or any other finish which cannot be properly classified as cut cast stone. *Buyers should be aware that these finishes are often sold in competition with cut cast stone.*

Continued on next page

RELATION OF TEXTURE AND FINISHES TO COST

Textures and Finishes

The following is a descriptive list of the finishes and textures in which cast stone is commonly supplied. Two major classifications are given: (1) Cut Cast Stone, (2) Uncut Cast Stone. Under the heading Cut Cast Stone, no mention is made of Sand Finish, Acid-Treated, Brushed, or any finish on which machine cutting from oversized castings is not done and, therefore, is not eligible for the designation Cut Cast Stone.

Cost

Following each finish, we have noted a figure representing its average relative cost on a percentage basis. The planer rubber finish has been adopted for this purpose as standard and given the value of 100%. This value is subject to variation according to the character and size of the building, but will undoubtedly serve in many cases where an approximate comparative figure is desired.

CUT CAST STONE—MACHINE CUT FINISHES

The finishes listed under this heading can only be produced where the facilities of carborundum planers, rubbing beds, etc. are available. All finishes produced in this manner are naturally more expensive than any of the finishes listed under the heading of Uncut Cast Stone.

Planer Rubbed (100%)

Under this classification all stone is cast not less than ¼ in. oversize and cut to correct profile by stone cutting machinery and with all machine marks eliminated. The full body aggregate of the stone is exposed and due to this cutting operation is permanently insured against crazing and other disfigurements. The irregularities in the castings are thereby eliminated and stones are cut to exact profile with beds and joints squared. It is a suitable finish for all purposes and for any class of building where a smooth finish is desired.

Honed (130%)

A subsequent operation to that of planer rubbing whereby all surfaces are smoothed with honing stones to give a semipolished effect.

As the difference between this finish and Planer Rubbed does not show up in a photograph, it is not illustrated.

Polished (180%)

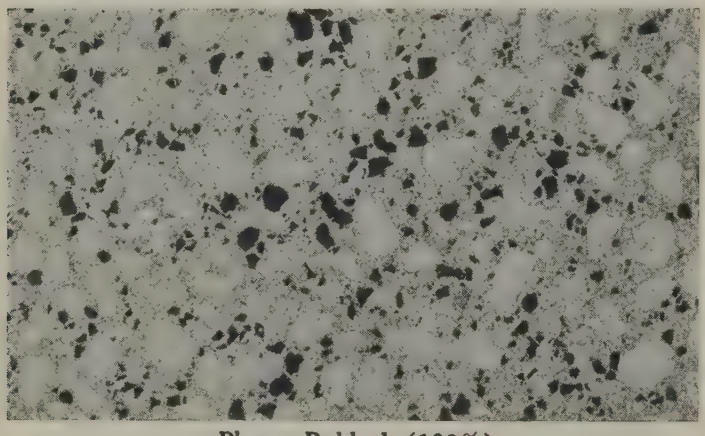
A subsequent operation to honing; the term is self-explanatory.

Machine Groove Tooled (105%)

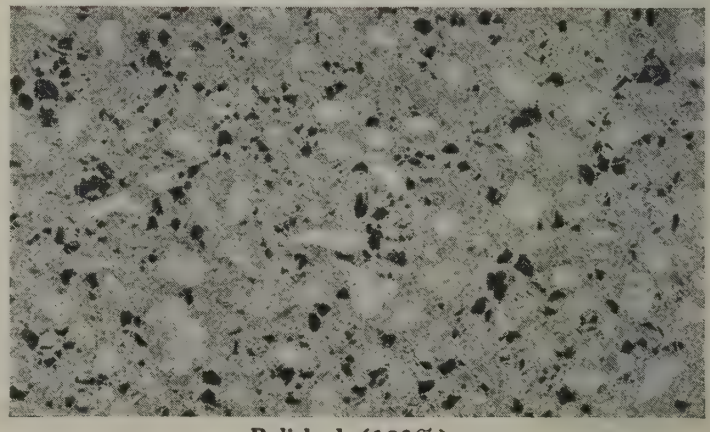
An operation similar to Planer Rubbed, except that on all vertical surfaces a series of regular evenly-spaced half-round grooves are cut. It is supplied in various widths of cutting.

Sawn (105%)

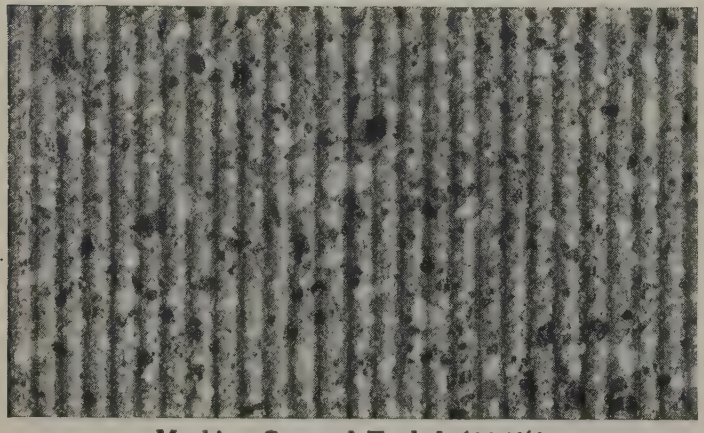
A surface texture produced during the operation of machine cutting whereby irregular random, saw-cut effects are produced, a desirable finish for ashlar field with textured surface.



Planer Rubbed (100%)



Polished (180%)



Machine Grooved Tooled (105%)

Sawn (105%)

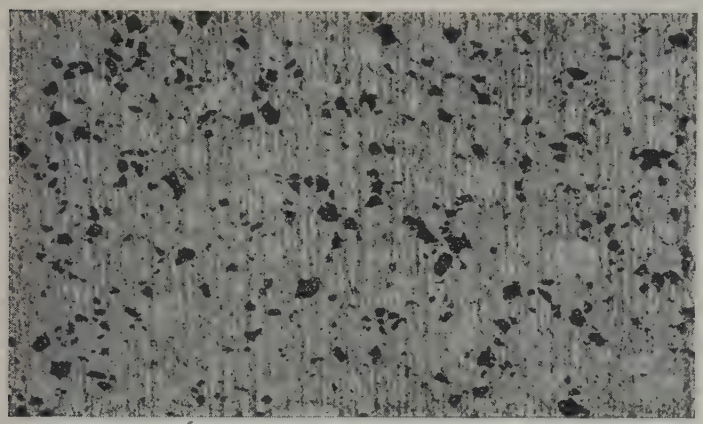
Continued on next page

CUT CAST STONE—HAND TOOLED FINISHES

All stones which are to receive hand-tooled texture are first prepared in the same manner as under Planer Rubbing.

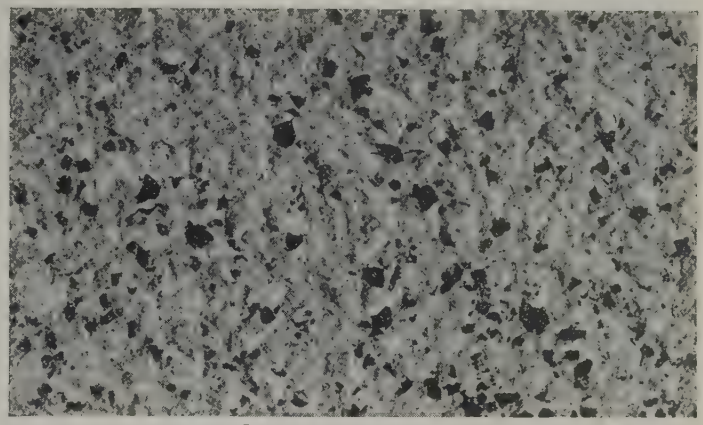
The tooling operations are merely for appearance and do not obviate the necessity of the preliminary cutting from oversized casts.

Bush-hammered, Crandalled, and other hand-cut finishes are frequently sold under those designations on which the preliminary operation of machine cutting has not been done. Finishes so produced are, of course, cheaper and do not possess the same qualities as Cut Cast Stone.



Bush Hammered (6 cut, 8 cut, etc.) (130%)

Done with a pneumatic hammer and showing a series of parallel vertical fractures. It is one of the finest finishes to be had in Cut Cast Stone

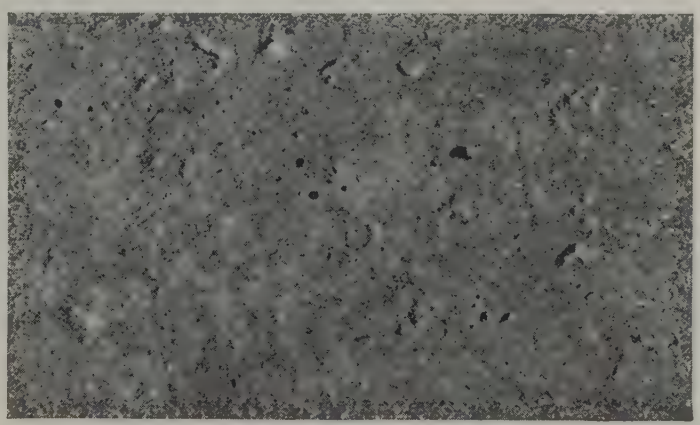


Crandalled (135%)

A coarse cutting showing no direction of tooled marks and more suitable for heavy members. This texture should not be used where fine detail is desired

Random Tooled (140%)

This finish and its application is illustrated on the second page following. It consists of intermingling various tooled textures, particularly suitable for English and Gothic style buildings where it is desired to emphasize the character of handwork.



"Old English" (120%)

"Old English" (120%)

This texture relates to none of the standard and accepted finishes. It is the most recent development of Dextone and is now being used to best advantage in conjunction with the modernistic style of architecture. It has new and unexpected advantages of color and a wide range of surface effects.

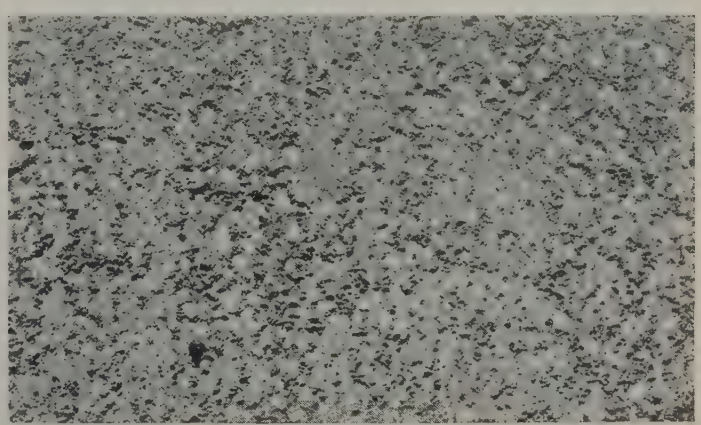
UNCUT CAST STONE

The finishes under this heading include Sand Finish, Gothic Finish, Sand Rubbed, etc. All are inferior to Cut Cast Stone finishes. Gothic and Sand Rub only are illustrated. We do not recommend these finishes and only furnish them if required.

Sand Finish (70%) is not illustrated as we do not recommend its use. It is listed here for reference only. It is cast in sand moulds and without surface finishing of any kind. Suitable only where appearance is of small importance and where greatest economy must be exercised. No demands of quality should be made of this finish.

Gothic Finish (75%)

To produce this, the surface of the "green stone" is brushed or roughened by other means thereby removing approximately $\frac{1}{16}$ in. of the rough cast surface. A comparatively small amount of aggregate is exposed. No machinery or equipment is required and it is, therefore, a cheaper finish suitable for work where fine sharp arrises and other qualities of cut stone work are not essential



Sand Rub (80%)

Produced in a similar manner to Gothic Finish except that the finished stone is somewhat smoother. It is an economical substitute for Planer cut stone. It has many varieties and is given various names by different manufacturers. It is the finish commonly supplied when the specification calls for Rubbed stone. It is, therefore, essential to specify Cut Cast Stone if the superior grade of the material is to be required

Continued on next page

SOME OF THE OPERATIONS IN PRODUCING CUT CAST STONE

Left

Moulding and Casting

Showing the conveying bucket in which mixed materials are constantly agitated while in transit, and the precautions taken to secure proper placing and uniform spread of mixture in the mould

Right

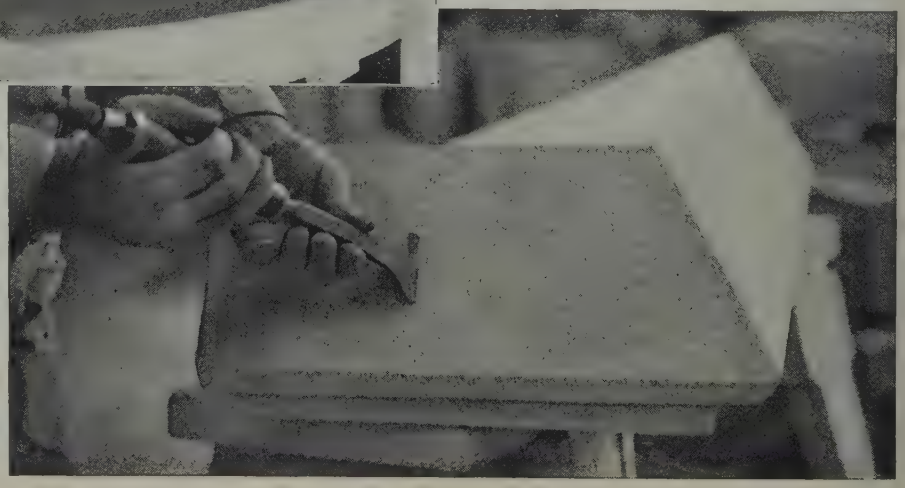
Carborundum Planer

The illustration shows a moulded member being ground to exact profile. The carborundum grinding wheel will cut to a depth of ½ in. if required. This wheel is precisely shaped in reverse and on continuous courses perfect fit is guaranteed without cutting at the job

Left

Rubbing Bed

This machine is used only for cutting and finishing ashlar and other flat work. The coarseness or fineness of the finished texture is controlled by the abrasive used. Stones finished on this machine are automatically made true and plain



Right

Hand Cutting

After stones are cut by machine to finish sizes the required texture is applied by pneumatic chisels. By changing tools the various cut textures are produced

Continued on next page

POINTS TO INVESTIGATE IN APPROVING CUT CAST STONE

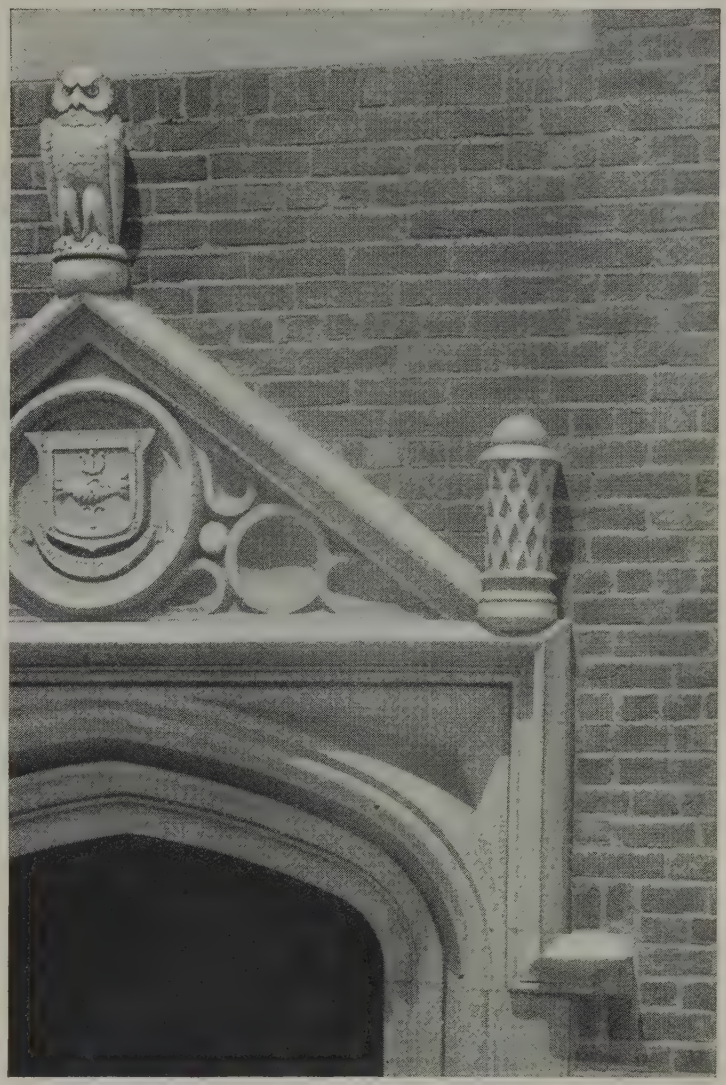
How to Buy Cut Cast stone

Architects are aware of the difficulties of enforcing the requirements of their specifications. This is frequently due to the use, in the specifications, of ambiguous terms.

(1) Make sure that all bids are based on the requirements of a specification which includes the recommended essential points. Do not permit alternates on cheaper finishes unless the specification specifically calls for them.

(2) Require that the concern from whom you are buying show evidence of plant equipped with screens, finishing machinery and all incidental equipment necessary in the production of Cut Cast Stone and can show representative work at least 10 years old.

(3) Many architects are now finding it to their advantage to take separate bids outside of the general contract for cast stone; thereby eliminating many of the commonly known trade practices, under which the true intent of their specification is evaded.



A Photograph Showing Hand Carving and Random Cut Finishes of Cut Cast Stone Over Doorway

This shows the interesting texture combination of a random tooled surface. The tooling on the flat surfaces as well as on the mouldings varies on each surface. This gives a texture with the appearance of age and takes away the hard effect of straight tooling. The tooling generally has no definite direction but carries out a number of cuttings, each face of the stone being different

Architect Service

This company maintains a technical staff to assist architects and builders in all matters pertaining in the use of Dextone.

The service is without charge. It is maintained for the purpose of assisting those contemplating the use of cast stone in selecting the material best fitted to their needs, in making preliminary estimates and in drawing up specifications.

Where this service is utilized, it is frequently possible for our representatives to show the architect means whereby he can allow for the additional cost incidental to securing cut cast stone by the elimination of certain features of relatively less importance.

Representative Work, Location and Architect

Hartford Seminary Foundation, 6 buildings, Hartford, Conn.
Allen & Collens, Architects
Isolation Building, Municipal Hospital, Waterbury, Conn.
Cross & Cross, Architects
Roosevelt High School, Yonkers, N. Y.
G. Howard Chamberlin, Architect
Seaside Bank, Seaside, L. I., N. Y.
Holmes & Winslow, Architects
St. Bartholomew's Church, White Plains, N. Y.
Cherry & Matz, Architects
Masonic Temple, Plainfield, N. J.
F. B. & A. Ware, Architects
Two buildings, Yale University, New Haven, Conn.
James Gamble Rogers, Architect
New York Telephone Company Building, Glen Cove, L. I., N. Y.
Vorhees, Gmelin & Walker, Architects
First National Bank, Palmerton, Pa.
Ernest Strassle, Architect
West Haven High School, West Haven, Conn.
R. W. Foote, Architect
Masonic Temple, Ansonia, Conn.
Orr & delGrella, Architects
Elks Clubhouse, New Haven, Conn.
Alfred W. Boylen, Architect
Church of the Epiphany, Brooklyn, N. Y.
Bastow & Way, Architects
Masonic Temple, Westfield, N. J.
John F. Jackson, Architect
Masonic Temple, Westville, Conn.
R. W. Foote, Architect
First M. E. Church, Bridgeport, Conn.
Allen & Collens, Architects
St. Paul's Church, Yonkers, N. Y.
Cram & Ferguson, Architects
New Roselle High School, New Roselle, N. J.
Frederick Elsasser, Architect
Masonic Temple and Scottish Rite Cathedral (interior work), Scranton, Pa.
Raymond Hood, Godley & Fouilhoux, Architects
Holy Name of Mary Church, Croton on Hudson, N. Y.
Knappe & Morris, Architects
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A. F. Gilbert, Architect
Ross Stores, Yonkers, N. Y.
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Junior High School, New Rochelle, N. Y.
Starrett & Van Vleck, Architects
School No. 8, Paterson, N. J.
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TRADE-MARK

The Company and Its Facilities

This firm originated Artstone nearly sixty years ago, and by reason of long experience and a superior product the confidence of architects and builders throughout the country has been gained. Ornamental work is a specialty, it being in this line that some of the greatest economies are effected.

Advantages of Artstone

A building material which is attractive, everlasting, and not high in cost is the claim for Rackle Artstone. To these qualities there may be added strength, which not only is inherent in the material itself, but is augmented by the addition of steel reinforcing. Such reinforcing is of especial value in Gothic window tracery and in all work of delicate detail.

Artstone Colors and Finishes

An almost endless variety of colors is available. White, buff, gray, red and brown in various shades and combinations are used the most. As to finishes, while smooth and tooled surfaces are still supplied, a distinct improvement has been brought about recently by the introduction of Artstone that is hand-finished while in a plastic condition. This results in a more artistic material, varying in appearance according to the method of finishing, and is far denser and more durable than was possible by the older processes.

Samples of colors and finishes may be had for the asking.

Co-operation with the Architect

The manufacturers of Rackle Artstone have always been careful to carry out with exactness the architect's ideas, and so it is always preferable to have complete information on all points from the designer of the building. But it is not always that the architect is in a position to furnish every detail required by the contractor, and in such cases the Rackle organization will often be found of service.

There are occasions, too, when the architect feels the necessity for consultation with the manufacturers of a special product such as Rackle Artstone, perhaps regarding an estimate, or the quality and tests of the material, or its adaptation to certain designs. In all matters of this nature the co-operation of the GEO. RACKLE & SONS CO. may be depended upon.

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Cavalier Hotel, Virginia Beach, Va.
NEFF & THOMPSON, Architects

Continued on next page

First M. E. Church, Warren, Pa.
CHAS. W. BOLTON & SON, Architects

Note the Countrywide Use of Rackle Artstone

Epworth-Euclid M. E. Church, Cleveland, Ohio
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Baltimorian Apartments, Baltimore, Md.
Van Cleve Hotel, Dayton, Ohio
Hoosier Mercantile Co., Richmond, Ind.
S. S. Kresge Co., Cleveland, Ohio
McCrory Stores, Washington, D. C.
Science Hall, Hiram College, Hiram, Ohio
Wellsburg School, Wellsburg, V. Wa.
Fire and Police Station, Gary, Duluth, Minn.
Towson Presbyterian Church, Towson, Md.
Torrance State Hospital, Torrance, Pa.
Grant Building, Pittsburgh, Pa.
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Rackle reinforced concrete roof tile form a light, strong and economical roof which is fireproof, and meets every requirement of first class building construction. These tile are made in both flat and channel sections, the standard size of the former being 2x5 ft. x 1½ or 1¾ in., and of the latter being 1 ft. 6 in. x 8 ft. x 3½ in.

For foundries, shops, warehouses, garages, schools and theaters Rackle tile are especially valuable. They are laid rapidly in place on steel purlins, no forms or centering being required, and are suitable for either flat or pitched roofs.

Full information regarding Rackle tile, with sizes of purlins for different spans, etc., will be forwarded on application.

Rackle Roof Tile Are Shipped Over a Wide Area

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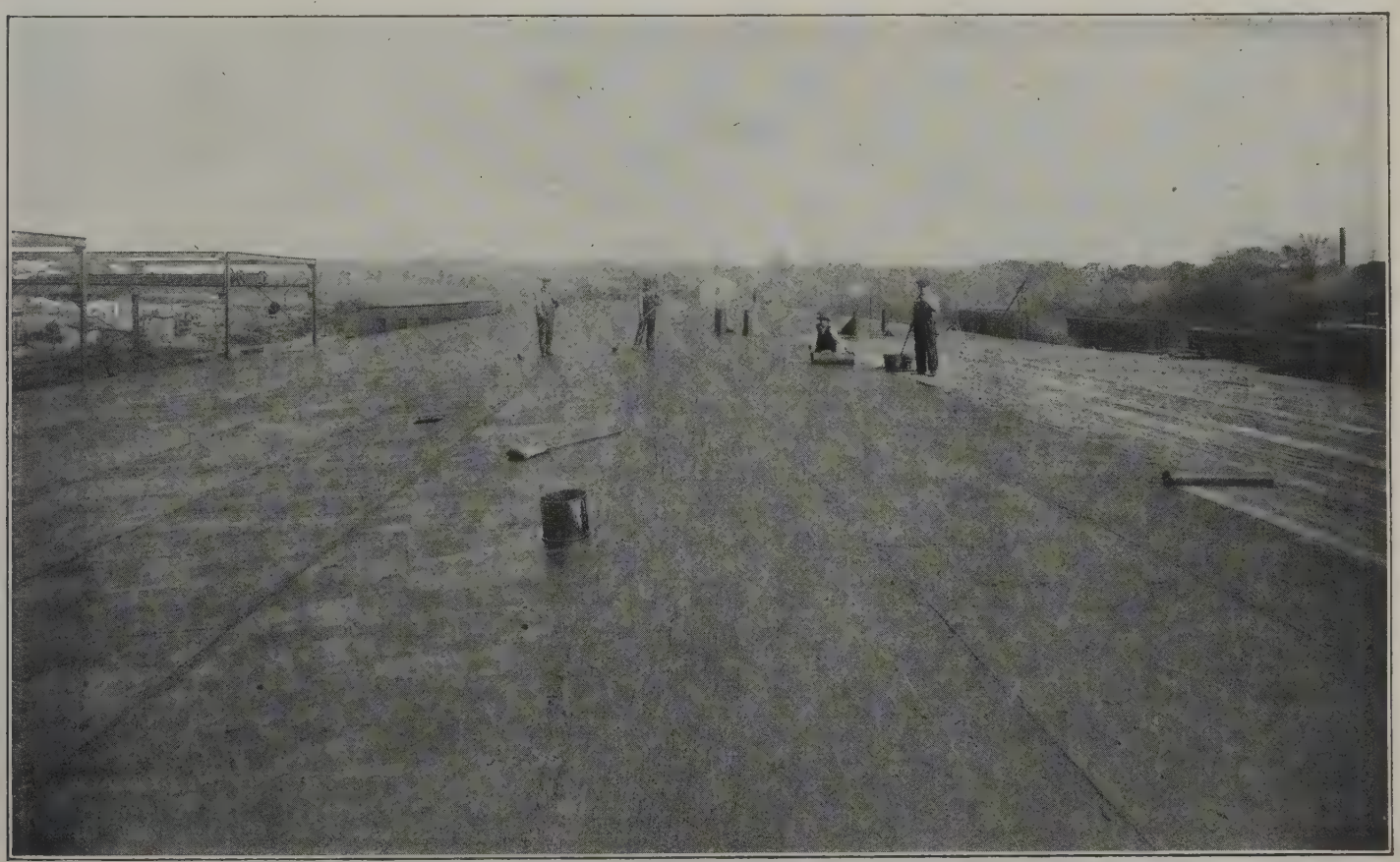
Fostoria Glass Co., Moundsville, W. Va
Pennsylvania Power & Light Co., Williamsport, Pa.
Meadville School, Meadville, Pa.
St. Marys Sewer Pipe Co., St. Marys, Pa.
Ohio Bell Telephone Co., Cleveland, Ohio
Ford Junior High School, Youngstown, Ohio
Midwest Rubber Reclaiming Co., East St. Louis, Ill.
Pennsylvania Power & Light Co., Wilkesbarre, Pa.
Gibson Junior High School, Youngstown, Ohio
Canfield Oil Co., Coraopolis, Pa.
Linden Avenue School, Pittsburgh, Pa.



Rackle Tile Roof Under Construction, The Eclipse Stove Company, Mansfield, Ohio

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ATLANTIC TERRA COTTA is made in accordance with the architect's drawings and specifications, by methods that are the development of fifty years' experience. It is fundamentally dependable and durable. In design it is most adaptable in decorative modeled detail, any one color or colors in combination, and in a variety of textures. Atlantic Modeling follows the architect's sketches or instructions with spirit, character and expression. Our laboratories have developed hundreds of colors for the architect's selection. Atlantic Drafting Departments prepare clear and legible construction drawings that insure rapid and economical construction, safety and durability on every operation.

Exhibit

A large exhibit with daylight illumination of Atlantic Terra Cotta at the New York Office, shows the varied range of Atlantic colors and textures. Inspection is invited. Visits to one of our factories gladly arranged.

Uses of Terra Cotta

Atlantic Terra Cotta for entire facades or defined features thereof.

For interior sidewalls and ceilings.

For important rooms in hotels and banks, and for rotundas of public buildings.

For exterior and interior construction and decoration with masonry, steel or reinforced concrete frame.

Printed Information (Catalogues on Request)

A monthly magazine "Atlantic Terra Cotta" containing many full page plates illustrating current buildings of importance is sent to architects and designers without charge. (A.I.A. Standard Classification, File No. 9.)

Atlantic Terra Cotta Stock Design Catalogue—The catalogue illustrates Terra Cotta in a variety of complete designs and separate pieces for commercial buildings of small and moderate size. Particularly suitable for small stores and banks. Designed to aid the architect to save time and money on small buildings.

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General Information

The ATLANTIC TERRA COTTA CO. is so organized as to give the architect and contractor service broader in scope than is usual with manufacturers of building materials. Co-operation is offered in the details of design, construction, color, surface, polychrome. Conference on definite projects is strongly recommended and will be arranged at the architect's convenience.

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Four factories permit us to execute orders for Terra Cotta with promptness for buildings of any size. A Southern factory gives every facility to architects and builders in the South.

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Graham, Anderson, Probst & White, Architects
52-Story Office Building, Lexington Avenue at 42nd Street, New York, N. Y.
Sloan & Robertson, Architects
Dade County Courthouse and Miami City Hall, Miami, Fla.
A. Ten Eyck Brown, Architect
August Geiger, Associate
Euclid Avenue Baptist Church, Cleveland, Ohio
Walker & Weeks, Architects
Tudor City, New York, N. Y.
Fred F. French Co., Architects
National Press Club, Washington, D. C.
C. W. & Geo. L. Rapp, Architects
City Hall, Asheville, N. C.
Douglas D. Ellington, Architect
Union Trust Building, Detroit, Mich.
Smith, Hinchman & Grylls, Architects
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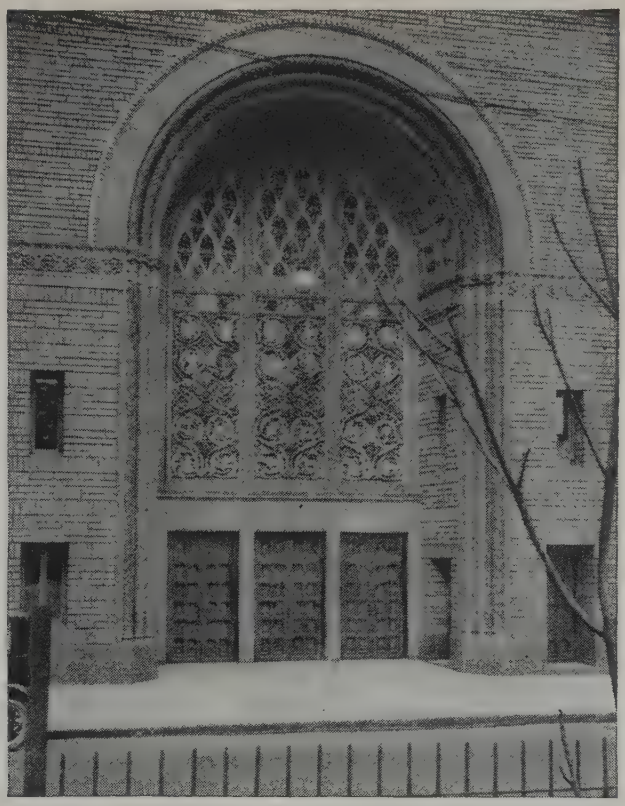
Interiors

Church of St. Catherine of Alexandria, Brooklyn, N. Y.
Emile G. Perrot, Architect
Pan-American Union Annex, Washington, D. C.
Albert Kelsey and Paul P. Cret, Architects
St. Mark's Church, Brooklyn, N. Y.
W. Philip McGovern, Architect

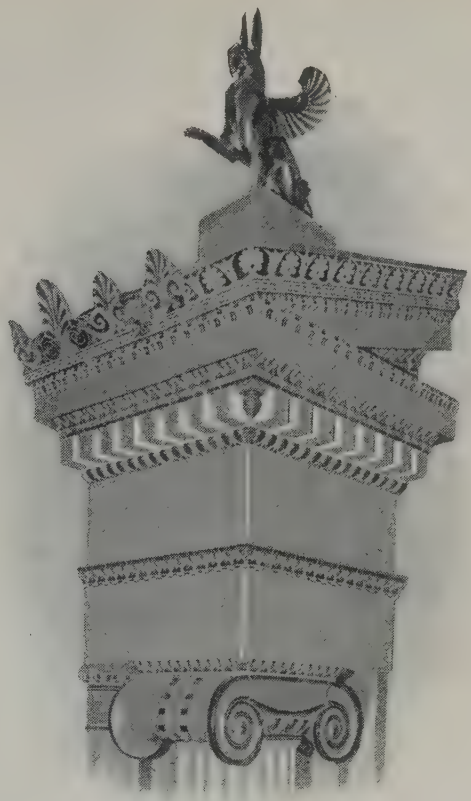
Continued on next page



Euclid Avenue Baptist Church, Cleveland, Ohio

Walker & Weeks, Architects

A beautiful example of Lombard Romanesque entirely of Atlantic Terra Cotta. The arrangement of ashlar in varying buff and the beautifully modeled brilliant polychrome screen over the main entrance are particularly interesting



Philadelphia Museum of Art, Philadelphia, Pa.

Horace Trumbauer, C. C. Zantzinger and C. L. Borie, Jr., Associated Architects

C. Paul Jennewein, Sculptor Leon V. Solon, Polychromist

Early Grecian architecture reproduced in the original colors, including special fire scarlet vermilion and burnished gold.

Illustration shows actual Terra Cotta as erected

Dade County Courthouse and Miami City Hall, Miami, Fla.

A. Ten Eyck Brown, Architect

August Geiger, Associate Architect

Entirely of Atlantic Terra Cotta from sidewalk to roof on all elevations

Cleveland Terminals Building, Cleveland, Ohio

Graham, Anderson, Probst & White, Architects

Atlantic Terra Cotta trim throughout and for tower facing for 23 stories

Atlantic Terra Cotta Chimney Pots in Slate Blue and Buff, Residence of Charles W. King, Architect

Catalogue and price list sent on request

CONKLING-ARMSTRONG TERRA COTTA CO.

"Build with Architectural Terra Cotta"

SALES OFFICE

705 Insurance Co. of North America Building, 16th Street and Parkway

PHILADELPHIA, PA.

(Works, Wissahickon Avenue and Juniata Street)

AGENCIES

BOSTON, MASS., E. Stanley Wires Co., Inc., 120 Boylston Street
PITTSBURGH, PA., James R. Pitcairn, 507 Century Building
BALTIMORE, MD., Wm. T. Carson, 17 W. Saratoga Street
WASHINGTON, D. C., Wm. T. Carson, 17 W. Saratoga Street, Baltimore, Md.
RICHMOND, VA., Earnest Bros., 805 E. Franklin Street
YOUNGSTOWN, OHIO, R. D. Faris Co., 211 N. Champion Street
CHARLOTTE, N. C., Ross Sales Service
WILMINGTON, N. C., C. F. Howell
TAMPA, FLA., Stovall & Archer, Peninsular Telephone Building
COLUMBIA, S. C., C. W. Turner, 58 Arcade Building
NEW CASTLE, PA., Pearson Brick Co.
DETROIT, MICH., Dresden Brick Co., Hammond Building
SUFFOLK, VA., E. L. Folk, Jr., 702 National Bank Building
CLARKSBURG, W. VA., Thornton Fire Brick Co.

Product

Architectural Terra Cotta of highest quality.

Services

As one of the largest terra cotta concerns in the country, the Conkling-Armstrong organization is in an exceptional position to execute, from sketch drawings if necessary, work of any description, however artistic, complex or technically difficult, and of any magnitude whatever. Information, specific or general, covering any matter relative to terra cotta and its use gladly supplied on request and without obligation.

Our Record

Forty years' experience, more than 12,000 contracts, a maintained standard of excellence during this period, are our credentials for soliciting your business.

Delivery

Large centrally located plant assures convenient delivery to any part of the United States.

Quality

Conkling-Armstrong material has long represented the best in terra cotta both as to satisfactory appearance and permanence. This has been the result of studied investigation, not only of the material, but allied facts such as support, mortar, setting, pointing, etc.

Illustrating a Fragment of the Architectural Terra Cotta Ornamentation on the Anthony Wayne Theater, Wayne, Pa.

W. H. Lee, Architect

The Architectural Terra Cotta in this building was done in a matt glaze and polychrome finish.
These perforated panels are 4 ft. 2 in. x 2 ft. 7 in. in size

Use of This Material

Schools, colleges, churches, theaters, office buildings, banks, store buildings, garages and factory buildings, trimmed with Architectural Terra Cotta, become neighborhood beautifiers.

This material, which has stood the test of time and the elements, with all its color and surface treatment possibilities is the logical building material where durability, decorative qualities and color are required to make a complete and permanent design.

Representative Work

Philadelphia, Pa.

Benjamin Franklin Hotel, Horace Trumbauer, Architect
Wesley Building and Robert Morris Hotel, Ballinger Co., Architects
Scottish Rite Temple, Horace W. Castor, Architect
Atlas Storage Warehouse, George S. Kinsley, New York, Architect
Atlantic Refining Company's Filling Station, Broad Street and Roosevelt Boulevard, Joseph F. Kuntz, Pittsburgh, Architect
Home Office Building, Fidelity Mutual Life Insurance Co., Zantzinger, Borie & Medary, Architects

Boston, Mass.

Filene Building, D. H. Burnham & Co., Architects

Richmond, Va.

Colonial Theater, Carneal & Johnston, Architects

Wilmington, N. C.

Cape Fear Hotel, G. Lloyd Preacher, Inc., Architects

Atlantic City, N. J.

Hotel Blenheim and Central Pier, Price and McLanahan, now McLanahan & Bencker, Architects
New Stanley Theater, Hoffman-Henon Co., Architects

Tampa, Fla.

First Baptist Church, Chas. M. Hart, New York, Architect

Jacksonville, Fla.

St. James Building, H. J. Klutho, Architect

New York, N. Y.

Broadway Tabernacle, Barney & Chapman, Architects
Wanamaker's Store, D. H. Burnham & Co., Architects
Bowling Green Building, Audsley Bros., Architects

Harrisburg, Pa.

Doutrich's Store Building, Clayton J. Lappley, Architect
Office Building, Charles H. Lloyd, Architect

Trenton, N. J.

Stacy-Trent Hotel, Esenwein & Johnson, Buffalo, N. Y., Architects

Lancaster, Pa.

Brunswick Hotel, C. Emlen Urban, Architect

Miami, Fla.

Security Building, Robert Greenfield, Architect

Pittsburgh, Pa.

Clark Building and Stanley Theater, Hoffman-Henon Co., Architects

CORNING TERRA COTTA CO., INC.

Architectural Terra Cotta

MAIN OFFICE AND FACTORY

CORNING, N. Y.

AGENCIES IN ALL PRINCIPAL CITIES

Corning Architectural Terra Cotta

The Corning Terra Cotta Co., Inc., having been in business over forty years, has enjoyed a very consistent growth in its business, based on the following fundamentals of management:

Extreme Care in Execution—Through years of research and study on the part of Corning ceramic experts, colors and glazes of infinite variety are secured with extreme durability.

Modeling of the Bolder Character Used in Decorative Panel of Tennessee Theatre, Knoxville, Tenn.
Graven and Maygar, Architects, Chicago, Ill.

The modeling staff is composed of artists specializing in the different types of architecture. They are, therefore, prepared to execute exacting requirements in any required style.

With the experience and diversity of its organization the Company gives an architect and owner assurance that the Architectural Terra Cotta used in their buildings will be an exceptional investment in appearance, durability and financial return.

Service—The organization is very desirious of cooperating with architects and builders on any problems concerning the use of Architectural Terra Cotta.

The Company gives the most careful attention to the handling of prompt deliveries.

Specifications

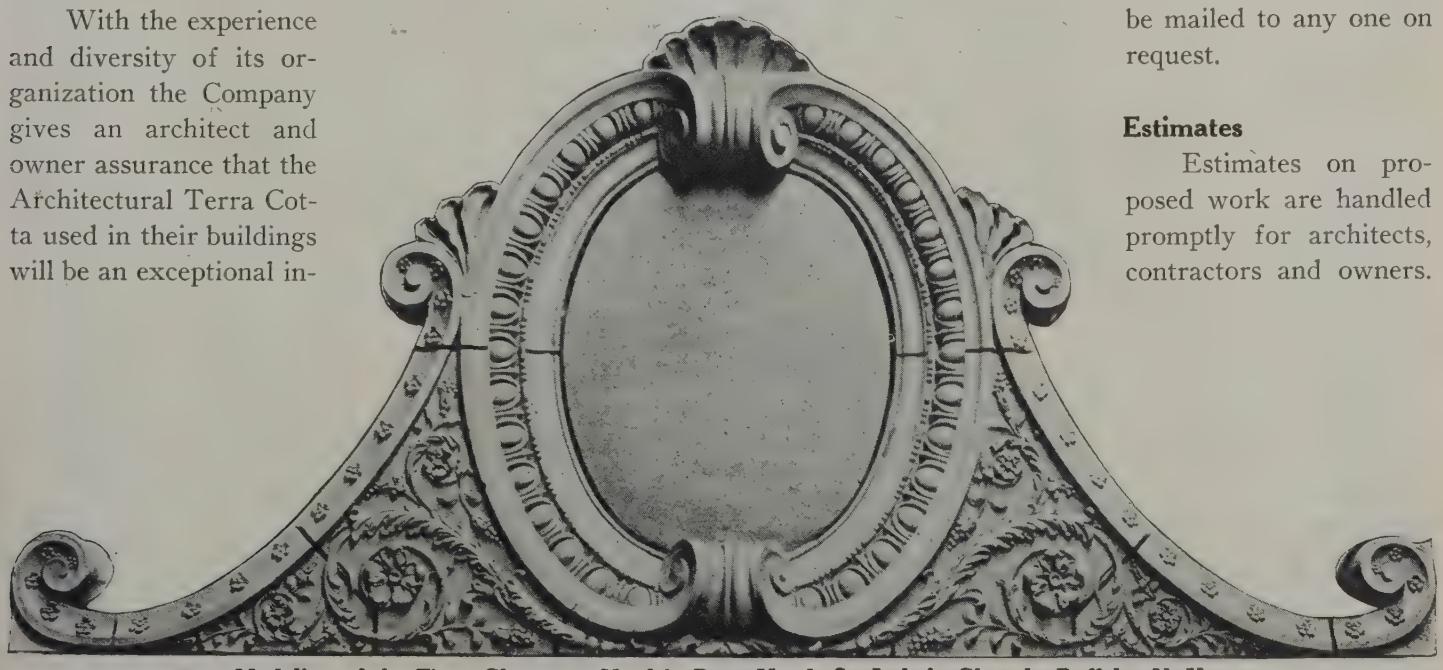
The use of the National Terra Cotta Society's specifications shown on pages A364-367 of this volume is recommended.

Samples

Samples of representative colors and finishes will be mailed to any one on request.

Estimates

Estimates on proposed work are handled promptly for architects, contractors and owners.



Modeling of the Finer Character Used in Door Head, St. Luke's Church, Buffalo, N. Y.
Chester Oakley, Architect, Buffalo, N. Y.

FEDERAL TERRA COTTA CO.

Manufacturers of a Superior Grade of Architectural Terra Cotta

FACTORY
WOODBRIDGE, N. J.

MAIN OFFICE
101 Park Avenue
NEW YORK, N. Y.

SALES OFFICES
IN PRINCIPAL CITIES

Product

ARCHITECTURAL TERRA COTTA for exterior and interior use.

Service

Development of preliminary drawings to show adaptability and construction of terra cotta.

Colors and Finishes

Complete lines of unglazed standard colors, such as gray, buff, red, etc., with hard burned vitreous surface; matt and full glazed white, cream, and polychrome finish.

All surface finishes are hard burned, impervious to weather conditions, and permanently durable.

Terra Cotta Granite and Terra Cotta Marble

Reproducing exactly the color, texture and general appearance of the natural material. Samples furnished on request.

Specialties

Gold glaze and a wide variety of Terra Cotta textures.

Detail of Terra Cotta Work, Savoy-Plaza Hotel, New York, N. Y.
Terra Cotta caps, balustrade and urns in marble texture

Unusually Large Pieces

With careful study of jointing to conform to architect's scale and design.

Guarantee

Federal Terra Cotta is *guaranteed* and a periodic inspection is made regularly of all buildings in which it is used.

Specifications

Standard Terra Cotta specifications are obtainable from this Company or from the National Terra Cotta Society.

Representative Work

BUILDING	LOCATION	ARCHITECT	BUILDER
Savoy-Plaza Hotel	New York, N. Y.	McKim, Mead & White	Geo. A. Fuller Co.
Roxy Theater	New York, N. Y.	W. W. Ahlschlager	Chanin Construction Co.
Stanley Theater	Baltimore, Md.	Hoffman-Henon Co.	Hoffman-Henon Co.
Barlum Tower	Detroit, Mich.	Bonnah & Chaffee	Otto Misch Co.
Pittsburgher Hotel	Pittsburgh, Pa.	H. L. Stevens & Co.	Pittsburgher Hotel Corp.
Grand Rapids Trust Co	Grand Rapids, Mich.	Smith, Hinchman & Grylls	Owen, Ames-Kimball Co.
Esperson Building	Houston, Tex.	Eberson & Eberson	American Construction Co.
Mastbaum Theater	Philadelphia, Pa.	Hoffman-Henon Co.	Hoffman-Henon Co.
Chase National Bank	New York, N. Y.	Graham, Anderson, Probst & White	C. T. Wills, Inc.
Museum of Art	Baltimore, Md.	John Russell Pope	P. C. Streett Engineering Co.
Municipal Building	Greensboro, N. C.	Harry Barton	Angle & Moesser
Biltmore Hotel	Atlanta, Ga.	Schultze & Weaver	Starrett Brothers
Two Park Avenue	New York, N. Y.	Buchman & Kahn	Shroder & Koppel

ESTABLISHED 1810

GALLOWAY TERRA COTTA COMPANY

Manufacturers of Galloway Pottery

3200 Walnut Street
PHILADELPHIA, PA.

Products

GALLOWAY GARDEN and DECORATIVE POTTERY and TERRA COTTA, including: Flower Pots, Boxes, Vases, Bird Baths, Sun Dials, Tables, Benches, Hermes and Statuary.

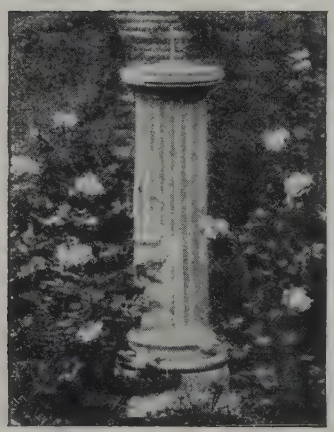
GALLOWAY HAND MADE CHIMNEY POTS.

Also Architectural Terra Cotta.

GALLOWAY POTTERY

Galloway Pottery Finishes

We find that the most popular finish is the light stony gray. Red, buff and other colors can be made to order as well as a variety of glazes, which finish is especially well suited to jars.



Sun Dial with Roses

Galloway Pottery for Garden and Interior Use

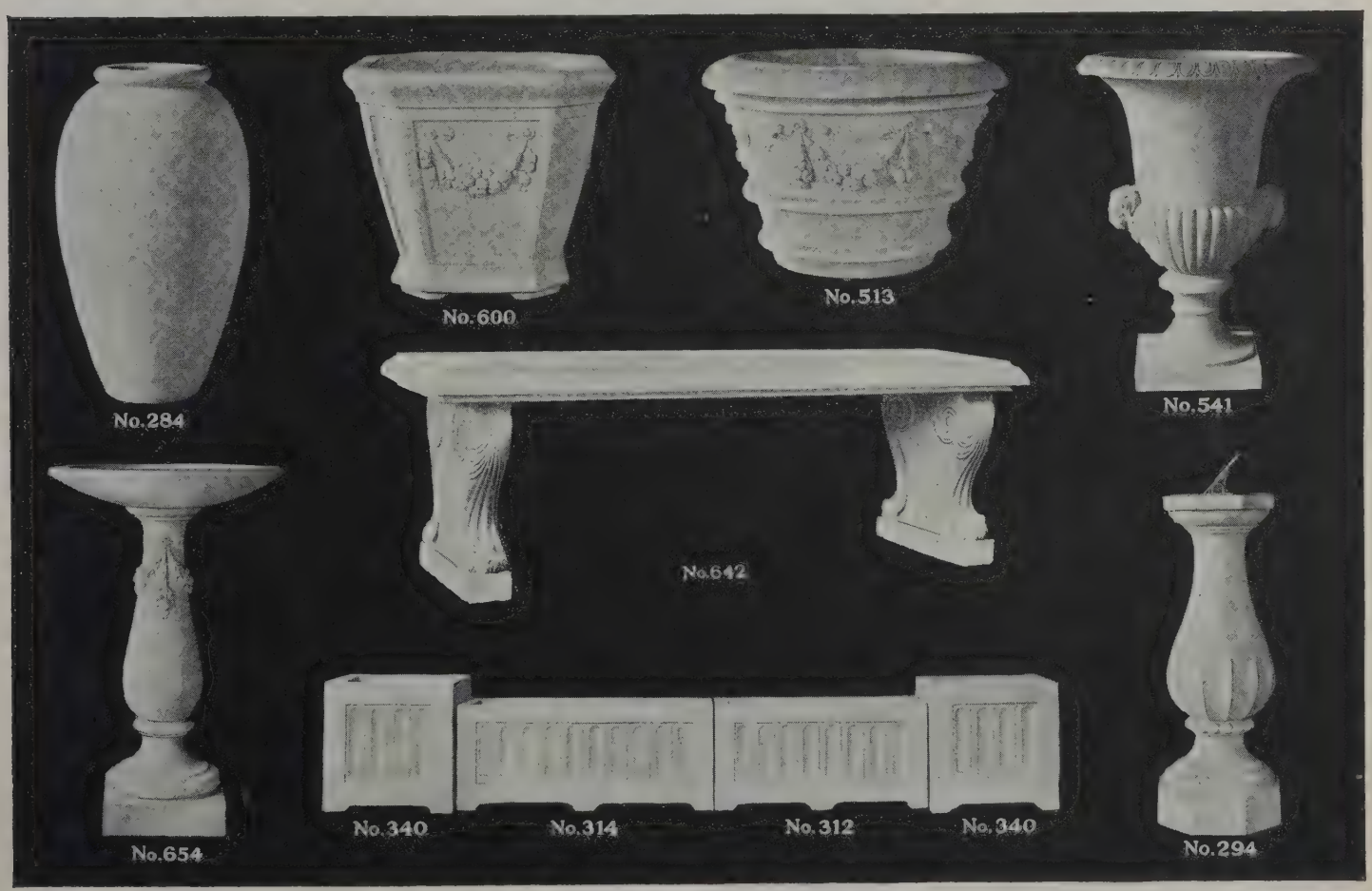
The Galloway organization has been making pottery for over a hundred years. The artistic worth, fine workmanship and durable quality of materials embodied in Galloway Pottery are all endorsed by our hundreds of pleased customer-friends.

The Galloway Pottery shown herewith represents only a few of the many original designs and replicas from antique art which we carry in stock or make to order. Careful workmanship makes Galloway Pottery a welcome addition to the finest interiors; its durability is an essential feature for out-of-doors decoration.

Catalogue

Our latest catalogue of Galloway Pottery and schedule of Chimney Pots will be sent on request.

Flowers Vase on Terrace



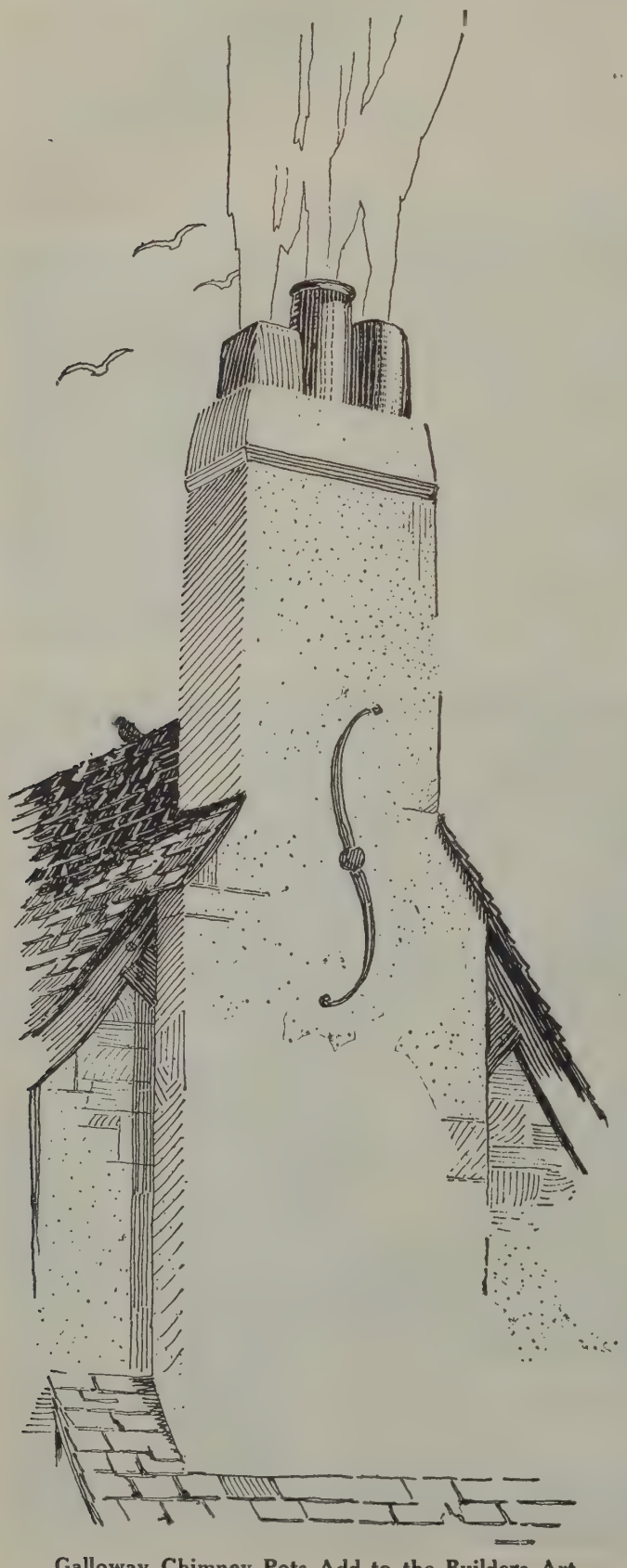
A Few Examples of Galloway Pottery

Continued on next page

GALLOWAY *Hand Made* CHIMNEY POTS

Galloway Chimney Pots Complete the Picture

By the use of one or more types of Galloway Hand Made Chimney Pots, very pleasing effects are secured. The illustration below indicates how an element of Old World appeal can be cleverly utilized in modern residential architecture.



Galloway Chimney Pots Add to the Builders Art

Artistic and Practical Value of Chimney Pots

The graceful lines of the roof achieve an added interest when the chimney-top shows that final touch of charming color so easily attained with Galloway Hand Made Chimney Pots. Their natural shade of terra cotta medium red harmonizes with almost every color scheme—or grays, buffs and other colors can be furnished if desired.

The chimney—focal point of the roof lines—is well worthy of the artistic treatment afforded by the quaint charm of Galloway Hand Made Chimney Pots; for they add that last distinguishing touch which complements the beauties of the architectural effect.

Galloway Hand Made Chimney Pots

Galloway Hand Made Chimney Pots are made of high-fired, strong, durable terra cotta. They improve drafts, prevent rain water from washing down the flues and afford a simple method of increasing the chimney height without adding brick or stonework. Furnished in a wide range of types and sizes.

Color—The usual finish is a medium shade of red, but gray, buff and other colors will be made on order. Special designs, colors and sizes, other than those illustrated or described, can be furnished to order.

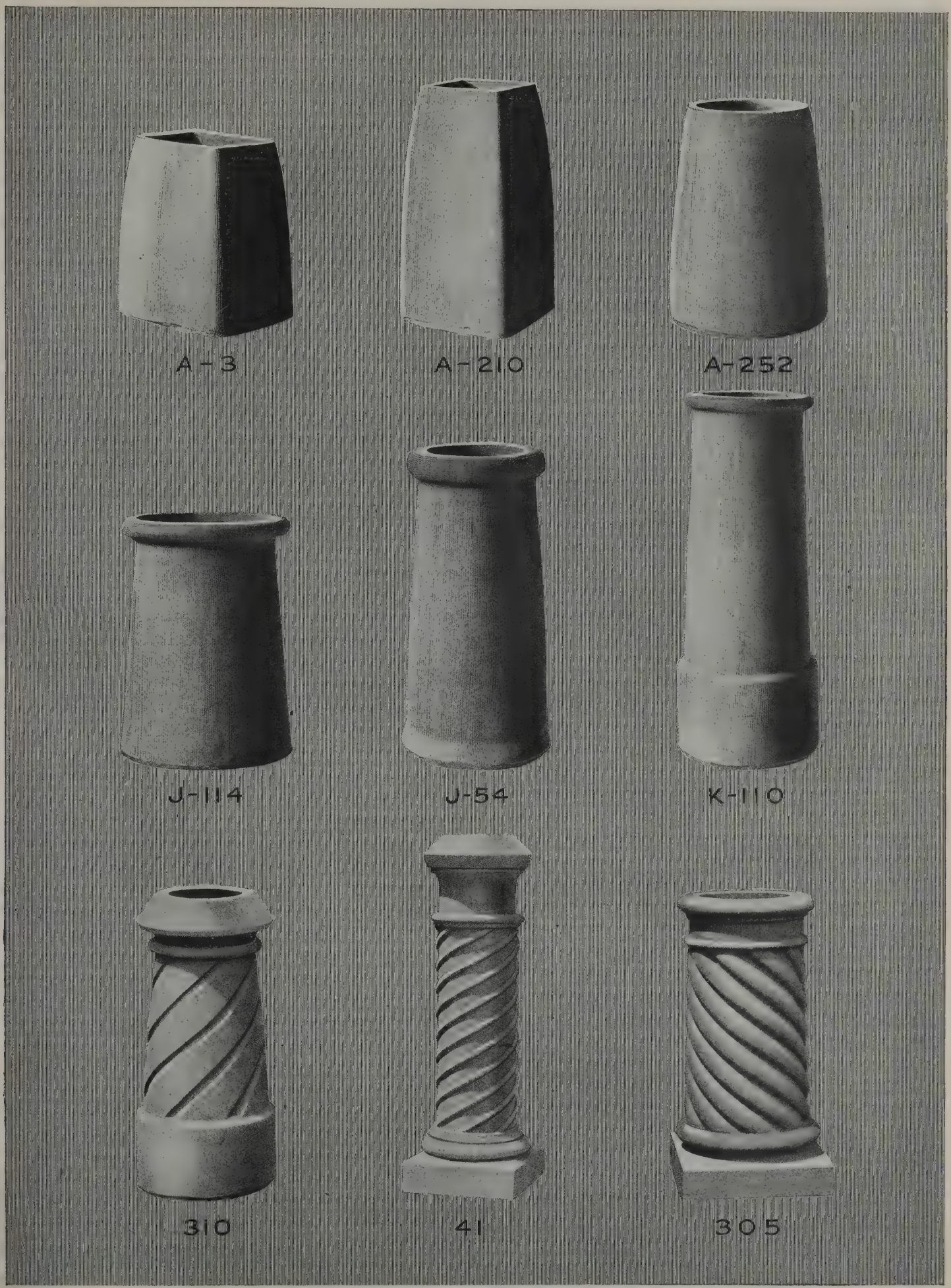
Estimates—In writing for quotations please give flue sizes, quantities and, if possible, a plan of the flues showing distances between them. If ordered a little in advance of the time when they will be needed, unnecessary delays will be avoided, particularly when special work must be executed.

GALLOWAY HAND MADE CHIMNEY POTS

No.	Outside base size, in.	Shape of base	Inside top size, in.	Height, in.
		Type A-3		
68	12 x12	Square	7 x 7	18
3	12 x16	Rectangular	7 x11	18
4	16 x16	Square	11 x11	18
		Type A-210		
210	13 x13	Square	7½x 7½	24
211	13 x16½	Rectangular	7½x11½	24
212	16½x16½	Square	11½x11½	24
213	16 x21	Rectangular	11 x16	24
214	21 x21	Square	16 x16	24
		Type A-252		
250	14	Round	8	22
251	16	Round	10	22
252	19	Round	13	22
253	21	Round	15	22
		Types J-114 and J-54		
54	15	Round	11	30
475	15	Round	11	24
542	20	Round	14	30
5421	20	Round	14	36
114	14x18	Oval	8x11½	25

Note: Type J—Pot in other sizes 22, 24 and 30 in.; diameter, 24 to 48 in. high.

		Type K-110		
26	12½	Round	6½	27
110	14	Round	9	36
		Miscellaneous		
41	12x12	Round with square base	6½	36
305	16½x16½		10	30
310	14	Round	8	30



Galloway Hand Made Chimney Pots

O. W. KETCHAM

Ornamental and Structural Burnt Clay Products

121-125 North 18th Street, South of Parkway
PHILADELPHIA, PA.

FACTORY: CRUM LYNNE, PA.

BRANCH OFFICES

NEW YORK, N. Y., Bush Terminal Building, 130 West 42nd Street

WASHINGTON, D. C., Metropolitan Bank Building

Products

Architectural Terra Cotta; Hand Made "Ageart" Terra Tile.
Face Brick; Enameled Brick; Salt Glazed "Athena" Brick; Floor Brick.
Hollow Tile Fireproofing.
Also Paving Brick.

Architectural Terra Cotta

We manufacture all kinds for exterior and interior work, decorative or plain of all colors and finishes, as well as polychrome.

Face Brick

Our line consists of all colors and finishes, together with moulded brick.
The most intricate shapes and design.

Salt Glazed "Athena Brick"

Made of three shades. Numbered 102, 103 and 104 with radius jamb and sill moulds. Also moulded base and cap, and special sanitary floor brick.

Floor Brick

In different sizes, glazed and unglazed, for use in packing houses, battery rooms, milk dairies, etc.

Enameled Brick

These can be had of the following colors: white, green, blue or brown.
Made of standard sizes and shapes.

"Ageart" Terra Tile

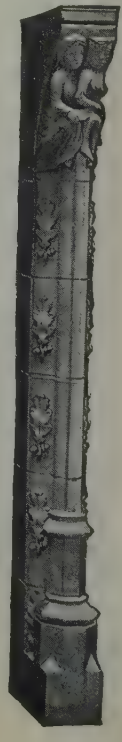
Special hand made roofing tile made of any form, finish or color or blended colors.

Hollow Tile

Made in standard sizes, shapes and different weights for exterior and interior construction.

Services

Architects desiring expert advice on architectural terra cotta construction, brick or fireproofing may feel free to call upon us for such service.
Extensive exhibits of our products may be seen in all our offices.
Descriptive booklets or samples may be had on request.



A Few Examples of Terra Cotta Work Executed by O. W. Ketcham

NEW YORK ARCHITECTURAL TERRA COTTA COMPANY

AND

TERRA COTTA PRODUCTS CORPORATION

TELEPHONE
STILLWELL 7400

401 Vernon Avenue
LONG ISLAND CITY, N. Y.

PLANTS: OLD BRIDGE, N. J. AND LONG ISLAND CITY, N. Y.

ARCHITECTURAL TERRA-COTTA, MACHINE-MADE TERRA-COTTA PRODUCTS, CLAY BUILDING BLOCKS, MACHINE-MADE ASHLAR

Quality

For over forty years the New York Company has manufactured terra-cotta of the highest quality only. Its product meets the most exacting requirements of architect and owner.

Service

The New York Company has at its command most complete facilities for the rendering of steady and dependable service to its customers.

United States Express Realty Company Building, New York, N. Y.

In 1905 the United States Express Realty Company erected its own office building on the block fronts Greenwich Street, Rector Street and Trinity Place, New York City. The building was erected by Thompson-Starrett Company from the plans of Clinton & Russell, Architects.

In 1926, the new owners of the office building decided to add an additional seven stories as a vertical addition. The same general contractors were chosen and again Clinton & Russell drew the plans.

The NEW YORK ARCHITECTURAL TERRA COTTA COMPANY furnished the original terra-cotta facing of this building in 1905 and were again chosen twenty-one years after to exactly match the old terra-cotta for the additional seven stories.

In the completed building, as it stands today, it would be difficult to tell where the old terra-cotta ends and the new terra-cotta begins

Terra-Cotta

Ceramic finishes of proved merit cover such a wide range that the variety of selection presented to architect and owner is almost limitless. The New York Company presents the results of forty years' constant research in this department. The New York Company applies these ceramic finishes to terra-cotta which has been fabricated to outlast the building of which it will form a part.

Only the highest grade of selected clays, scientifically mixed and thoroughly pugged, tempered and aged enter into the construction of the New York Company terra-cotta.

With solidly pressed faces, sides and ends, all of honest thickness, and with heavy struts adequately placed, each piece of New York Company terra-cotta carries with it the New York Company guarantee.

Tee Pee Cee Standard Profiles

To meet the demand for selection of wide range of ceramic colors in standardized profiles for sills, copings, band courses, ashlars, mouldings, etc., we offer die run products made from precisely the same materials as the hand-made architectural terra-cotta, but at economy of price made possible only through standardization and machine fabrication.

Because of the standardized method of packaging, this Tee Pee Cee machine-made product is available for the smallest jobs at the same price per unit charged for larger quantities. Small orders receive the same prompt and careful attention given to larger shipments.

For color plates, construction plates and specifications, see the three following pages.

Continued on next page

MACHINE-MADE TERRA-COTTA PRODUCTS, ASHLAR BLOCKS FOR WALL FACING OR FOR COMPLETE BONDED WALL; TEE PEE CEE CLAY BUILDING BLOCKS

The Need

During recent years, a widespread demand has become evident for a very economical terra-cotta in which the owner might get the benefit of standardized machine production, without sacrifice of the enduring quality and the wide color selection to be had in the hand-made architectural terra-cotta.

Development

To meet this demand our research and engineering departments began about five years ago the production of terra-cotta by machine through steam lubricated steel dies, with sections cut to standard lengths, then dried, sprayed and burned exactly the same as the hand-made product. This material combines all of the well-known advantages of architectural terra-cotta with all of the economies of mechanical quantity production.

These terra-cotta ashlar blocks may either be specified as a complete wall in and of themselves, or as facing, or to course and bond with brick backing. Used as facing, the ashlar usually courses 7¼ in. high by 1 ft. 4¼-in. lengths. Used to bond with brick backing the ashlar usually courses 8¼ in. high.

Diversified Uses

Since the impervious surface of terra-cotta requires no upkeep, but may be cleaned and re-cleaned with soap and water as long as the building stands, the material is ideal for public and semipublic buildings, hospitals and schools, also for laboratories, dairies, power plants, etc.

A few installations are cited here:

Chemical Laboratory, Princeton University, Princeton, N. J., Chas. Z. Klauder, successor to Day & Klauder, Architects

Grade School, University Place, Port Chester, N. Y., Tooker & Marsh, Architects

Auditorium, Gymnasium Building, Canandaigua, N. Y., Wilson Potter, Architect

Residence, Stanwich & Taconic Roads, Greenwich, Conn., Thompson & Churchill, Architects

School for Church of Resurrection, Boston Post Rd., Rye, N. Y., Murphy & Lehmann, Architects

Grade School, South River, N. J., Alexander Merchant, Architect

Laundry for Apartment House, 989-1003 First Avenue, New York, N. Y., George & Edward Blum, Architects

Cord Meyer Garage, N. S. Roosevelt Avenue bet. 88th and 89th Streets, Elmhurst, L. I., N. Y., Robert Tappan, Architect

Overbrook Hospital, Cedar Grove, N. J., Henry Berg, Plant Supt. of County Inst. of Essex Co., Overbrook County Hospital, Architect

School, Marion Street & Waverly Avenue, Lynbrook, L. I., Oscar Lowinson, Architect

Mattress Room for Mt. Sinai Hospital, 5th Avenue & 100th Street, New York City, A. W. Brunner Associates, Architects

Garage Building for St. Francis Hospital, S. W. Cor. 9th & Erie Streets, Jersey City, N. J., Christian H. Ziegler, Architect

Squash Court for Gymnasium, Princeton, N. J., Aymar Embury 2nd, Architect

Bakery, 99th Avenue and 222nd Street, Queens Village, New York, N. Y., Henry Holder, Architect

School, Beacon, N. Y., Tooker & Marsh, Architects

Ursuline School, New Rochelle, N. Y., McGill & Hamlin, Architects

Economy

An independent survey conducted by the Department of Education of the City of New York disclosed that at unit price customarily used in our estimates this material which eliminates all cost of upkeep after first installation amortises as against 4 in. hollow tile, plaster and wall paint upon second repainting of the plastered wall.

Construction Details

It affords us much pleasure to present the construction sheet shown on second following page and our engineering and laboratory departments are at the service of architects who desire more particular and detailed information.

For working details to larger scale, ask for Folder No. 9c.

Other Products

Machine-made window sills, mouldings, band courses, ashlars to match and the Grueby terra-cotta products block.

Estimates

Estimates may be had upon the square foot or unit basis, but we recommend adherence to the long-established usage of the architectural terra-cotta industry, whereby, as manufacturers, we issue lump sum estimates upon quantities which we compute from architect's elevations and floor plans.

It should be noted that where special hand-made blocks are required to furnish a complete job, we include them in such estimates and fabricate the specials in our departments for hand-made work.

Suggested Form of Specification

Machine-made clay building block facing, glazed [unglazed], and of color to be selected by architect, to course 7 in. high, net size (8 in. high net size when shown to bond with brick), x 16 in. long net size, with cuts to break joint, and with all necessary mitres, bullnose and angle blocks, sill, lintel, jamb, cove base and capping blocks to make a complete job.

These blocks are to be fabricated of carefully selected, thoroughly ground, screened and pugged architectural terra-cotta body, with ample grog [grit] component so that the block will burn straight and true.

Thickness of blocks shall be from 2 to 8 in., as required to suit architect's details.

Blocks shall have solid back, and shall be glazed on exposed faces and returns only, so that bed joints and backs shall afford good absorptive surface for adhesion of mortar or plaster.

Blocks shall be as made by the Terra Cotta Products Corporation or the New York Architectural Terra Cotta Company, or equal and shall be carefully packed for delivery to mason contractor.

For specifications for hand-made architectural terra-cotta, see pages of the National Terra Cotta Society in this section.

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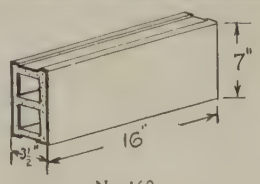
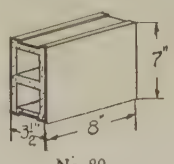
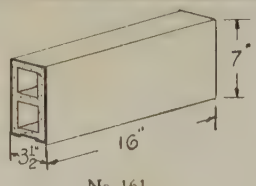


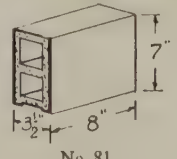
No. 160
Ashlar Block
7"x3½"x16"
1 Face



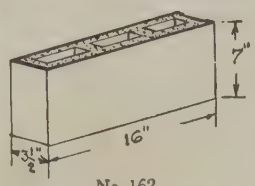
No. 80
Ashlar Half Block
7"x3½"x8"
1 Face



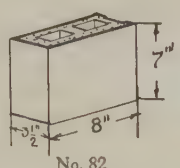
No. 161
Sill or Lintel
7"x3½"x16"
2 Face



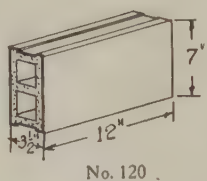
No. 81
Sill or Lintel Half
7"x3½"x8"
2 Face



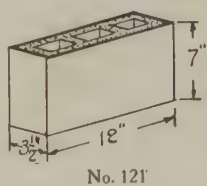
No. 162
Jamb Block
7"x3½"x16"
2 Face



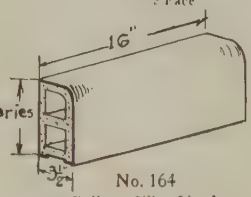
No. 82
Half Jamb
7"x3½"x8"
2 Face



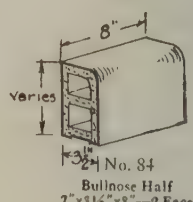
No. 120
Ashlar Block
7"x3½"x12"
1 Face



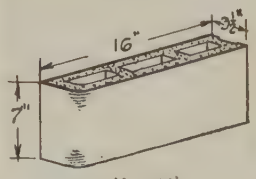
No. 121
Ashlar Block
7"x3½"x12"
2 Face



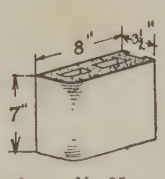
No. 164
Bullnose Sill or Lintel
7"x3½"x16"
2 Face



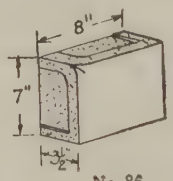
No. 84
Bullnose Half
7"x3½"x8"—2 Face



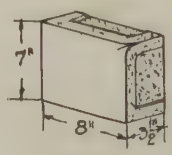
No. 165
Bullnose Block
7"x3½"x16"
2 Face



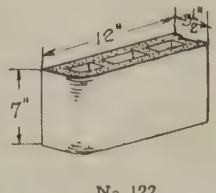
No. 85
Bullnose Half
7"x3½"x8"
2 Face



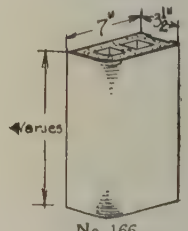
No. 86
Right Mitre
for Sill, Lintel
or Jamb



No. 87
Left Mitre
for Sill, Lintel
or Jamb

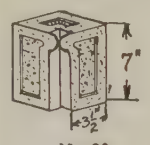


No. 122
Bullnose Block
7"x3½"x12"
2 Face

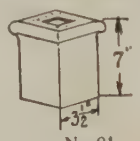


No. 166
Bullnose Jamb
14"x7"x3½"
2 Face

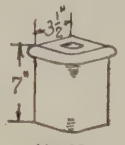
The Above Also Furnished 2", 5", 6" and 8" Thick, and 8" High to Course 8¼", for Bonding With Brick Backing.



No. 90
Square
Internal Mitre



No. 91
Square
External Mitre



No. 92
Bullnose
External Mitre

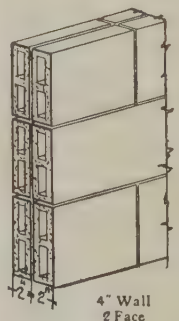
No. 93
Bullnose
Internal Mitre

No. 94
Square
Internal Mitre

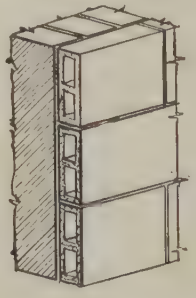
No. 95
Square
External Mitre

No. 96
Bullnose
External Mitre

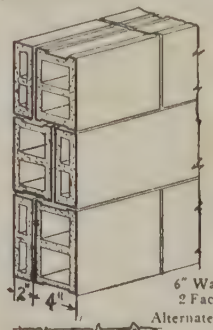
No. 97
Bullnose
Internal Mitre



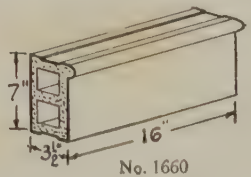
4" Wall
2 Face



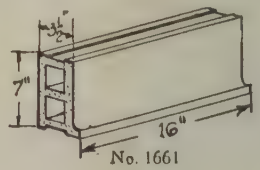
2" Block to Brick Wall



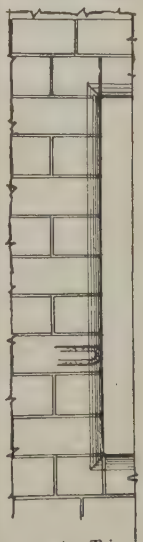
6" Wall
2 Face
Alternate Bond



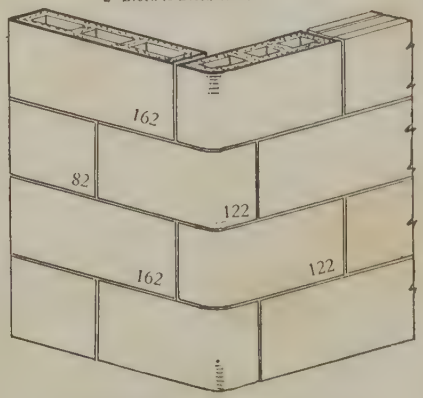
No. 1660
Capping

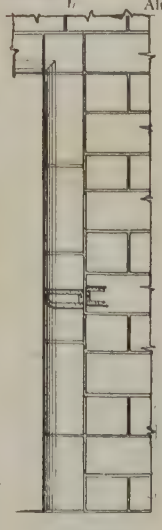


No. 1661
Base

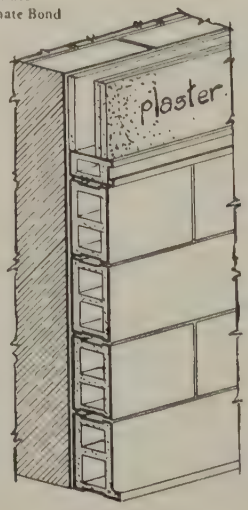


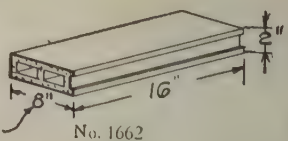
Window Trim



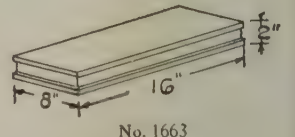


Door Trim

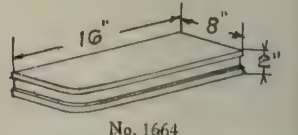




No. 1662
Capping



No. 1663
Mitre Square



No. 1664
Bullnose Mitre

FOR ECONOMICAL USE.

Course Heights—5", 7" and 8" (net).
Unit Lengths—1'-4", with Wire Cuts for Any Shorter Pieces as Required.
Thicknesses—2" Solid or Open Back, 3½", 5", 6" and 8".

For Working details to larger scale,—ask for Folder 9-C

CONSTRUCTION DETAILS OF MACHINE-MADE TERRA-COTTA PRODUCTS

NEW JERSEY TERRA COTTA COMPANY

Manufacturers of Architectural Terra Cotta

TELEPHONE
VANDERBILT 6410

299 Madison Avenue
NEW YORK, N. Y.

FACTORIES: PERTH AMBOY and SOUTH AMBOY, N. J.

AGENCIES

ATLANTA, GA., LUKE SEAWELL
BOSTON, MASS., FRANKLIN M. DAVIS
BUFFALO, N. Y., SENECA CLAY CO.
CINCINNATI, OHIO, E. F. GRAND BRICK CO.
COLUMBUS, OHIO, ALLAN ROSS RAFF
CLEVELAND, OHIO, YORK H. SMITH
DETROIT, MICH., THOMAS BROS. & CO., LTD.
LOUISVILLE, KY., LOUISVILLE BUILDERS SUPPLY CO.
MONTREAL, CAN., WEBSTER & SONS, LTD.
NEW ORLEANS, LA., ERSKINE W. FISHER
PHILADELPHIA, PA., JAMES A. CLANCY
NORFOLK, VA., GROVER L. WHITE
RICHMOND, VA., HENRY W. O'GRADY
WILKESBARRE, PA., THOS. S. NOLAN

Products

ARCHITECTURAL TERRA COTTA for exteriors and interiors of buildings of the permanent type.

Also Solid Back Machine Made Clay Building Blocks, glazed in all ceramic colors, particularly adapted to interiors, school corridors, power stations, hospitals and all places where a fire-resisting, light reflecting, sanitary wall is desired.

Quality

New Jersey Terra Cotta is in every sense of the word a quality product. Graduate ceramic engineers, trained in correct terra cotta technique, are constantly adding new color glaze combinations and textures to a palette which even now possesses a wonderful range of richness, giving the designer an almost unlimited choice of imperishable colors, backed by the qualities gained through thirty-eight years of achievement in the production of terra cotta.

Modeling

Directing this department is an artist of exceptional ability and training, and under his guidance is a group of artists eminently qualified to create with stylistic correctness decorations in relief, ranging from the accepted classic forms to the art modern.

Production

NEW JERSEY TERRA COTTA COMPANY owns and operates two large and modern factories located at Perth Amboy and South Amboy, New Jersey, each with a personnel technically equipped to efficiently produce in large quantity the finest terra cotta.

Service

Technical information on construction, design and color possibilities is promptly available upon request, without charge.

Price

For definite price, send us architects' elevations and floor plans and specifications, if available.

Approximate estimates of costs can be furnished from sketches.

Representative Work

Syracuse Hotel, Syracuse, N. Y., George B. Post & Sons, Architects
Liberty Bank Building, Buffalo, N. Y., Alfred C. Bossom, Architect
Keith-Albee Theater, Cincinnati, Ohio, Rapp & Rapp, Architects
Bush Terminal Building, New York, N. Y., Helme and Corbett, Architects
Postum Building, New York, N. Y., Cross & Cross, Architects
Capitol Theater, New York, N. Y., Thomas W. Lamb, Architect

N J T C

TRADE-MARK

Apartment, 59th Street and Park Avenue, New York, N. Y.
GOLDNER & GOLDNER, Architects

NATIONAL TERRA COTTA SOCIETY

19 West 44th Street

NEW YORK, N. Y.

FOR ESTIMATES ADDRESS INDIVIDUAL MEMBERS

THE AMERICAN TERRA COTTA & CERAMIC COMPANY
1746 The Builders Building, Chicago, Ill.

ATLANTA TERRA COTTA CO.
Glenn Building, Atlanta, Ga.

ATLANTIC TERRA COTTA CO.
19 W. 44th Street, New York, N. Y.

N. CLARK & SONS
116 Natoma Street, San Francisco, Cal.

CONKLING-ARMSTRONG TERRA COTTA CO.
Insurance Company of North America Building, Philadelphia, Pa.

CORNING TERRA COTTA CO., INC.
Corning, N. Y.

FEDERAL TERRA COTTA CO.
101 Park Avenue, New York, N. Y.

GLADDING, McBEAN & CO.
660 Market Street, San Francisco, Cal.; 621 So. Hope Street, Los Angeles, Cal.; 1500 First Ave., South, Seattle, Wash.; 454 Everett Street, Portland, Ore.

THE INDIANAPOLIS TERRA COTTA COMPANY
Olney and Roosevelt Streets, Indianapolis, Ind.

KANSAS CITY TERRA COTTA & FAIENCE CO.
19th Street and Manchester Avenue, Kansas City, Mo.

O. W. KETCHAM
125 N. 18th Street, Philadelphia, Pa.

MIDLAND TERRA COTTA CO.
105 West Monroe Street, Chicago, Ill.

NEW JERSEY TERRA COTTA CO.
299 Madison Avenue, New York, N. Y.

NEW YORK ARCHITECTURAL TERRA COTTA CO.
401 Vernon Avenue, Long Island City, N. Y.

THE NORTHWESTERN TERRA COTTA COMPANY
2525 Clybourn Avenue, Chicago, Ill.; East 16th Street, Chicago Heights, Ill.; W. First Avenue and Umatilla Street, Denver, Colo.; 4417 Oleatha Avenue, St. Louis, Mo.

WASHINGTON BRICK, LIME & SEWER PIPE CO.
Washington Street and Pacific Avenue, Spokane, Wash.

WESTERN TERRA COTTA CO.
Franklin Avenue and Missouri Pacific Ry., Kansas City, Kan.

THE WINKLE TERRA COTTA CO.
Century Building, St. Louis, Mo.

Services of the Society

The NATIONAL TERRA COTTA SOCIETY is a bureau operated by the manufacturers of terra cotta in the United States for the technical and artistic improvement of product, the dissemination of authentic information relating to it and the assistance of the architectural and engineering professions in the proper and effective employment of this material. In addition to the Standard Specifications printed below the Society issues other helpful literature relating to the proper construction of terra cotta and the use of color in architectural design; also illustrated brochures pertaining to various classes of buildings.

Its individual member companies are also prepared to assist architects with counsel and recommendation upon the use of terra cotta in specific instances of application, and to furnish samples of their product when desired.

Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta

These Specifications were prepared with the assistance of representatives of the Structural Service Committee of the American Institute of Architects and of the National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.

Note: The Architect or Specification Writer will find it convenient to follow the Short Form Specifications beginning with Section 63.

The Short Form incorporates all the provisions of the Standard Terra Cotta Specification, but eliminates the necessity of mentioning them in detail.

Reference to the Glossary, Sections 50-62, will supply the surface finish, ceramic finish, and color data necessary to specify surface and color correctly.

The Corollary Clauses, Sections 85, 86, explain the setting option between mason and manufacturer.

Sections 87-91 under Corollary Clauses explain the specifications for flashing, sheet metal, structural steel, structural concrete and rough carpentry. These specifications form a part of the Terra Cotta Specification, although the materials are supplied and set in place by different contracting parties.

A—General Information

Drawings and Schedules

1. The Terra Cotta manufacturer shall be furnished with all drawings, details and other information necessary for the manufacture of Terra Cotta, including drawings for all classes of work with which the Terra Cotta engages.

2. Wherever Terra Cotta is required to match in contour, color, finish and surface treatment, existing Terra Cotta, as for example in connection with alterations or additions to existing work, the Terra Cotta manufacturer shall be furnished with the required profiles and samples of the original work, and other needed information.

3. The Terra Cotta manufacturer shall, before proceeding with manufacture, submit to the architect for his correction and approval, shop drawings showing jointing and construction of the Terra Cotta and provision made for all flashing and counter flashing. These drawings must conform as nearly as practicable to the architect's drawings, but shall be in accordance with good Terra Cotta structural practice.

4. All pieces of Terra Cotta shall be numbered. The Terra Cotta manufacturer shall provide two copies of the completed scale shop drawings to be used for setting and showing the piece numbering of the Terra Cotta, and the size of the joints to be used for setting the various portions of the work clearly indicated. These drawings shall be designated as the setting drawings.

Continued on next page

5. The Terra Cotta manufacturer shall furnish, as promptly as possible, a schedule of all special anchors, hangers, etc., necessary to secure and support the Terra Cotta in a manner approved by the architect.

B—Material

Quality, Tests

6. *Note:* In view of the researches now being conducted by the National Bureau of Standards at the instance of the National Terra Cotta Society, it seems inadvisable to attempt, at this time, to write either quality clauses in terms of crushing strengths, densities and elasticity, or specifications for tests. Clauses descriptive of the desirable physical characteristics and of tests to prove compliance of the material with such physical requirements will be prepared as soon as the necessary data are available and inserted in a later edition of this standard specification.

Modeling

7. All ornament shall be artistically modeled by the Terra Cotta manufacturer's staff artists. (Or, models made to Terra Cotta shrinkage scale will be furnished to Terra Cotta manufacturer, without cost to him, securely crated for shipment f.o.b. modellers' studio at .)

8. Photographs in duplicate of all ornament shall be submitted to the architect for his approval or correction, or, if he so desires, he may inspect all modeling at the factory. Such approval or inspection by the architect shall be made promptly. No ornamental work shall be burned until modeling has been approved.

Surface Finish, Ceramic Finish and Color

9. The surface finish, ceramic finish and color of all exposed surfaces of Terra Cotta shall be as indicated by the architect's drawings or as specified. For surface and ceramic treatments, see Glossary of Terms relating to Terra Cotta, which is hereby made a part of this specification.

10. The ceramic finish shall be applied to the Terra Cotta in such a manner as thoroughly to coat the exposed surfaces.

Samples

11. The Terra Cotta manufacturer shall submit samples of the color or colors of the ceramic finish to the architect for his approval, and all Terra Cotta shall conform without marked variation to the sample or samples so approved.

C—Design and Structure

Ends, Walls and Partitions

12. Walls shall not be less than one inch thick and partitions shall be of such thickness and so spaced as to perform their proper functions with regard to form and structure. Each piece of Terra Cotta shall be provided with the necessary anchor holes and hand holes and shall be so formed as properly to engage the structure. Beds generally shall be not less than 4 in. deep.

Washes, Weep Holes and Drips

13. Projecting courses, cornices and heavy ornamental detail may have washes, drips and weep holes, where shown on the approved shop drawings.

Preparation for Flashing

14. Where so shown the washes of all projecting cornices and other exposed horizontal surfaces shall have provision made for flashing. All surfaces where the wash pitches inward toward the structure and stops against superimposed work; all balcony floors, and all gutter grades shall have provision made for flashing.

15. Raggles shall be provided to receive gutter linings and flashings when the joints can not be used for the purpose. Raggles shall be not less than ¾ in. deep.

16. All capping courses, copings and sills except of the "slip" type, shall have stools and lugs at intersections with vertical surfaces.

Joints

17. All joints shall be straight and true and of an approximate uniform width of ¼ in. All Terra Cotta shall be laid out at the factory to test it for uniformity of joint widths and over-all dimensions. Where necessary to secure accurate dimensions and uniform joint widths, the material shall be sized straight and true.

D—Transportation, Storage and Protection

Shipment, Delivery and Care

18. Unless otherwise specifically agreed, all Terra Cotta shall be furnished by the manufacturer f.o.b. cars factory, with freight allowed to destination. All Terra Cotta shall be carefully packed in hay, straw, excelsior or other suitable material.

Replacements

19. If any pieces of Terra Cotta are damaged in transit, the manufacturer shall be immediately notified in writing by the setting contractor and proceed with the remaking of the pieces. The responsibility for the cost of such replacements shall be determined by the point of delivery fixed by the contract under which the Terra Cotta is delivered. If the point of delivery is beyond the immediate control of the manufacturer, the setting contractor shall assume responsibility for the necessary proof of damage.

E—Erection

Handling

20. The setting contractor shall receive the Terra Cotta on arrival at the freight yards and shall transfer it without damage from the cars to the building. When the Terra Cotta manufacturer delivers on trucks at the building the setting contractor shall unload and store the Terra Cotta. Terra Cotta shall be stored under cover not in contact with the ground, stacked without inflammable packing on wood laths or strips, so as to protect it from injury.

Mechanics

21. All Terra Cotta shall be set by mechanics experienced in the handling and setting of the material.

Cutting and Fitting at the Building

22. Notice of errors in the manufacture of the Terra Cotta shall be given to the manufacturer immediately upon discovery. Cutting or fitting due to such errors shall be done by the Terra Cotta manufacturer or shall be paid for by him if he fails to do the necessary cutting or fitting promptly upon receipt of notice.

23. Other necessary cutting and fitting of the Terra Cotta that may be required at the building, including all fitting around anchors, steel and iron work and reinforced concrete, shall be done by the contractor for setting Terra Cotta.

Supporting Metal Work and Anchors

24. *In Connection with Structural Steel*—Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta and which are not secured to the structural steel by rivets or short bolts, as shown on the architect's drawings, together with all anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta, shall be furnished and set by the contractor for setting Terra Cotta.

25. *In Connection with Structural Concrete*—The contractor for structural concrete shall furnish and set all supporting metal work inbedded in the concrete and all shelf angles and continuous rods. All such metal work shall conform to the requirements of the setting drawings prepared by the Terra Cotta manufacturer.

26. All other loose iron such as clamps, hangers, clips, straps, and pins shall be furnished and set by the Contractor for setting Terra Cotta.

27. All anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta shall be of wrought iron or non-corroding soft steel.

28. Anchors, hangers, bolts, clips, straps, rods and pins for securing the Terra Cotta, except where otherwise shown or specified, shall be of the following minimum sizes:

29. Anchors:—(a) For ashlar or courses balanced on the wall, shall be ¼x¼ in. or ⅛x⅝ in., or No. 6 gauge galvanized wire.

30. (b) For projecting courses not balanced on the wall, shall be not less than ⅝-in. round or square bars or equal cross section.

31. Hangers shall be ⅝-in. diameter round bars or other shapes of equal cross section area.

32. Clips and straps shall be ⅜x2 in.

33. Pins shall be ½-in. diameter round bars.

34. Continuous rods on concrete wall faces to which Terra Cotta ashlar is clipped, shall be ⅝-in. diameter round bars which shall be secured to the masonry with ½-in. diameter round anchors placed not more than 2 ft. 0 in. on centers.

35. All steel or iron supporting metal work shall be clean and thoroughly protected with two coats of pure red lead and linseed oil paint, asphaltum applied hot, or other approved protective compound.

Protection of Supporting Metal Work

36. Metal work of every description, supporting Terra Cotta, shall be imbedded thoroughly in the masonry backing and when not so imbedded, metal work shall be protected against corrosion by encasing with cement mortar or in cement mortar masonry.

37. When the back of a Terra Cotta course comes in con-

Continued on next page

tact with iron or structural concrete in such manner as to prevent the encasing of supporting iron from the rear, an opening shall be made in the top to admit of the placing of the encasing mortar as required above.

Mortar

38. All cement used for setting mortar shall be a standard brand of Portland cement fulfilling the requirements both physical and chemical of the standard specifications for Portland cement adopted by the American Society for Testing Materials.

39. All sand used for setting mortar shall be clean, sharp and well graded in size.

40. All mortar for setting and pointing shall be composed of one volume of Portland cement to three volumes of sand. Hydrated lime, not to exceed 9 pounds to the sack of cement, shall be added.

41. The sand and cement and lime, if any, shall be thoroughly mixed dry before any water is added. The use of retempered mortar shall not be permitted.

Setting

42. All Terra Cotta shall be set true to a line and carefully laid in a solid bed of mortar. All rebates in bed and cross joints from front to back and top to bottom, shall be filled solid with mortar leaving no voids. Each piece of Terra Cotta shall be tamped into place, excess mortar cut off and struck with a jointer or trowel. All sills, wall copings and other capping courses, shall be set in a thick bed of mortar and well pounded down so that the mortar fills all spaces around bottom of webs of Terra Cotta.

43. All Terra Cotta projecting courses shall be so set that the arris casting a shadow shall be true to line.

44. When the Terra Cotta work is of such scope or character that the proper handling and setting of the Terra Cotta require special skill and knowledge, the Terra Cotta manufacturer shall, if required by the contract, furnish a competent Terra Cotta setter to assist in the sorting, selecting and handling of the Terra Cotta, to co-operate with the setting contractor, to assist him when cutting or fitting of the Terra Cotta is necessary, to advise as to interpretation of setting drawings, and to help generally in securing rapid, efficient progress during the setting of the Terra Cotta. For such service the setting contractor shall pay such setter full time at his regular wage rate. When the furnishing of such a competent setter involves traveling expenses, the setting contractor shall pay the same and also make an allowance for his board.

45. When the services of such a competent setter are not required under the contract, the Terra Cotta manufacturer may, at his own option and expense, send such a representative to the work who shall perform the above services, and the setting contractor shall co-operate with and aid and facilitate the performance of such services by such representative.

Pointing

46. All joints in Terra Cotta shall be pointed and struck as the setting progresses except in freezing weather. In freezing weather and when re-pointing is necessary, all joints shall be raked or cut out to a depth of ½ in. and the pointing mortar driven into the joint and struck with a jointing tool.

47. All joints in overhanging Terra Cotta, balustrades, parapets and free standing features shall have joints raked out one-half (½) inch, and pointed with an approved elastic cement.

Protection

48. All uncompleted walls including Terra Cotta and backing shall be protected by waterproof covering at night and at any time when liable to injury from storms or freezing.

(Note: All other protection required for projecting courses, jambs of openings, etc., is provided for under the work of other trades.)

Cleaning Down

49. Upon completion of the work, mason's wedges, shoring, supports and centering and all other false work and protections shall be removed and the Terra Cotta cleaned down. If satisfactory results can not be obtained by the use of abrasive soap or washing powder, a solution consisting of 1½ pints of muriatic acid to a gallon of water may be used. In the use of acid solutions only wooden pails and fibre brushes shall be employed.

Glossary of Terms Relating to Terra Cotta

Surface Finish

50. Surface Finish designates the texture of the surface of the clay body prior to application of Ceramic Finish.

51. It may be:

(a) *Smooth.*
(b) *Tooled or Drove.*
(b1) Eight lines to the inch.
(b2) Six lines to the inch.
(c) *Light irregular drag or combing.*
(d) *Heavy irregular drag or combing.*
(e) *Special.*

52. A special Surface Finish like "bush-hammered," "pitted," "vermiculated," etc., involves extra expense and, if required, should be clearly specified.

53. *Surface Finish for unglazed surfaces* may be smooth or may be tooled with a light or heavy drag. Flat surfaces of sufficient width may be tooled, while the curved surfaces of mouldings may be left smooth.

Surface Finish for glazed Ceramic Finish (whether lustrous or mat) is usually made smooth.

54. *Granite Colors,* if unglazed, may be made smooth or with irregular drag, or pitted. A bush-hammered or special surface involves extra expense, and if required should be clearly specified. If glazed Ceramic Finish is used for Granite Colors the surface treatment is usually smooth.

Ceramic Finish and Color

55. Ceramic Finish designates the surface and color applied by the ceramic processes of coating, glazing, burning, etc.

56. (1) *Unglazed Terra Cotta:* Terra Cotta with a Ceramic Finish producing an unglazed finish made in various shades of buff, gray, salmon, red and brown. Most colors thus made are vitreous.

57. (2) *Glazed or Enameled Terra Cotta:* Terra Cotta having an impervious Ceramic Finish of a glassy texture which may be either lustrous or mat (sometimes designated as full or dull glazes or enamels) made in various colors.

58. (3) *Granite Color Terra Cotta:*

(a) Unglazed Granite Color:—A mottled Ceramic Finish similar to unpolished granite.

(b) Glazed or Enameled Granite Color:—A mottled Ceramic Finish similar to polished granite, made either lustrous or mat.

59. (4) *Polychrome Terra Cotta or Faience:* Terra Cotta having two or more colors on the same piece.

(a) Polychrome, Unglazed:—Unglazed Terra Cotta having two or more colors on the same piece.

(b) Polychrome, Glazed:—Glazed Terra Cotta having two or more colors on the same piece.

(c) Polychrome, Blended Colors:—Made only in glazed Terra Cotta. If, in polychrome glazed work, the colors are not to be separated by definite lines or contours of ornaments, but are to be blended together by brush treatment, or the like, the term "Polychrome, blended colors" shall be used. The character of work expected should be explicitly described.

(Note: For polychrome work always clearly specify the work to be done and the number of colors on a single piece.)

60. (5) *Special:* There are a number of Ceramic Finishes used by individual manufacturers the processes for which are patented or the names copyrighted which are not included in this Glossary.

61. (6) *Semi-Glaze:* An ambiguous term which should never be used.

62. (7) *Fire-Gilding:* A coating of gold glaze either mat or lustrous, fixed by an additional burning. (The area of surface to be gilded should be clearly described.)

Short Form Specification for Incorporation in the Architect's Specifications

To be used in connection with Standard Specifications and the Standard General Conditions of the American Institute of Architects.

63. *Note to Architect:*—The Standard Specification does not state who shall set the Terra Cotta, who shall provide wood centering, scaffolding, hoists, cover boards and protection (except tops of walls against weather). It does not include any cement or concrete work in connection with forming gutter grades and washes on projecting courses and features, or the furnishing or setting of sheet metal flashings and gutter linings. It does not include the furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel or structural concrete. It requires the architect to show on his drawings the sizes and arrangement of rolled or fabricated structural shapes used for supporting Terra Cotta. (See notes on corollary clauses at end of this specification for the work of other trades to take care of such omissions.)

General Conditions

64. The general conditions of the American Institute of Architects, Third Edition, shall form a part of this specification and contract and all work shall be subject to the provisions thereof.

Continued on next page

Work Included

65. The work included in the contract comprises the manufacture, (and) delivery (and setting) of all Terra Cotta in accordance with the contract drawings and these specifications.

66. All (here insert a complete description of work) shall be of Terra Cotta.

Work Not Included

67. The following items are not included as a part of the contract for furnishing (and setting) Terra Cotta.

(a) Masonry backing. See specifications for (.....).

(b) The furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel. See specifications for (.....).

(c) Cement or concrete grading for gutters, washes, floors, etc. See specifications for (.....).

(d) Furnishing and setting sheet metal, see specifications for (.....).

Materials and Workmanship

68. All Terra Cotta work under this contract, except as hereinafter specified, shall be executed in strict conformity with the Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta, adopted by the NATIONAL TERRA COTTA SOCIETY; which Standard Specification is hereby declared and made a part of this specification with the same force and effect as if written herein in full.

Surface Finish, Ceramic Finish and Color

69. All Terra Cotta

(Note: If several textures or finishes are to be used give location of each.)

shall be

70. (1) *Unglazed.*

Surface Finish or flat members shall be

(a) *Smooth.*

(b) *Tooled or Drove.*

(b1) Eight lines to the inch.

(b2) Six lines to the inch.

(c) *Light irregular drag or combing.*

(d) *Heavy irregular drag or combing.*

(e) *Special.*

(Note: Special surface finishes like "bush-hammered," "pitted," "vermiculated," etc., should be described.)

71. The surface finishes of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

72. (2) *Unglazed Granite Colors*—Surface finishes of flat members generally shall be (a, b, c, d, e). The surface finish of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

73. (3) *Lustrous or Full Glazed or Enameled*—Surface finish shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

74. (4) *Mat or Dull Glazed or Enameled*—Surface finish shall be

(See Note 3.)

75. (5) *Lustrous or Full Glazed or Enameled Granite*—Surface finish shall be

(See Note 3.)

76. (6) *Mat or Dull Glazed Enameled Granite*—Surface finish shall be

(See Note 3.)

77. The color of the Terra Cotta generally shall be (.....) as per approved sample or samples.

78. (7) The Terra Cotta comprising....(described here in detail....) shall be (two, three, four) color polychrome. Colors (....specify where....) shall be blended.

79. (8) The surface finishes of (....specify where....) shall be fire gilded with (mat or lustrous) gold glaze.

(Note: Sections 1, 2, 3, 4, 5, 6 are alternates. If there is no polychrome work or no fire gilding omit sections 7 and 8. Sections a, b, c, d, e, are alternates for surface finish.)

Delivery

80. The Terra Cotta manufacturer shall furnish and deliver (f.o.b. cars factory with freight allowed to destination) (on trucks at the site of the building) (and set) all the Terra Cotta as indicated on the drawings or as here described.

Setting

81. All Terra Cotta shall be set by (Terra Cotta manufacturer) (mason.....). For such anchors and metal work as are to be furnished by the setting contractor see Standard Specification.

(Note to Architect: If the Terra Cotta manufacturer is to set his material include the following clause in the Terra Cotta specification. See also suggested clauses at end of this specification to take care of these omissions and for incorporation in the specifications for the work of other trades.)

82. "Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse, shall be furnished to the Terra Cotta manufacturer free of charge by the (....mason contractor....)."

Terra Cotta Setter

(Note to Architect: If the work is of such scope or character that the proper handling and setting requires special skill, the following clause may be inserted:)

"The Terra Cotta manufacturer shall furnish at the expense of the setting contractor a competent Terra Cotta setter to assist in the sorting, selecting, handling and setting of the Terra Cotta."

Joints

83. (The Standard Specification does not require any joints to be rubbed. If rubbed joints are to be required it should be so stated here.)

84. (The Standard Specification requires all joints to be approximately ¼ in. wide. If joints of a different width are desired it should be so stated here.)

Suggestions for Corollary Clauses

85. 1.—If the Terra Cotta is to be set by the Terra Cotta manufacturer, a clause similar in purport to the following should be included in the general requirements relating to masonry or brick work:

86. "Terra Cotta will be furnished and set by the Terra Cotta manufacturer. Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse shall be furnished to the Terra Cotta manufacturer, free of charge, by the (mason contractor)." A provision should also be included to the effect that the (mason contractor) shall construct the brick (concrete) backing for the Terra Cotta and "The backing shall proceed simultaneously with the setting of Terra Cotta. Each piece of Terra Cotta shall be backed up solid with brick and mortar, so as to make a perfect bond and homogeneous mass between wall lines. This backing shall extend beyond the wall line when necessary to structural stability. If concrete is used it shall not be stronger than a 1 to 9 mixture."

Also a provision under which the (mason) contractor shall place all concrete or cement grading for gutters, washes and balcony, loggia or other floors.

87. In the case of parapet walls specifications should state that flashing if used shall be carried through the wall, or if flashing be not used the back of the parapet wall shall be damp-proofed and the waterproofing carried through the wall.

88. 2.—In the specifications for sheet metal work there should be included a clause similar in purport to the following:

"The washes on all cornices and other exposed surfaces, where shown or specified, shall be covered with ( ) which shall be turned up against vertical surfaces (cap flashed) and cemented into the raggles provided for the purpose in the Terra Cotta."

89. 3.—Structural Supports.

Under "Structural Steel," a clause similar in purport to the following should be included:

"Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta, and which are secured to the structural steel with short bolts or rivets, shall be furnished and erected by the contractor for (structural steel.)"

90. Under "Structural Concrete" a clause similar in purport to the following should be included:

"Steel beams, channels, angles, T's, plates, fabricated brackets and outlookers and other members, bolts, rods, wires, anchors, and sleeves for supporting Terra Cotta, which are inbedded in the structural concrete, also shelf angles and continuous rods attached to structural concrete shall be furnished and set by the contractor for structural concrete, in strict accordance with setting drawings prepared by the Terra Cotta manufacturer." (For information as to the sizes and character of bolts, rods, anchors, etc., see Section E paragraphs 24 to 35 inclusive on "Supporting Metal Work and Anchors" of Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta. Such supports should be clearly shown on the drawings.)

91. 4.—Under "Rough Carpentry" or other suitable division of work, there should be included a clause providing that the contractor shall furnish, set and maintain all centering, cover boards, boxing and protection for Terra Cotta, and remove the same upon completion of the work.

THE NORTHWESTERN TERRA COTTA COMPANY

WORKS AND MAIN OFFICE
2525 Clybourn Avenue
CHICAGO, ILL.

OTHER OFFICES
DENVER, COLO. ST. LOUIS, MO. DETROIT, MICH. CLEVELAND, OHIO MINNEAPOLIS, MINN.

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SALES AGENCIES IN ALL PRINCIPAL CITIES

Products

ARCHITECTURAL TERRA COTTA for exteriors and interiors, in plain, ornamental or sculptured design, in all known finishes, and in any desired color or combinations of color.

Also Northwestern Terra Cotta in stock designs; Northwestern Multi-unit Sills for steel sash windows; Northwestern Chimney Pots; Northwestern Garden Pottery; Northwestern Faience.

Northwestern Service

More than fifty years of practical experience has equipped THE NORTHWESTERN TERRA COTTA COMPANY with both personnel and plants that insure a service unsurpassed in this industry.

For the *architect:* Northwestern experts co-operate with the architect, from the concept of the building, to furnish the technical information necessary to secure desired results.

For the *builder:* Northwestern executives give personal attention to the making of prompt and proper deliveries, thus reducing labor cost and obviating time penalties.

For the *owner:* Northwestern reputation and responsibility guarantee both the quality and the character of Northwestern Terra Cotta, which in turn insures a satisfactory yield on the owner's investment.

Northwestern Facilities

Within the last year the Chicago Heights plant has been added to those at Chicago, Denver, and St. Louis, further increasing the capacity of the company, which was already the largest as well as the oldest company engaged in the manufacture of terra cotta in America. THE NORTHWESTERN TERRA COTTA COMPANY has production facilities adaptable to the largest or the smallest job.

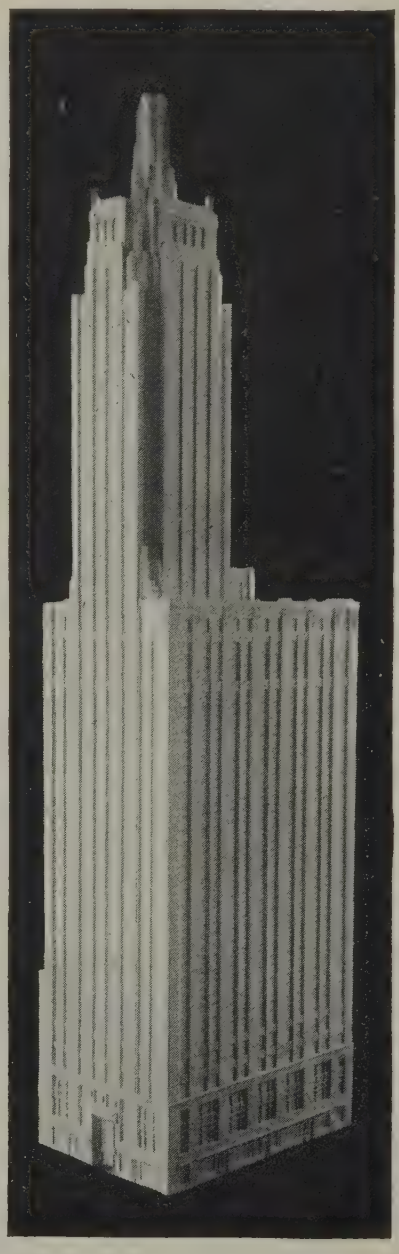
Northwestern Terra Cotta

Glazed Northwestern Terra Cotta is impervious to moisture, and is made in any one of three degrees of gloss, viz.: bright, satin and matt.

Unglazed Northwestern Terra Cotta is covered with a slip coating of varying degrees of hardness and sheen.

Either glazed or unglazed material may have a plain, pulsichrome, speckled, mottled, granite, old ivory, fire flashed, shaded, blended, or special color treatment.

All ceramic finishes are applied over a mechanical surface finish as selected: either smooth, tooled, drove, irregular drag or combing, bush hammered, rugged, pitted or special.



Carbon and Carbide Building, Chicago, Ill. (Model)

Northwestern Quality

Northwestern Terra Cotta is made from special fire clays, carefully selected by laboratory tests to produce a finished product rarely equaled and never surpassed for beauty and durability.

The Northwestern staff of ceramic experts, trained through three generations of constant improvement, are past masters of design, of color and of texture—the three essentials in architectural terra cotta.

Northwestern Specifications

In making out specifications for any terra cotta structure, always use the word "Northwestern," in connection with the color treatments, mechanical and ceramic finishes desired, and thus secure that quality of product and that character of service which has established Northwestern leadership for over half a century.

Northwestern Color Service

Recognizing the tremendous possibilities for the use of color architecturally, and appreciating the problems that will come with this development, THE NORTHWESTERN TERRA COTTA COMPANY has established a Consulting Color Service and places it at the disposal of any architect who may have a color problem to solve.

There is no charge for this service, neither does it carry with it any obligation from the architect to the company. It brings to you the results of years of thought, study and experiment in the application of color to the interior of buildings of all classes.

There are certain well-defined principles for the application of color to exteriors. These principles have been worked out not only by our own staff, but by consulting colorists of authority and repute, to the end, we hope, that this service may be the most practical and helpful ever offered to architects by any building material manufacturer.

Continued on next page

Growing Trend to Color

You need only look through the pages of popular magazines to recognize and appreciate the tremendous trend to color in all lines of business. Note the brilliancy of the lacquers now so popular. Observe the color treatments of the most exclusive as well as the most popular automobiles. See how brilliant color has become the keynote for interior decorations.

These striking uses of color show conclusively that the American people appreciate color in every grade of its development.

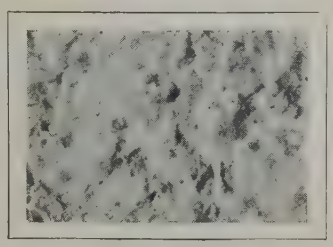
The architects who recognize this national trend of color, and use color for the inspiring motif of their architectural masterpieces, will find an unusually sympathetic response on the part of their clients.

In the days of the Renaissance the architect was also a painter and a sculptor. He majored in color as well as in form, as is evidenced by the masterpieces of Michelangelo and Raphael.

Today the architect must be equally versatile. Besides a complete mastery of form, he must have a thorough knowledge of color in all its aspects in relation to architecture.

American architects now have the opportunity to follow in the footsteps of these illustrious masters, but they have better materials to work with.

Panel Showing Use of Special Textures in Architectural Design



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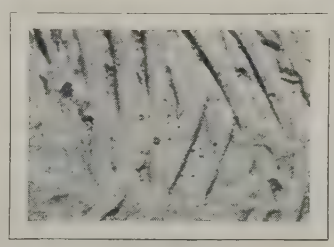

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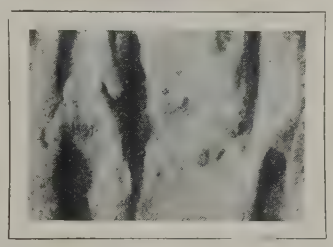

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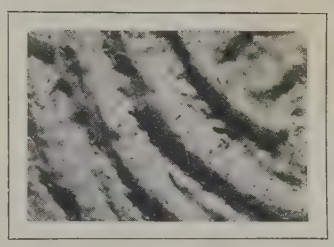

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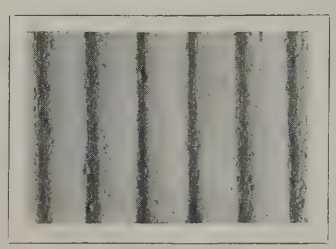

Tooled-7

Northwestern Advantages

Northwestern Terra Cotta offers all of the advantages of form that any other material can offer. It offers additional advantages in its various surfaces, different finishes, and enduring beauty. To these is added the charm of color, from pleasing tints to brilliant hues—either in plain, ornamental or sculptured surfaces.

Among a few of the notable Northwestern Terra Cotta structures are:

The Wrigley Buildings, Pure Oil Building, Bell Building, Pittsfield Building, Builders Building, Insurance Exchange Building, and State Bank Building in Chicago; the American Insurance Union Citadel in Columbus, Ohio; the Union Central Life Insurance Annex in Cincinnati, Ohio; and hundreds of similar outstanding examples of American architecture.

Northwestern Floodlighting

The value of Northwestern Terra Cotta for floodlighting purposes is unsurpassed. Textures and finishes are designed especially by Northwestern to secure the greatest degree of illumination at the least cost for electric current.

This use of floodlighting has a direct bearing upon the value of Northwestern Terra Cotta structures in color effects—because the beauty of color treatments when illuminated at night is even greater than their charm in the daytime.

Architects or owners who desire more information regarding the use of Northwestern Terra Cotta, and the application of color to building design, are invited to write the Consulting Color Service of The Northwestern Terra Cotta Company, Chicago, St. Louis or Denver.

DENISON LOAD-BEARING TILE

PATENTS OWNED BY
AMERICAN TILE ENGINEERING CO.

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DENISON TILE CO., LTD., Tilbury, Ont.
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DENISON TILE CO., LTD., Bell River, Ont.
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REDFIELD BRICK AND TILE CO., Redfield, Iowa
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FACTORIES AT STRATEGIC POINTS

GENERAL SALES AGENTS

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ATLANTA, GA., B. Mifflin Hood Brick Co.
AUGUSTA, GA., Georgia-Carolina Brick Co.
BOSTON, MASS., Dolben & Co.
BUFFALO, N. Y., Seneca Clay Co.
CHARLESTON, W. VA., West Virginia Brick Co.
BARBOURSVILLE, W. VA., Denison Tileway Co.
CINCINNATI, OHIO, Purcell Co.
DAYTON, OHIO, Purcell Co.
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DULUTH, MINN., Duluth Builders Supply Co.
ERIE, PA., Boyd & Schafer
FARGO, N. D., J. H. Holman
HAILEYBURY, ONT., A. P. Dunbar
HUNTINGTON, W. VA., Denison Tileway Co.
John S. Farr
IRONWOOD, MICH., Morgan Co.
JACKSONVILLE, FLA., Georgia-Carolina Brick Co. of Fla.
JERSEY SHORE, PA., Penn. Clay Products Co.
LANSING, MICH., Brick and Supplies Corp.
MASON CITY, IOWA, Mason City Brick and Tile Co.
MILWAUKEE, WIS., Wisconsin Face and Fire Brick Co.
MINNEAPOLIS, MINN., Wunder-Klein-Donohue
MONTREAL, QUEBEC, C. C. Drew & Co.
NEW YORK, N. Y., Hay Walker Brick Co.
OMAHA, NEB., Sunderland Bros. Co.
PHILADELPHIA, PA., Cox-Janeway Corp.
PITTSBURGH, PA., D. J. Kennedy Co.
McCrady Bros. Co.
Sankey Bros.
ST. PAUL, MINN., Corning Donohue, Inc.
SAULT STE. MARIE, ONT., J. B. Briscomb
SCRANTON, PA., LeBar, Evans & Allen
SUPERIOR, WIS., Northern Supply & Fuel Co.
TORONTO, ONT., R. L. Moran
WILKES-BARRE, PA., LeBar, Evans & Allen
WINDSOR, ONT., Denison Tile Company, Ltd.

Product

Denison Load-Bearing Tile.

Patents and License

The manufacture, sale and use of Denison Load-Bearing Tile are licensed under the "Wilson System Bearing Wall Construction" Patented; patents as follows: United States Patents No. 760,774; No. 784,476; No. 1,234,990; No. 1,171,913. Reissue No. 14,414; No. 1,350,399. Canadian Patents No. 151,165 and No. 178,744. Other domestic and foreign patents pending.

Advantages

(1) Two separate mortar beds in every course, both lying in same horizontal plane. (2) Dead air space insulates between these two mortar beds same as body of tile is insulated, thus preventing formation of frost or moisture lines on inside of wall. (3) This air space between mortar beds insures against conduction of moisture through wall. (4) Because of insulated mortar joints, plaster may be applied direct to the tile without the use of furring.

(5) All vertical webs are in perfect alignment to carry all load pressures. This gives a wall the greatest load-bearing capacity. (6) Tile is completely symmetrical, thereby facilitating laying. (7) It is a complete unit which will stand on its own base in a stable condition when stood on either face or end, thus facilitating handling and piling.

(8) Works out to all brick heights and thicknesses and bonds perfectly with any header course from third to ninth. (9) Dimension tile of fractional lengths furnished to facilitate laying any length of wall. (10) Furnished with scored or smooth face, as ordered.

(11) Corner tile permit turning inside or outside corner without destroying insulating efficiency of wall at corners.

(12) Jamb and half-jamb tile are furnished for either casement or box frame openings, which provide weatherproof joints with the frames and maintain the insulating efficiency of the wall.

Strength

These tile are guaranteed by the various manufacturers to have a minimum crushing strength of not less than 700 lbs. to the sq. in. net area of web section. Laboratory tests, made for the various manufacturers by such recognized testing laboratories as the following, show a crushing strength per tile ranging from 120,000 to 193,750 lbs.: Iowa State College; State Universities of Iowa, Minnesota and Wisconsin; Carnegie Institute; Drexel Institute; Pittsburgh Testing Laboratory; Department of Buildings of Minneapolis and Detroit.

Costs

Construction costs will vary somewhat, due to such local problems as freight rates; yet, in general, practice indicates that it is safe to say that a given wall can be built of these tile at a cost that is 20% to 30% less than the cost to build the same wall of common brick, and the same price as to build it with common tile.

Specifications and Details

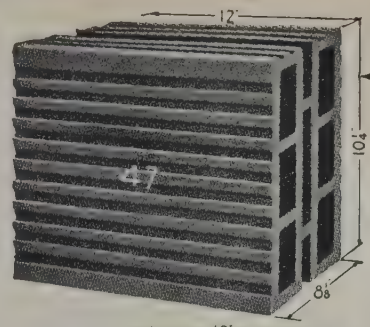
The following may be used as standard specifications for the use of these tile in "Wilson System Bearing Wall Construction":

Denison Load-Bearing Tile shall be laid with the voids horizontal except for corners, jambs, piers or pilasters; all vertical joints shall be staggered and the tile above should overlap the tile below by at least 3 in. When the wall thickness is greater than that of the tile, it shall be constructed of a combination of whole and half thickness units, spaced apart from each other the distance of the void between the two lobes of the whole tile, and the next whole tile above shall bond two subadjacent tile below together by overlapping two bearing webs of each, retaining all bearing webs in alignment. Where joists rest on the wall they shall extend into same so that they will overlap at least two bearing members of the tile. Where wall heights do not work out to even courses of the tile being used, a smaller unit shall be used to complete the height. Dimension lengths, which are furnished in sufficient quantities, shall be used to complete lengths of walls and between openings, etc.

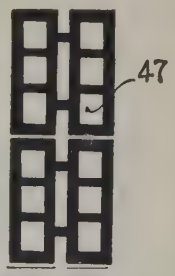
Working Drawings

A portfolio, containing a full set of detail and working drawings and standard specifications furnished free on request made to any licensed manufacturer.

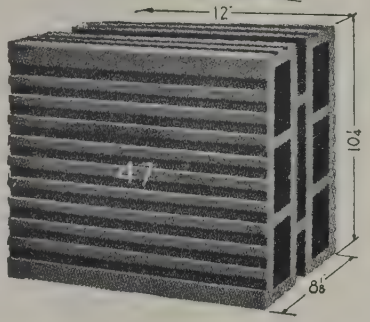
Continued on next page

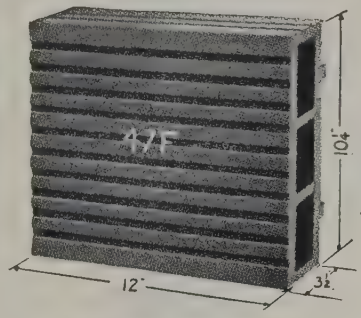


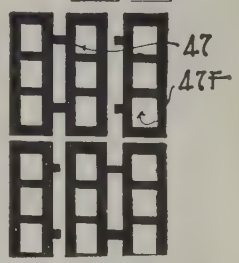
← THESE ——— BUILD ——— THESE →



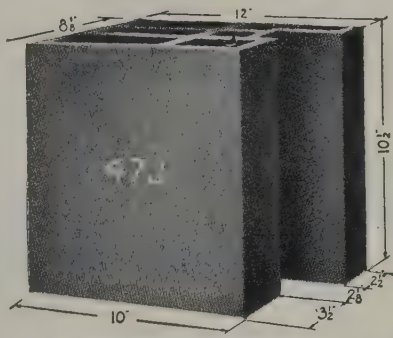
The No. 35 or the No. 23 and their allied units may be used in the place of, or in connection with, the No. 47 and its related units in this or in any of the other constructions shown here. In this way any desired height of wall can be reached that may be reached by using common brick.

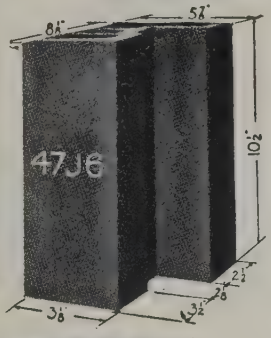


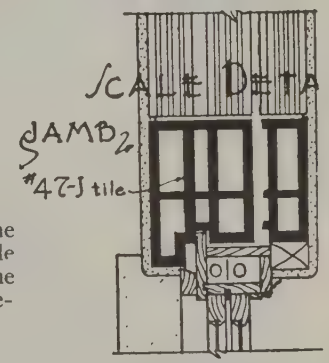




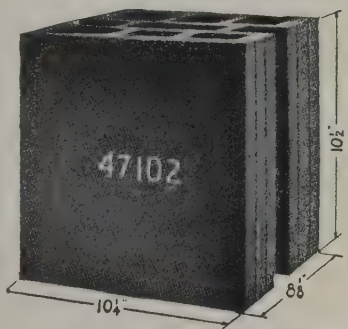
An "F" tile is, in reality, one of the two lobes of either a No. 47, a No. 35 or a No. 23. It may be furnished ready split, or it can be split from the full standard unit on the job.

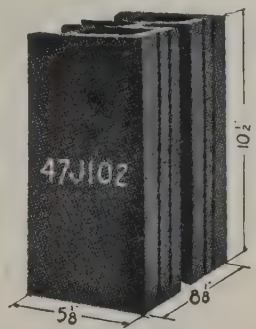


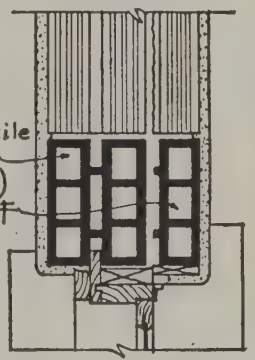




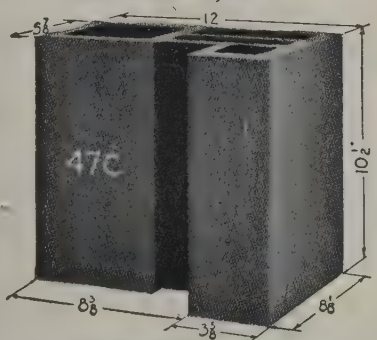
The "J" and "J6" units in the different sizes make possible weatherproof joints between the wall and a box frame without destroying the wall insulation.



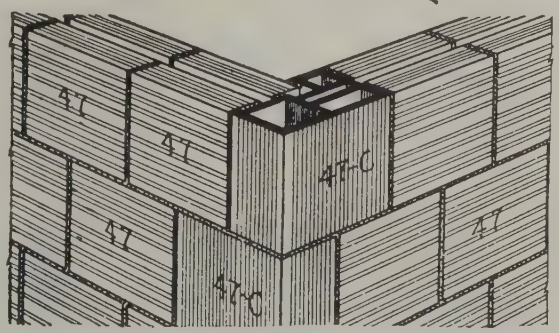


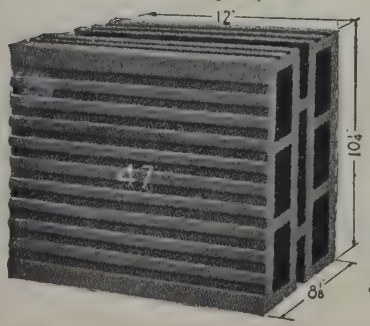


These units in the different sizes make weatherproof joints between the wall and casement frames without destroying the wall insulation.

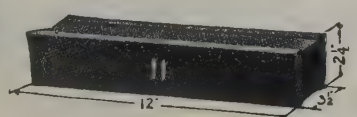


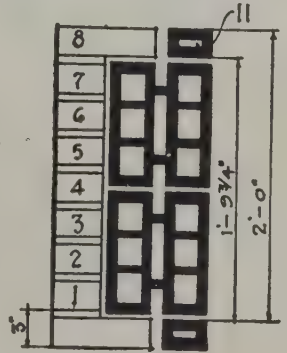
This corner unit enables either an inside or an outside corner to be turned without destroying the wall insulation. It bonds the two walls together into a strong and rigid corner.





The No. 11 is a hollow unit for backing up header courses of brick and maintains both the insulating and the load bearing efficiency of the wall.



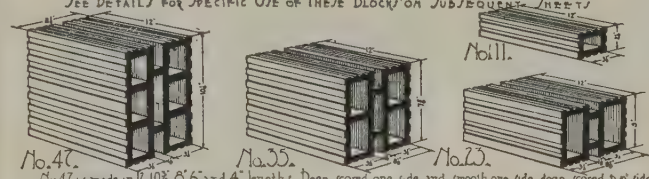


Construction Details of Load-Bearing Tile

Continued on next page

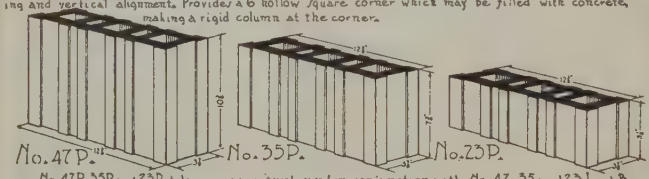
LOAD-BEARING TILE

See Details for Specific Use of These Blocks on Subsequent Sheets

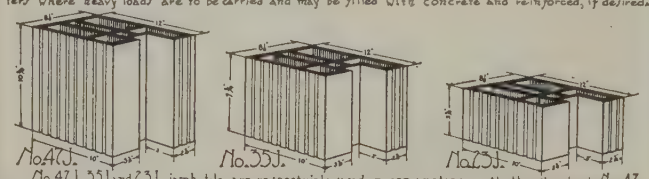


No.47 is made in 12, 10⅔, 8, 6 and 4" lengths. Deep scored one side and smooth one side, deep scored two sides or smooth two sides. No.35 and No.23 made in the same lengths with the same scorings, except 10⅔ length. No.47 is the standard unit, while the No.35 or No.23 may be used if desired, their principal use is to arrive at specific brick heights. No.11 is intended for the same purpose and is made only in 12" lengths.

No.47C, 35C and 23C tile are respectively used in conjunction with No.47, 35 and 23 Load-Bearing Tile. They close and turn corners forming perfect bond and retaining all vertical webs in bearing and vertical alignment. Provides a 6" hollow square corner which may be filled with concrete, making a rigid column at the corner.



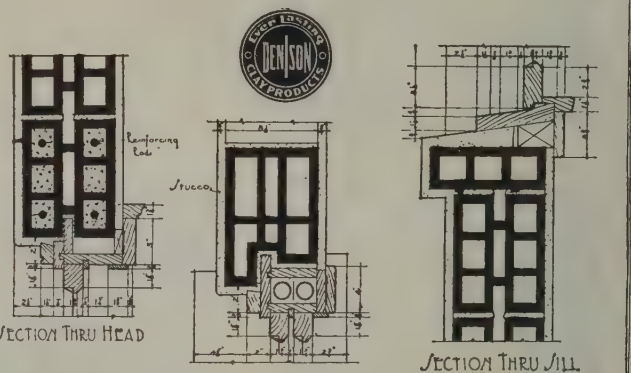
No.47P, 35P and 23P tile are respectively used in conjunction with No.47, 35 and 23 Load-Bearing Tile. They are used for forming casement frame jambs and half jambs, also columns and pilasters where heavy loads are to be carried and may be filled with concrete and reinforced, if desired.



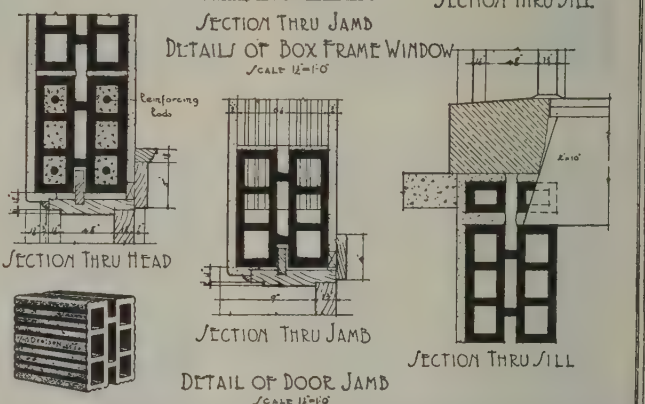
No.47J, 35J and 23J jamb tile are respectively used in conjunction with the standard No.47, 35 and 23 tile and are made in a 6" length in addition to the 12" length shown.

Set No. 1. 1921 Sheet No. 1.

LOAD-BEARING TILE



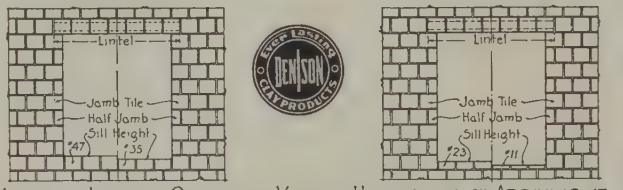
DETAILS OF BOX FRAME WINDOW
SCALE 1½"=1'-0"



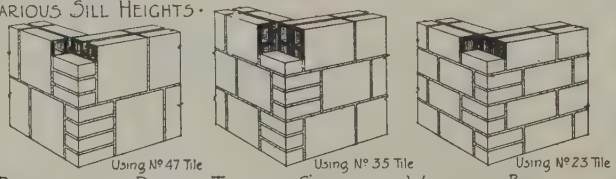
DETAIL OF DOOR JAMB
SCALE 1½"=1'-0"

Set No. 2. 1921 Sheet No. 3.

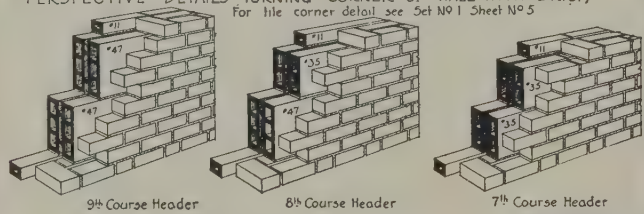
LOAD-BEARING TILE

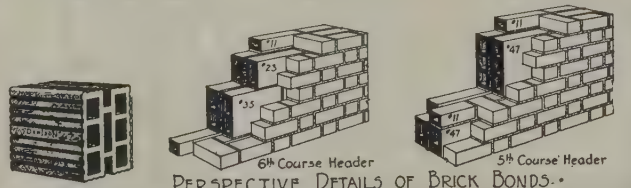


METHOD OF LAYING UP OPENINGS OF VARIOUS HEIGHTS AND OF ARRIVING AT VARIOUS SILL HEIGHTS.



PERSPECTIVE DETAILS TURNING CORNER OF WALL WITH BRICK
For tile corner detail see Set No 1 Sheet No 5



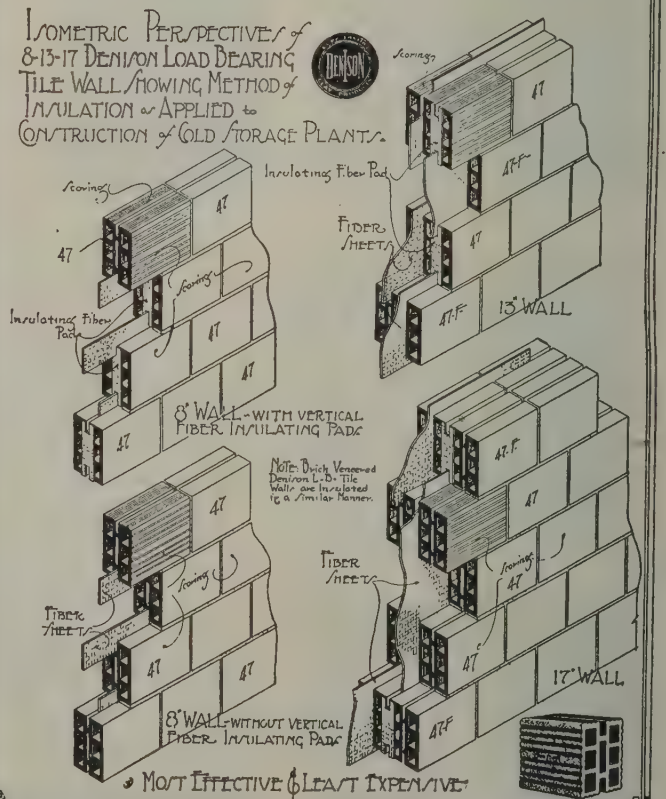


PERSPECTIVE DETAILS OF BRICK BONDS.

Set No. 5. 1921 Sheet No. 7.

LOAD BEARING TILE

ISOMETRIC PERSPECTIVES of 8-13-17 DENISON LOAD BEARING TILE WALL SHOWING METHOD of INSULATION as APPLIED to CONSTRUCTION of COLD STORAGE PLANTS.



MOST EFFECTIVE & LEAST EXPENSIVE

Set No 8 1916 Sheet No 1

Sample Construction Detail Plates Reduced

P. BANNON PIPE CO.

Hollow Tile Fireproofing and Patent Lidded Pipe

LOUISVILLE, KY.

Products

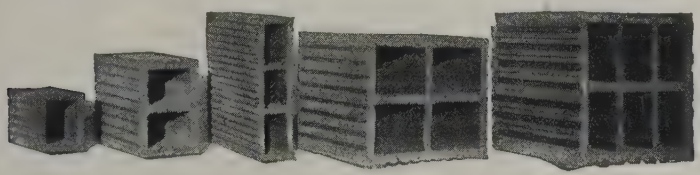
HOLLOW TILE FIREPROOFING; SHALE BRICK; FIRE BRICK; WALL COPING; FLUE LININGS; CHIMNEY TOPS; SEWER PIPES; PATENT LIDDED PIPE and EXPANSION PIPE SUPPORTS.

Also, Vitrified Culvert Pipe; Drain Tile; Glazed Conduit Pipe (for underground work); Vitrified Paving Brick and Blocks; Boiler and Grate Tile.

Hollow Tile and Shale Brick

Hollow Tile—For fireproofing of every description. Made of shale. For partitions and furring tile, 1½ to 16 in.; building tile, 6-cell and 9-cell, 6 to 12 in.; book tile, back up blocks; column covering; standard arch floor tile, 6 to 16 in.

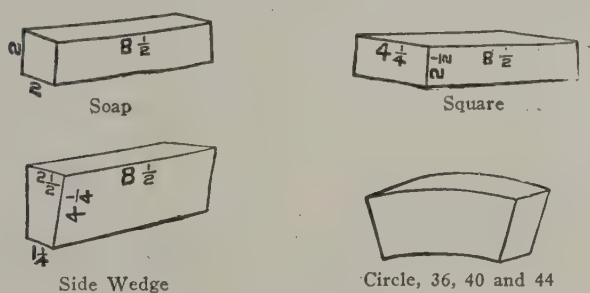
Shale Brick—Are manufactured hollow; with rough texture face, and common.



HOLLOW TILE SIZES

Fire Brick

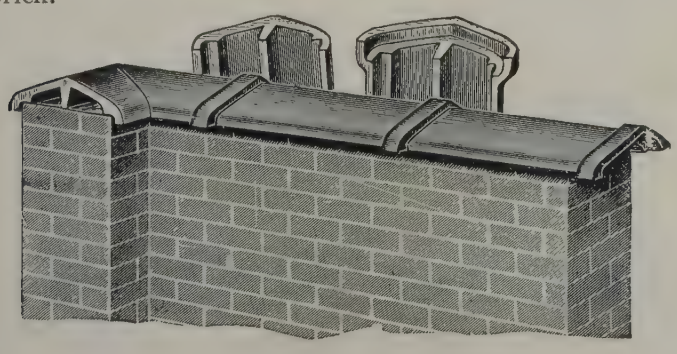
All shapes and sizes.



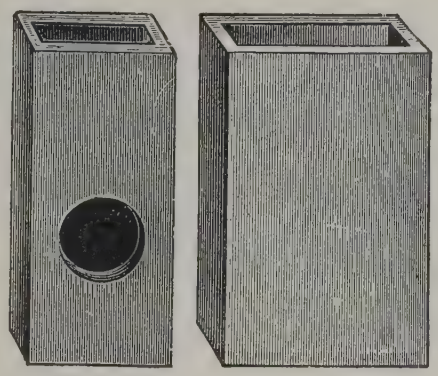
FIRE BRICK SIZES

Wall Coping

Made of best fire clay and shale, thoroughly vitrified, glazed to render surface as smooth as glass. Tile is shaped to fully cover wall, protecting same from action of the elements; also secures the top course of brick.



WALL COPING, HIP SHAPE
With or without rib



8½ x 13 in., pipe hole — 13 x 13 in.

FLUE LININGS

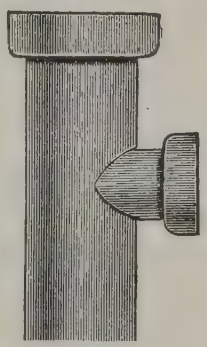
No. 14
CHIMNEY TOP

Sewer Pipe and Fittings

Made of vitrified salt glazed fire clay and shale.

The salt glazed surface, being smooth, clean and impervious, protects pipe and fittings from dampness, frost, all acids and sediments.

It is durable, low in cost, convenient for construction, and because of its smooth glazed surface has greater carrying capacity than any other material. It can be laid by unskilled labor.



SEWER PIPE
T-Branch

LIDDED PIPE
For conducting steam and water pipe

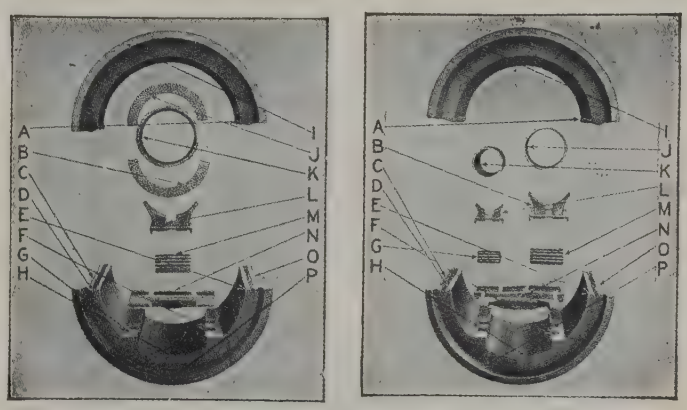


Plate E, Single Line — Plate F, Double Line

DETAIL OF CONDUIT

Reference letters point as follows:

Plates E and F—A, reinforcement inside along score cut on both sides of lid half; C, outer open scores; D, trenchlike fracture; E, inner open scores; F, support anchoring pocket; H, drainage space; I, hub of lid half; O, cement shelf and outer reinforcement at each side of lower half; P, hub of lower half.

Plate E, only—B and J, standard covering; K, 6-in. iron pipe; L, saddle receiving K, direct; M, 4⅛x2-in. toothed roller (meshes in rack of saddle and cradle); N, No. 15-F-15 cradle (the finger supported style).

Plate F, only—B, saddle for main line J; L, saddle for return line K; G, roller for return saddle; M, roller for main line saddle; N, No. 16-P-15-D cradle (the rib supported, boss-anchored style)

CLAY PRODUCTS COMPANY, INC.

Manufacturers of Ar-Ke-Tex Tile Including Insul-Glaz, Caentile, Cream Gloss and Mottled Tile

GENERAL OFFICE
BRAZIL, IND.

Products

AR-KE-TEX
ART-CERAMIC TEXTURE

TRADE-MARK

AR-KE-TEX TILE including the following:

INSUL-GLAZ TILE (Salt Glazed).
CAENTILE (Smooth and Wire-cut).
CREAM GLOSS TILE.
MOTTLED TILE.

Also manufacturers of Vitrified Glazed Clay Conduit, Building Conduit, Textured Interlocking Tile, Filter Bed Tile and Raggle Block.

Material

In Ar-Ke-Tex Tile it has been our aim to perfect a material for wall construction which combines the many advantages of structural tile with surface finishes, that in quality and appearance are acceptable for the highest class of projects. The following kinds of Ar-Ke-Tex Tile have a common base of vitrified fire clay and differ only in the texture of the finish.

Insul-Glaz Tile—Insul-Glaz Tile is a smooth face vitrified fire clay tile with a uniformly heavy salt glazed finish and of a color most desirable in this class of material.

Caentile—Caentile is a vitrified fire clay tile with colors and textures of the highest grades of buff and gray, smooth or matt face brick.

Cream Gloss Tile—Cream Gloss Tile is a vitrified fire clay tile with a lustrous, cream colored, salt glazed finish.

Mottled Tile—Mottled Tile is a vitrified fire clay tile with a mottled cream brown finish.

Qualities

All Ar-Ke-Tex Tile are made with the aim of attaining super quality. Due to unavoidable vacillations in heat some tile come out of the kiln with slight variations in texture and these are classed as commercial quality.

Super Quality—The standard of perfection of smooth face vitrified tile, glazed or unglazed.

Commercial Quality—A high grade vitrified tile, glazed or unglazed, suitable for many purposes.

Color

Insul-Glaz super quality tile is furnished in either a light, medium or dark shade. A range of shade will be furnished which blended in the wall will have an extremely light effect or a dark effect, as desired, and a ceramic beauty possible only with a slight mingling of shade.

Super Quality smooth Caentile is furnished in blended shades of buff gray or cream buff.

Matt Caentile and commercial grades of Insul-Glaz Tile and smooth Caentile are furnished in full range of shade only.

Cream Gloss Tile and Mottled Tile are furnished in a closely blended range of shade.

While every endeavor is made to furnish shapes of the same variations of shade as the standard units, greater latitude must be permitted, particularly on rush shipments.

Construction Features of Ar-Ke-Tex Tile

Ar-Ke-Tex Tile have many advantageous construction features. Among them the following stand out: fire, acid, oil and grease resistant; insulation quality; sanitary finish; high crushing strength and low dead weight; indestructibility; attractiveness of finish; economy and rapidity of erection; permanency of color and finish; readily cleaned; minimum upkeep; low relative cost.

Some of the Principal Uses

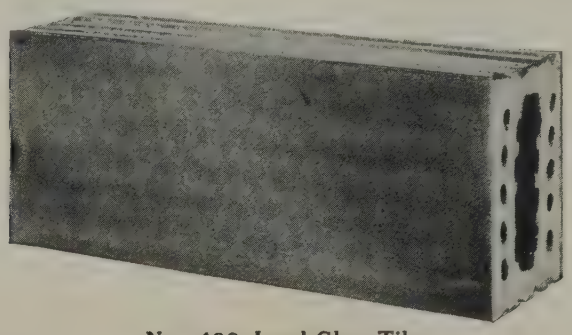
Among the principal uses of Ar-Ke-Tex Tile are: finishing rooms of public or semi-public buildings where one or more of the construction features listed above are a necessity. School buildings—particularly in corridors, playrooms, workshops, basements, gymnasiums, laboratories, lavatories; for wainscots, etc. Others include hotels, natatoriums, hospitals, food preparation plants, power plants, warehouses, etc.

Facilities and Service

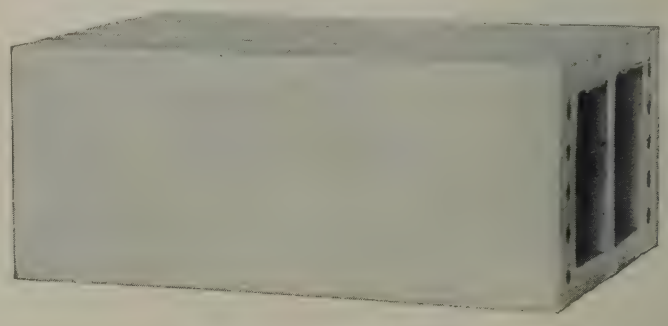
CLAY PRODUCTS COMPANY, INC. operates two plants with a combined capacity in excess of 125,000 tons per year. The plant locations are such that shipments can be made over any one of four trunk line railroads. Ample stocks of standard units are always on hand for prompt shipment.

The Company maintains an engineering department which is ready at all times to render assistance to the architect, engineer or builder in the solution of construction problems where Ar-Ke-Tex Tile may be involved.

Special sizes or shapes can be manufactured to meet unusual conditions.



No. 400 Insul-Glaz Tile



No. 800 Smooth Caentile

Continued on next page

Pertinent Data Regarding Ar-Ke-Tex Tile

Wall Thicknesses Which Can Be Built with Ar-Ke-Tex Units—*Veneer*—1⅜ and 1⅞ in. (exclusive of mortar backing).

Single Faced—3¾ and 8 in.

Double Faced—4¼, 6¼, 8, 10¼, 12¼, 16½ in. and up.

All walls from 4¼ in. may be of one finish of tile on one face and of a different finish of tile on the other face, e.g., a 4¼-in. wall may be Insul-Glaz Tile on one face and Caentile on the other face.

NUMBER OF AR-KE-TEX TILE REQUIRED PER SQUARE FOOT OF NET WALL

Thickness, in., of Veneer tile	Thickness, in., of Wall	Number of faces tile finished	Quantities required per sq. ft. of net wall, using ½-in. joints
1⅜	.....	1-veneer	1.05 No. 350
1⅞	.....	1-veneer	1.05 No. 250
.....	3¾	1	2.10 No. 400 or 1.05 No. 650
.....	4¼	2	2.10 No. 250
.....	6¼	2	1.05 No. 250 plus 2.10 No. 400
.....	8	1	2.10 No. 800
.....	8	2	4.20 No. 400 or 2.10 No. 650
.....	10¼	2	1.05 No. 250 plus 2.10 No. 800
.....	12½	2	2.10 No. 400 plus 2.10 No. 800
.....	16½	2	4.20 No. 800
.....	12¼	1-other face brick veneered; brick header every 6th course	0.70 No. 400 plus 1.40 No. 800 plus 7 face and 1 common brick.

Brick Displacement—Brick displaced by Ar-Ke-Tex Tile equal 5x8x12-in. tile, 6 brick and 5x4x12-in. tile, 3 brick.

Crushing Strength—Approximately 3400 per sq. in. of gross bearing surface.

Absorption—Less than 5% of own weight in 48 hours.

Weight of Wall—Weight of Ar-Ke-Tex Tile walls as compared to brick of equal thickness are given in the following table:

Ar-Ke-Tex-Tile		Equivalent Brick Wall*
Wall thickness, in.	Weight per sq. ft., lb.	Weight per sq. ft., lb.
4¼	35	43
6¼	55	84
8	60	84
12½	95	125

*Brick taken at 125 lb. per cu. ft.

Mortar Clinch—The ½-in. round holes in the exterior webs of the tile assure a permanent mortar clinch in the vertical joints of the tile wall, an important factor in exposed tile construction.

Hand Smoothed Edges—All cut edges are hand smoothed, in the green, so that finished faces will be free from any roughness or featheredges, which are not only unsightly but cause chipping.

Mortar and Mortar Color—Ar-Ke-Tex Tile may be laid in any kind of mortar made according to good practice with joint size and color to suit the individual taste of the architect or his client.

Double Faced Walls—It is not recommended that double faced walls be built of one tile extending through the wall, but rather of two units as shown in details on plates following.

This procedure will permit of alignment of both faces at a cost no higher than would be necessary with two-faced sorting.

Tests—The testing laboratory of the University of Wisconsin has made a series of tests on Ar-Ke-Tex Tile (Insul-Glaz and Caentile). Copies of the reports of test will be sent upon request.

The following results of tests on three blocks are taken from one of the certified reports:

TEST ON STANDARD 5x8x12-IN. BLOCK

No.	Strength per sq. in.	*Percent of voids	Weight, lb.	Weight after 48 hr. immersion, lb.
Clay P. C. 4	3950	45.3	20.00	20.15
Clay P. C. 5	3690	44.5	19.02	19.13
Clay P. C. 6	3700	45.4	19.73	19.80

*Not including 10 small round holes lengthwise, 5 in each vertical web.

Sorting, Packing and Shipping

Ar-Ke-Tex Tile are sorted for one face only, except No. 250's, 350's and 650's and shapes which are sorted for faces as marked on details.

Ar-Ke-Tex Tile are packed in the car with extreme care and thoroughness.

Super quality tile of all finishes are individually wrapped in corrugated board. Commercial quality tile are packed with lath gates between tiers; lath and straw between rows and corrugated board between faces.

Shipped by carload lots the minimum loadings are—

No. 800, 5x8x12 in., 3500 pieces

No. 400, 5x4x12 in., 5000 pieces

No. 650, combination 5x8x12 in. and 5x4x12 in., 3000 pieces.

Samples

Samples of any kind of Ar-Ke-Tex Tile will be sent, without charge to architects on request.

When Specifying

When specifying, give kind of material, quality, color range, whether bullnose or square closures, and whether cove base and wainscot cap units are desired.

References

The varied character of the buildings listed below indicate the possibilities and the wide uses to which Ar-Ke-Tex Tile can be applied.

Building and Location	Architect
Power Plant, U. S. Bureau of Standards, Washington, D. C.	W. H. I. Deming
Campbell Soup Co., Manufacturing Bldg., and Powerhouse, Camden, N. J.	Battey & Kipp
Campbell Soup Co., Manufacturing Bldg. Warehouse and Power Plant, Chicago, Ill.	Battey & Kipp
8 Sub-stations, Duquesne Light Co., Pittsburgh, Pa.	Byllesby Eng. & Mgmt. Corp.
Hydro Electric Plant, Northern States Power Co., Chippewa Falls, Wis.	Byllesby Eng. & Mgmt. Corp.
8 Sub-stations, Cincinnati Street Railway Co., Cincinnati, Ohio	Harry Hake and C. H. Kuck, Associate
Industrial School, Boston, Mass.	Stone & Webster
Lasell Gymnasium, Williams College, Williamstown, Mass.	Densmore, LeClear & Robbins
Power Plant, University of Texas, Austin, Tex.	Herbert M. Greene Co.
Gymnasium, Miss Chapin's School, New York, N. Y.	Delano & Aldrich
Y. M. C. A., Schenectady, N. Y.	Hemmil & Corbett
Y. W. C. A., Washington, D. C.	Arthur B. Heaton
Eastman School of Music, Gymnasium, Rochester, N. Y.	Gordon & Kaelber
Grand Haven (Mich.) High School	Warren-Holmes-Powers Co.
Stauffer's Restaurant, Pittsburgh, Pa.	Janssen & Cocken
Fisher Building, Detroit, Mich.	Albert Kahn, Inc.
N. W. Bell Telephone Bldg., Davenport, Iowa	Seth J. Temple
Penn. Motor Inn, Indianapolis, Ind.	Bishop, Knowlton & Carson
Pevely Dairy, St. Louis, Mo.	C. G. Schoelch Co.

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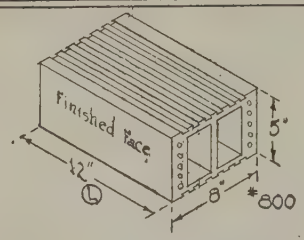
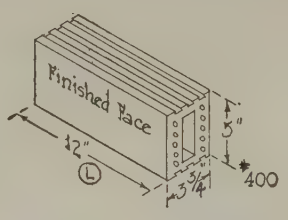
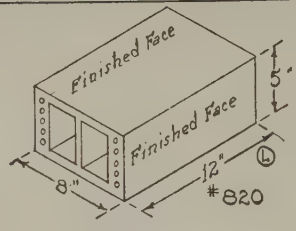


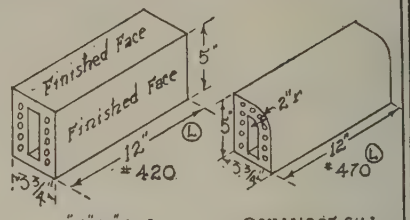
STANDARD 5"x8"x12" STRETCHER
*400 AND *800 SELECTED FOR ONE FACE ONLY



STANDARD 5"x4"x12" STRETCHER

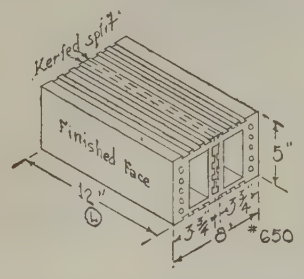


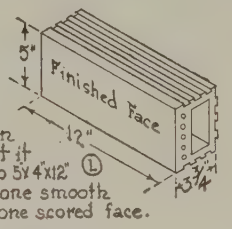
5"x8"x12" SILL (OR LINTEL) TILE
SELECTED FOR TWO ADJACENT FACES ALSO FURNISHED IN 4-6 & 8 INCH LENGTHS (L)



5"x4"x12" SILL (OR LINTEL) TILE
SELECTED FOR TWO ADJACENT FACES — ALSO FURNISHED IN 4-6 & 8 INCH LENGTHS (L)

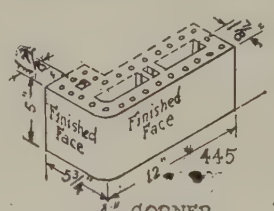
BULLNOSE SILL (OR LINTEL) STRETCHER TILE
ALSO FURNISHED IN 4-6 & 8 INCH (L) SHORT LENGT





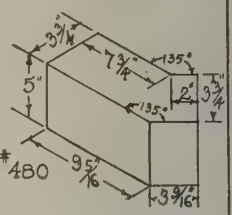
Note: When *650 is split it makes two 5"x4"x12" tile each one smooth face and one scored face.

COMBINATION 5"x8"x12" AND 5"x4"x12" TILE
*600-12"L - SELECTED ONE-FACE EQUALS ONE SUPER-QUALITY 5"x8"x12" OR ONE SUPER-QUALITY 5"x4"x12" AND ONE COMMERCIAL 5"x4"x12". *650-12"L - SELECTED TWO-FACE EQUALS TWO SUPER-QUALITY 5"x4"x12".

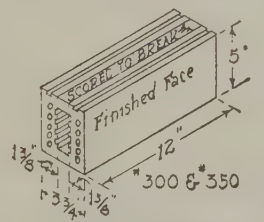


4"-CORNER BULLNOSE KERFED
METHOD OF KERFING FOR USE WITH *250 TILE

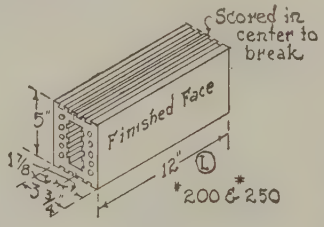
RIGHT OR LEFT BULLNOSE STARTER TILE.
FOR USE WITH BULLNOSE JAMB & BULLNOSE SILL (OR LINTEL)



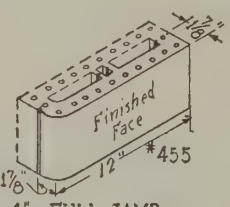
COMBINATION INT & EXT. OCTAGONAL CORNER



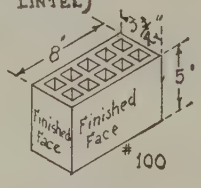
SLAB TILE
SELECTED FOR
*300 FOR 1-5"x12" FACE
*350 FOR 2-5"x12" FACES



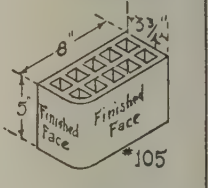
KERFED TILE
SELECTED FOR
*200 FOR 1-5"x12" FACE
*250 FOR 2-5"x12" FACE



4"-FULL JAMB BULLNOSE KERFED
METHOD OF KERFING FOR USE WITH *250 TILE



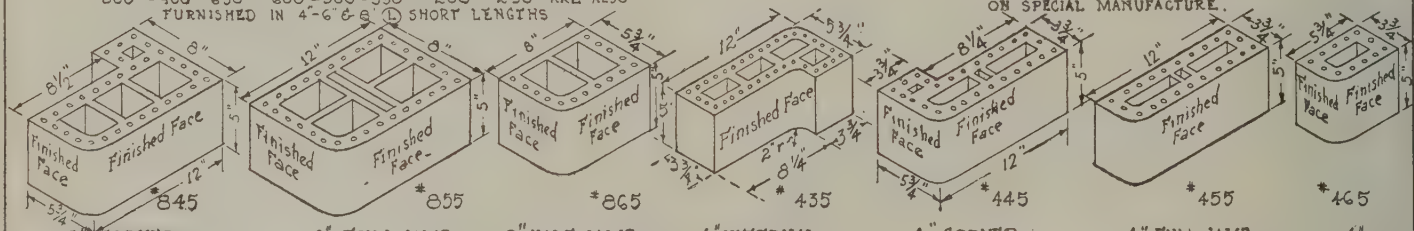
5"x4"x8" HEADER
SELECTED FOR TWO ADJACENT FACES



5"x4"x8" HEADER BULLNOSE
SELECTED FOR TWO ADJACENT FACES

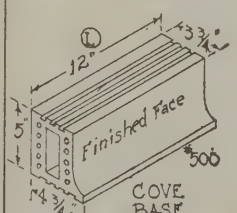
*100 IS THE ONLY STANDARD CLOSURE UNIT FURNISHED WITH MATT FACE TILE.
ONE USE OF 5"x4"x8" HEADER IS TO BREAK BOND OF STRETCHER TILE AT 4" & 8" POINTS.
HALF HEADER TILE 5"x3¾"x3¾" MAY BE SECURED ON SPECIAL MANUFACTURE.

*800 - *400 - *650 - *600 - *300 - *350 - *200 - *250 ARE ALSO FURNISHED IN 4-6 & 8 (L) SHORT LENGTHS

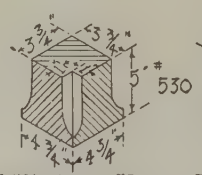


8" CORNER BULLNOSE | 8" FULL JAMB BULLNOSE | 8" HALF JAMB BULLNOSE | 4" INTERNAL CORNER BULLNOSE | 4" CORNER BULLNOSE | 4" FULL JAMB BULLNOSE | 4" HALF-JAMB BULLNOSE

THESE UNITS (EXCEPT *435) CAN ALSO BE FURNISHED AS SQUARE CLOSURES AND ARE DESIGNATED *840-850-860-440-450 & 460 RESPECTIVELY.

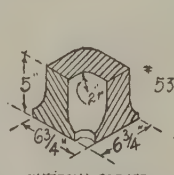


COVE BASE
STANDARD LENGTH (L) - 12"

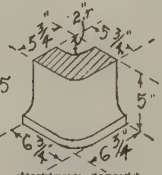


INTERNAL CORNER SQUARE

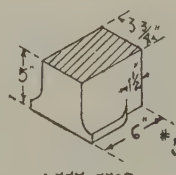
EXTERNAL CORNER SQUARE



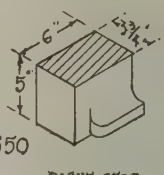
INTERNAL CORNER, BULLNOSE



EXTERNAL CORNER BULLNOSE

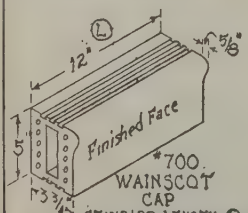


LEFT STOP

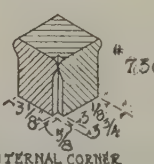


RIGHT STOP

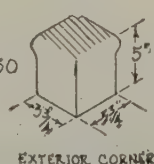
COVE BASE COMBINATION CORNERS AND STOPS (SHADED PORTIONS SHOW UNFINISHED FACES)



WAINSCOT CAP
STANDARD LENGTH (L) - 12"
500 & 700 ARE ALSO FURNISHED IN 4-6-8 (L) SHORT LENGTHS.



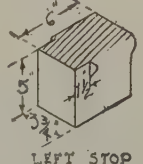
INTERNAL CORNER SQUARE



EXTERIOR CORNER SQUARE

INTERNAL CORNER BULLNOSE

EXTERNAL CORNER BULLNOSE



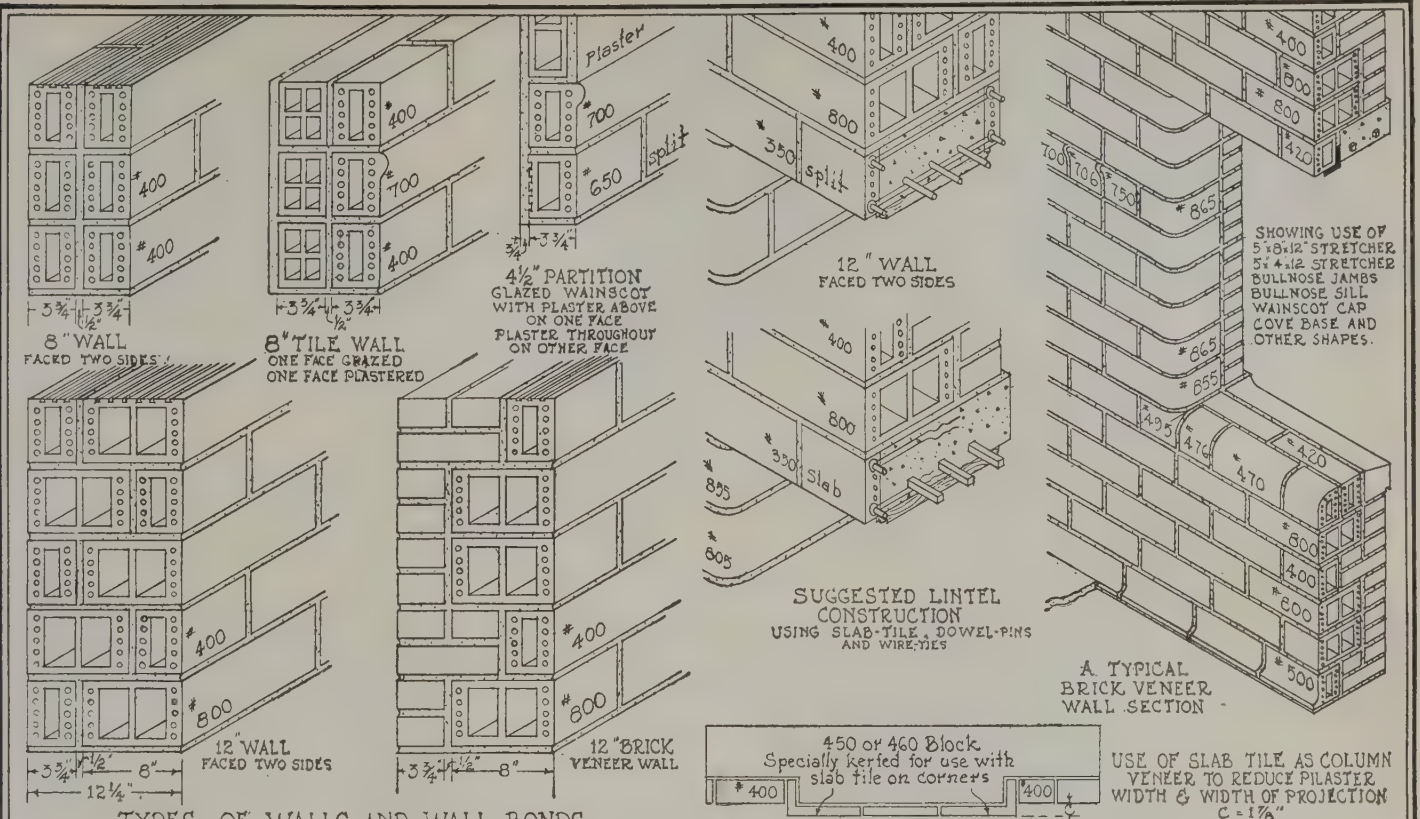
LEFT STOP

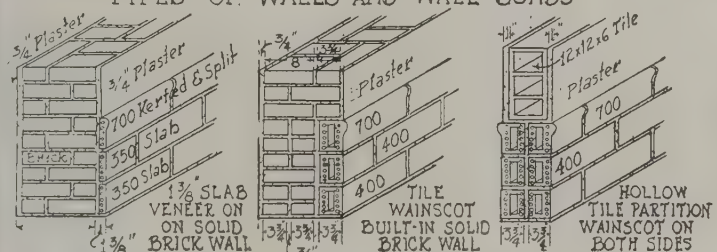
RIGHT STOP

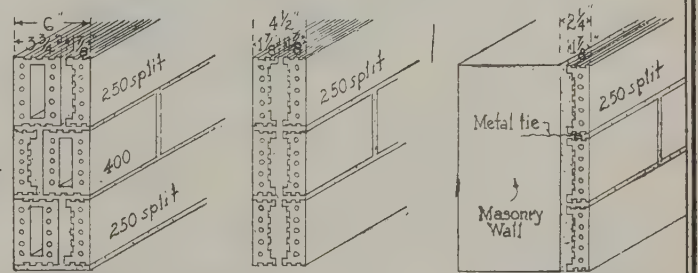
WAINSCOT CAP COMBINATION CORNERS AND STOPS

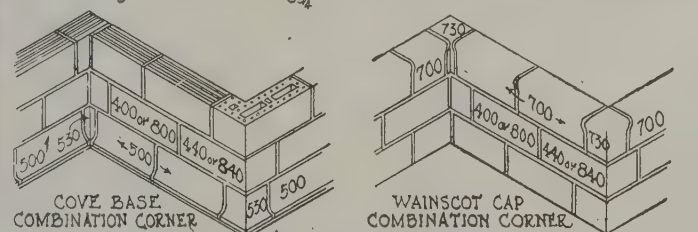
DRAWN BY SWEETS CATALOGUE SERVICE	STANDARD STRETCHER AR-KE-TEX UNITS AND SHAPES	NOT DRAWN TO SCALE AUG. 31, 1927	DRWG 1

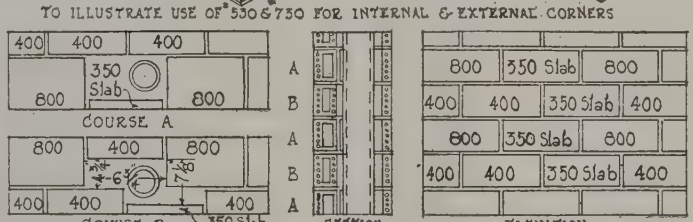
Continued on next page





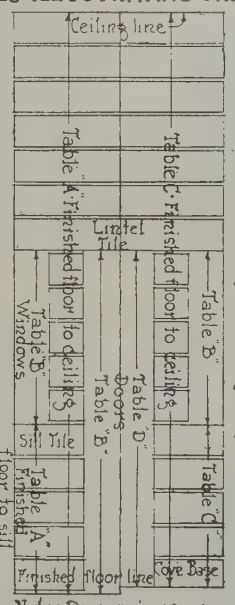






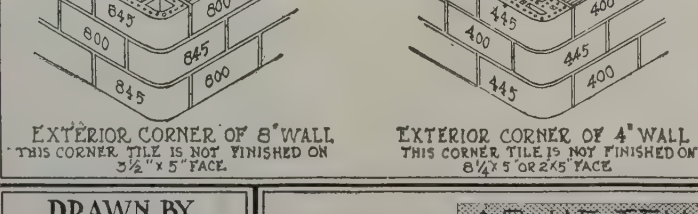
SUGGESTED STANDARD OPENING WIDTHS

0-4"	6-5
0-8½	6-3½
1-0½	6-7
1-1	6-11½
1-4½	7-3½
1-9	7-4
2-1	7-7½
2-1½	8-0
2-5	8-4
2-9½	8-4½
3-1½	8-8
3-2	9-0½
3-5½	9-4½
3-10	9-5
4-2	9-8½
4-2½	10-1
4-6	10-5
4-10½	10-5½
5-2½	10-9
5-3	11-1½
5-6½	11-5½
5-11	11-6



No. of Courses	Table "A"	Table "B"	Table "C"	Table "D"
1	0-5½	0-6	0-4⅞	0-4⅞
2	0-11	0-11½	0-9¾	0-10⅛
3	1-4½	1-5	1-3⅝	1-3⅞
4	1-10	1-10½	1-8⅜	1-9⅜
5	2-3½	2-4	2-2⅞	2-2⅞
6	2-9	2-9½	2-7⅜	2-8⅜
7	3-2½	3-3	3-1⅞	3-1⅞
8	3-8	3-8½	3-6¾	3-7⅜
9	4-1½	4-2	4-0⅜	4-0⅞
10	4-7	4-7½	4-5⅞	4-6⅜
11	5-0½	5-1	4-11⅜	4-11⅞
12	5-6	5-6½	5-4⅞	5-5⅜
13	5-11½	6-0	5-10⅜	5-10⅞
14	6-5	6-5½	6-3⅜	6-4⅜
15	6-10½	6-11	6-9⅜	6-9⅞
16	7-4	7-4½	7-2⅞	7-3⅜
17	7-9½	7-10	7-8⅜	7-8⅞
18	8-3	8-3½	8-1⅜	8-2⅜
19	8-8½	8-9	8-7⅜	8-7⅞
20	9-2	9-2½	9-0⅜	9-1⅜
21	9-7½	9-8	9-6⅜	9-6⅞
22	10-1	10-1½	9-11⅝	10-6⅜
23	10-6½	10-7	10-5⅜	10-5⅞
24	11-0	11-0½	10-10⅝	10-11⅜
25	11-5½	11-6	11-4⅜	11-4⅞
26	11-11	11-11½	11-9⅜	11-10⅜
27	12-4½	12-5	12-3⅜	12-3⅞
28	12-10	12-10½	12-8⅜	12-9⅜
29	13-3½	13-4	13-2⅜	13-2⅞
30	13-9	13-9½	13-7⅛	13-8⅜
31	14-2½	14-3	14-1⅜	14-1⅞
32	14-8	14-8½	14-6⅞	14-7⅜
33	15-1½	15-2	15-0⅜	15-0⅞
34	15-7	15-7½	15-5⅜	15-6⅜
35	16-0½	16-1	15-11⅜	15-11⅞
36	16-6	16-6½	16-4⅞	16-5⅜
37	16-11½	17-0	16-10⅜	16-10⅞
38	17-5	17-5½	17-3⅜	17-4⅜
39	17-10½	17-11	17-9⅜	17-9⅞
40	18-4	18-4½	18-2⅞	18-3⅜

Note: Dimensions are subject to slight variations to be taken up in the joints



DRAWN BY SWEETS CATALOGUE SERVICE

DETAILS AR-KE-TEX OF CONSTRUCTION

AR-KE-TEX ARCHITECTURAL CERAMIC TEXTURES

SCALE: 3/8" & 3/4" EQUALS 1 FT. AUG. 26, 1927

DRWG 2

HEATH CUBE SERVICE, INCORPORATED

A Service Organization Maintained by the Licensed Distributors of Heath Cubes

1200 Baker Building

MINNEAPOLIS, MINN.

LICENSED PRODUCERS AND DISTRIBUTORS

Eastern

NEW YORK, N. Y., Heath Cube Sales, Inc., 101 Park Avenue
WASHINGTON, D. C., United Clay Products Company
PITTSBURGH, PA., Martin Brick Company
CLEVELAND, OHIO, Cleveland Builders Supply & Brick Co.
COLUMBUS, OHIO, Nelsonville Brick Company
BASCOM, OHIO, J. A. Miller Tile Company

Southern

CORAL RIDGE, KY., Coral Ridge Clay Products Company
JACKSONVILLE, FLA., Interlocking Tile Company
EL PASO, TEX., International Brick Company
DALLAS, TEX., Fraser Brick Company

Central

MINNEAPOLIS, MINN., Heath Cube Sales Co., Baker Building
SHEFFIELD, IOWA, Sheffield Brick & Tile Company
ROCKFORD, IOWA, Rockford Brick & Tile Company
LINCOLN, NEB., Western Brick & Supply Company

Western

SAN FRANCISCO, CALIF., N. Clark & Sons
LOS ANGELES, CALIF., Los Angeles Pressed Brick Co.
SPOKANE, WASH., American Fire Brick Company
TACOMA, WASH., Far West Clay Company

Patents

The Heath Cube system of construction is completely patented in the United States and Canada. Rights to manufacture and sell under Heath patents in the United States are granted by the Heath Unit Tile Company, Tacoma, Washington.

The Product

The Heath Cube is a standardized hollow tile building unit, cubical in shape, dimensioned according to the established measurement of brickwork. Its size, exactly that of six brick assembled with mortar to form a cube, permits the substitution of Heath Cubes wherever brick has been figured. Strength is provided by complete double-web-and-shell alignment and perfect two-way bond.

The simplified form of construction possible through the use of Heath Cubes brings with it marked economies—in fact, the Heath Cube offers an entirely new and efficient solution to all structural masonry problems.

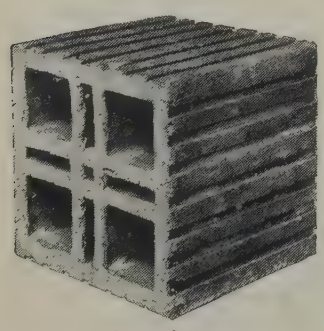
A New Principle in Masonry Construction

It is the universal adaptability of the Heath Cube with its basic brick dimensions that makes it entirely unique as a unit for masonry construction. The easy divisibility of the Heath Cube permits the use of a Header-Cube for brick backup, and Half and Quarter-Cubes wherever proper bonding or structural details may require.

With the Heath Cube it is possible to build an all-tile wall regardless of the number of openings, piers, pilasters, chases or corners. Brick patchwork is entirely eliminated. All elements become an integral part of a complete and perfect tile structure. Incidentally, the complete tile wall, free from danger of efflorescence experienced with brickwork, makes by far the more satisfactory plastering surface.

Economy

The economy of Heath Cube construction begins with the simplicity of the Cube itself. No units are required other than the basic Cube and its fractional parts. The usual 15% to 25% brick patchwork is eliminated. Because Heath Cubes may be either end-set or side-set, there is no slushing of exposed voids with mortar. No special tile shapes are needed. Not only does the use of Heath Cubes result in a saving of material—but it greatly simplifies the operations of the mason. The Heath System is the most satisfactory and the least expensive form of masonry construction.



One Cube
18 pounds

Strength

Two exclusive and unique features give to Heath Cube masonry its great strength. First, whether in side-set or end-set construction there is always fixed double-web-and-shell alignment. Since vertical joints are approximately the same width as the space between the double webs, direct vertical alignment of webs and shells results. It would be impossible to build a properly bonded wall without this complete alignment. A perfect two-way bond, eliminating continuous vertical joints, is the second vital factor contributing strength.

Quality Standards

Manufacturers have been selected to make Heath Cubes on their ability to produce high quality products. The required quality conforms to the specifications of the Hollow Building Tile Association and of the American Society for Testing Materials. Heath Cubes are of a uniformly high quality throughout the United States.

Design Data

120 lb. per sq. in. gross area, is the safe working load for either side-set or end-set construction.

Webs and shells are ⅝ in. thick. The Cube contains 52% solids and 48% voids.

One cubic foot of Heath Cube masonry weighs 63 lb.

Heath Cubes—Forms Supplied

Heath Cubes are furnished in either whole or factional units as illustrated on the next page. Ordering a sufficient number of Header-Cubes will save time and possible waste on the job. Since two Half-Cubes can be set in place of one whole Cube it is advisable to make your estimate on this shape generous. Quarter-Cubes can be split from Half-Cubes as needed. In any case the whole Cube is always divisible into any shape on the job.

Cubes are ordinarily furnished with all four faces scored. Where desired however, they may be obtained with one or more faces smooth or with texture surfaces.

Architect's Handbook

Complete details, specifications, and full information on Heath Cube masonry have been assembled in convenient reference form. Write the Heath Cube Service, Incorporated, or your nearest distributor for a copy of the Architectural Handbook on Heath Cube Masonry. It is fileable.

Miniatures

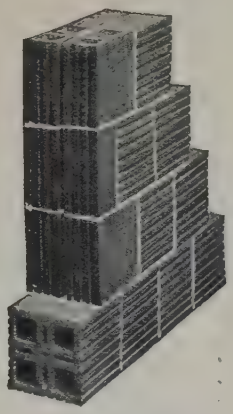
Miniature Heath Cubes are available for studying and planning details of construction. Architects desiring these should address the nearest Heath Cube distributor.

Six Brick
30 pounds

Continued on next page

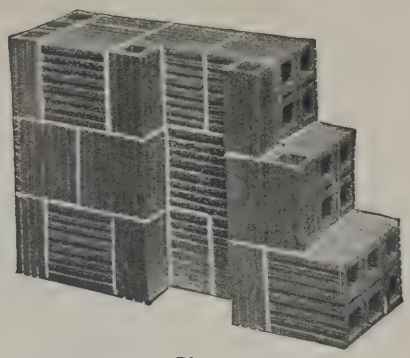
Junctions

This shows an 8-in. Cube wall joining a 12-in. Cube wall with perfect bond relation



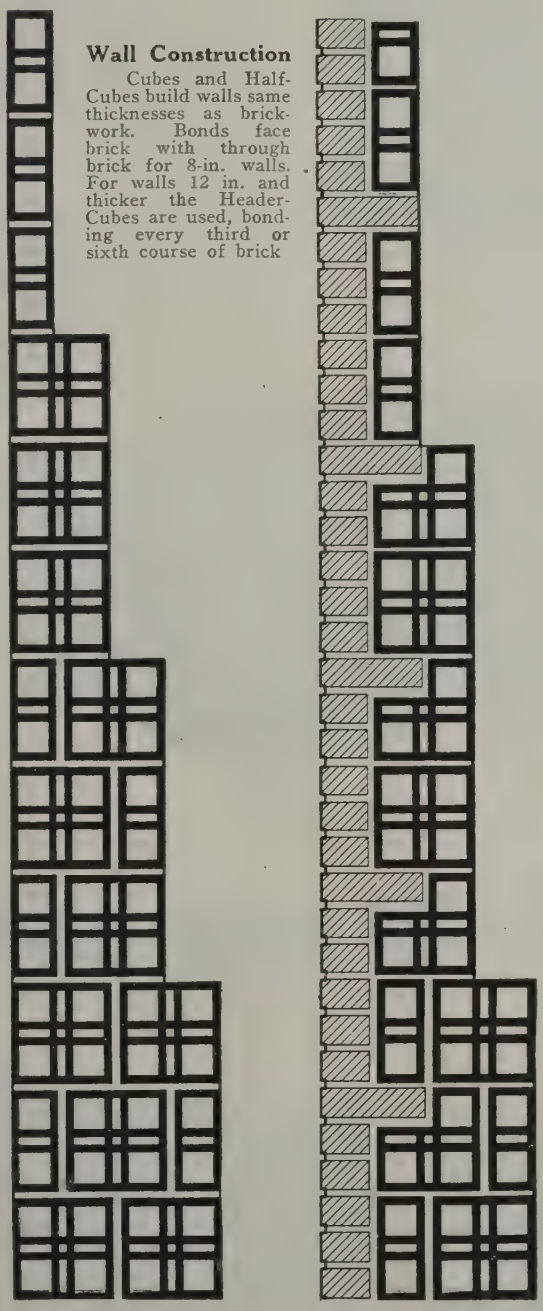
Metal Sash

The adaptability of the Cube is well illustrated by this jamb with a continuous joint in which metal sash may be built without impairing the full strength of the wall structure



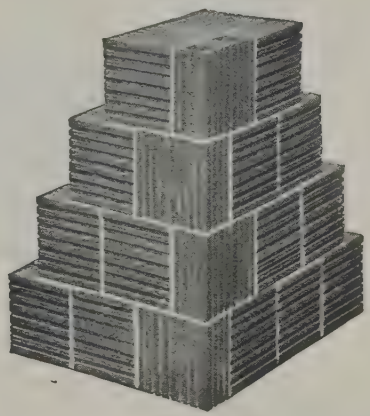
Chases

This shows how a chase may be built into a Heath Cube wall. Notice the absence of open voids and preservation of bond structure



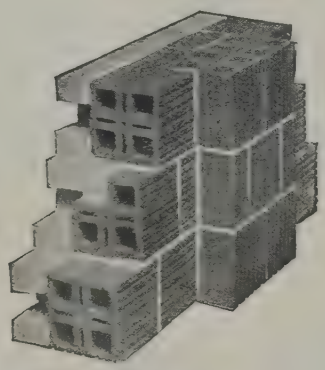
Wall Construction

Cubes and Half-Cubes build walls same thicknesses as brickwork. Bonds face brick with through brick for 8-in. walls. For walls 12 in. and thicker the Header-Cubes are used, bonding every third or sixth course of brick



Corners

Corners for walls of all thicknesses are built by end-setting the Half-Cubes and starting off the whole Cubes in perfect running bond

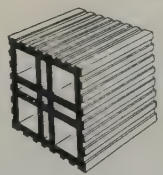


Backup

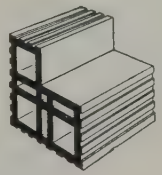
In the construction of pilasters and fireproofing around columns, whole Cubes and Half-Cubes bond perfectly with the Cube and Header-Cube backing

Closures

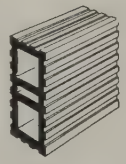
Note how the closures and chase illustrated in this figure are built with a regular Cube and Half-Cube without the use of special shapes or brick patchwork



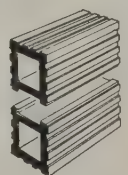
The Basic Cube



Header-Cube



Half-Cube



Quarter-Cubes

HEATH CUBE MASONRY CONSTRUCTION

HOOSIER BUILDING TILE & SILO CO.

Glazed Tile for Interior and Exterior Wall Construction

ALBANY, IND.

Hoosier Interior Tile

Made from our light-burning fire clay, burned to an extreme degree of hardness.

Colors—Light or dark buff, gray or cream shades.

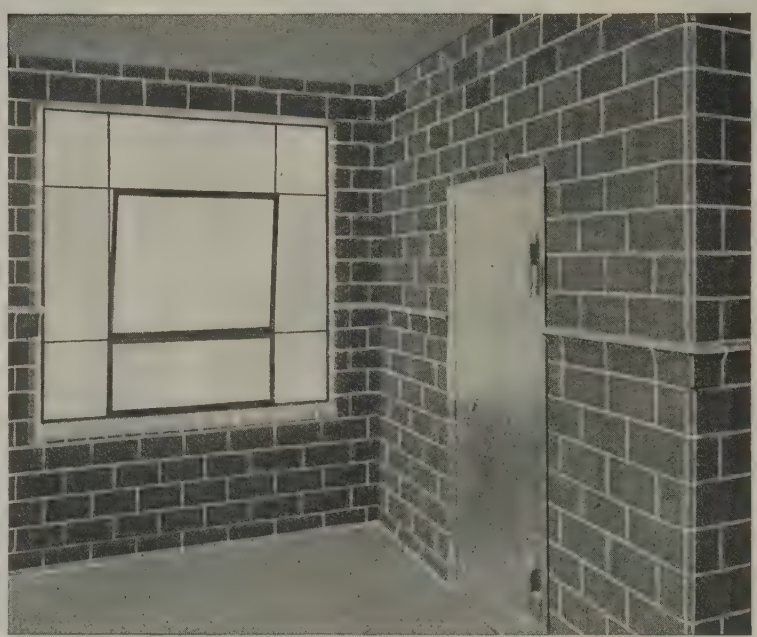
Finish—Smooth or wire-cut glazed, or semiglazed. All smooth finish product for interior wall construction has hand dressed edges.

Size—5x12-in. face. Furnished in 4 and 8-in. widths in regular or scored-to-split designs for working out different thicknesses of wall. (See accompanying illustration of blocks. Details of measurement on following page.)

Uses—The principal use of Hoosier interior tile is for sanitary walls in public and semi-public buildings. In school buildings it is particularly appropriate for corridors, workshops, basements, gymnasiums, laboratories, lavatories, etc., where it is used as wainscoting. This material is also used quite extensively in power plants, warehouses, storerooms, factories, packinghouses, etc. We recommend our light gray and cream colors in the semiglazed finish for use above wainscot or in wall construction where the reflection of glazed tile would be undesirable.

Grading—Hoosier interior tile is graded as "A," "B" and "C" grades. "A" grade is our standard of perfection. "B" grade is a good quality product, not sorted as to shade and admitting of certain mechanical defects not allowable in "A" quality in either the glazed or semiglazed finish. "C" grade consists of culls or, as they are sometimes termed, seconds. (Write for special detailed sheet.)

Loading and Packing—Hoosier interior "A" grade tile is packed with corrugated paper between faces and lath or paper between ends. "B" and "C" grades will be packed in straw unless otherwise agreed on.



Interior Wall of Hoosier Tile

Interior and exterior corners, wainscot cap and base with base in connection with window and door openings. Special shapes can be furnished for Hoosier interior wall tile construction.

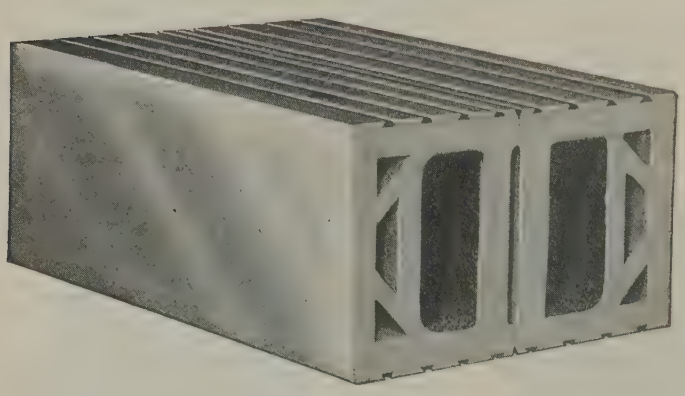
Hoosier Exterior Tile

In light colors it is made from our light-burning clay and in dark colors from our dark-burning clay; thoroughly vitrified and furnished in salt-glazed, semiglazed and dull finish.

Colors—Light or dark brown, gray, cream, wine-black and special mixtures, all of which are designated by shade numbers.

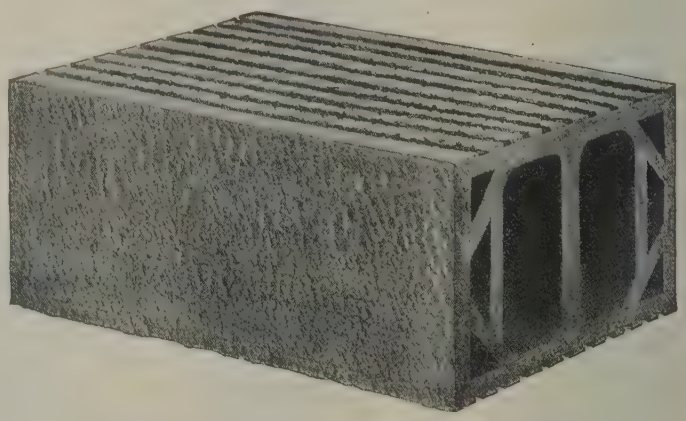
Finish—Smooth or wire-cut glazed, or semiglazed.

Size—5x12-in. face, furnished in 4, 8 and 12-in. widths. (See illustrations at bottom of page.)

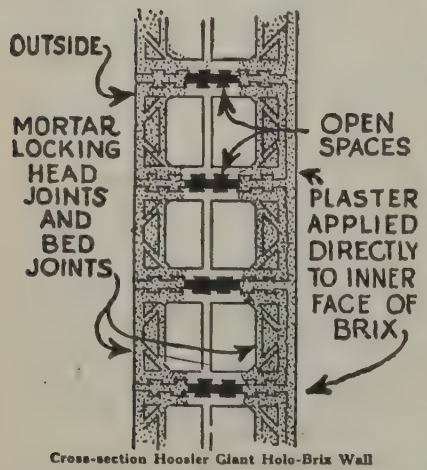


Smooth Glaze 8x5x12-in. Stretcher

Kerfed to make two 4-in. blocks with two finished faces

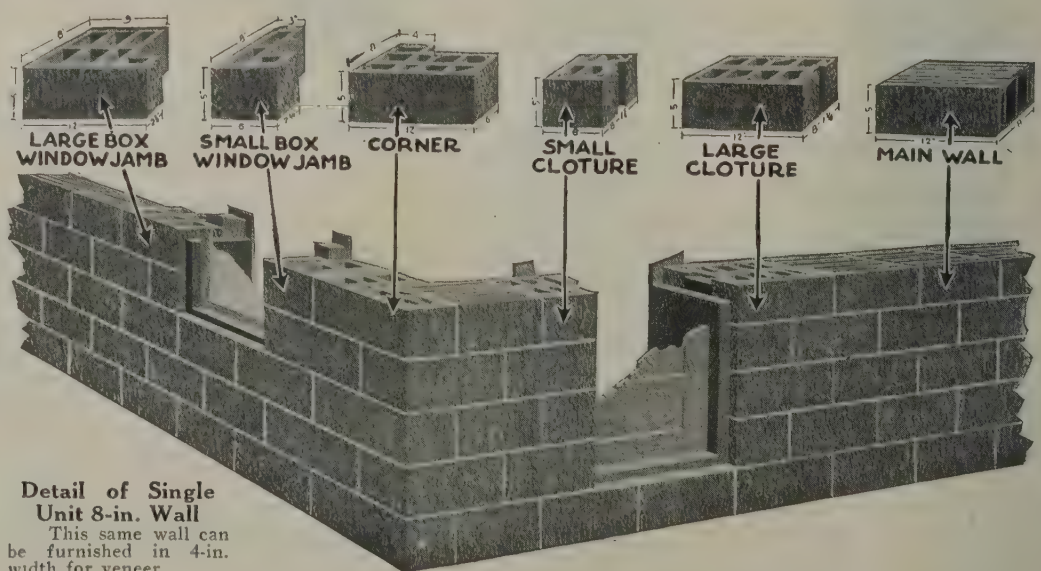


Regular 8x5x12-in. Matt Finish Stretcher



Cross-section Hoosier Giant Holo-Brix Wall

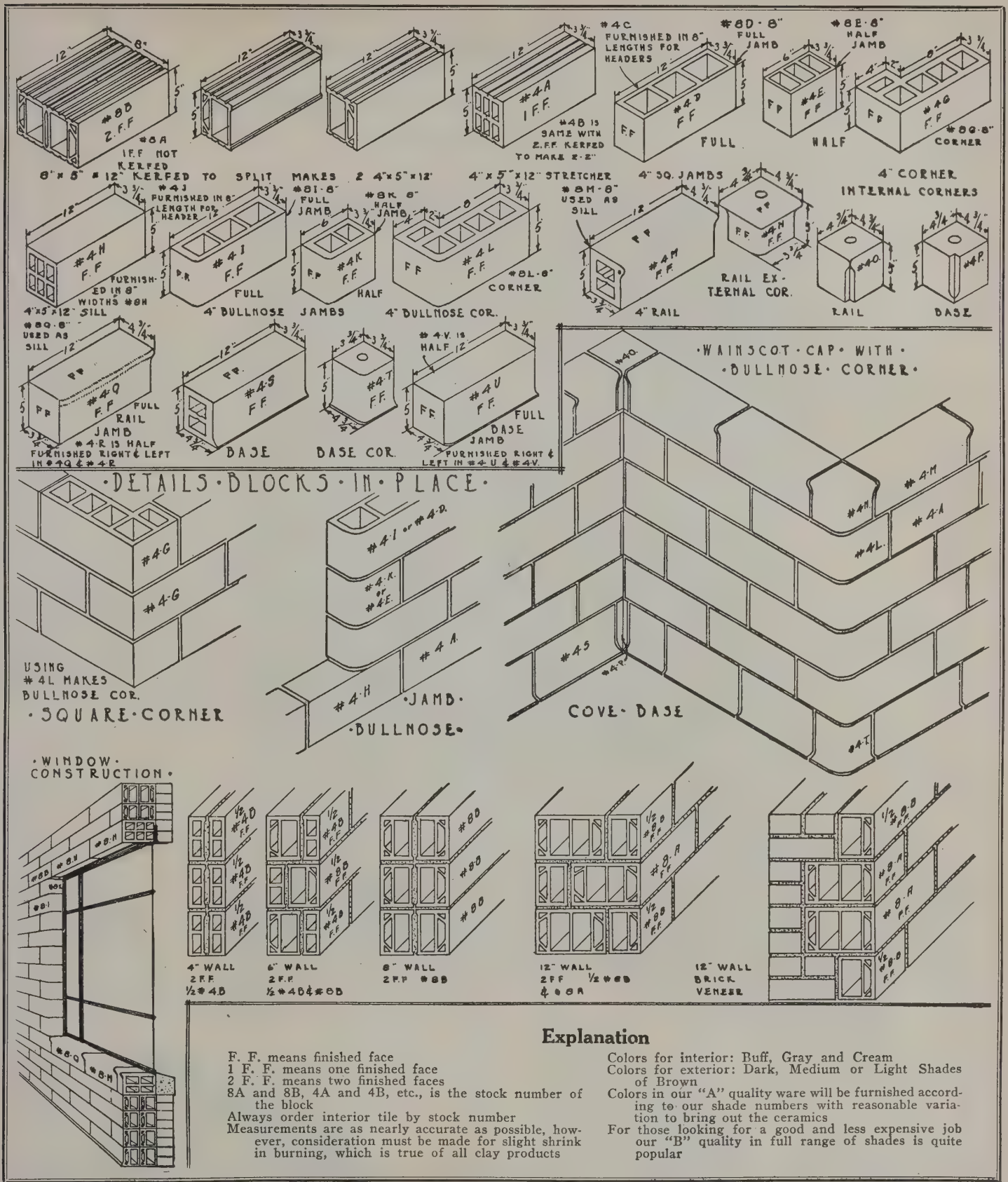
Cross Section of Single Unit 8-in. Wall



Detail of Single Unit 8-in. Wall

This same wall can be furnished in 4-in. width for veneer

Continued on next page



Explanation

F. F. means finished face
1 F. F. means one finished face
2 F. F. means two finished faces
8A and 8B, 4A and 4B, etc., is the stock number of the block
Always order interior tile by stock number
Measurements are as nearly accurate as possible, however, consideration must be made for slight shrink in burning, which is true of all clay products
Colors for interior: Buff, Gray and Cream
Colors for exterior: Dark, Medium or Light Shades of Brown
Colors in our "A" quality ware will be furnished according to our shade numbers with reasonable variation to bring out the ceramics
For those looking for a good and less expensive job our "B" quality in full range of shades is quite popular

Special Shapes for Interior Wall Construction

Uses—Hoosier wire-cut or mat-finish tile is used quite extensively for exterior finished wall in public buildings, such as churches, offices, storerooms, apartments, etc., and also in the more massive type of residence construction. Our smooth-glaze tile, in dark brown colors, we recommend for use in the construction of garages, factories, sidewalls of storerooms, basement walls, or in any class of building wherein line brick or cement block would be considered.

Grading—Hoosier exterior tile is graded as to first and second quality. Our first quality is our standard of perfection in this class of ware and is graded in different shades and blends, all of which are specified by shade number. Our second quality is a hard-burned product. No attempt is made to sort as to shade, and defects are admitted which are not allowable in our first quality. This grade will make a good wall in cases wherein appearance would not be considered.

Loading and Packing—All Hoosier exterior tile is loaded with straw between faces and ends. (Send for special color chart showing shades.)

Construction Features of Hoosier Tile

May be summed up as follows:

A crushing strength of more than 2000 lb. per sq. in., with a moisture test of less than 3%, make the product adaptable to load bearing finished walls. All tile are 5x12-in. face, with proper units to work in connection with openings to make bond. (See drawings.)

Walls can be built in any multiple of 2 in. in width. Our 4 and 8-in. widths are the most popular. The former equals three brick and the latter, six. The unit is of such size that it lays up fast, eliminating unnecessary mortar joints and thereby saving both labor and mortar. As a natural consequence, there is a saving of from 20% to 30%, as compared to brick.

In addition, are the advantages, of a hollow wall for insulation and the sanitary features of a hard-burned, glazed and non-absorbent wall with a load weight reduction of approximately 40% as compared with brick construction—a wall with an appealing and distinctive beauty that very much resembles brick in construction.

HENRY MAURER & SON

Manufacturers of Terra Cotta Hollow Tile Fireproofing

TELEPHONE
ASHLAND 1510

420 East Twenty-third Street
NEW YORK, N. Y.
PLANT, MAURER, NEW JERSEY

Products

"RARITILE" Enclosure Blocks for walls faced with brick. Standard sizes of INTERIOR PARTITION BLOCKS, WALL FURRING, and WALL BEARING BLOCKS.

For Fire Brick, see page C3122.

Quality

Deservedly reputed of best quality and workmanship, true to size and shape, with minimum tendency to breakage.

Facilities

Extensive clay mines adjacent to plant premises, owned, developed and operated by the company; plant located on tidewater in New York Harbor and two railroads (Central Railroad of New Jersey and Lehigh Valley R. R.) insures prompt shipment by boat or rail; motor truck deliveries direct to building give uninterrupted supply for work in progress. Modern and complete machinery and equipment afford ample provision for the largest contract requirements.

Backing Tile

The "Raritile" is a backing system of simple design, and yet possesses every desirable feature sought by architects, engineers and owners. Only one size of block is used, making an ideal construction from a standpoint of permanence, simplicity and economy.

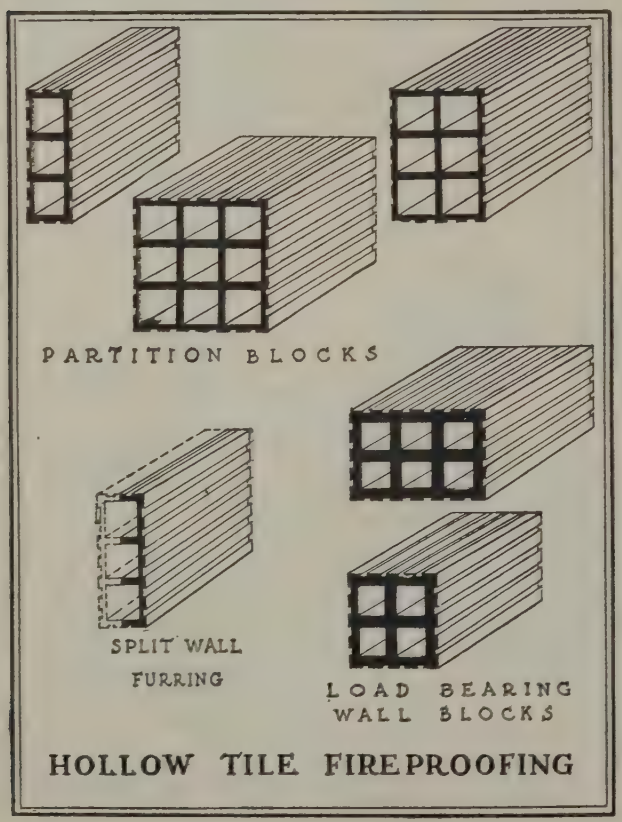
The webs and shells run vertically in perfect alignment, backing up both the stretcher and header face brick, with resultant maximum strength.

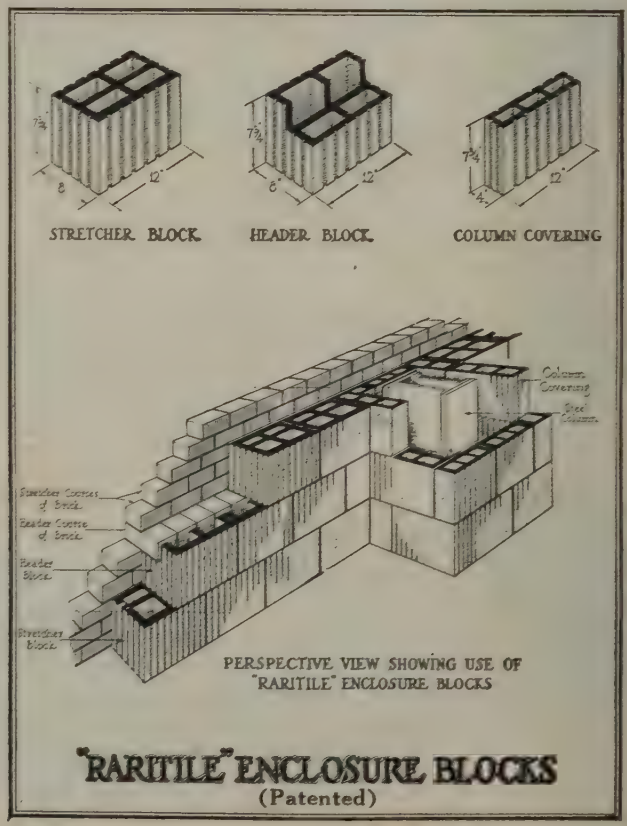
The air cells extend vertically the entire height from floor to floor with a continuous uninterrupted cubical air content, which creates absolute insulation as well as a true and complete furring into the wall; dampness can not penetrate as the cement joints are broken by the air cells.

Rigid unyielding support for the header face brick ties them in securely so they can not possibly sway or move out of place.

Catalogue

Descriptive catalogue on request.





NATCO

THE *COMPLETE* LINE *of* HOLLOW BUILDING TILE

Represented by

[ ]

NATIONAL·FIRE·PROOFING
·COMPANY·

General Offices: Fulton Building, Pittsburgh, Penna.

NATCO PRODUCTS INDEX

INTERIOR WALLS

Natco Vitritile.....Pages 2 to 9 inc.

A particularly attractive load bearing, structural tile for interior walls and partitions—also furnished kerfed or split for furring. Beautifully glazed, sanitary, easily cleaned—eliminates the necessity of plastering or painting.

Natco Partition Tile.....Page 23

Light, strong, easily and economically laid. Fireproof, indestructible, resists the passage of cold, heat and sound.

Natco Furring Tile.....Page 23

Applied to the interior of exterior walls—prevents dampness from penetrating and discoloring plaster.

EXTERIOR WALLS

Natco Vitritile.....Pages 2 to 9 inc.

A particularly attractive glazed load bearing, structural face tile—sanitary—easily cleaned.

Natco Double Shell Load Bearing Tile
.....Pages 10 to 13 inc.

Furnished with 12x12″ scored face for various thicknesses of walls. Double shell construction—resists cold and dampness—provides effective base for stucco.

Natco Triple X Load Bearing Tile....Page 13

Has 12x12″ scored face for different wall thickness. For structures where stucco exterior is desired. Economical, quickly, and easily laid, permanent.

Natco Header Backer Tile.....Page 14

Combined with brick in load bearing and curtain walls. Mechanically bonded, light in weight, substantial and permanent. Meets every brick and mortar joint condition.

Natco Unibacker Tile.....Page 15

Provides effective bond between tile and brick facing. But one unit required for entire wall. Insures rapid, economical construction.

Natco Cubes (Heath Patents)....Not illustrated

Can be furnished on request.

Natco Interlocker Tile.....Not illustrated

Can be furnished on request.

Natco Storage Bins.....Not illustrated

For the storage of coal, grain, ashes, sand, silage and various other materials, Natco Circular Glazed Hollow Tile Storage Bins, reinforced with steel bands, are recommended for permanence, economy and fire safety. These bins vary in size from 8 ft. in diameter to 30 ft. and can be built 50 ft. in height. Descriptive literature on application.

Natco Face Tile (Tex-Tile)..Pages 16 to 22 inc.

Furnished glazed or unglazed, 5x12″ face for 8″ walls. Attractive texture face in several beautiful color ranges. Double shell construction. For residences, office and commercial buildings, etc.

Natco Face Tile (Combed Face)
.....Pages 16 to 22 inc.

Glazed 5x12″ combed exterior face—interior smooth, sanitary, easily cleaned. For 6 and 8″ walls. (Also furnished unglazed when desired.) Double shell construction. For industrial and factory buildings, etc.

FIREPROOFING

Natco Girder and Column Covering
.....Pages 30 to 32 inc.

Well burned Natco Hollow Tile has no equal as a covering for structural steel or iron—is best nonconductor of heat—is not destroyed by fire or water—all necessary shapes and sizes furnished.

FLOORS

(Also adapted to flat roofs)

Natcoflor.....Pages 24 and 25

Combination of special shaped Natco Tile with 2″ wide reinforced cement grout joints. Saves dead load, floor depth, labor costs and insurance—all tile ceiling.

Natco Flat Arch Floors.....Pages 26 to 28 inc.

Afford great strength and fire safety with minimum weight. Can be laid winter and summer because they require no concrete fill or costly forms. All tile ceiling.

Natco Combination Floors—(Standard One and Two Way Systems).....Page 29

Adapted for all classes of buildings where long span fireproof floors are required without beams showing in ceilings. Reduces dead load and provides a good plastering surface.

Natco Segmental Arch.....Page 25

Strongest and most economical type of floor possible. Particularly adaptable for warehouses, lofts, factories, sidewalks or where great strength is required and a flat ceiling is not necessary.

ROOFS

(See also Floors above)

Natco Book Tile.....Page 28

A permanent, non-spalling roof of high insulating value due to the enclosed air spaces. Particularly adapted for glass factories and similar structures—also for buildings where a light, pitched roof is required.

NATIONAL FIRE PROOFING COMPANY

Manufacturers of Natco Hollow Tile

Fulton Building

PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK	CHICAGO	PHILADELPHIA	BOSTON
Flatiron Building	Builders Building	Land Title Building	Textile Building

IN CANADA: National Fire Proofing Co. of Canada, Ltd., TORONTO, ONT.

The Company

Established in 1889, the National Fire Proofing Company has been in business continuously since that time. It is the only concern in the world manufacturing a complete line of structural clay products.

Beside the branch sales and service offices listed above, the company also operates as contractors for fireproof construction in hollow building tile in the Chicago district.

TRADE NATCO MARK

Facilities

The total production of the National Fire Proofing Company approximates a million tons of structural clay products annually. This production comprises hollow building tile to meet every building need.

The company operates twenty-two plants in seventeen different localities, in close proximity to the principal tile markets of the country. In addition, it operates a plant in Hamilton, Ontario. It owns or leases over 5000 acres of clay deposits. It is estimated that the deposits thus controlled contain not less than 56,000,000 recoverable tons of clay, which, at the normal rate of operation, is sufficient to last more than fifty years.

Reliability

The rating of the company in Dunn and Bradstreet, together with its long record of fair dealing with its customers is the best possible guarantee of its dependability and stability.

Branding

All hollow tile manufactured by the National Fire Proofing Company is branded with the trade mark name "NATCO." Special types bear, in addition, marks of identification, such as Natco XXX, Natco Header Backer, Natco Unibacker, etc. All tile intended for load bearing walls is so branded.

The Product

Natco Hollow Building Tile is made from special clay, found only in certain favored localities. This clay is mined and moulded into scientifically designed shapes that provide maximum strength and durability with a minimum of weight. These shapes are dried, then placed in large kilns where they are exposed to a temperature of over 2000 degrees varied to suit the structural or non-structural use of the ware.

The Complete Natco Line

Natco, The Complete Line of Hollow Building Tile, comprises units to meet every building need in structures of every kind.

You have a single source of supply, backed by one united, uncompromising responsibility. Along with the tremendous production facilities of the company, you have the stability, the experience and the practical knowledge of the needs of the field that has come with over forty years in business.

Engineering Service

The company maintains an adequate and efficient Engineering Department. This department is anxious to co-operate and show you how you can most economically and satisfactorily use Natco Hollow Tile to the best advantage in every type of construction.

ADVANTAGES OF NATCO HOLLOW TILE

Permanence

Made of selected clay, cured and burned under the careful supervision of graduate ceramic engineers, Natco tile is permanent in form and structure. It is unaffected by heat, cold, dampness and chemicals—never warps or disintegrates.

Strength

Natco Tile is scientifically designed for the purpose to which it is to be applied. The aim is to obtain maximum strength, with minimum weight.

Minimum Weight

Natco Hollow Building Tile, while equal or superior to other materials in strength, insulating qualities, and fire safety, affords through its lightness considerable savings in dead load as well as in steel and foundation costs.

Insulating Qualities

With Natco Hollow Tile, the enclosed dead air spaces provide positive insulation against rapid changes in temperature. In wall construction where any of the types of double shell tile are used, the double shell construction itself, with its wide non-continuous mortar joints, together with the moisture stops at each end acts as an additional barrier against the passage of cold, heat and moisture.

Due primarily to its insulating qualities, Natco Hollow Tile has no equal as a covering for steel. In floor construction, its insulating qualities give it a distinct advantage over other types of floors.

Fire Safety

Made of raw material—clay—which is absolutely non-inflammable, and then exposed during manufacture to over 2000 degrees of heat, Natco Tile is obviously fire-resistive. Its rate of heat transfer is very low, so that it is the ideal material to shield steel work in skeleton buildings.

Soundproofness

Due to the dead air spaces which resist the passage of sound, walls and floors of Natco Hollow Tile are more nearly soundproof than any solid structural materials.

Installations

So many outstanding buildings all over the country have been constructed of Natco Hollow Tile, that it is out of the question to give even a partial list. In thousands of public buildings, skyscrapers, hospitals, schools, institutions of all kinds, residences, industrial and commercial buildings, and other types of buildings, Natco Hollow Tile has been used and is giving perfect satisfaction.

Distribution

Natco plants are strategically located near the principal tile markets of the country. Wherever possible, orders are placed with those plants most advantageously located in order to make savings in transportation charges.

Shipping

Natco Tile are loaded by experts, under close supervision, assuring that the cars will come through with a minimum of breakage. On material such as Vitritile, cardboard wrappers are used, to assure arrival in first class condition.

Single Source of Supply

Instead of buying wall tile one place, floor tile another, you can—by using Natco—fill all tile needs from a single source of supply. Shipments may be better arranged to suit your needs, car load lots may be made up instead of expensive partial shipments and all responsibility will rest with one company.

Continued on next page

NATCO VITRITILE

General

Natco Vitritile is an extremely attractive glazed structural fire clay tile for use in both interior and exterior load bearing and non-structural walls and partitions. It is made with one or both faces glazed and kerfed or split for furring in a multiplicity of standard sizes and shapes to suit practically every condition and dimension. In the 8" thickness the tile is furnished with one good face only. Requires no plastering, painting or similar maintenance. (Can be furnished unglazed on special order.)

Color

Made in four (4) standard shade blends (Nos. 50, 55, 75, 90) ranging from a light cream buff through the yellow and orange buffs to a rich brown.

Combinations of the various shade blends are most harmonious and practical. A "Full Range" blend of shades Nos. 50, 55 and 75 is standard. Combination No. 105 consists of a blending of the lighter shades Nos. 50 and 55. Combination No. 130 consists of a blending of the medium shades Nos. 55 and 75. Shade blend No. 90 (rich brown) is used for color accent in base, trim, etc. Special selections of individual shade ranges (No. 50, 55 and 75) can be made at an additional cost.

Quality

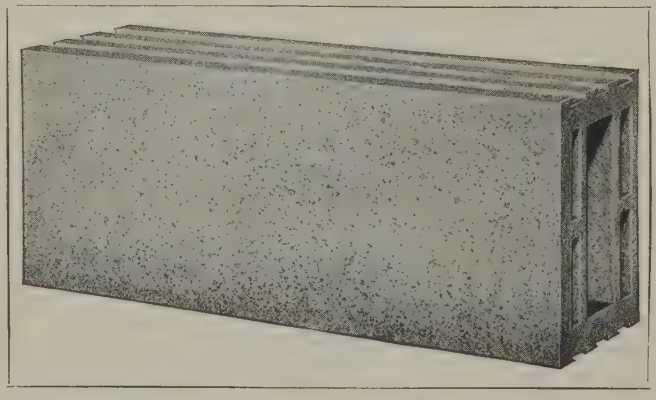
All tile shipped are true to shape, without warpage or surface imperfections. All Natco Vitritile are packed in corrugated wrappers to prevent injury in handling and shipping.

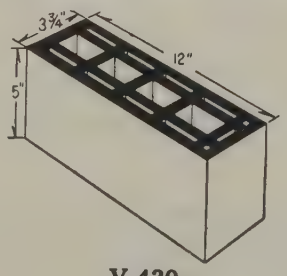
Sanitary

The tile surfaces are entirely unaffected by dirt, grease, chemicals and heat—thus are thoroughly sanitary to the highest degree.

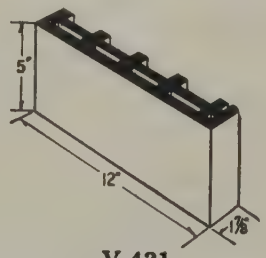
Adaptability

The field for use is unlimited. It is ideal for walls and wainscots in laboratories, schools, restaurants, hotel kitchens and supply rooms, hospitals, gymnasiums, natatoriums, corridors, sub-stations, subways and subway stations, public comfort stations, lavatories, shower rooms, garages, abbatoirs, basements, etc.





V-420
3¾"x12"x5" Square Full Closure



V-421
1⅞"x12"x5" Furring, Square Full Closure

V-400
3¾"x5"x12" Wall Stretcher (smooth two sides), also furnished in 2", 3", 4", 5⅞", 8" and 10" lengths

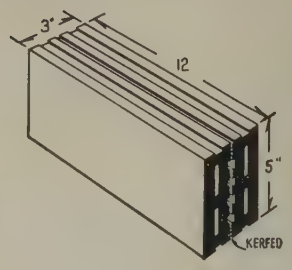
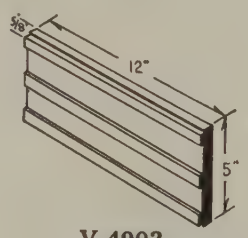
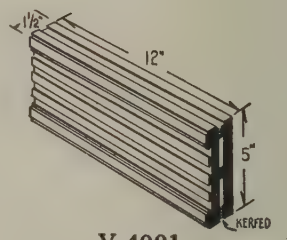


Fig. A
Refer to V-4901 and V-4902 below



V-4902
⅝"x5"x12" Slab. Shipped in pairs in single block, which is kerfed to split. (See Figs. A and V-4901.) This slab furnished for use at electric conduits and outlets. Furnished in 12" length only



V-4901
1½"x5"x12" Slab. Shipped in pairs in single block, which is kerfed to split. (See Fig. A.) This slab furnished for use at pipe chases and conduit spaces. Furnished in 12" length only

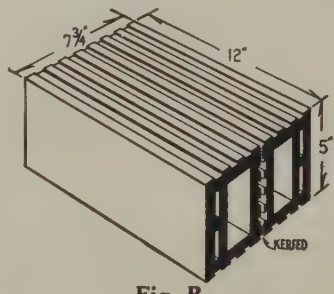


Fig. B
Refer to V-890

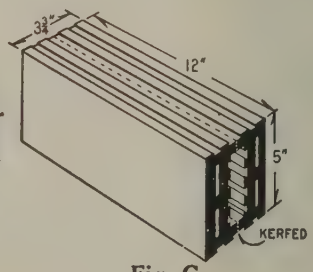
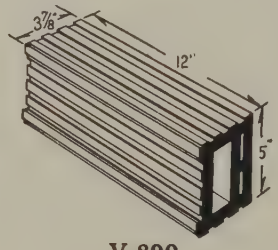
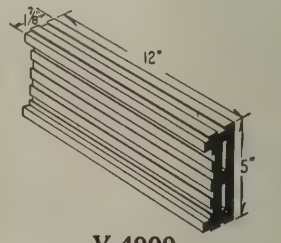


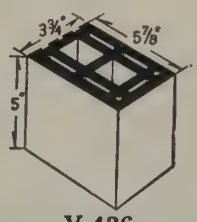
Fig. C
Refer to V-4900



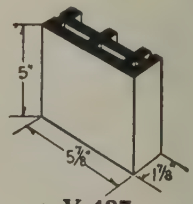
V-890
3⅞"x5"x12" Smooth One Side Stretcher. Opposite side scored for plaster. Shipped in pairs in single block, which is kerfed to split. (See Fig. B.) Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



V-4900
1⅞"x5"x12" Furring Stretcher. Shipped in pairs in single block, which is kerfed to split. (See Fig. C.) Also furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



V-426
3¾"x5⅞"x5" Square Half Closure



V-427
1⅞"x5⅞"x5" Furring Square Half Closure

NATCO VITRITILE

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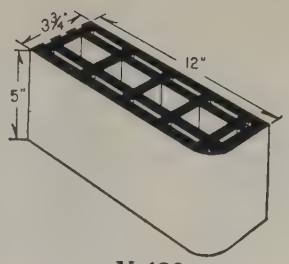
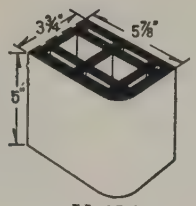
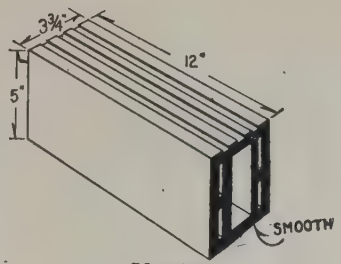


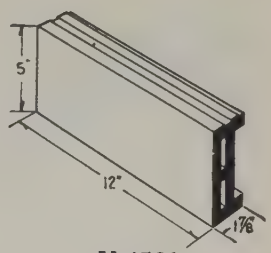
V-430
3¾"x12"x5" Single Bullnose Full Closure



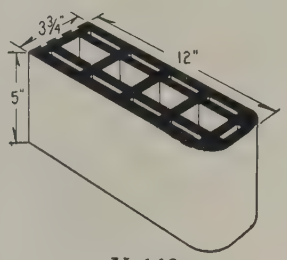
V-436
3¾"x5⅞"x5" Single Bullnose Half Closure



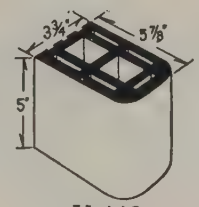
V-4500
3¾"x5"x12" Square Lintel or Sill Tile. Also furnished in 5⅞" and 8" lengths



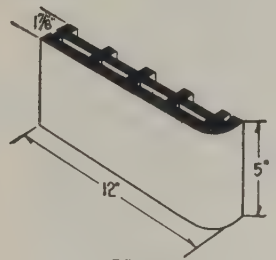
V-4501
1⅞"x5"x12" Furring, Square Lintel or Sill Tile. Also furnished in 5⅞" and 8" lengths



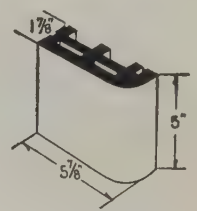
V-440
3¾"x12"x5" Double Bullnose Full Closure



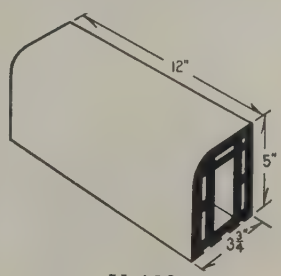
V-446
3¾"x5⅞"x5" Double Bullnose Half Closure



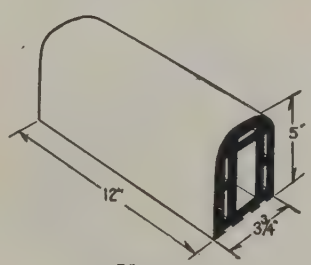
V-441
1⅞"x12"x5" Furring, Bullnose Full Closure



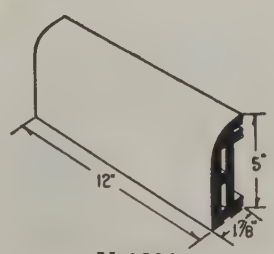
V-447
1⅞"x5⅞"x5" Furring, Bullnose Half Closure



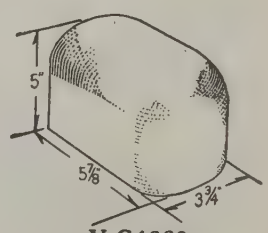
V-460
3¾"x5"x12" Single Bullnose Sill or Lintel Tile. Also furnished in 5⅞" and 8" lengths



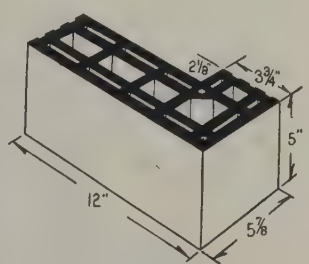
V-4600
3¾"x5"x12" Double Bullnose Coping Tile. Also furnished in 5⅞" and 8" lengths



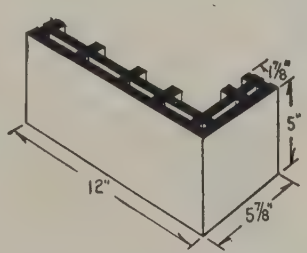
V-4601
1⅞"x5"x12" Furring, Bullnose Sill or Lintel. Also furnished in 5⅞" and 8" lengths



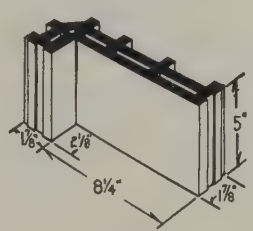
V-C4660
3¾"x5"x5⅞" Double Bullnose Coping Closure. Used with V-4600



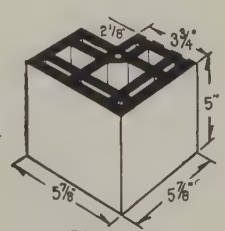
V-4100
3¾"x12"x5" Square External and Internal Corner



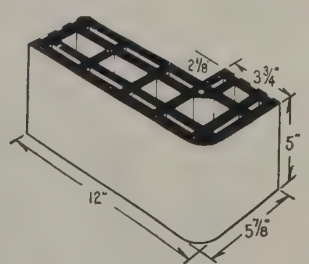
V-4101
1⅞"x12"x5" Furring, Square External Corner



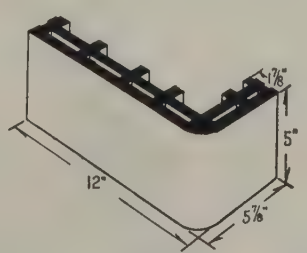
V-4102
1⅞"x8¼"x5" Furring, Square Internal Corner



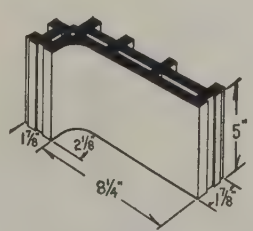
V-4105
3¾"x5⅞"x5" Square External and Internal Half Corner



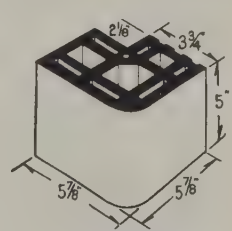
V-4110
3¾"x12"x5" Bullnose External and Square Internal Corner



V-4121
1⅞"x12"x5" Furring, Bullnose External Corner



V-4122
1⅞"x8¼"x5" Furring, Bullnose Internal Corner



V-4115
3¾"x5⅞"x5" Bullnose External and Square Internal Half Corner

NATCO VITRITILE

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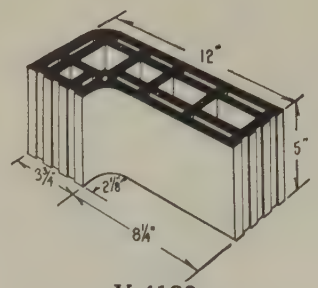
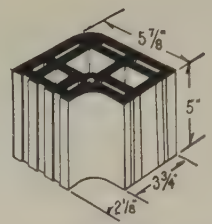
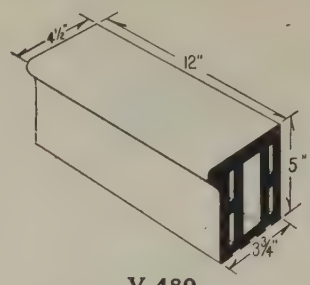


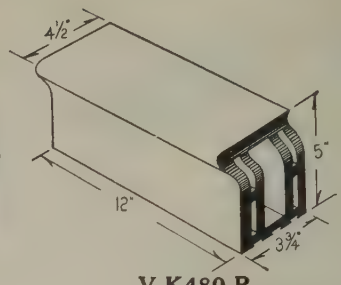
V-4120
3¾"x12"x5" Bullnose External and Internal Corner



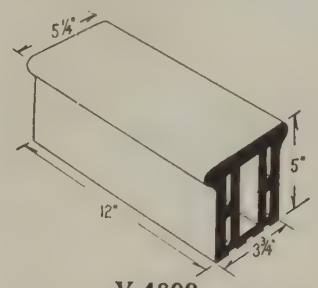
V-4125
3¾"x5⅞"x5" Bullnose External and Internal Half Corner



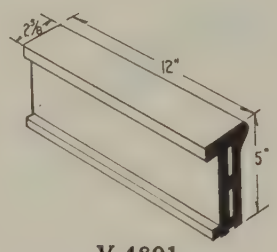
V-480
3¾"x5"x12" Single Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



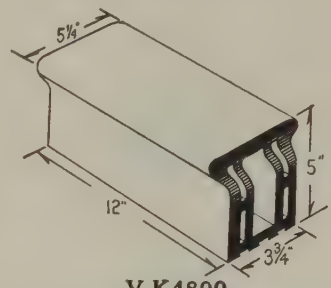
V-K480-R
3¾"x5"x12" Single Wainscot Cap, coped right (coped left opposite hand). Furnished in 3", 4", 5⅞" and 8" lengths



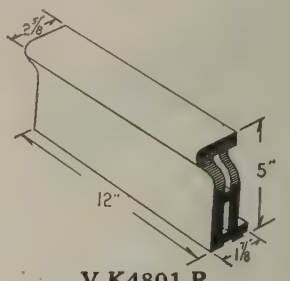
V-4800
3¾"x5"x12" Double Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



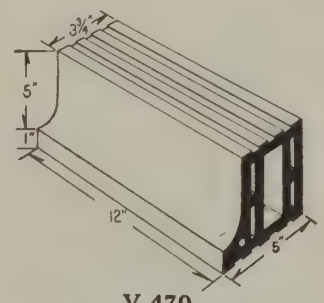
V-4801
1⅞"x5"x12" Furring Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



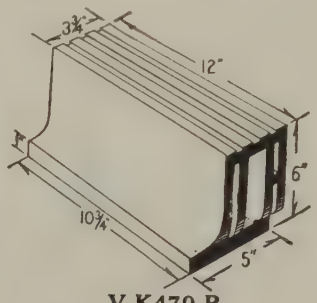
V-K4800
3¾"x5"x12" Double Wainscot Cap, coped. Furnished in 3", 4", 5⅞" and 8" lengths



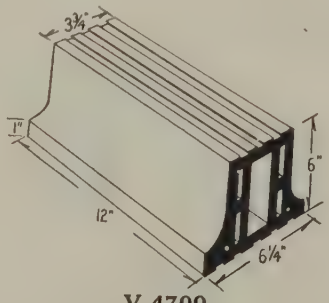
V-K4801-R
1⅞"x5"x12" Furring, Wainscot Cap, coped right. (Coped left opposite hand.) Furnished in 3", 4", 5⅞" and 8" lengths



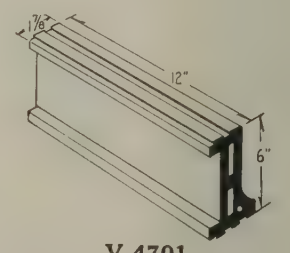
V-470
3¾"x6"x12" Single Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



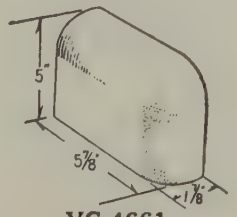
V-K470-R
3¾"x6"x12" Single Cove Base, coped right (coped left opposite hand). Furnished in 3", 4", 5⅞" and 8" lengths



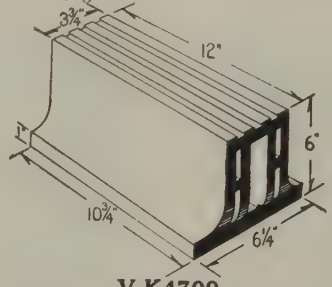
V-4700
3¾"x6"x12" Double Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



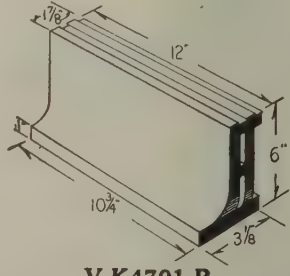
V-4701
1⅞"x6"x12" Furring, Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



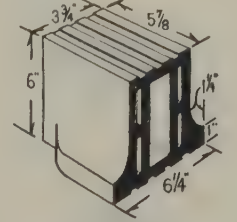
VC-4661
1⅞"x5"x5⅞" Furring, Bullnose Coping Closure, left hand. (Right hand opposite.)



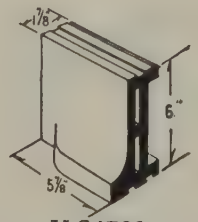
V-K4700
3¾"x6"x12" Double Cove Base, coped. Furnished in 3", 4", 5⅞" and 8" lengths



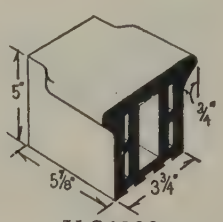
V-K4701-R
1⅞"x6"x12" Furring, Cove Base, coped right (coped left opposite hand). Furnished in 3", 4", 5⅞" and 8" lengths



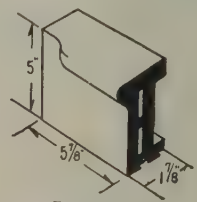
V-S4700
3¾"x6"x5⅞" Double Cove Base Stop



V-S4701
1⅞"x6"x5⅞" Furring, Cove Base Stop, right hand. (Left hand opposite.)



V-S4800
3¾"x5"x5⅞" Double Wainscot Cap Stop



V-S4801
1⅞"x5"x5⅞" Furring, Wainscot Cap Stop, right hand. (Left hand opposite.)

NATCO VITRITILE

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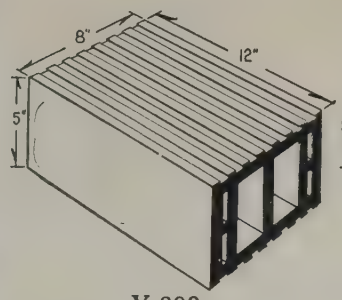
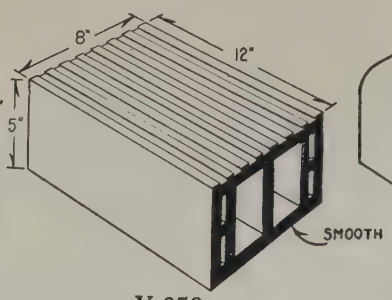
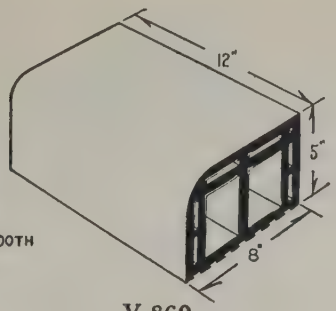


V-800
8"x5"x12" Wall Stretcher, smooth two sides. Also furnished in 3", 4", 5⅞" and 8" lengths

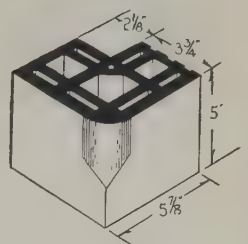
V-8000
8"x5"x12" Wall Stretcher, scored one side. Also furnished in 3", 4", 5⅞" and 8" lengths



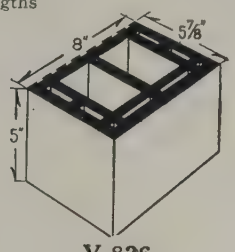
V-850
8"x5"x12" Square Lintel or Sill. Also furnished in 5⅞" and 8" short lengths



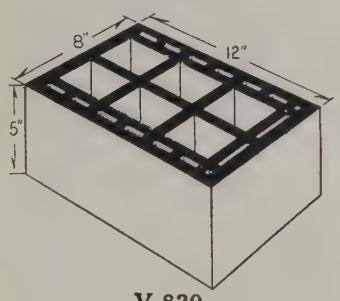
V-860
8"x5"x12" Bullnose Sill or Lintel. Furnished in 5⅞" and 8" lengths



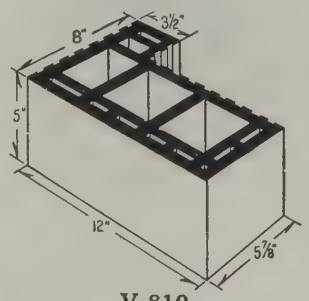
V-C4075
3¾"x5⅞"x5" Chamfered Corner



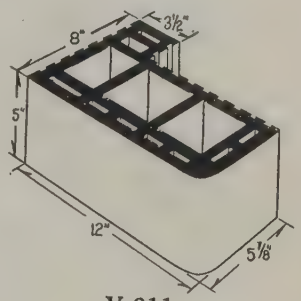
V-826
8"x5⅞"x5" Square Half Closure



V-820
8"x12"x5" Square Full Closure



V-810
8"x12"x5" Square Corner



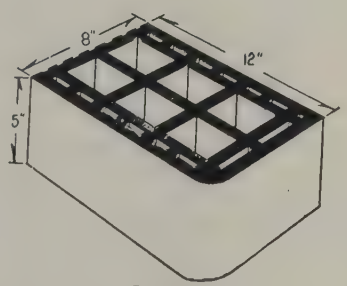
V-811
8"x12"x5" Bullnose Corner

Directions for Ordering Shapes

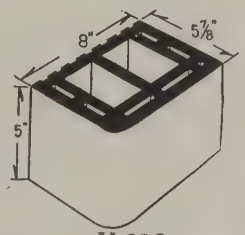
Short Lengths—All numbers under shapes in which short lengths are furnished, denote 12" lengths. When ordering shorter lengths give this same number with length wanted. For example, if a 3" length of V-400 is wanted, mark V-400-3", or, if the half or 5⅞" length be desired, order V-400-6".

3¾" Corners, Jambs, Cove Base and Wainscot Caps, etc. (Shapes V-420, V-426, V-430, V-436, V-4100, V-4110, V-4120, V-470 and V-480) will be furnished scored on one side for use with shape V-890 in 3¾" partition plastered on one side when so ordered. Be sure to specify whether external or internal side of corners are to be scored.

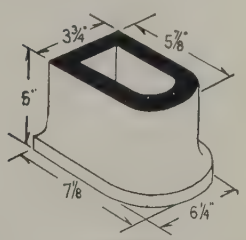
When ordering corners (Shapes V-4100, V-4110, V-4120, V-C4700, V-C4710, V-C4720, V-C4800, V-C4810 and V-C4820) of select one face material, do not fail to specify whether the select face is internal or external.



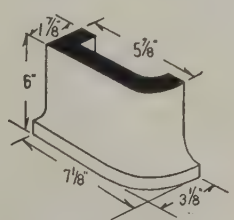
V-830
8"x12"x5" Bullnose Full Closure



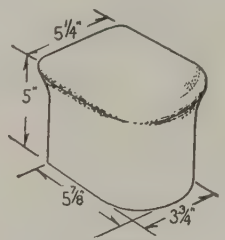
V-836
8"x5⅞"x5" Bullnose Half Closure



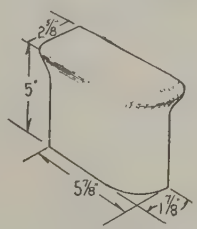
V-S4750
3¾"x5⅞"x6" Cove Base Double Bullnose Closure. See Fig. 10



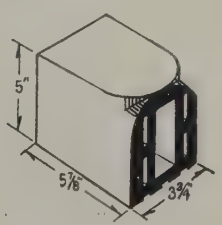
V-S4751
1⅞"x5⅞"x6" Furring, Cove Base Bullnose Closure, left hand. (Right hand opposite)

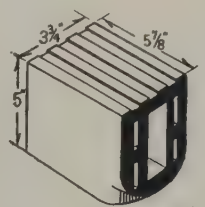


V-S4850
3¾"x5⅞"x5" Wainscot Cap Double Bullnose Closure. See Fig. 10

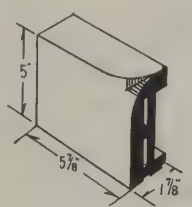


V-S4851
1⅞"x5⅞"x5" Furring, Wainscot Cap Bullnose Closure, left hand. (Right hand opposite)





V-S4600
3¾"x5"x5⅞" Combination Bullnose Lintel or Sill Starter, for use with Bullnose Sills, Lintels and Jambs. See Fig. 6



V-S4601
1⅞"x5"x5⅞" Furring, Bullnose Sill or Lintel Starter, left hand. (Right hand opposite)

NATCO VITRITILE

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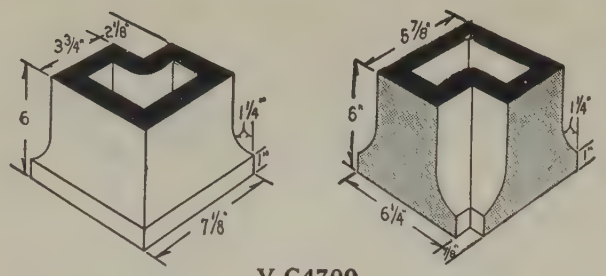
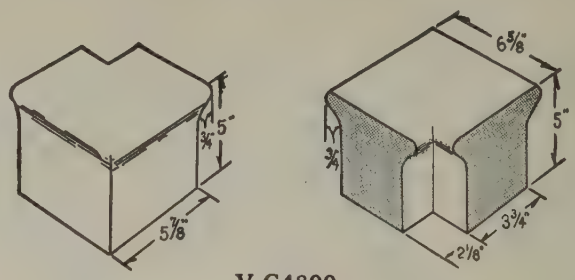
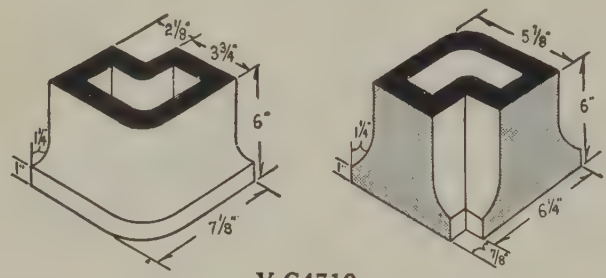


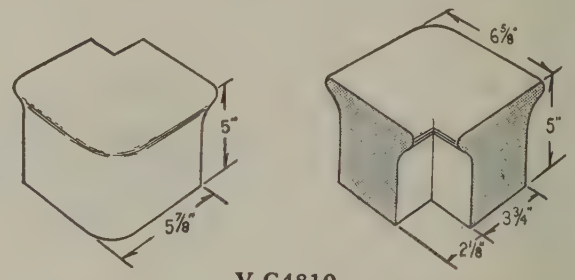
V-C4700
3¾"x5⅞"x6" Square Internal and External Cove Base Corner



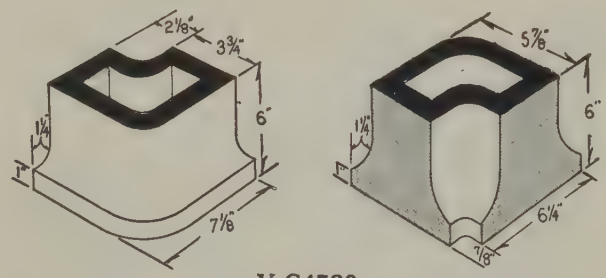
V-C4800
3¾"x5⅞"x5" Square External and Internal Wainscot Cap Corner



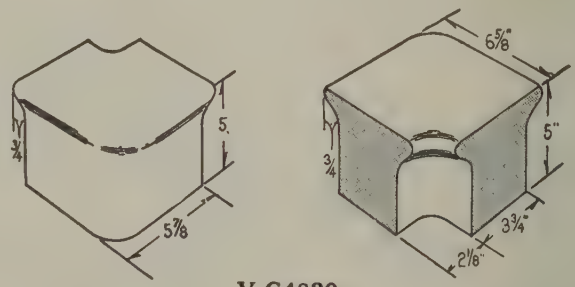
V-C4710
3¾"x5⅞"x6" Square Internal and Bullnose External Cove Base Corner



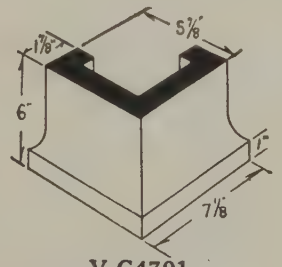
V-C4810
3¾"x5⅞"x5" Bullnose External and Square Internal Wainscot Cap Corner



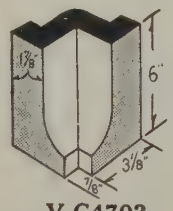
V-C4720
3¾"x5⅞"x6" Bullnose Internal and Bullnose External Cove Base Corner



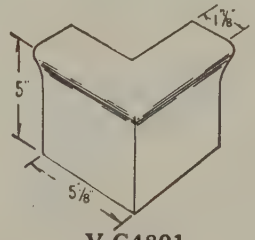
V-C4820
3¾"x5"x5⅞" Bullnose External and Internal Wainscot Cap Corner



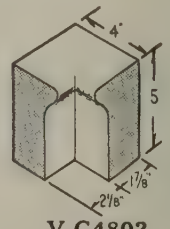
V-C4701
1⅞"x5⅞"x6" Furring, Cove Base Square External Corner



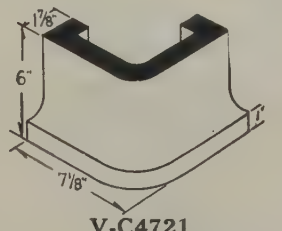
V-C4702
1⅞"x2⅛"x6" Furring, Cove Base Square Internal Corner



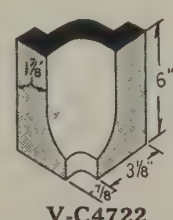
V-C4801
1⅞"x5⅞"x5" Furring, Square Wainscot Cap External Corner



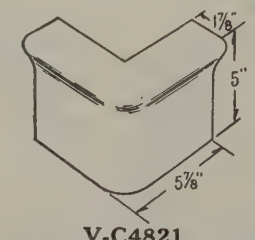
V-C4802
1⅞"x2⅛"x5" Furring, Square Wainscot Cap Internal Corner



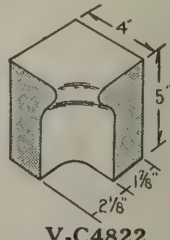
V-C4721
1⅞"x5⅞"x6" Furring, Bullnose Cove Base External Corner



V-C4722
1⅞"x2⅛"x6" Furring, Bullnose Cove Base Internal Corner



V-C4821
1⅞"x5⅞"x5" Furring, Bullnose Wainscot Cap External Corner



V-C4822
1⅞"x2⅛"x5" Furring, Bullnose Wainscot Cap Internal Corner

NATCO VITRITILE

Continued on next page

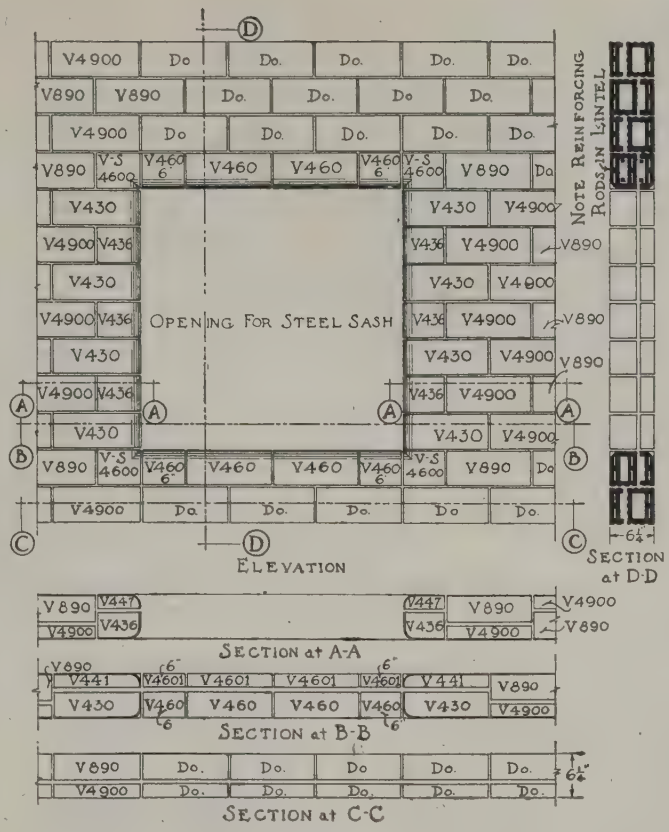
Height Table

Tile { 3¾" x 5" x 12" / 8" x 5" x 12" }
Joints ¼"
For ⅜" Joints, see Page 19

Course No.	Height
1	— 5¼"
2	—10½"
3	1'— 3¾"
4	1'— 9"
5	2'— 2¼"
6	2'— 7½"
7	3'— 0¾"
8	3'— 6"
9	3'—11¼"
10	4'— 4½"
11	4'— 9¾"
12	5'— 3"
13	5'— 8¼"
14	6'— 1½"
15	6'—6¾"
16	7'— 0"
17	7'— 5¼"
18	7'—10½"

The table above is used to determine the heights of walls which will best lay up without cutting tile, using ¼" bed joints. For instance, should you desire to build a wall 7' 0" high you will note that it will require 16 courses.

By varying the thickness of the mortar joints these dimensions may be slightly changed.



Treatment of openings in 6" Natco Vitritile Partition for steel sash. Illustration shows use of Bullnose Sills, Lintels and Jambs.

Length Table

Tile { 3¾" x 5" x 12" / 8" x 5" x 12" }
Joints ¼"
For ⅜" Joints, see Page 19

No. Tile	Length
1	1'— 0"
1½	1'— 6⅛"
2	2'— 0¼"
2½	2'— 6⅜"
3	3'— 0½"
3½	3'— 6⅝"
4	4'— 0¾"
4½	4'— 6⅞"
5	5'— 1"
5½	5'— 7⅛"
6	6'— 1¼"
6½	6'— 7⅜"
7	7'— 1½"
7½	7'— 7⅝"
8	8'— 1¾"
8½	8'— 7⅞"
9	9'— 2"
9½	9'— 8⅛"

The table above shows the length of walls and pilasters that will best lay up without cutting tile, using ¼" vertical mortar joints. For instance, should you desire a wall 9'-2" long you will note that it will require 9 tile.

To find width of openings, add two mortar joints or ½" to each dimension above.

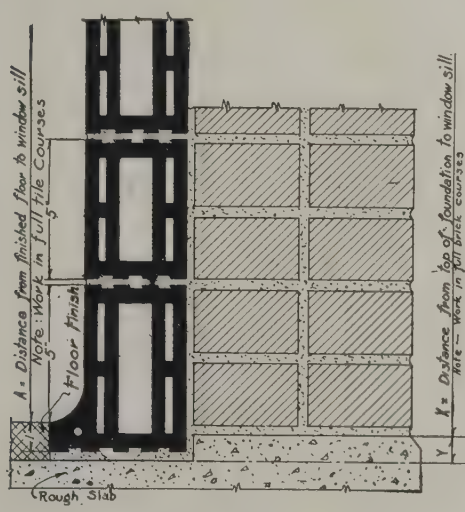


Fig. 1

Suggestions for Starting Natco Vitritile Cove Base from Masonry Foundation

(1) Establish sill height (A) above the finished floor in full courses of tile.

(2) Having sill length (A) and thickness of brick courses, distance (X) can be determined.

(3) With top of foundation fixed, figure distance (Y) to suit thickness of floor finish.

Note: Illustration shows ¼" joints in Vitritile and ⅜" exterior brick joints.

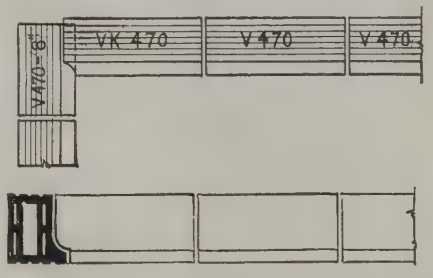


Fig. 2

Plan and Elevation of Intersection of 3¾" Single Cove Base, showing use of Coped Cove Base, V-K470

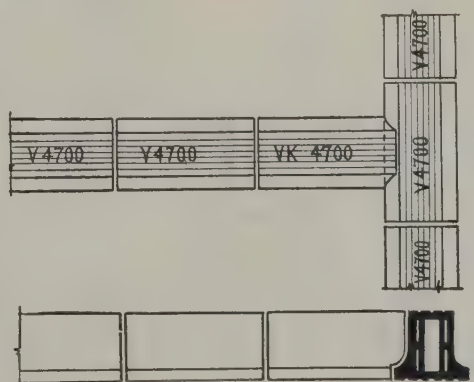


Fig. 3

Plan and Elevation of Intersection of 3¾" Double Cove Base showing use of Coped Cove Base, V-K4700

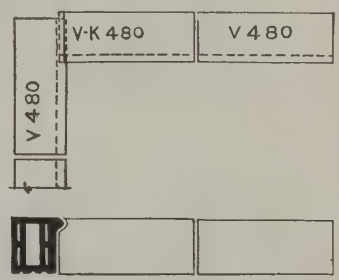


Fig. 4

Plan and Elevation of Intersection of 3¾" Single Wainscot Cap showing use of Coped Wainscot Cap, V-K480

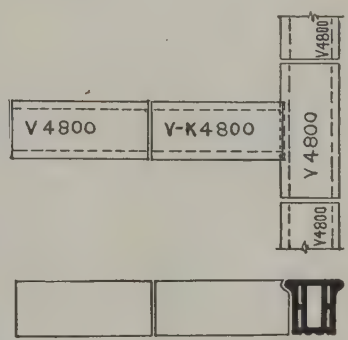


Fig. 5

Plan and Elevation of Intersection of 3¾" Double Wainscot Cap showing use of Coped Wainscot Cap, V-K4800

NATCO VITRITILE

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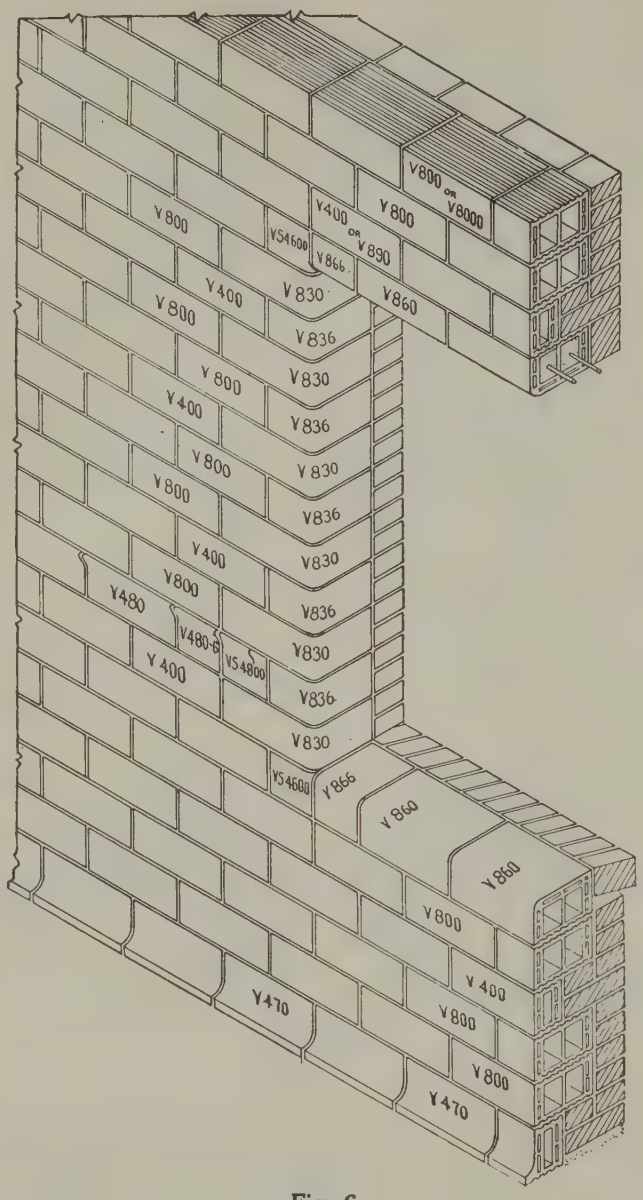

Fig. 6
Inside of a 12″ Exterior Wall using 3¾″ and 8″ Vitritile for backing face brick with bond on every 6th course of brick. Note use of sill and lintel starter with bullnose sill, jamb and lintel, also note wainscot cap stop

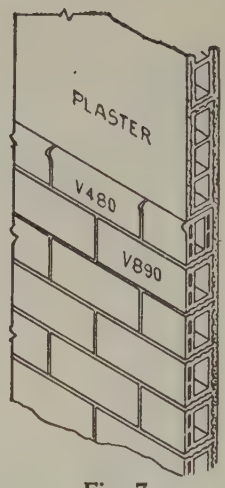

Fig. 7
Illustrating use of 3¾″ tile scored on one 5″ x 12″ face to give a smooth tile finish on one side of partition and plaster on other side

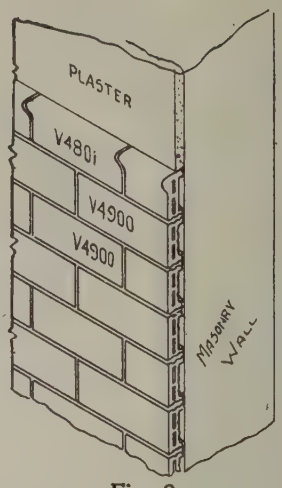

Fig. 8
Masonry wall furred with kerfed Vitritile

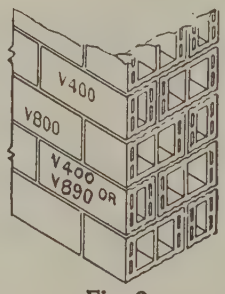

Fig. 9
Method of constructing 12″ Vitritile wall, having two smooth faces

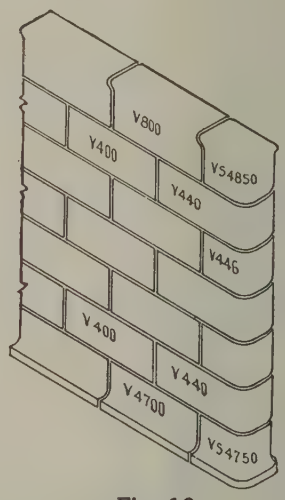

Fig. 10
3¾″ Partition with Double Bullnose Jambs at end

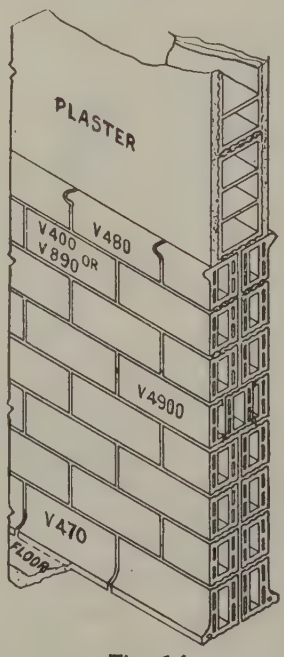

Fig. 14
An 8″ partition having two smooth faces with Vitritile Wainscot and plaster above on 6″ Hollow Tile. Note junction of Cove Base and 1″ Floor finish

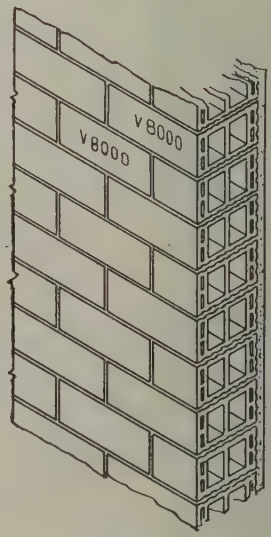

Fig. 15
8″ Vitritile wall, plastered one side

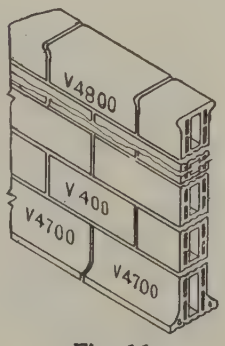

Fig. 11
3¾″ Partition of all Vitritile. Note use of Double Wainscot Cap and Cove Base. Two smooth faces

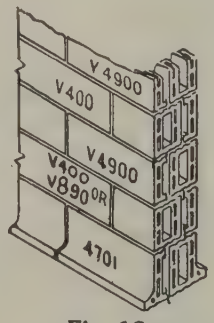

Fig. 12
Construction of a 6″ Vitritile partition with two smooth faces.

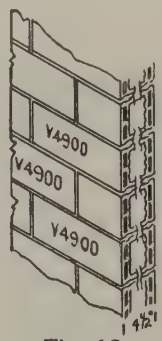

Fig. 13
Method of constructing a 4½″ Vitritile partition with two smooth faces

NATCO VITRITILE

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Fig. 16
Door Construction—Two-face Partitions
3¾" double-faced partition showing three types of door construction. Note use of various types of door stops and method of filling jamb tiles with mortar at door at left to stiffen the construction

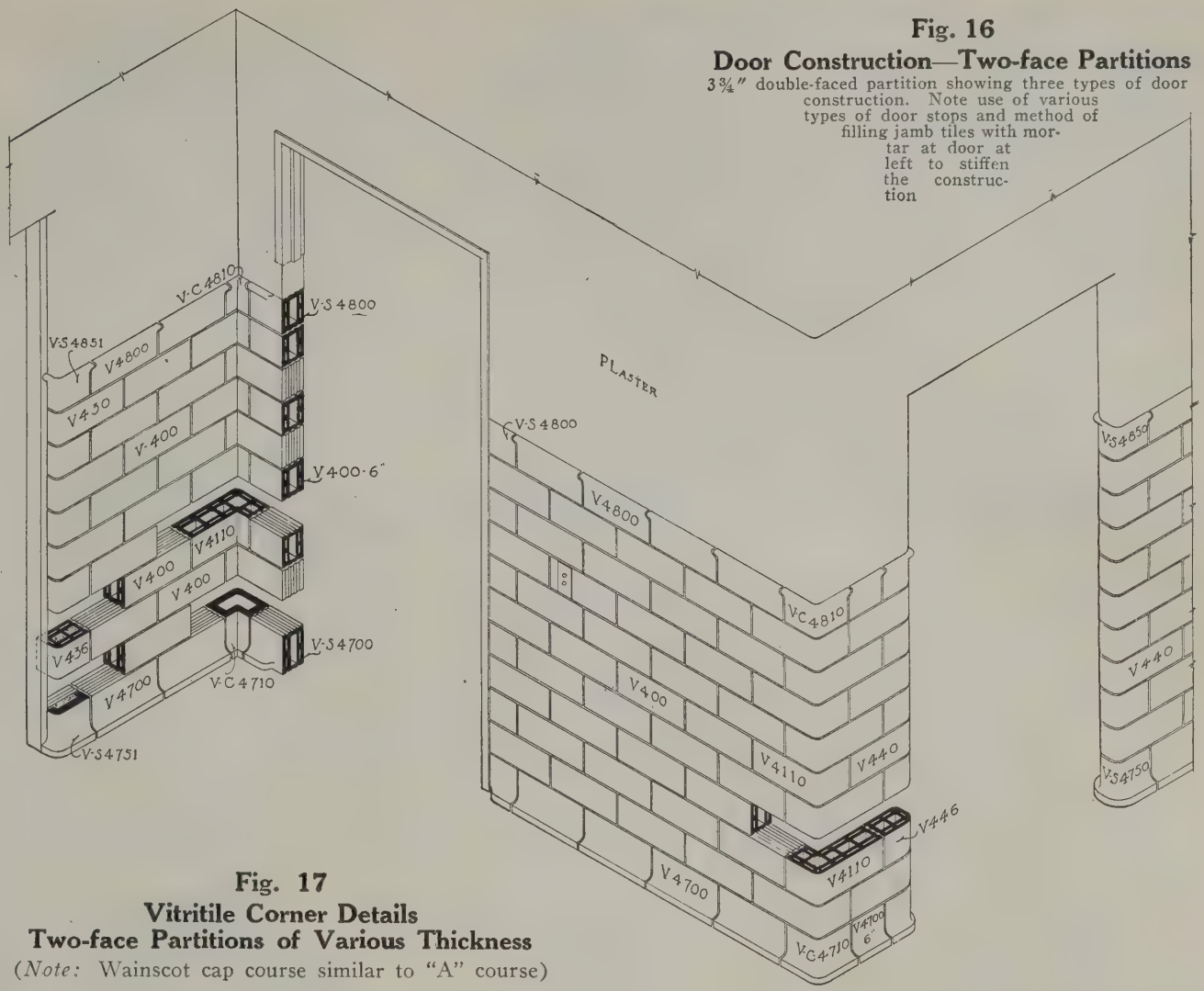
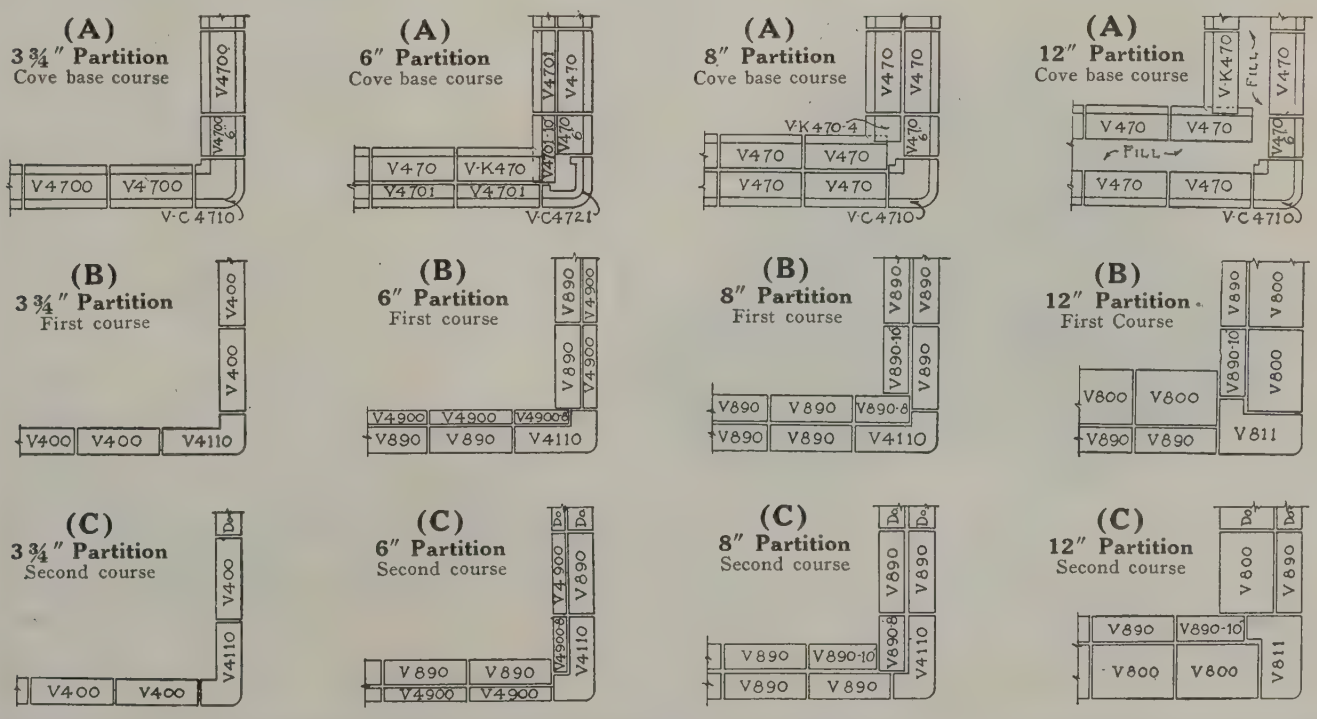


Fig. 17
Vitritile Corner Details
Two-face Partitions of Various Thickness
(*Note:* Wainscot cap course similar to "A" course)



NATCO VITRITILE

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NATCO DOUBLE SHELL LOAD BEARING TILE

General

Natco Double Shell Load Bearing Tile is designed for vertical web load bearing walls to receive exterior stucco and interior plaster applied directly to the tile surfaces. The standard wall units have 12″ x 12″ dovetail scored faces and are furnished in four (4) thicknesses—6″, 8″, 10″, and 12″ to meet the various wall thickness requirements. Beside the standard wall units, complete dovetail scored complementary accessory units are furnished in each thickness for sills, jambs (for both wood and steel windows), lintels, corners, joist closures, joist bearing slabs, joist fillers, etc. to obviate cutting and fitting.

With properly staggered joints all webs are brought into vertical alignment developing maximum wall strength.

Special Feature

The outstanding feature of this tile is the double shell web construction on the two exposed faces which provides a wide, non-continuous, keyed mortar joint on both beds and ends. This non-continuous mortar joint not only permanently seals the outside face cell structure, materially increasing insulation, but most important, it positively prevents moisture passage by capillary attraction from the exterior to the interior.

Advantages

Fireproof—Furnishes the maximum in permanent fire safety.

Low Labor Cost—The completeness of the line speeds erection by obviating the usual cutting and fitting.

Maximum Insulation—The mortar sealed double shell exterior and interior face construction adds materially to insulation, comfort and economy.

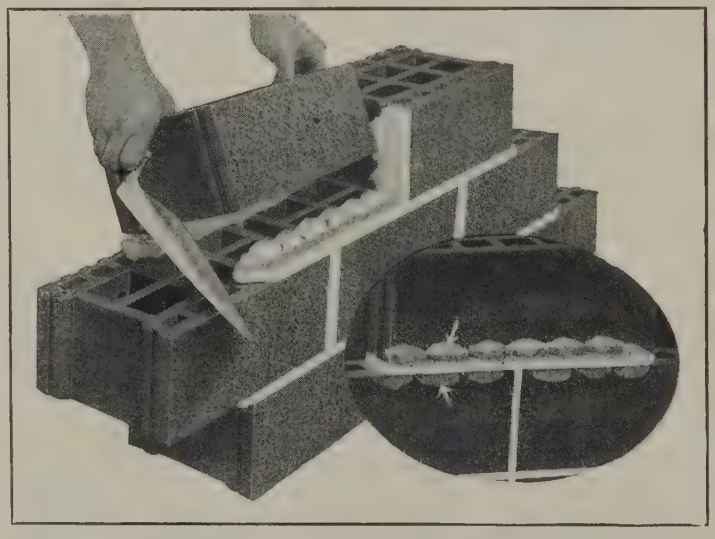
Permanent Stucco and Plaster Base—The dovetail scored tile surface provides the ideal stucco and plaster base.

Prevents Interior Plaster Stains—The non-continuous mortar joints prevent discoloration on the interior.

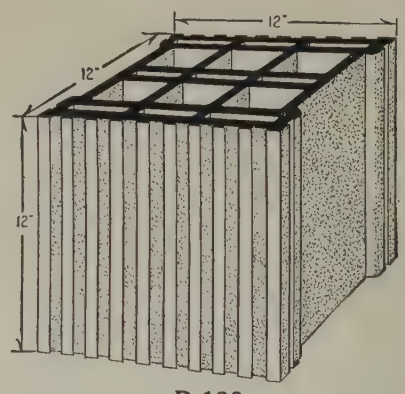
Ideal for Pipe Installation—The vertical voids furnish provision for pipe chases for conduit and other piping easily accomplished without shattering the tile and with the minimum patching.

Adaptability

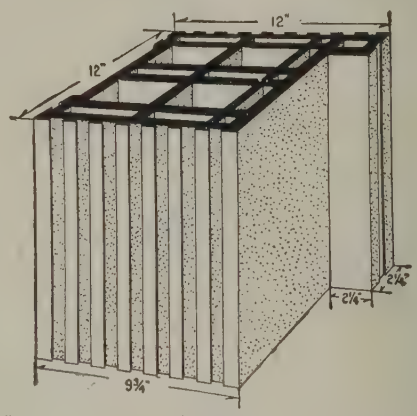
Specially adapted to the best class of buildings requiring stucco exteriors.



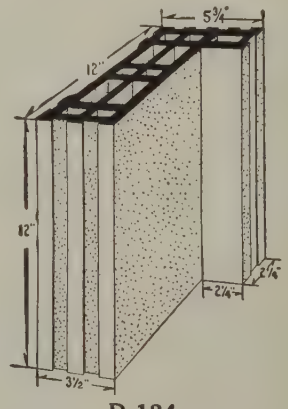
The illustration shows how the mortar keys into the small cells of the Natco Double Shell type of tile. Note the non-continuous mortar joints which seal the outside cells and prevent transmission of heat and moisture through the wall. (Cut shows Natco Double Shell Face Tile described on Natco Pages 16 to 22 inc.)



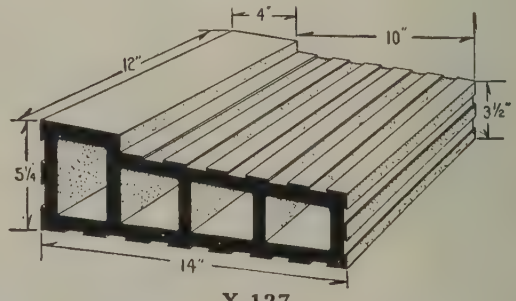
D-120
12″ x 12″ x 12″ Double Shell Wall Tile



D-123
12″ x 12″ x 12″ Double Shell Jamb for Box Frame Windows. (See Fig. 7)



D-124
12″ x 5¾″ x 12″ Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



X-127
14″ x 5¼″ x 12″ Sill for 12″ Wall. (See Fig. 10)

NATCO DOUBLE SHELL LOAD BEARING TILE

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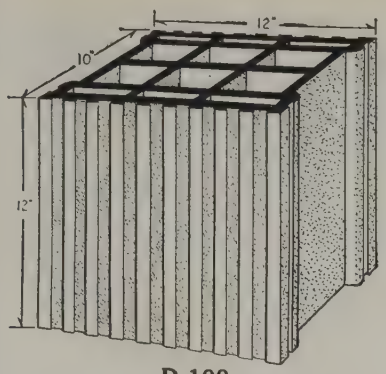
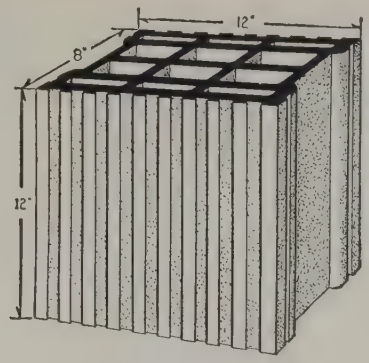
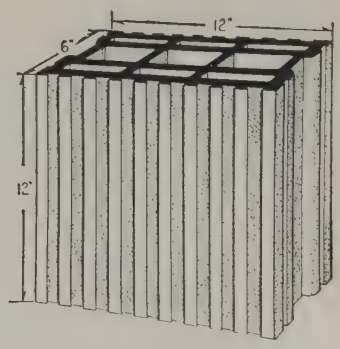


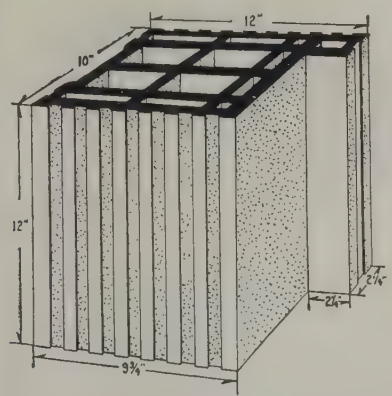
D-100
10" x 12" x 12" Double Shell Wall Tile



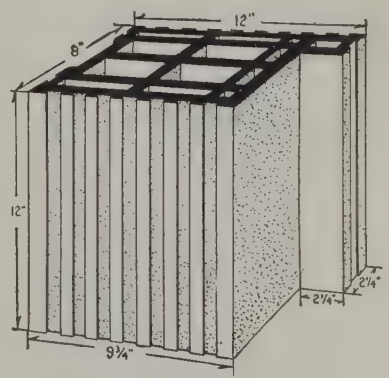
D-80
8" x 12" x 12" Double Shell Wall Tile



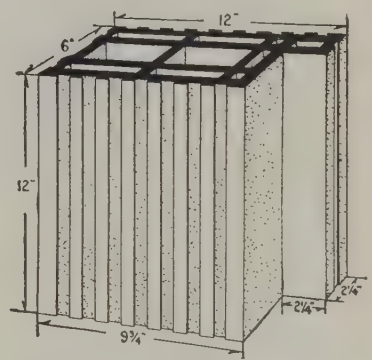
D-60
6" x 12" x 12" Double Shell Wall Tile



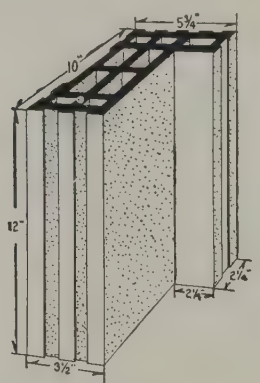
D-103
10" x 12" x 12" Double Shell Jamb for Box Frame Windows. (See Fig. 7)



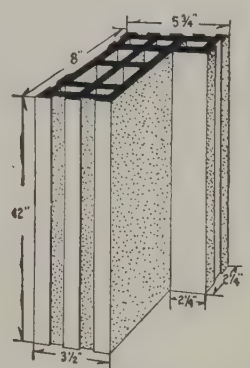
D-83
8" x 12" x 12" Double Shell Jamb for Box Frame Windows. (See Fig. 7)



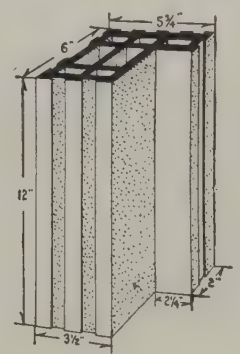
D-63
6" x 12" x 12" Double Shell Full Jamb for Box Frame Windows. (See Fig. 7)



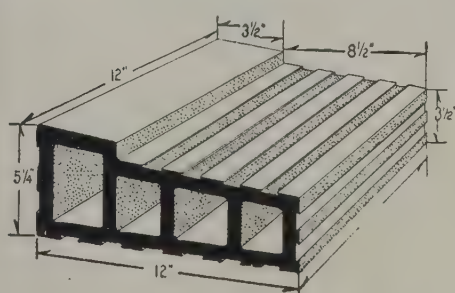
D-104
10" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



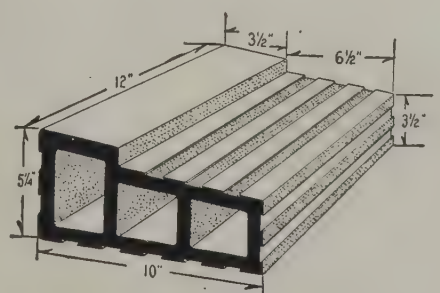
D-84
8" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



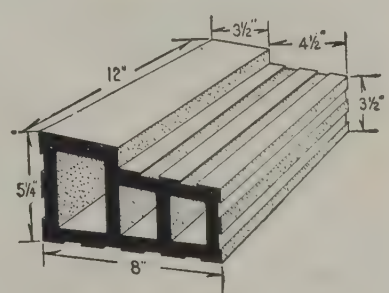
D-64
6" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



X-107
12" x 5¼" x 12" Sill for 10" Wall. (See Fig. 10)

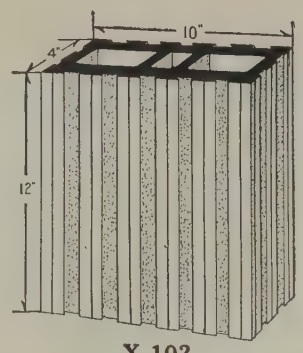


X-87
10" x 5¼" x 12" Sill for 8" Wall. (See Fig. 10)

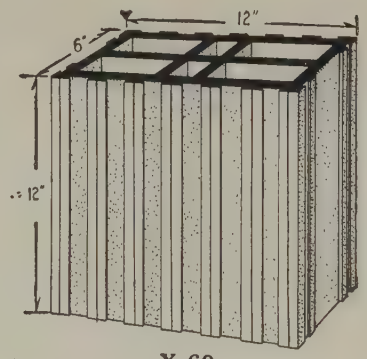


X-67
8" x 5¼" x 12" Sill for 6" Wall. (See Fig. 10)

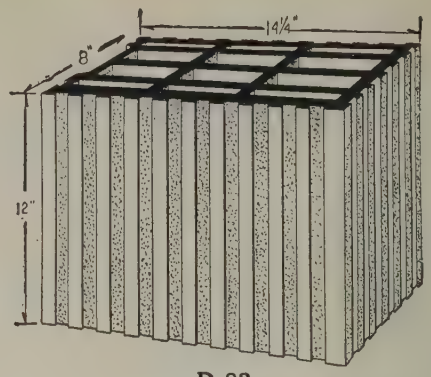
NATCO DOUBLE SHELL LOAD BEARING TILE



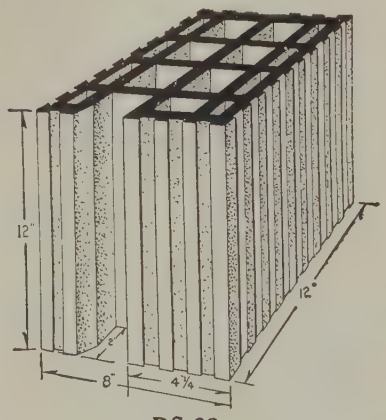
X-102
10 x 4″ x 12″ Corner for 10″ wall. (See Fig. 5)



X-60
6″ x 12″ x 12″ for 6″ and 12″ Walls. (See Figs. 3 and 6)

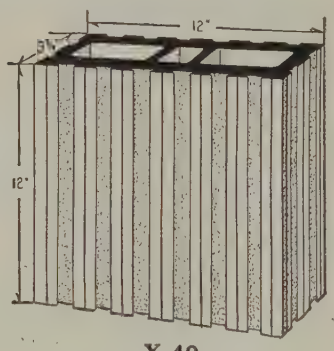


D-82
8″ x 14¼″ x 12″ Double Shell Corner for 8″ Wall. (See Fig. 4)

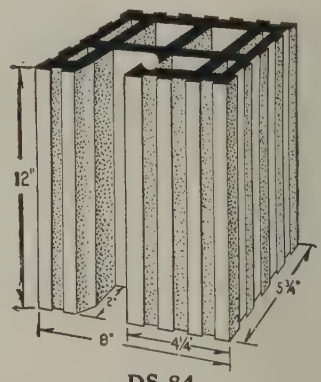


DS-83
8″ x 12″ x 12″ Full Jamb or Lintel Tile for Steel Sash and Plank Frame Windows and Doors. Recess in tile takes care of flange on steel sash or wood weather strip on plank frame. This tile is also used as a Full Closure Tile

4″ x 1″ x 12″ }
6″ x 1″ x 12″ } **Slabs** { 8″ x 1″ x 12″
12″ x 1″ x 12″



X-40
3¾″ x 12″ x 12″ Joist Closure also cut 10½″ high for use as joist filler. (See Fig. 1)



DS-84
8″ x 5¾″ x 12″ Half Jamb for Steel Sash and Plank Frame Windows and Doors. Recess in tile takes care of flange on steel sash or wood weather strip on plank frame. This tile also used as a Half Closure Tile

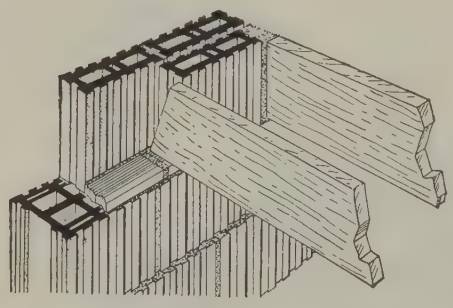


Fig. 1

Fig. 1
Shows method of building wood joists into wall. 3¾″ x 12″ x 12″ tile are used for the exterior face of wall and by using 1″ tile slabs for the joists to rest on, they get a solid and flat bearing surface and the load is evenly distributed. The space between joists is filled with 3¾″ x 12″ x 10½″ filler tile to make a solid wall to top of joists. Joists may be spaced as desired. Illustration shows joists 14″ on centers

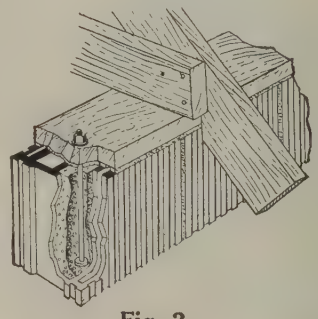


Fig. 2

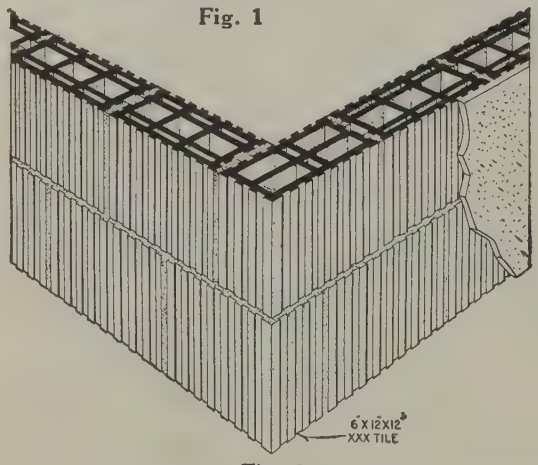


Fig. 3

Fig. 2
Bolting of roof plate to top of wall is necessary in any masonry wall to anchor roof and prevent its dislodgement due to high wind pressure

Fig. 3
Corner construction in a 6″ Double Shell Load Bearing Wall

Fig. 4
Corner construction in an 8″ Double Shell Load Bearing Wall

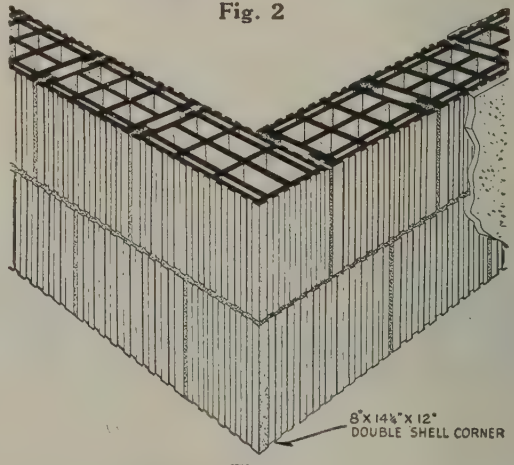


Fig. 4

NATCO DOUBLE SHELL LOAD BEARING TILE

Continued on next page

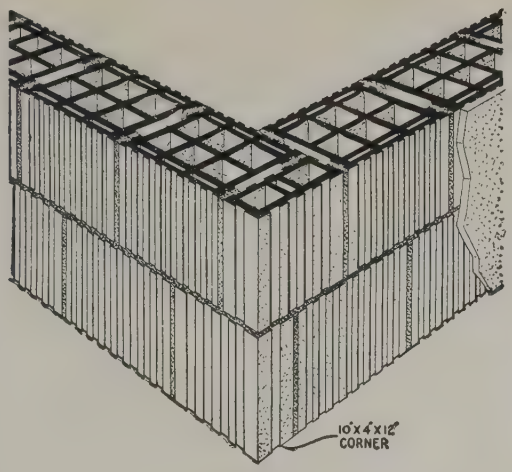


Fig. 5

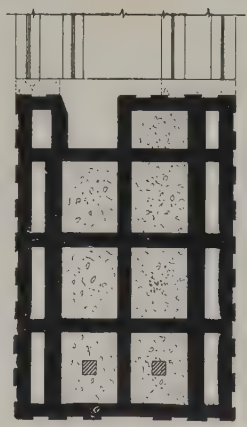


Fig. 8

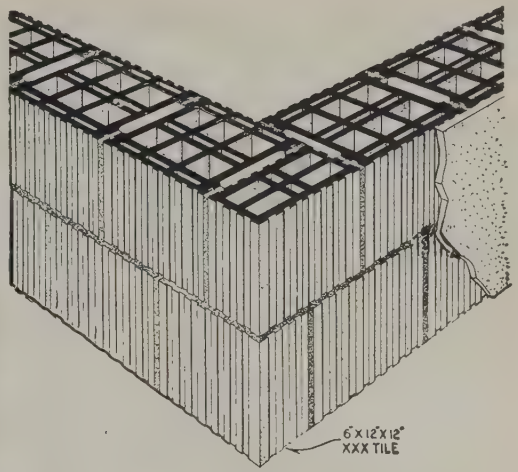


Fig. 6

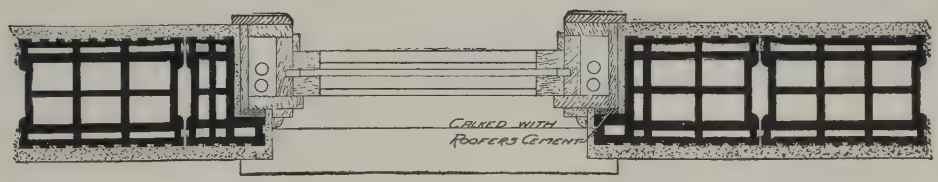


Fig. 7

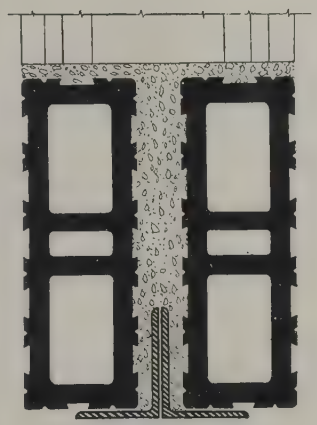


Fig. 9

Fig. 5
Corner construction in a 10" Double Shell Load Bearing Wall

Fig. 6
Corner construction in a 12" Double Shell Load Bearing Wall

Fig. 7
Longitudinal cross section showing use of full and half jamb tile with box frame. Recess in tile provides space for sash weight box

Fig. 8
Reinforced lintel made by placing steel rods in bottom cells of steel sash full jamb and filling cells of tile with concrete. For use with steel sash, reverse tile and construct as above

Fig. 9
Lintel construction over wide openings, using 3¾" x 12" x 12" tile for wall facings and steel angles for carrying load

Fig. 10
Section at window sill showing fitting of frame to sill and waterproofing between frame and sill with roofers' cement

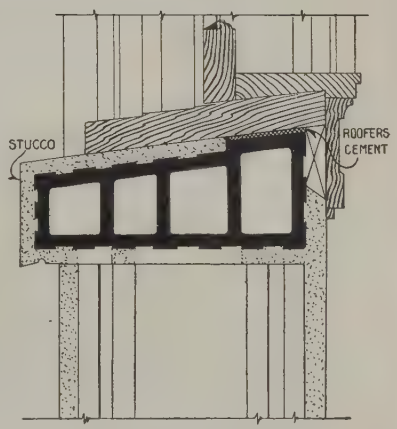
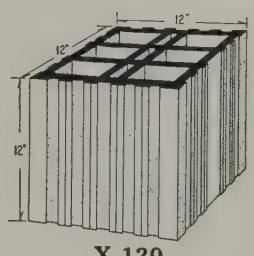
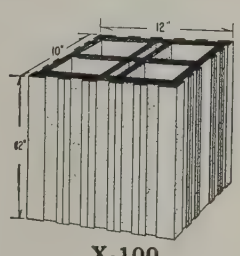


Fig. 10

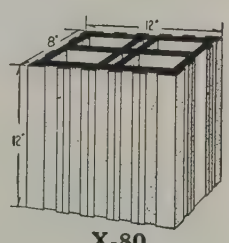
NATCO DOUBLE SHELL LOAD BEARING TILE



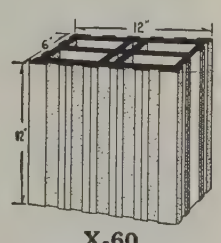
X-120



X-100



X-80



X-60

General

Natco Triple X Load Bearing Tile is furnished for construction similar to that of Natco Double Shell Load Bearing Tile where a lighter weight tile is desired. It is extensively used in the Eastern market.

For construction details, etc., see Natco Pages 10 to 13 inclusive. Triple X construction is identical with Double Shell construction.

Numerical Designation

The wall units and accessory tile shapes are identical in outside dimensions with the Double Shell Load Bearing Tile—substitute the letter X for the letter D in those numerals of the Double Shell series to obtain the Triple X tile of the same dimension. Tiles lettered X in the Double Shell series are the same for both Double Shell and Triple X.

NATCO TRIPLE X LOAD BEARING TILE

Continued on next page

NATCO HEADER BACKER

General

Natco Header Backer Tile is particularly well adapted for exterior load bearing walls faced with brick since the perfect bond every sixth (6th) course between brick and tile allows the full thickness of the masonry wall to be calculated for load carrying capacity.

For brick faced curtain or closure walls in steel or reinforced concrete skeleton construction, Natco Header Backer walls are ideal in point of economy. Due to a reduction of 25 per cent in dead weight over solid brick construction, savings in structural steel run into tons and foundation costs are materially reduced. It is the only tile giving a 10″ wall with an all tile backing.

Western Header Backer

The Western Header Backer is designed structurally similar to the Double Shell Load Bearing Tile and has all its advantages. (See Natco Page 10.)

Eastern Header Backer

The Eastern Header Backer is designed structurally similar to the Triple X Load Bearing Tile. The 1″ shell and web thickness fulfill New York Building Code requirements. (See Natco Page 13.)

Displacement

One (1) 8″ x 5″ x 12″ Header Tile and one (1) 8″ x 12″ x 10½″ Backer Tile including ½″ bed and vertical joints lay up 1.43 sq. ft. of wall surface; or conversely, there are required 700 Headers and 700 Backers to lay up 1000 sq. ft. of wall surface.

Backer Height

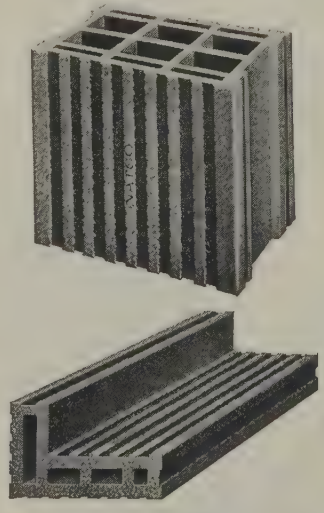
A 10½″ backer is standard and fulfills requirements in the majority of buildings. If necessary, however, the backer tile can be made of a special height to meet any ordinary brick and mortar joint condition.

Advantages

Strength—The perfect 6th course bond with the face brick gives maximum load bearing strength for wall thickness.

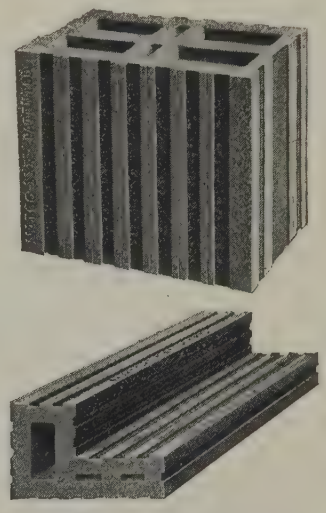
Lightness—Approximately 25 per cent lighter than solid brick masonry walls of equal thickness. The 10″ and 14″ thicknesses are not obtainable in solid brick masonry.

Insulation—The cellular tile structure promotes insulation comfort and economy.



Western Header Backer

Note that the backer tile is similar to Natco Double Shell Load Bearing Tile except in height which is 10½″ instead of 12″. (See Natco Page 10.) Header tile matches the backer tile in web construction

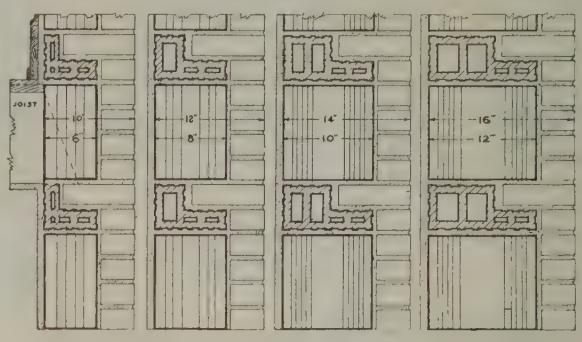


Eastern Header Backer

Note that the backer tile is similar to Natco Triple X Load Bearing Tile except in height which is 10½″ instead of 12″. (See Natco Page 13.) Header tile matches the backer tile in web construction

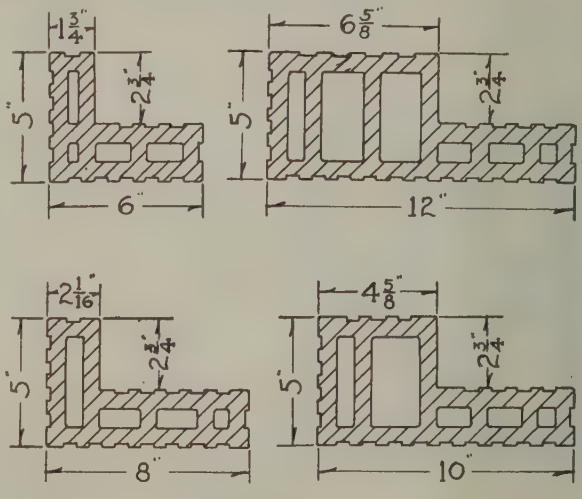
Adaptability

The strong, light Natco Header Backer construction is particularly adapted to use in all brick faced buildings, whether of load bearing or curtain closure wall construction, where the maximum in good construction and economy in labor costs are appreciated.



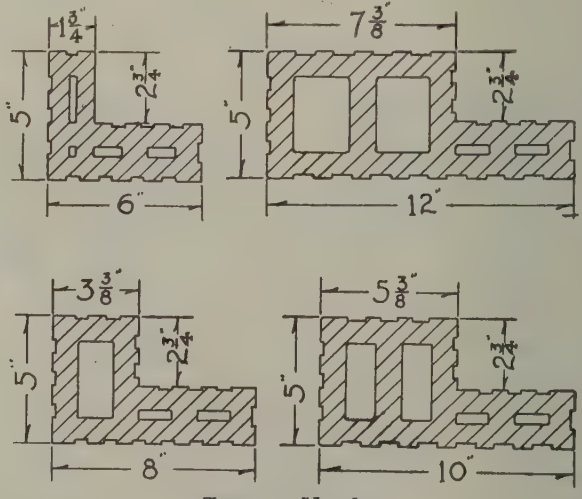
Typical Wall Sections

The standard backer is 10½″ high. While these sections show walls, including brick facing, 10, 12, 14 and 16″ only, thicker walls may easily be obtained by using additional tile



Western Header

The web design matches that of the double shell Western backer tile



Eastern Header

The web design matches that of the Eastern backer tile with 1″ web thickness

NATCO HEADER BACKER

Continued on next page

NATCO UNIBACKER

General

Natco Unibacker is a load bearing unit used in brick faced load bearing or curtain closure walls. It provides a mechanical bond every sixth (6th) course of such strength that full bearing value is allowed on the full masonry wall thickness.

Natco Unibacker can be bonded satisfactorily with Column Covering as three courses of the Unibacker will bond into two courses of the Column Covering.

The Eastern Unibacker is designed with 1" thick shell and webs particularly for the New York market.

Full bearing is provided for floor joists in load bearing walls.

The standard tile is dovetail scored for interior plaster.

Smooth Face Tile

If unplastered smooth tile walls are desired, unscored tile can be manufactured on special order. Adequate notice must obviously be given through our nearest branch office.

Economy of the Single Unit

Unibacker is made in a single tile shape and size which permits great speed of erection and consequent labor economies. This is particularly apparent in long curtain walls without openings.

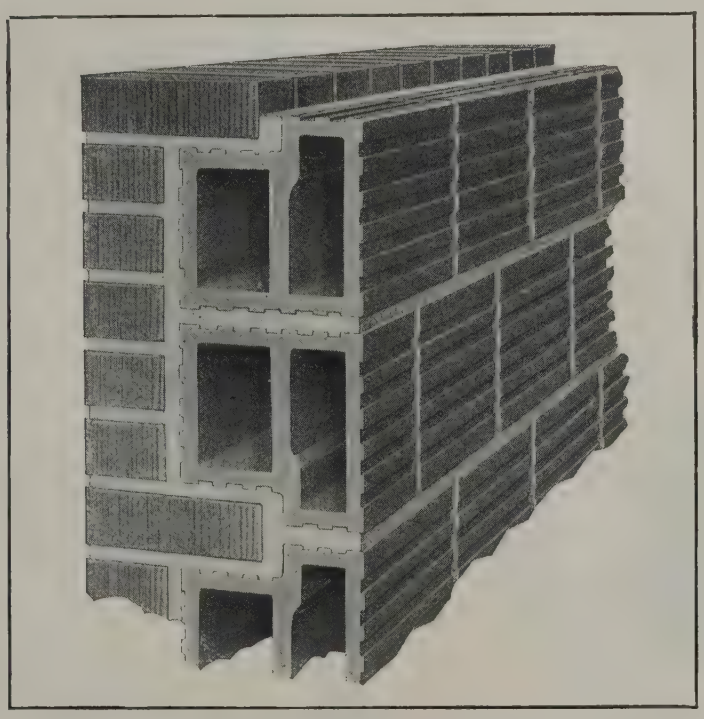
Its weight, compared with solid brick masonry, materially reduces foundation and steel costs without sacrifice of strength and permanence.

Unibacker is particularly economical of mortar. It saves approximately one-third (⅓) over ordinary tile construction.

Displacement

Each Unibacker unit replaces (according to thickness) from 8 to 12 brick, which accounts for the pronounced savings in erection costs and the greater erection speed.

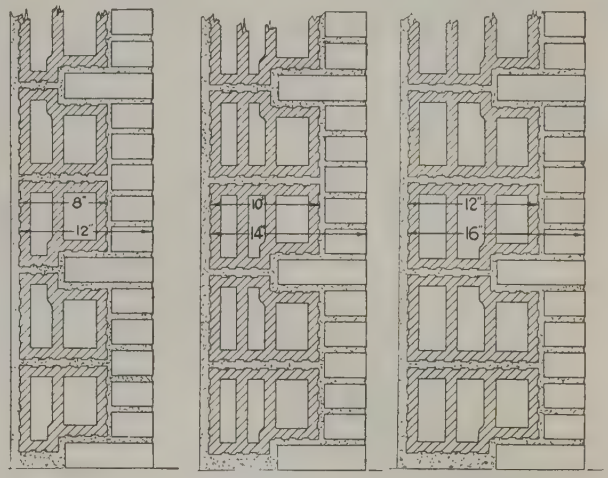
The inner face is 12" x 7¾". Standard thicknesses are 8, 10 and 12" for 12, 14 and 16" walls. Each tile lays up .715 sq. ft. of wall surface when ½" mortar joints are used. 140 units lay up 100 sq. ft. of wall.



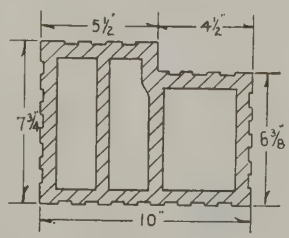
Natco Unibacker Construction
Note the strong, effective masonry bond between the Unibacker tile and brick facing

Adaptability

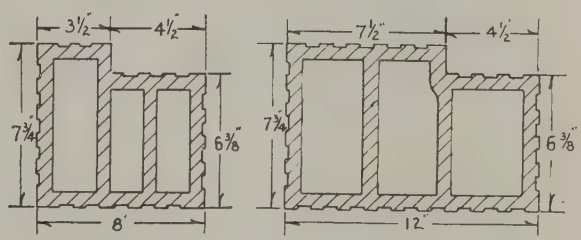
A strong, light construction with speed and labor economies adapting it admirably to use in all types of brick faced buildings of either load bearing or skeleton curtain wall construction.

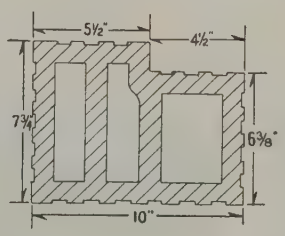


Typical Wall Sections
While these sections show walls including brick facing, 12, 14 and 16" only, thicker walls may easily be obtained by using additional tile

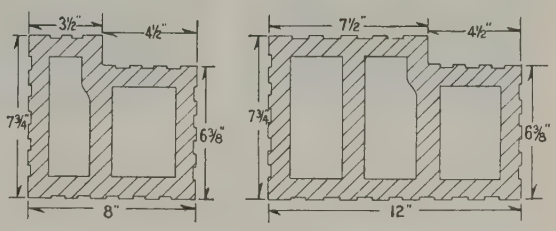


Western Unibacker
Due to the type of clay used the thinner shell and web construction adequately fulfills all load bearing requirements





Eastern Unibacker
This tile is particularly designed for the New York market where 1" thick shell and webs are required



NATCO UNIBACKER

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NATCO DOUBLE SHELL FACE TILE

General

Natco Double Shell Face Tile (Load Bearing) provides a most economical form of masonry construction.

The double shell feature adds to the comfort and strength of the completed structure. A multiple blanket of isolated air cells are located on both the exterior and interior face of the tile forming a barrier to heat transmission. All mortar joints are non-continuous, thus moisture cannot be drawn through by capillary attraction. The voids in the double shell key with the mortar adding strength and stability to the wall. (See also Natco Page 10.)

Each tile laid forms a section of an insulated moisture resisting wall, with an attractively finished exterior face. Upkeep is negligible, as the tile does not discolor, disintegrate or weather—obviously painting or similar maintenance is eliminated.

Each unit is equivalent to six brick, easily and quickly laid, effecting considerable labor and mortar savings.

Made with a 5″ x 12″ face for 8″ walls, complete with all accessory shapes for sills, jambs, lintels, etc.

Unglazed Tex-Tile (Designated by T)

Natco Unglazed Tex-Tile has a texture face resembling a high quality tapestry brick. To meet individual preferences, it is furnished in three (3) color combinations. These are termed Shade Ranges E-1, E-2 and E-3. In Shade Range E-1, the browns predominate. In Shade Range E-3 the reds predominate. In Shade Range E-2 a combination (full range) of Shade Ranges E-1 and E-3 is obtained which is extremely beautiful. The inside face is scored for plaster. (A color chart showing these shade ranges will be sent on request.)

Glazed Tex-Tile (Designated by TG)

Natco Glazed Tex-Tile has the same texture finish as the unglazed and is furnished in dark brownish shades. The inside face is scored for plaster.

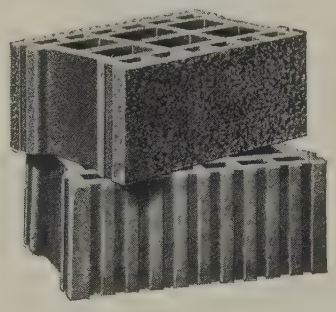
Glazed Comb Face Tile (Designated by B)

Natco Glazed Combed Face Tile has an exterior scratched or combed face and a glazed smooth, sanitary, easily cleaned interior surface. It is furnished in 6″ as well as 8″ thickness.

(When desired, it can be furnished with unglazed, combed exterior and combed interior faces.)

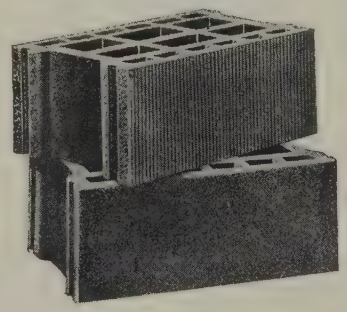
Adaptability

Natco Double Shell Face Tile is extensively and successfully used for residences, churches, schools, garages, factories, warehouses, gas stations, etc. It is the logical choice for any structure where attractiveness, permanence and comfort must be combined with economy.



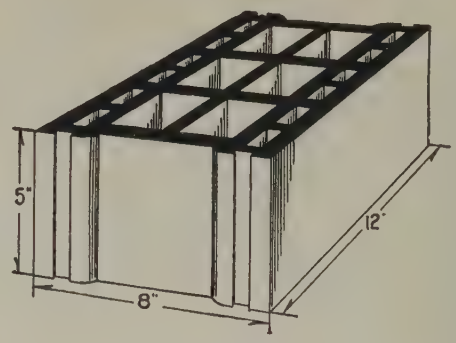
Natco Tex-Tile

Furnished with outside face either unglazed or glazed with the inside face scored for plaster

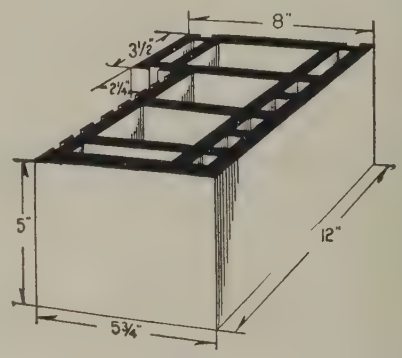


Natco Combed Face Tile

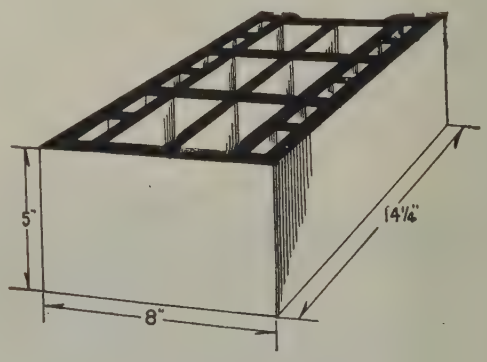
Furnished with outside face glazed and the inside face smooth glazed for exposed interior finish



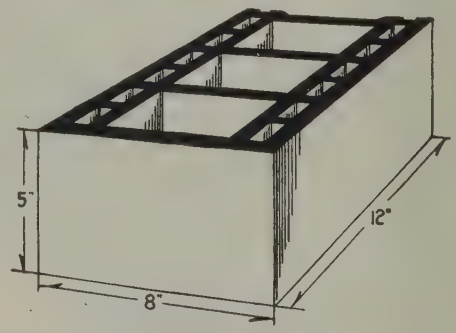
T-80; TG-80; B-80
8″ Wall Tile



T-82; TG-82; B-82
8″ Corner



T-88; TG-88; B-88
8″ Inside Corner



T-85; TG-85; B-85
8″ Closure

T-41; TG-41; B-41
1″ x 4″ x 12″ Joist Bearing Slab
See Fig. 5

NATCO DOUBLE SHELL FACE TILE

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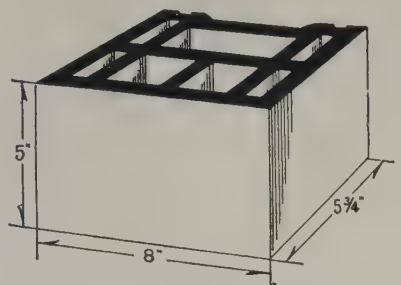
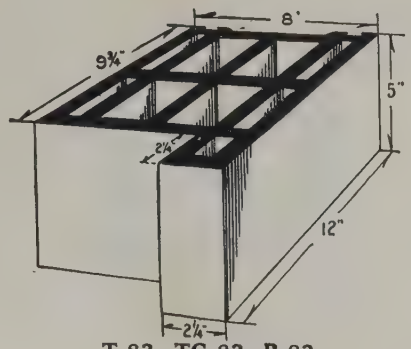
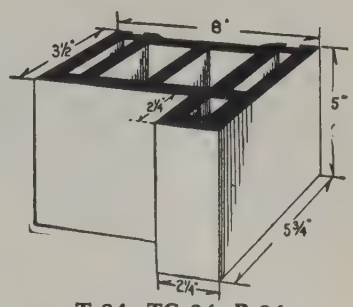


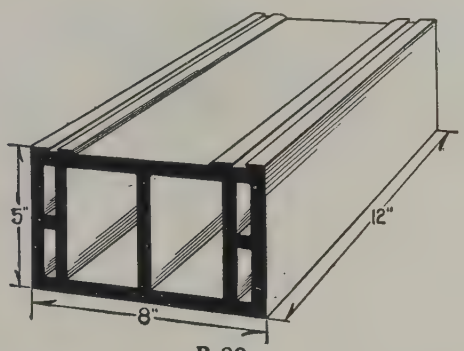
T-86; TG-86; B-86
8" Half Closure



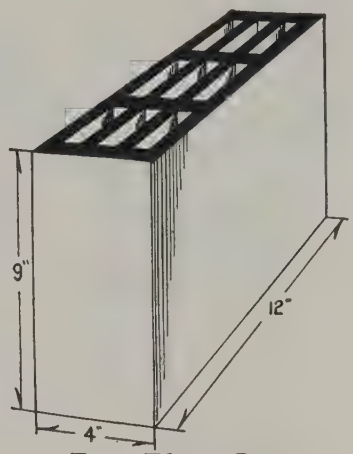
T-83; TG-83; B-83
8" Full Jamb



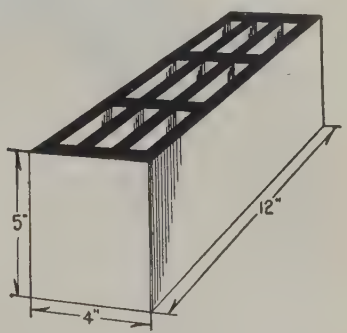
T-84; TG-84; B-84
8" Half Jamb



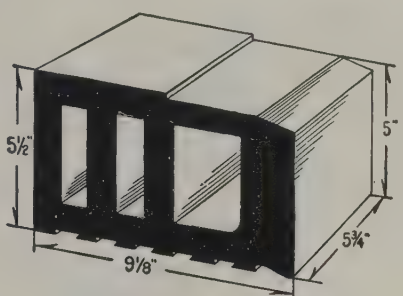
B-89
8" Straight Lintel
Furnished in Combed Face only. (See T-89, TG-89, Page 18)



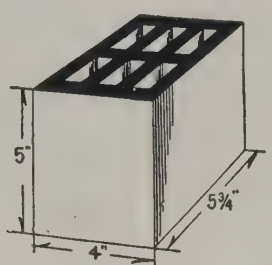
T-49; TG-49; B-49
4" Joist Filler



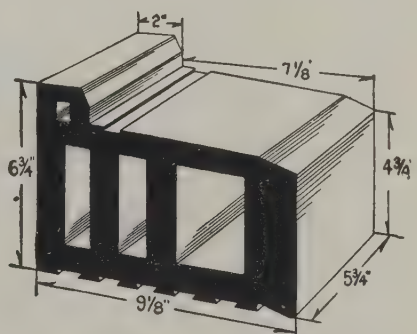
T-40; TG-40; B-40
4" Joist Closure



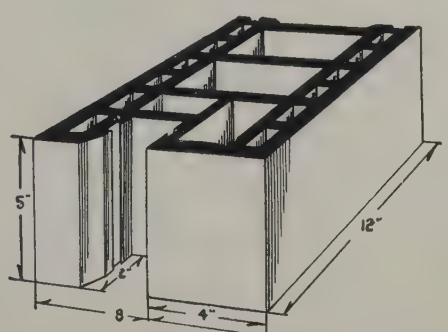
T-87; TG-87; B-87
8" Sill Tile



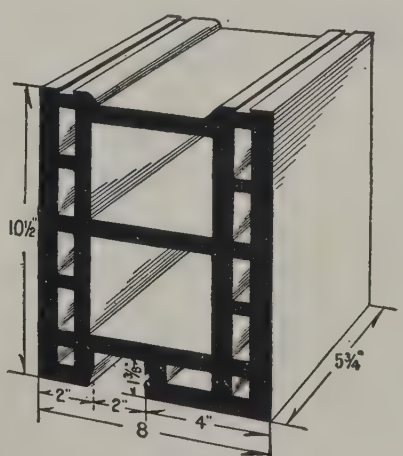
T-46; TG-46; B-46
Pilaster Tile



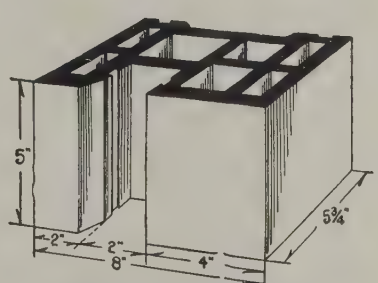
TS-87; TGS-87; BS-87
8" Sill for Steel Sash



TS-83; TGS-83; BS-83
8" Full Jamb for Steel Sash and for Plank Frame Windows and Doors



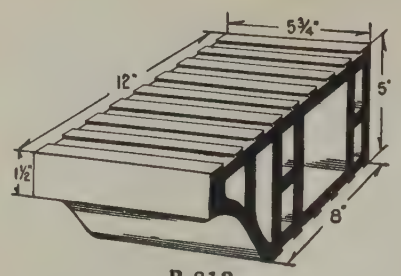
TS-89; TGS-89; BS-89;
8" Soldier Lintel for Steel Sash. (Note: This lintel is also used extensively with wood frame windows and for soldier courses)



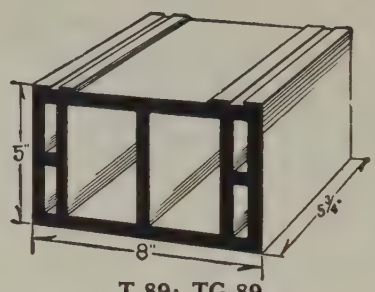
TS-84; TGS-84; BS-84
8" Half Jamb for Steel Sash and for Plank Frame Windows and Doors

NATCO DOUBLE SHELL FACE TILE

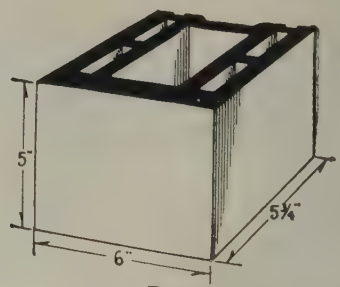
Continued on next page



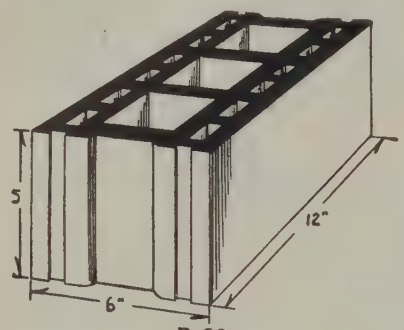
B-812
Corbel Tile
Made in glazed or unglazed combed face only



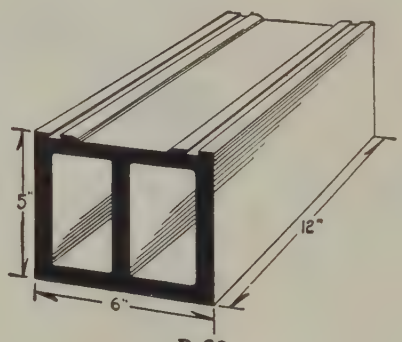
T-89; TG-89
8" Straight Lintel. See B-89, Page 17)



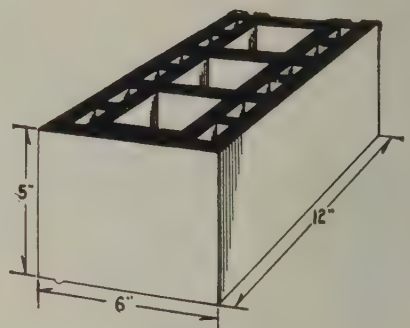
B-66
6" Half Closure



B-60
6" Wall Tile



B-69
6" Lintel



B-62
6" Combination Closure and Corner

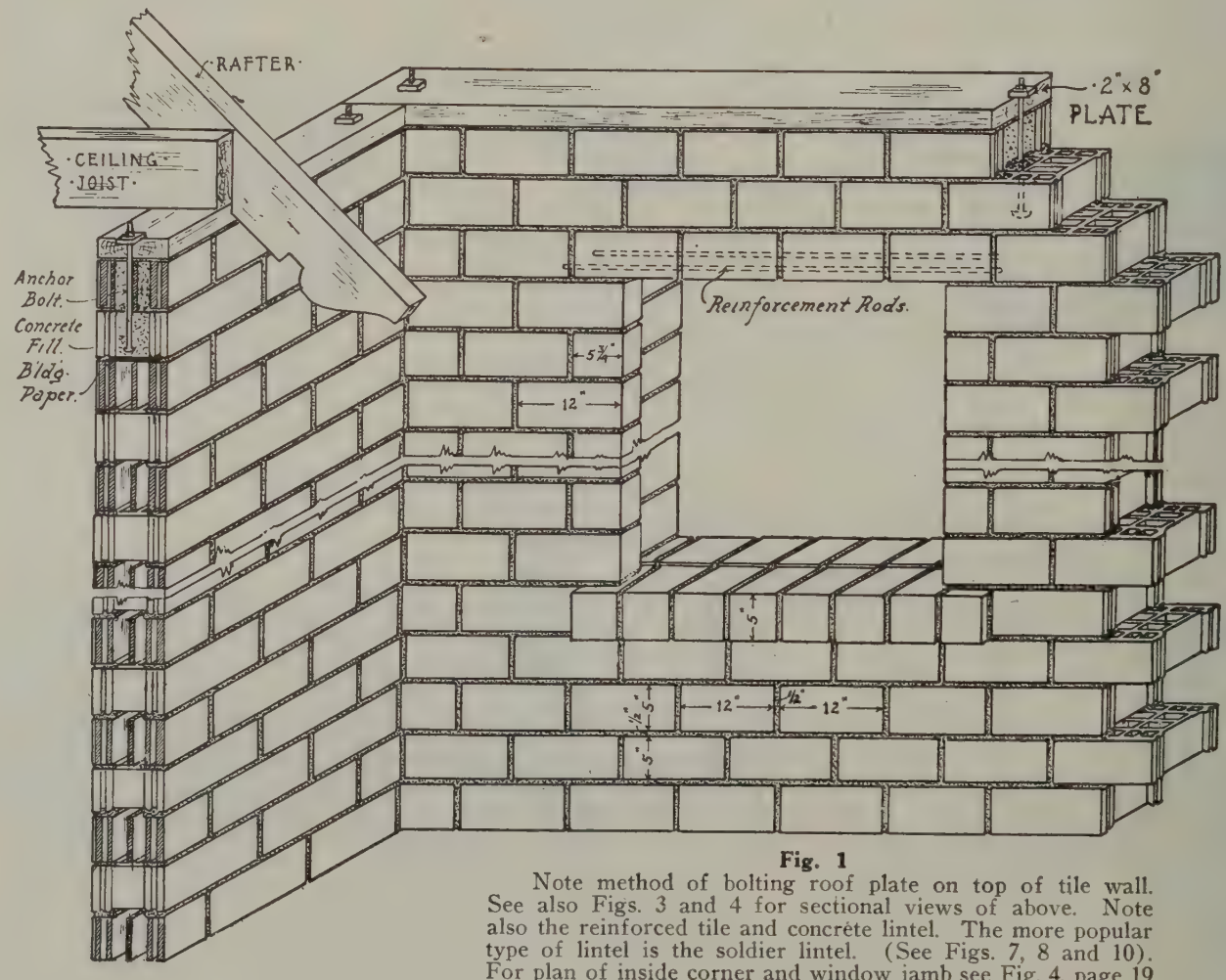


Fig. 1
Note method of bolting roof plate on top of tile wall. See also Figs. 3 and 4 for sectional views of above. Note also the reinforced tile and concrete lintel. The more popular type of lintel is the soldier lintel. (See Figs. 7, 8 and 10). For plan of inside corner and window jamb see Fig. 4, page 19

NATCO DOUBLE SHELL FACE TILE

Continued on next page

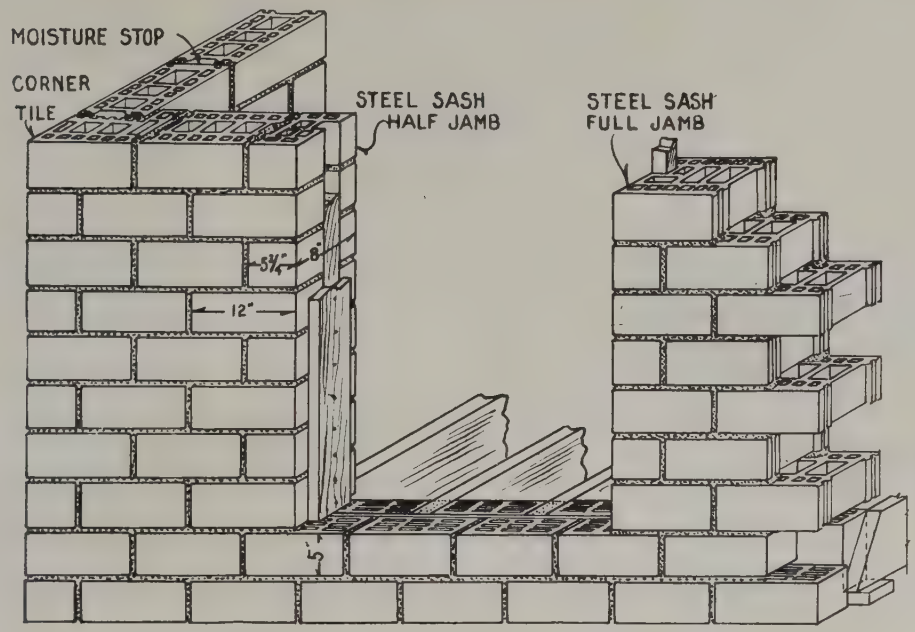


Fig. 2

Shows ordinary outside corner construction. Also shows method of making an absolutely weatherproof joint between tile and plank frame by using a strip of wood which has been nailed to the frame. This strip should fit into the recess in the tile. This method is recommended for all plank frames

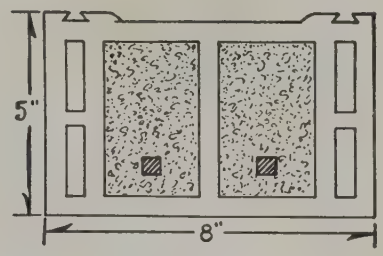


Fig. 3

Flat lintel showing reinforcing rods and concrete in both cells of tile. (See Fig. 1)

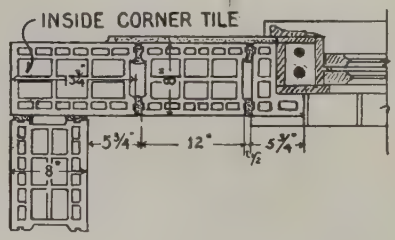


Fig. 4

Longitudinal cross section of wall shown in Fig. 1. Note jamb tile which provides space for sash weight box. Note the inside corner construction. This type of corner is required in ell shaped walls only

Course No.	Height
1	— 5⅜"
2	—10¾"
3	1'— 4⅛"
4	1'— 9½"
5	2'— 2⅞"
6	2'— 8¼"
7	3'— 1⅝"
8	3'— 7"
9	4'— 0⅜"
10	4'— 5¾"
11	4'—11⅛"
12	5'— 4½"
13	5'— 9⅞"
14	6'— 3¼"
15	6'— 8⅝"
16	7'— 2"
17	7'— 7⅜"
18	8'— 0¾"
19	8'— 6⅛"
20	8'—11½"
21	9'— 4⅞"
22	9'—10¼"
23	10'— 3⅝"
24	10'— 9"
25	11'— 2⅜"
26	11'— 7¾"
27	12'— 1⅛"
28	12'— 6½"
29	12'—11⅞"
30	13'— 5¼"
31	13'—10⅝"
32	14'— 4"
33	14'— 9⅜"
34	15'— 2¾"
35	15'— 8⅛"
36	16'— 1½"
37	16'— 6⅞"

Height Table

Tile 5" x 8" x 12"
Joint ⅜"

The table at the left is used to determine the height of walls which will best lay up without cutting tile, using ⅜" bed joint.

Length Table

Tile 5" x 8" x 12"
Joint ⅜"

The table at the right shows the length of walls that can be best laid without cutting tile, using ⅜" vertical mortar joint.

For window openings add ⅜" to height table and ¾" to length table.

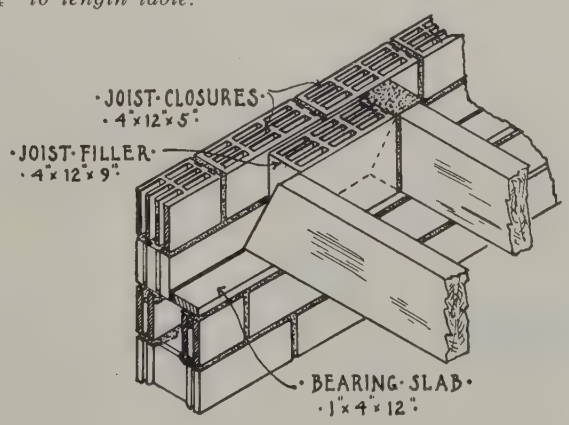


Fig. 5

Shows method of building wood joists in wall. Joist closure tile are used for exterior 4" of wall and by using 1" tile slabs bedded in mortar for the joists to rest on, the joists get a solid and flat bearing surface and the load is evenly distributed. The space between joists is filled with joist filler tile to make a solid wall to top of joists. Joists may be spaced as desired. Illustration shows joists 14" on centers.

No. Tile	Length
1	1'— 0"
1½	1'— 6⅛"
2	2'— 0⅜"
2½	2'— 6½"
3	3'— 0¾"
3½	3'— 6⅞"
4	4'— 1⅛"
4½	4'— 7¼"
5	5'— 1½"
5½	5'— 7⅝"
6	6'— 1⅞"
6½	6'— 8"
7	7'— 2¼"
7½	7'— 8⅜"
8	8'— 2⅝"
8½	8'— 8¾"
9	9'— 3"
9½	9'— 9⅛"
10	10'— 3⅜"
10½	10'— 9½"
11	11'— 3¾"
11½	11'— 9⅞"
12	12'— 4⅛"
12½	12'—10¼"
13	13'— 4½"
13½	13'—10⅝"
14	14'— 4⅞"
14½	14'—11"
15	15'— 5¼"
15½	15'—11⅜"
16	16'— 5⅝"
16½	16'—11¾"
17	17'— 6"
17½	18'— 0⅛"
18	18'— 6⅜"
18½	19'— 0½"
19	19'— 6¾"

NATCO DOUBLE SHELL FACE TILE

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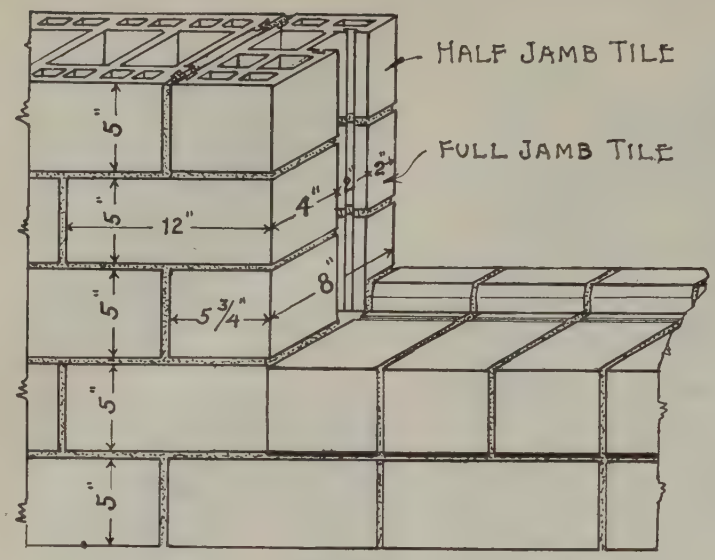


Fig. 6

Detail of opening for steel sash. Note recess in full and half steel sash jamb tile. (See Fig. 8 and 9 for method of bedding sash)

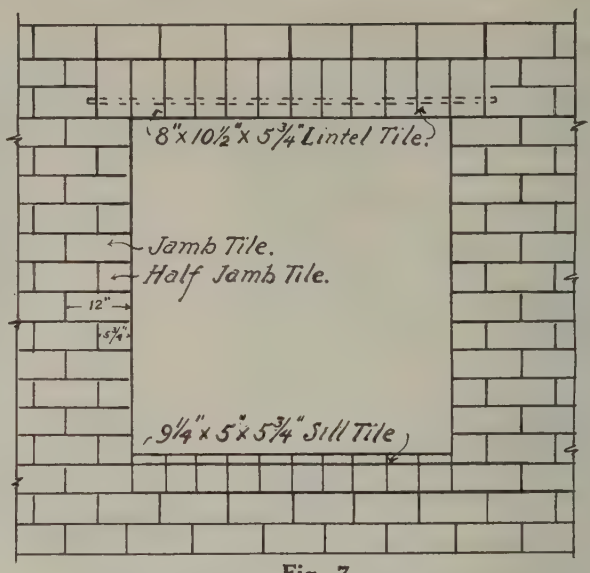


Fig. 7

Window opening showing soldier lintel. Can also be reinforced with angle iron as shown in Fig. 10

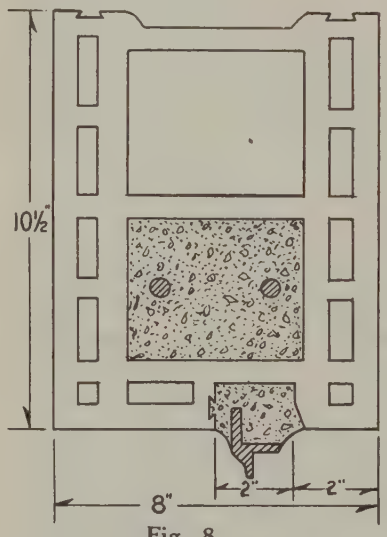


Fig. 8

Detail of lintel showing reinforced concrete beam in cell of tile and also method of bedding steel sash frame in the recess in steel sash lintel tile.

A method of reinforcing lintels over wide openings or where a heavy load bears above the openings. In order to allow the flanges of angles to go inside the tile, it is necessary to break out the small web of tile. This is very easily and safely done by tapping the web lightly with a hammer, breaking it out in small pieces until the web has been tapped out about half the length of the tile—then start at other end of tile and work to the middle

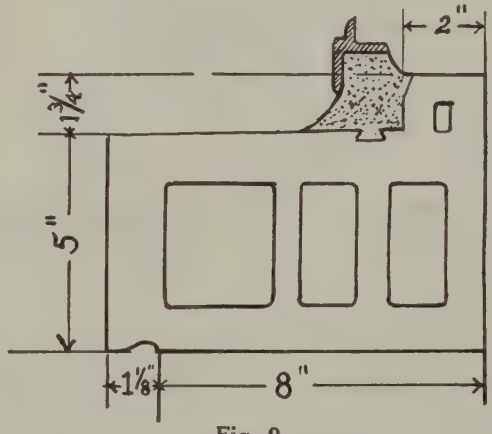


Fig. 9

Steel sash mortared to sill tile. Note dovetail scoring for holding mortar

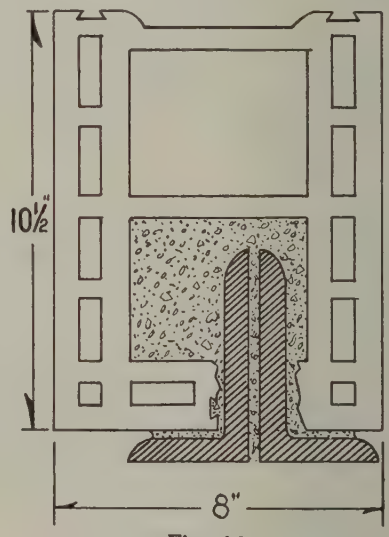


Fig. 10

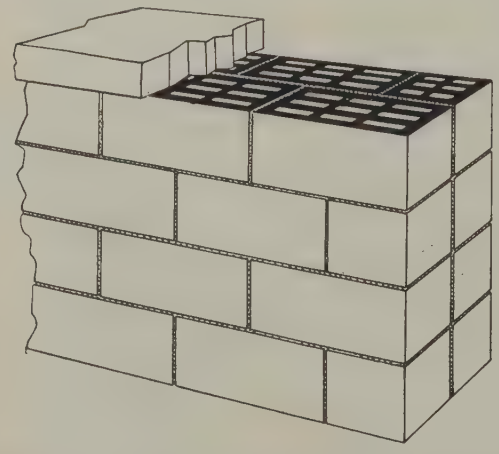
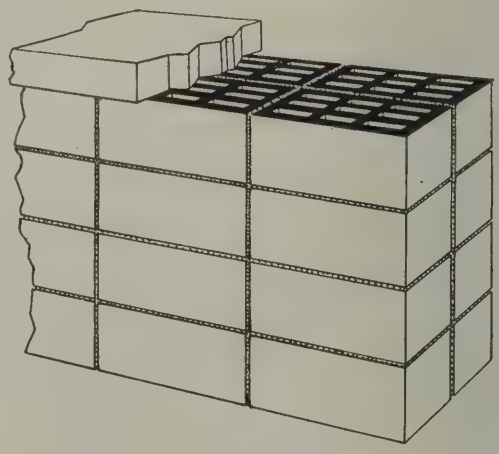


Fig. 11 (Left)

Detail of porch balustrade built of joist closures laid back to back with staggered mortar joints. This gives a finished face on each side and on the end

Fig. 12 (Right)

Detail of porch balustrade built of joist closures back to back with mortar joints in line. This gives a finished face on each side and on the end



NATCO DOUBLE SHELL FACE TILE

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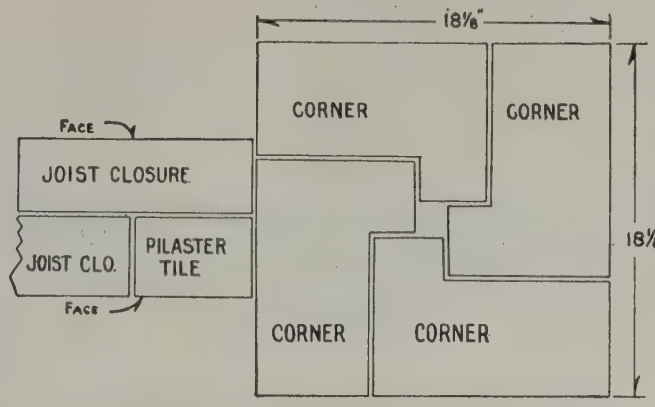


Fig. 13

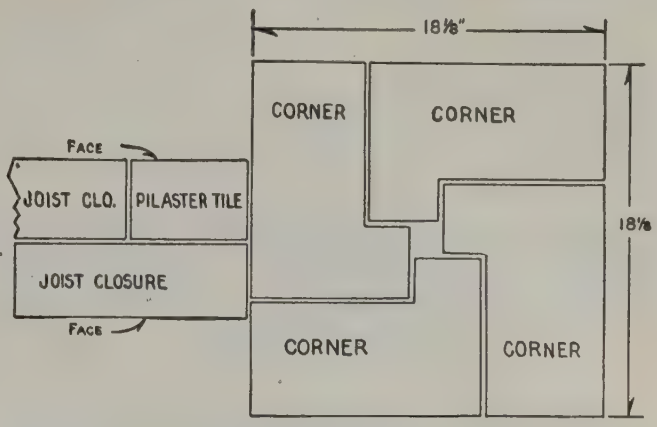


Fig. 14

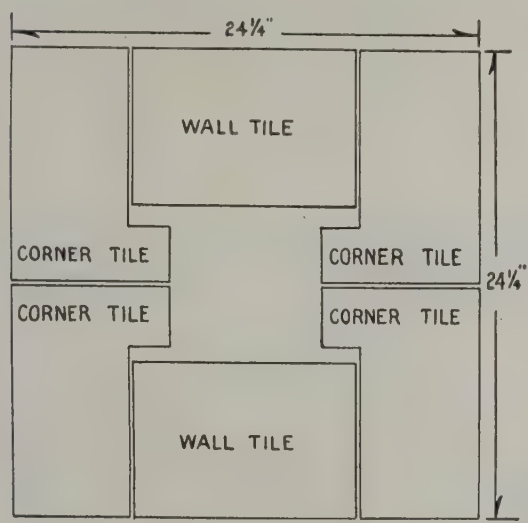


Fig. 15

PIERS

Figs. 13 and 14

Alternate course of a porch column and balustrade. This is the smallest column that can be built with finished faces on all four sides and true bonding of tile. Both sides of balustrades have finished faces. (See Figs. 11 and 12)

Figs. 15 and 16

Details of alternate courses of a 24¼" square column. Our engineering department will gladly furnish layouts of larger size columns on request

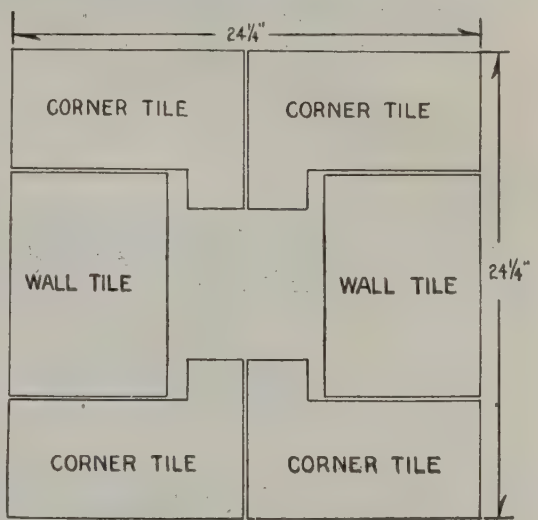


Fig. 16

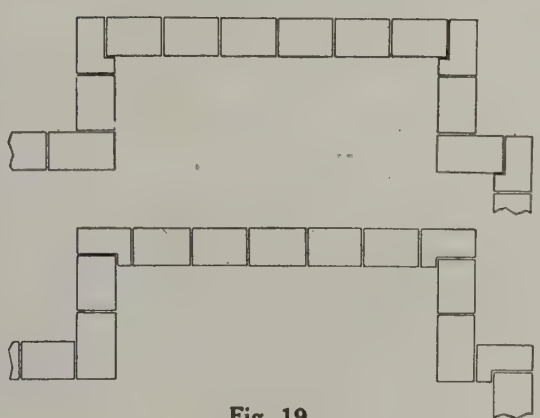
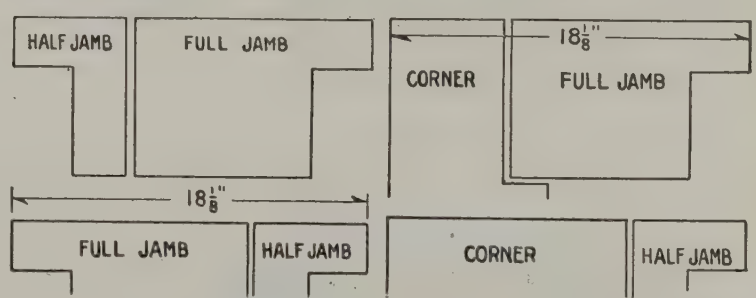


Fig. 19

Alternate courses of a typical bay window wall. Note that a true bond is preserved at all points in the wall without any cutting of tile



Figs. 17 and 18

Alternate courses showing the minimum distance between two windows, and the minimum distance from corner of building to nearest window without cutting of tile

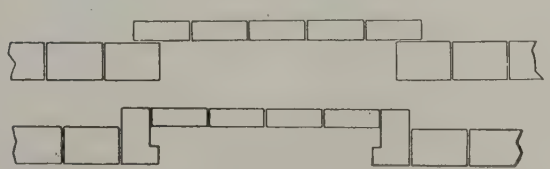


Fig. 20

Alternate courses of an 8" chimney recess. Chimney projects only 4" from face of wall

BAYS AND CHIMNEYS

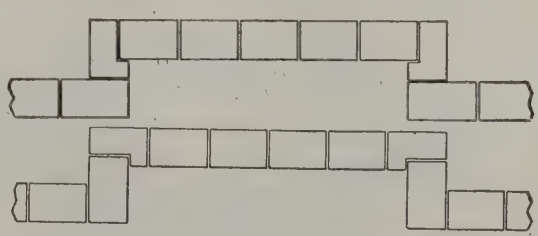


Fig. 21

Alternate courses of a 12" chimney recess. Preserves a true bond without cutting of tile. Chimney projects 12" from face of house wall. The chimney itself should be of brick

NATCO DOUBLE SHELL FACE TILE

Continued on next page

SUGGESTIONS FOR PILASTER CONSTRUCTION

The walls of industrial and commercial buildings are often designed to be built to considerable height without cross walls, and to bear heavy concentrated loads, such as floor beams and roof trusses. In these cases it is customary to build pilasters to stiffen the wall for wind pressure, and to carry these concentrated loads. Below are shown several pilaster layouts, and our engineering department will gladly furnish others if needed. Note that all pilasters are thoroughly bonded in the wall.

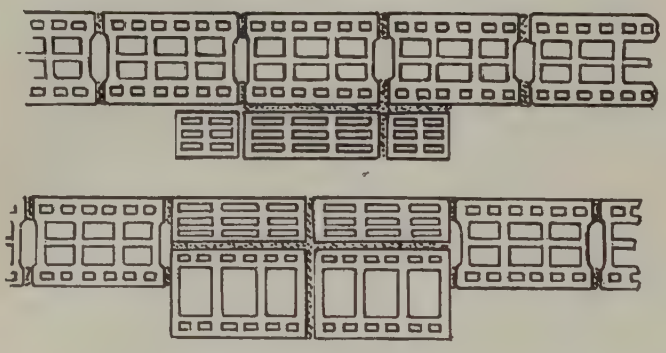


Fig. 22
Alternate courses of a pilaster 24½" wide with 4½" projection

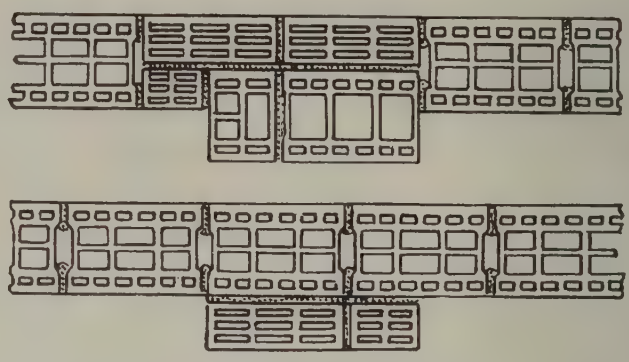


Fig. 25
Alternate courses of a pilaster 18½" wide with 4½" projection

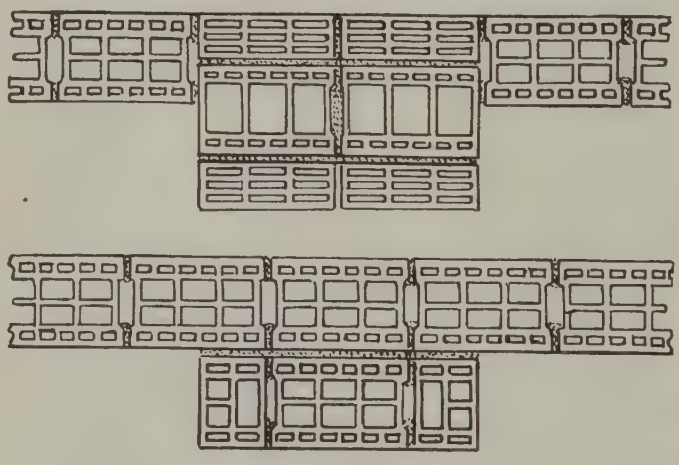


Fig. 23
Alternate courses of a pilaster 24½" wide with 8½" projection

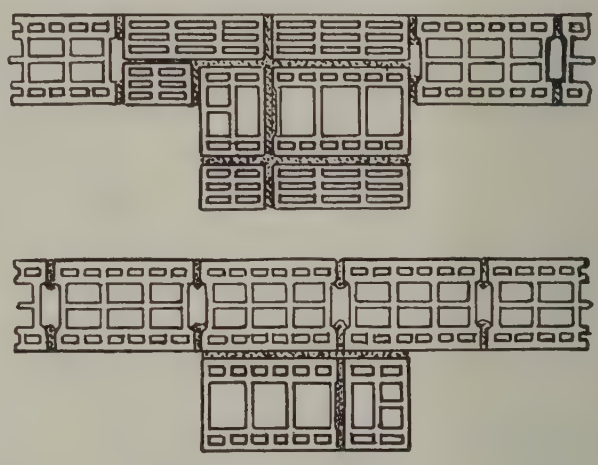


Fig. 26
Alternate courses of a pilaster 18½" wide with 8½" projection

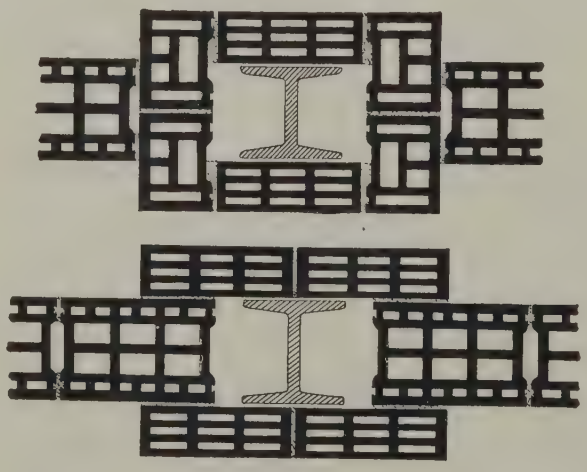


Fig. 24
Alternate courses showing method of enclosing H column. Gives a true bond. Our engineering department will gladly furnish layout for enclosing other sizes of columns

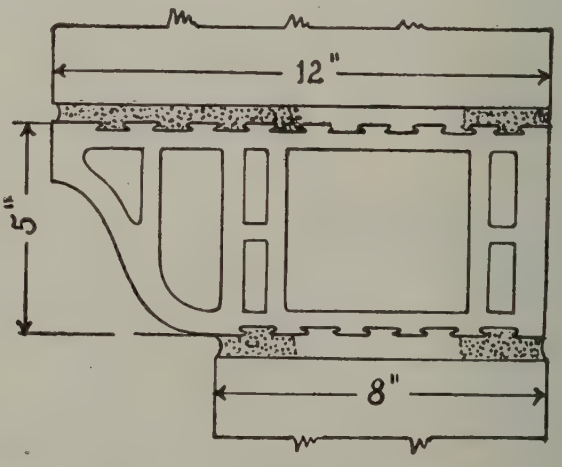


Fig. 27
Corbel Tile. Used for ornamenting top course of walls of commercial and industrial buildings. On top of corbel tile is usually placed wall coping or concrete slab. Corbel tile is furnished only with glazed combed face. (Not furnished with texture face)

NATCO DOUBLE SHELL FACE TILE

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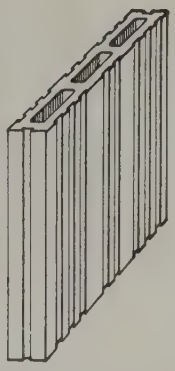
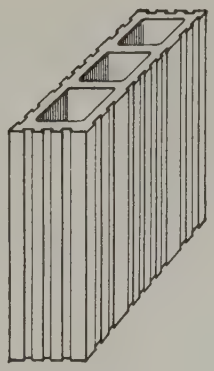
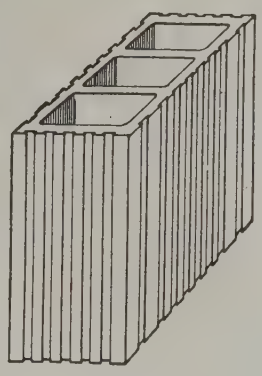


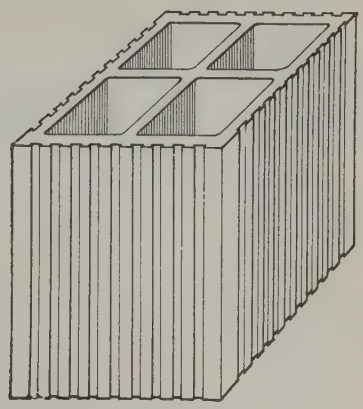
2 inch
Eastern Factories
2-cell—2x8x12—10 lb.
Ohio Factories
3-cell—2x12x12—15 lb.
Western Factories
3-cell—2x12x12—15 lb.



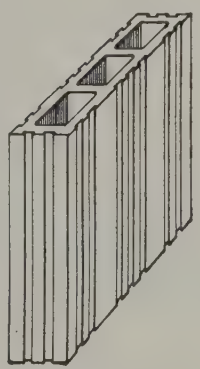
4x12x12
Eastern Factories
3-cell—16 lb.
Ohio Factories
3-cell—16 lb.
Western Factories
3-cell—16 lb.



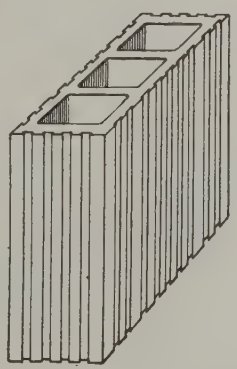
6x12x12
Eastern Factories
4 and 6 cell—22 and 24 lb.
Ohio Factories
3-cell—22 lb.
Western Factories
3-cell—22 lb.



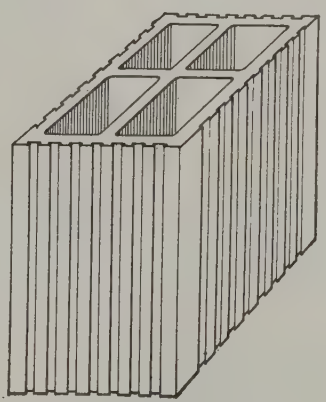
10x12x12
Eastern Factories
6-cell—36 lb.
Ohio Factories
4-cell—36 lb.
Western Factories
6-cell—36 lb.



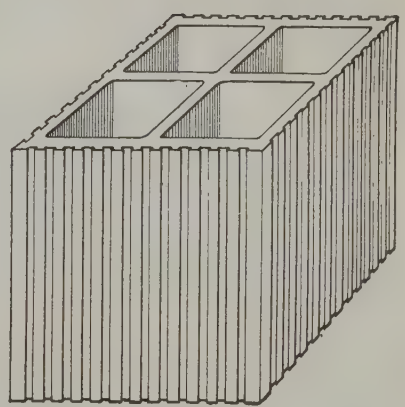
3x12x12
Eastern Factories
3-cell—15 lb.
Ohio Factories
3-cell—15 lb.
Western Factories
3-cell—15 lb.



5x12x12
Eastern Factories
6-cell—22 lb.
Ohio Factories
3-cell—19 lb.
Western Factories
3-cell—19 lb.



8x12x12
Eastern Factories
6-cell—30 lb.
Ohio Factories
4-cell—30 lb.
Western Factories
6-cell—30-lb.



12x12x12
Eastern Factories
6-cell—40 lb.
Ohio Factories
4-cell—40 lb.
Western Factories
6-cell—40 lb.

Natco Partition Tile

In addition to their fire-resisting qualities, hollow tile partitions are light, strong, easily erected by bricklayers, and do not transmit heat, cold or sound.

All partitions and furring tile, unless otherwise specified, are scored to receive plastering. If the surface is to be whitewashed the tile can be made smooth.

Wood or channel-iron bucks are placed in all door openings, and should be 1½″ wider than thickness of the tile and act as grounds for the plastering.

It is not generally practicable to use 2″ tile for partitions, except for closets, shafts, etc.

Partitions of 3″ can be safely used up to 12′ in height, 4″ to 16′ and 6″ to 20′.

The tile are commonly made 12″ wide by 12″ long, except 2″ tile at eastern and northeastern factories, which is made 12″ long but 8″ wide at eastern factories and 6″ wide at the northeastern factory. They can be made any size required, but special sizes are necessarily more expensive.

In office buildings it is good practice to have all the main corridor and stairway and elevator enclosures of 4″ and the partitions between rooms 3″. Partitions should be bonded where meeting and anchored to wood bucks or brick walls by using tenpenny nails, or metal wall ties, in each second joint.

Tile should be set on end, except top course, which may be set on side. When required for outside walls exposed to the weather the tile must be specially made of dense material, hard burned. At a slightly increased cost they can be made smooth on outside face and do not require plastering. They should be not less than 6″ thick.

Natco Split Furring Tile

Brick walls exposed to the weather must be furred with hard burned tile, to prevent dampness reaching the interior and destroying the plastering and interior decorations.

The tile are made either 1½″ or 2″ thick and 12″ square. The ribs being set against the wall, an air space is formed which effectively checks the passage of moisture. They should be set with the ribs vertical without mortar at back and fastened to the wall by driving .10d nails in the joints of the brickwork, the head of the nail being bent down upon the tile, using a nail over every third tile in every second course or metal wall ties may be embedded in wall, as provided by local building codes.

Where walls must be straightened or furred out to line with the face of piers the 2″ tile cannot be used. If the ceiling height is not too great use 3″ partition tile. If the space is greater than 3″ the tile may be set out from the wall leaving a clear air space behind them. They should be braced at intervals by the use of drive anchors or 4″ tile can be used without the anchors. This is known as free standing furring. The face of the tile is grooved for plastering.

NATCO PARTITION TILE AND WALL FURRING

Continued on next page

NATCOFLOR

Description

Natcoflor System is a combination of special shaped Natco tile with 2″ wide cement grout joists or ribs spaced 13″ center to center between the tile. Each rib is reinforced with two steel bars, one straight and one bent.

No concrete is required on top of the tile for structural purposes. Wooden sleepers are placed directly on the tile, and are held in place with cinder fill or sleeper clips.

The design of the tile is such as to place the maximum sectional area of the tile unit where it will be of the most use in resisting the compressive stresses. The dead weight of the tile thus has been kept down to the minimum. In other forms of "Combination" systems, these stresses are taken care of by the concrete top. The tile are made from special clay which gives them high compression strength. Tests have repeatedly and clearly demonstrated that tile may be safely figured to take compressive stresses of 1000 pounds per sq. in. of net sectional area, allowing an ample factor of safety.

Cement grout or mortar mixed one part cement to two and one-half parts sand is used for the 2″ joists. This thoroughly covers the steel reinforcing and completely fills the joints between the tile. (At girders, etc. where the open ends of the tile are exposed, the tile are first placed on end and the cells stopped with about 1″ of mortar.) The flanges of the tile meet at the bottom to form an all tile ceiling thus assuring an excellent base for plastering.

With Natcoflor, greater speed of erection at a much lower cost is secured. This is due to the perfect alignment of the tile, small amount of material required for reinforcing joists and the extremely light dead load as compared with other strictly fireproof floors.

Our engineers will be glad to give architects and designers any assistance required in using this construction.

Special Features

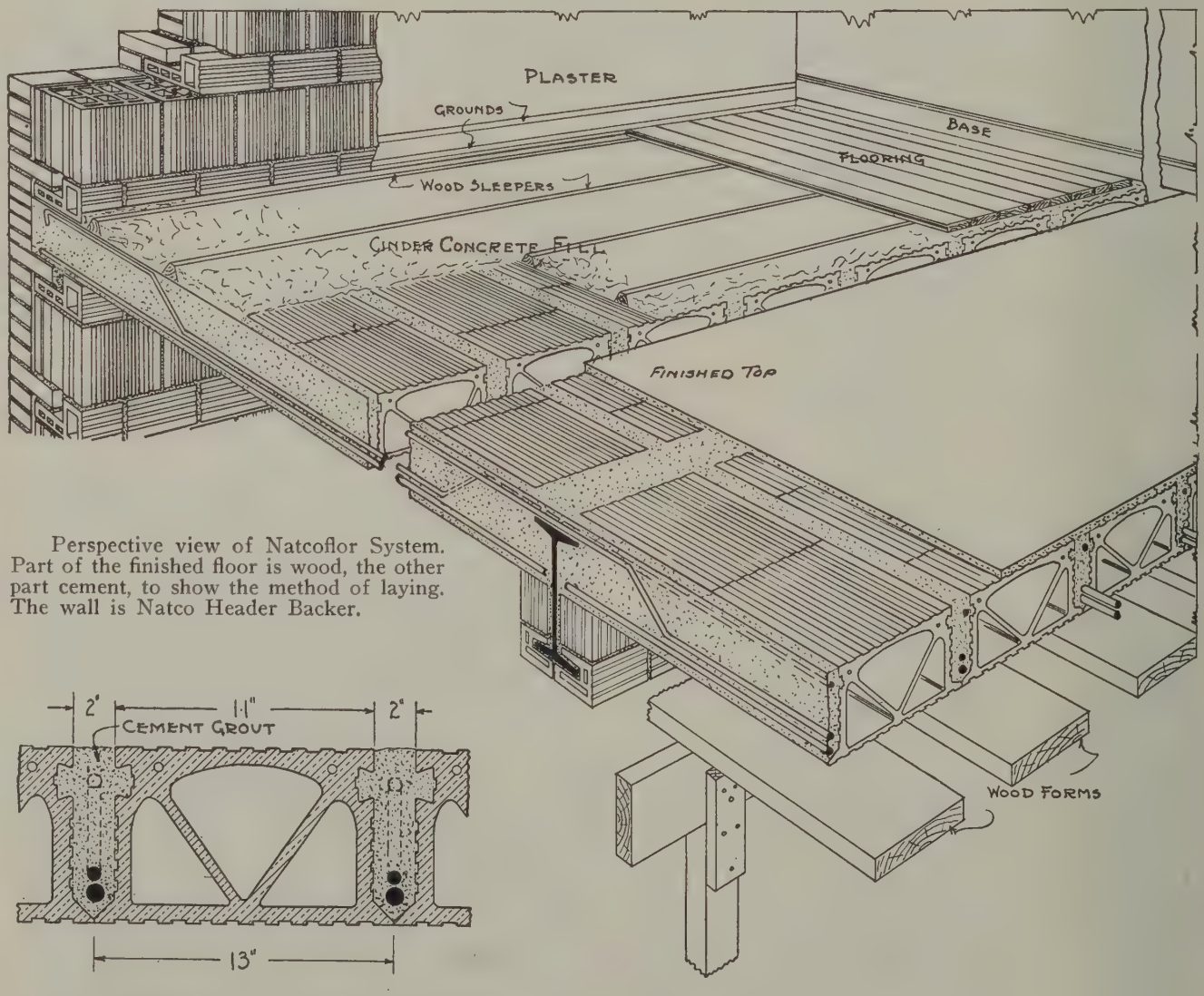
Saves Dead Load—In either steel or concrete frame and foundation.

Saves Floor Depth—2″ to 4″ less than other construction.

Saves Plastering—No metal lath or suspended ceiling. A continuous tile surface.

Saves Labor Cost—Permits speedy erection the year around.

Saves Insurance—Strictly fireproof construction.



Perspective view of Natcoflor System. Part of the finished floor is wood, the other part cement, to show the method of laying. The wall is Natco Header Backer.

Notice in the detail view, how the tile meet at the bottom, to form an all-tile ceiling.

NATCOFLOR SYSTEM OF FIREPROOF FLOORS

Continued on next page

Tile Depth and Steel Area "Natcoflor" Combination Long Span Floors
No Cement Top, 2" Mortar Ribs 13" O. C.

f_m and f_t = 1000 lb. per sq. in.
f_s = 16,000 lb. per sq. in.

$\frac{E_t}{E_s} = \frac{1}{10}$

¾" mortar below reinforcement.
S = Area of steel per joist, sq. in.
T = Depth of tile, in. = depth of floor.

Total safe load (dead plus live), pounds per square foot																					
	Continuous span $M = \frac{WL}{12}$	150		165		180		195		210		225		240		260		300		335	
	Semi-continuous span $M = \frac{WL}{10}$	125		135		150		160		175		185		200		220		250		280	
	Simple span $M = \frac{WL}{8}$	100		110		120		130		140		150		160		175		200		225	
Span in feet		T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
6		4	.16	4	.17	4	.19	4	.20	4	.22	4	.23	4	.25	4	.28	4	.31	4	.35
7		4	.21	4	.23	4	.26	4	.27	4	.30	4	.32	4	.34	4	.38	5	.32	5	.36
8		4	.28	4	.30	4	.33	4	.36	4	.39	5	.31	5	.33	5	.37	5	.42	5	.47
9		4	.35	4	.38	5	.32	5	.34	5	.37	5	.39	5	.42	5	.46	5	.53	6	.46
10		5	.33	5	.35	5	.39	5	.42	5	.46	5	.48	5	.52	6	.45	6	.51	6	.57
11		5	.39	5	.43	5	.47	5	.50	6	.43	6	.46	6	.49	6	.54	6	.62	7	.57
12		5	.47	5	.51	6	.44	6	.47	6	.51	6	.54	6	.59	6	.65	7	.61	7	.68
13		6	.43	6	.47	6	.52	6	.55	6	.60	6	.64	7	.57	7	.63	7	.71	8	.67
14		6	.50	6	.54	6	.60	6	.64	7	.58	7	.61	7	.66	7	.73	8	.70	8	.78
15		6	.57	6	.62	7	.57	7	.61	7	.67	7	.70	7	.76	8	.70	8	.80	9	.78
16		6	.65	7	.58	7	.65	7	.69	7	.76	8	.67	8	.73	8	.80	9	.79	9	.89
17		7	.61	7	.66	7	.73	8	.66	8	.72	8	.76	8	.82	9	.79	9	.90	10	.89
18		7	.68	7	.74	8	.69	8	.74	8	.81	9	.74	9	.80	9	.88	10	.89	10	1.00
19		7	.76	8	.69	8	.77	8	.82	9	.78	9	.83	9	.89	10	.88	10	.99	12	.90
20		8	.71	8	.77	8	.85	9	.79	9	.87	9	.92	10	.88	10	.97	12	.89	12	1.00
21		8	.78	8	.85	9	.82	9	.88	10	.85	10	.90	10	.97	12	.87	12	.98	12	1.10
22		9	.75	9	.81	9	.90	10	.85	10	.93	10	.99	12	.86	12	.95	12	1.08	.....	.....
23		9	.82	9	.89	10	.87	10	.93	12	.83	12	.87	12	.94	12	1.04	12	1.18	.....	.....
24		9	.89	10	.86	10	.95	12	.82	12	.90	12	.95								
25		10	.86	10	.93	12	.84	12	.89	12	.97	12	1.03								
26		10	.93	12	.81	12	.90	12	.96	12	1.05	12	1.12								
27		12	.81	12	.88	12	.97	12	1.04	12	1.13										
28		12	.87	12	.94	12	1.05	12	1.12												
29		12	.94	12	1.01	12	1.12	12	1.20												
30		12	1.00	12	1.08	12	1.20	....	.....												

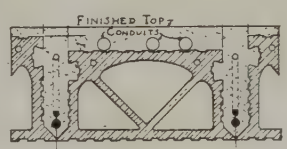
Design Data

Size, in.	4	5	6	7	8	9	10	11	12
Mortar per sq. ft....cu. ft.	.051	.064	.077	.090	.102	.115	.128	.141	.154
Wt. of tile .....lb.	26	28	30	32	34	37	40	44	47
Wt. of floor...lb. per sq. ft	30	34	39	42	45	48	52	56	59

Note: Unit shear not to exceed 60 lb. per sq. in. Width of joist may be figured 3½" in computing shear (2" for joist and ¾" for each adjoining shell of tile).

Conduits

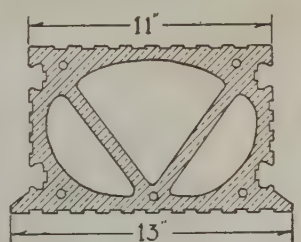
When cement or terrazzo floors are used, a run for conduit may be easily made by putting in a series of tile less in depth than the rest of the floor. In the case of wood floors, the conduit may be run between the sleepers.



Negative Moment and Shear Tile

Our company is able to furnish a special Natcoflor tile for use adjacent to the supporting members to take care of any excessive negative moment or shear at these points. This tile is so designed that the compressive area at lower portion of the tile is the same as the area in the upper portion besides having the additional key for the grout at the bottom. Generally two or three pieces of this special tile are required adjacent to the supporting member, depending on the designer's requirements. In some cases they would not be needed.

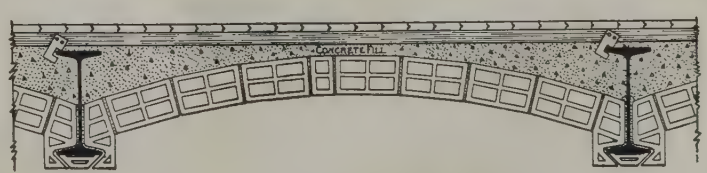
The advantages of this tile are that in some cases a saving in depth and cost of floor may be obtained. For example, a floor must sometimes be increased in depth because of excessive shear or negative moment although it meets the other design requirements. The tile weighs little more than the ordinary Natcoflor and the dead weight of the floor as a whole is not affected.



Negative Moment and Shear Tile

NATCOFLOR SYSTEM OF FIREPROOF FLOORS

This form of arch combines great strength with economy and lightness. It is particularly adaptable to warehouses, lofts, factories, sidewalks, or wherever a flat ceiling is not necessary.



The 6" arch is most commonly used and weighs approximately 35 lb. per sq. ft.

End construction tile may be used, but they are unsatisfactory unless the arches are of uniform span and rise throughout. Where a very light, strong arch is required in deep beams, and a flat ceiling is also demanded, use a suspended ceiling below the beam.

The most effective location for the tie rods to counteract the thrust is near the bottom of the beams. They may be placed there and painted, or set higher and protected by the arch. If this is done the rods in the end spans should be made forked or double rods set crossing each other.

Complete engineering data on application.

NATCO SEGMENTAL ARCH FLOOR

Continued on next page

NATCO FLAT ARCH FLOORS

General

Flat arches as adapted to floors and roofs are made up of various shaped tile as shown on Natco Page 28. The tile resting against the beams are called "skews" and the protection for the beam known as the "soffit" tile is held in place by the bevel on the "skews." The intermediate tile are called "inters" and the center one the "key."

Natco Flat Arch in general comes under two divisions, namely, the "End Construction Flat Arch" and the "Side Construction Flat Arch" each described and illustrated below.

The depth of the arch must be proportioned to the span between the beams and to a certain extent to the load carried. A safe general rule for finding the depth of the arch in inches is to multiply the span in feet by 1½" and add the thickness of the protection below the beams. This is the code requirement of the larger cities in general.

The outstanding advantage of the flat arch is its adaptability to speed in construction independent of temperature. Centers need remain in place but one-tenth to one-fourth as long as required under concrete construction. Moisture due to cement hydration is minimized.

Flat arch is most economical. Although the arch itself is placed by bricklayers, this labor cost is more than offset by the low centering cost. Centering is hung. (See Natco Page 27.) There is little or no lumber loss—no nails are used. Floors beneath are accessible for work by other trades.

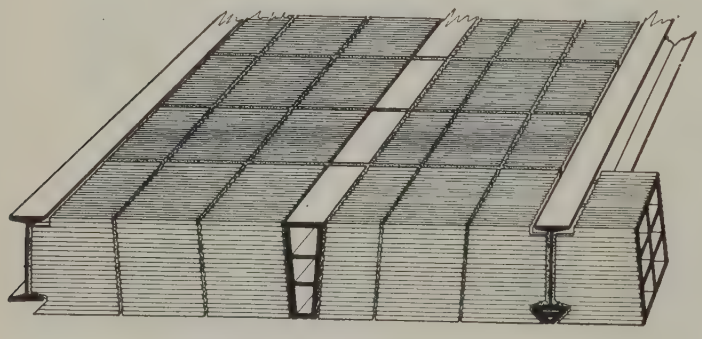
By the omission of tile units at the time of erection, pipe work of the mechanical trades is economically accommodated. Holes may be cut at any time, almost with impunity, and later easily patched.

The all-tile ceiling provides the most satisfactory surface for plastering.

Natco End Construction Flat Arch

Natco End Construction Flat Arch consists of end construction skews and inters and side construction keys.

This arch is the most adaptable form of arch, since the end construction skew can be cut to fit different elevations and sizes of the beams. Of course, it is advisable to keep the bearing beams as near the same elevation as possible so that the same skew which is usually cut to allow a 1½" or 2" soffit of tile under the beams may be used throughout and make for uniformity and, therefore, economy of construction. Moreover, this gives a more uniform ceiling level.



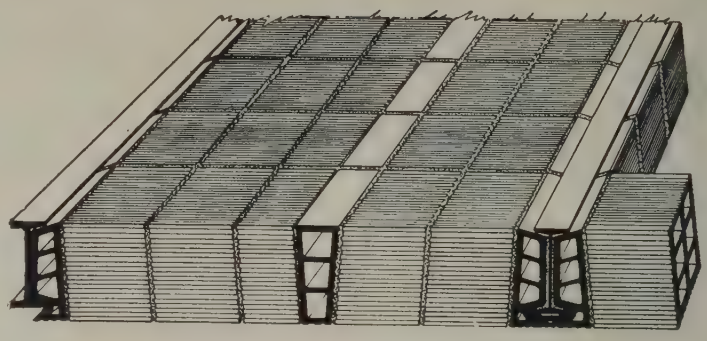
Typical End Construction Arch

Natco Side Construction Flat Arch

Natco Side Construction Flat Arch consists of side construction skews and keys and end construction inters.

By reversing the direction of the cells in the skews, better protection is given to the sides of the beams by the mortar joints and by the shells of the skews. The inters must be set end to end in straight courses from skew to key. The typical section illustrates the method of assembling the various members of this arch.

Side construction skews, being made by die to fit the various size standard beams, cannot be changed, as can end construction skews. If it is desired to use side construction skews uniformly throughout a building, the bearing beams must be on the same level at the bottom and of sufficient depth to permit the top of the skew to go under the top flange of the beam. Of course, special conditions can be taken care of by using end construction skews at these points and cutting them to fit.



Typical Side Construction Arch

Designing Data

The following table is applicable to all shapes of tile. Generally speaking, hollow tile of various shapes but of the same depth and cross-sectional area, have equal strength, and therefore, the strengths of arches of equal depth are directly proportional to their net sectional areas. The depth of arch as given in the table includes the protection underneath the bottom of the beam or the thickness of the soffit tile.

The strength of any arch depends as largely upon the workmanship as upon the material. The spans given in the table are safe if the arches are properly set, but may not agree with the requirements of the Building Codes of various cities.

Safe Loads given in the table have been figured for the Natco Combination Arch of side construction skews and keys with end construction inters. The net sectional areas of tile indicated, are for the keys—the critical point of the arch—and are taken per foot of tile parallel to beams.

Weights of arches have *not* been deducted from safe loads in the table; this and other dead load must be deducted to obtain the net safe live load for any arch and span.

Table of Safe Loads Per Sq. Ft.

(Dead and Live)

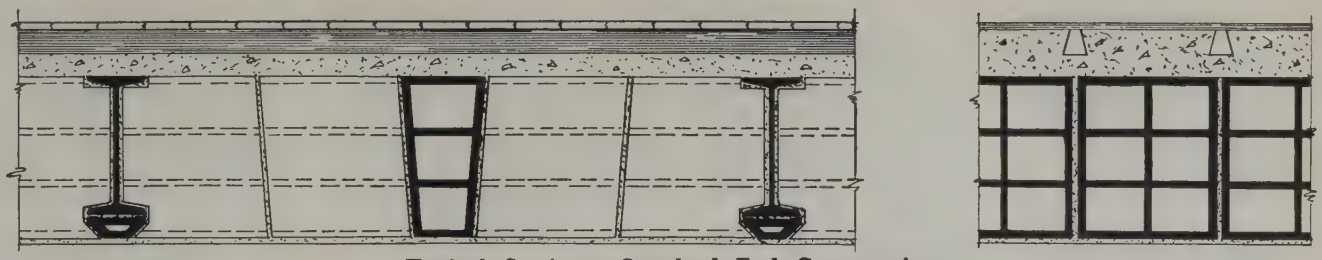
Factor of Safety of 7

Arches	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
Net sectional areas	27 sq. in.	27 sq. in.	27 sq. in.	27 sq. in.	36 sq. in.	36 sq. in.	36 sq. in.
Average wt. per sq. ft.	26 lb.	30 lb.	32 lb.	36 lb.	40 lb.	48 lb.	56 lb.
Span—ft. and in.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
3–0	420	490	560	630	933	1120	1400
3–3	357	417	477	537	795	954	1193
3–6	308	360	411	462	685	823	1028
3–9	268	313	358	403	597	716	895
4–0	236	276	315	354	525	630	786
4–3	.....	244	279	314	465	558	697
4–6	.....	218	249	279	415	497	622
4–9	.....	.....	223	251	372	447	558
5–0	.....	.....	201	227	336	402	504
5–3	.....	.....	182	205	305	365	457
5–6	.....	.....	.....	187	277	333	417
5–9	.....	.....	.....	171	254	305	381
6–0	.....	.....	.....	157	233	280	350
6–3	.....	.....	.....	.....	214	258	322
6–6	.....	.....	.....	.....	198	238	298
6–9	.....	.....	.....	.....	.....	221	276
7–0	.....	.....	.....	.....	.....	206	257
7–6	.....	.....	.....	.....	.....	178	223
8–0	.....	.....	.....	.....	.....	157	197
8–6	.....	.....	.....	.....	.....	.....	174
9–0	.....	.....	.....	.....	.....	.....	155
9–6	.....	.....	.....	.....	.....	.....	140
10–0	.....	.....	.....	.....	.....	.....	126

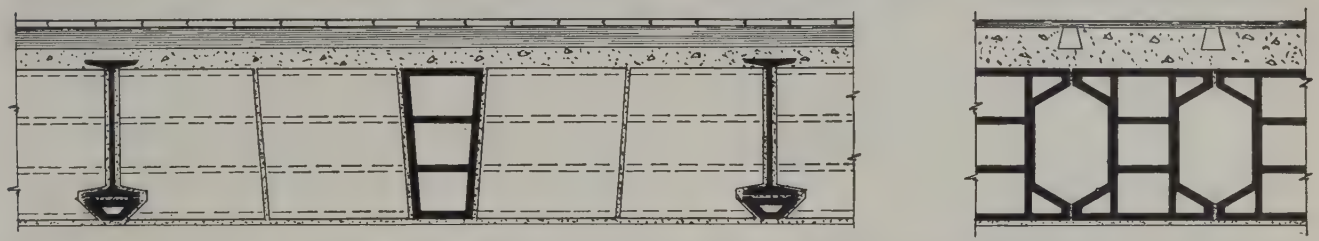
Engineering Service

It is part of National Fire Proofing Company's service to design the arches for each individual span and furnish schedules and sketches showing the pieces which should be used in each size of span, and to make skews which will fit the structural steel work.

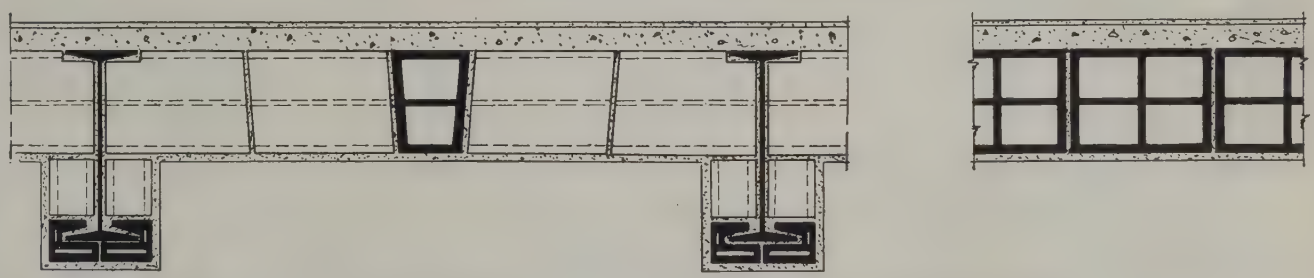
Continued on next page



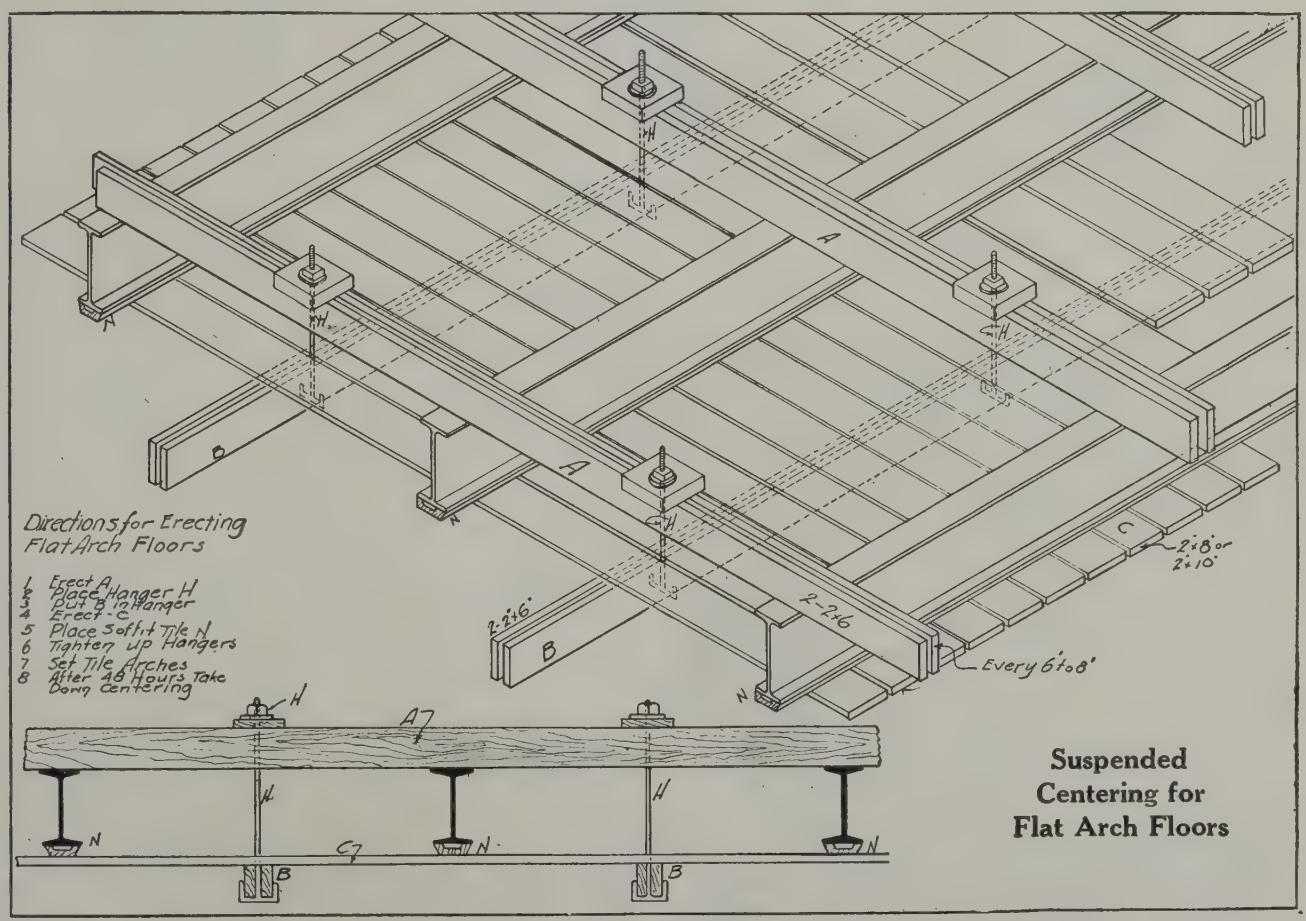
Typical Sections—Standard End Construction



Typical Sections, X-Tile Type—Western Factories Only



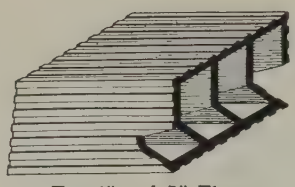
Typical Sections—Raised on Floor Beams for a Paneled Ceiling Effect



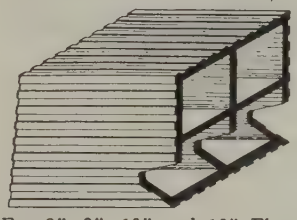
Suspended Centering for Flat Arch Floors

NATCO FLAT ARCH FLOORS

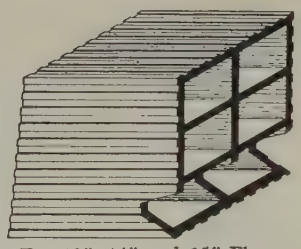
Continued on next page



For 6″ and 7″ Floors



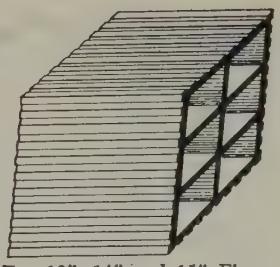
For 8″, 9″, 10″ and 12″ Floors



For 13″, 14″ and 15″ Floors

Bottom Cut End Construction Skews

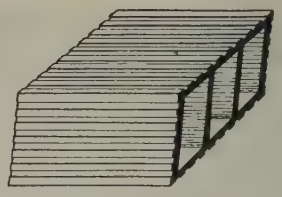
(*Note:* The 12″ length measured at center of arch is standard)



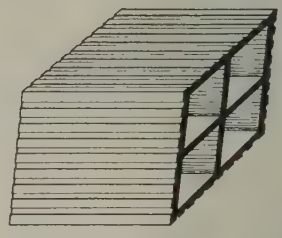
For 13″, 14″ and 15″ Floors

Inters

(*Note:* Furnished in 8″ and 12″ lengths)

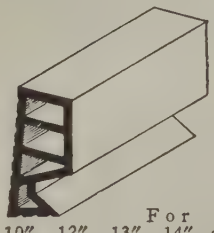


For 6″ and 7″ Floors

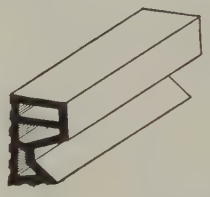


For 8″, 9″, 10″ and 12″ Floors

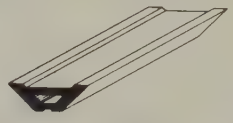
Typical Units of Natco Flat Arch



For 9″, 10″, 12″, 13″, 14″ and 15″ Floors

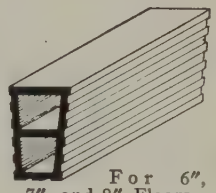


For 6″, 7″ and 8″ Floors

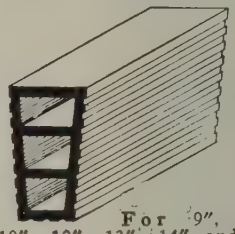


Soffit

(Furnished in 1½″ 2″ thicknesses in widths to suit flange of beam)



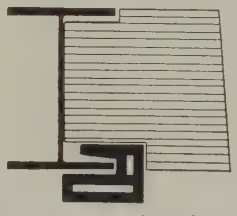
For 6″, 7″, and 8″ Floors



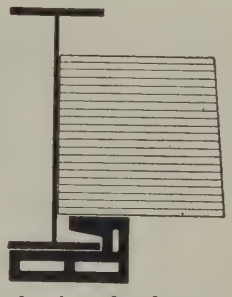
For 9″, 10″, 12″, 13″, 14″ and 15″ Floors

Side Construction Skews

(*Note:* 4½″ in thickness of center-line of arch. These skews can be furnished only for standard flange beams)



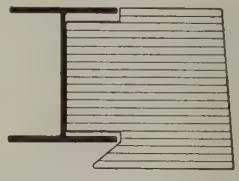
End construction skew, cut to suit clip tile and flange of beam



Shows bearing of end construction butt skew on spandrel beam

Keys

(Furnished in 3″, 4″, 5″ and 6″ thicknesses measured at the center line of arch)



End construction skew cut at top and bottom for wide flange beam

NATCO FLAT ARCH FLOORS

NATCO BOOK TILE

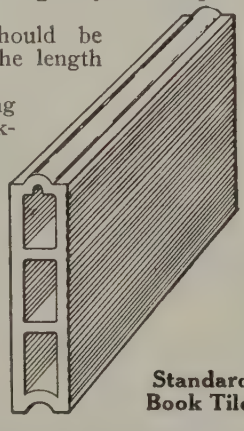
On account of their shape these tile are called "Book Tile," and they are made especially for roofs to be covered with concrete, tar and felt or any composition roofing. They are made of uniformly hard-burned material 3″ thick, and of a length depending very much upon the weight to be carried.

The steel framework T's should be spaced 1″ wider on centers than the length of the tile.

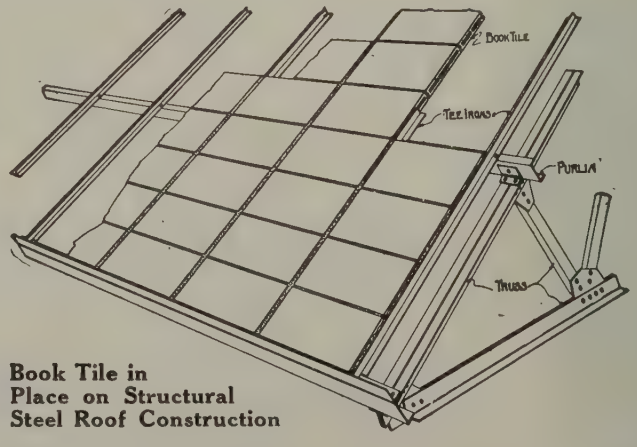
Book tile are used for covering the flat roofs of penthouses, bulkheads, etc., and may be used for main flat roof of a building when only light live loads are anticipated.

When providing for future increase in height of a building, a floor of flat arches is set and roof grading placed on temporary supports of T's (or dwarf-walls), and book tile.

Natco Book Tile permits a minimum of condensation of moisture underneath due to its high insulating qualities. This makes it invaluable for the protection of manufacturing processes, such as glass making, etc., where the product might be injured by the drip of water.



Standard Book Tile



Book Tile in Place on Structural Steel Roof Construction

NATCO BOOK TILE

Continued on next page

NATCO COMBINATION LONG SPAN FLOORS

Natco One Way System

The Natco Combination One Way System is particularly adapted to all classes of buildings where long span fireproof floors are required without the beams showing in the ceilings. The Natco Hollow Tile in combination with the load bearing concrete reduces the dead load and provides a good plastering surface. The tile make permanent forms in which are cast the series of connected concrete "T's."

The tile in a line of units are all in contact, and hold each other securely in the proper positions. They are not displaced in pouring the concrete, and no realignment is necessary.

The naturally strong adhesive bond between tile and concrete, aided by the mechanical bond of the dovetail scorings on the tile, produce a monolithic effect.

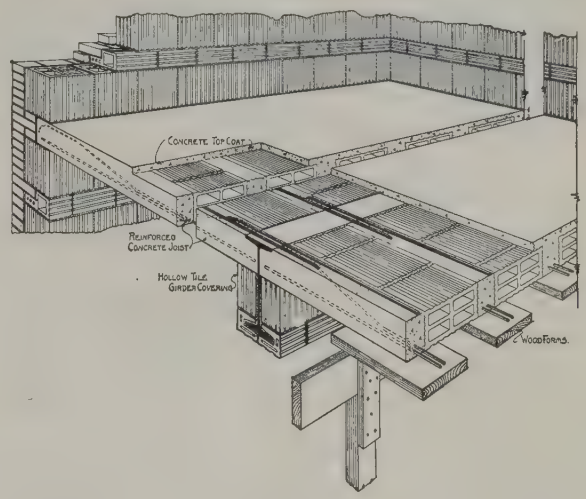
In these floors, the Natco Hollow Tile fireproofs the load carrying concrete of the beams against the flames of a fire below. Without this protection, a fire is likely to cause spalling, rapid weakening of the floor, and ultimate failure.

Special Two Way System Tile

Besides our regular one way system of combination floor we are able to furnish a special tile adaptable for a two way system of combination floor.

This special Natco tile is a hollow tile block *with no exterior openings,* which prevents the concrete from entering the cells as would be the case if ordinary floor tile were used.

The design of the two way system is similar to the one way, the joists running in two directions at right angles instead of one which distributes the load in two directions. This floor has the advantages of decreasing the depth of slab, eliminating deep spandrel beams, and giving a very rigid floor laterally. No additional cross-bracing is required, which is a very important consideration in tall buildings subjected to high wind stresses.



Perspective View of Typical One Way Combination Floor

Note economical wood centering used; 2x8″ or 2x10″ under each joist is sufficient

Tile Depth and Steel Area Required, One Way Combination Floor Slabs, 2″ Concrete Top, Joists 4″ wide, 16″ O.C.

fc.=650 lb. per sq. in.
fs.=16,000 lb. per sq. in. $\frac{Ec}{Es}=\frac{1}{15}$
Shear, 60 lb. per sq. in.

¾″ of concrete below reinforcement.

T=Tile; S=Steel.

*If moment $\frac{WL}{12}$ is used, investigate design for shear.

Total safe load (dead plus live), pounds per square foot																								
	Continuous Span $M=\frac{WL^*}{12}$	150		165		180		195		210		225		240		260		300		335		375		450	
	Semi-continuous span $M=\frac{WL}{10}$	125		135		150		160		175		185		200		220		250		280		310		375	
	Simple span $M=\frac{WL}{8}$	100		110		120		130		140		150		160		175		200		225		250		300	
Span in feet		T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
6												3	.20	3	.22	3	.24	3	.28	4	.24	4	.27	5	.27
7		3	.19	3	.20	3	.22	3	.24	3	.26	3	.28	3	.30	4	.26	4	.30	5	.27	5	.30	6	.31
8		3	.24	3	.26	3	.29	3	.31	3	.34	3	.36	4	.31	4	.34	5	.32	5	.36	6	.34	7	.35
9		3	.31	3	.33	3	.37	3	.40	4	.34	4	.36	4	.39	5	.35	5	.40	6	.38	7	.37	8	.40
10		3	.38	3	.41	3	.46	4	.39	4	.42	4	.45	5	.40	5	.44	6	.42	7	.41	8	.41	9	.44
11		3	.46	4	.39	4	.44	4	.47	5	.42	5	.45	5	.48	6	.45	7	.45	7	.50	8	.49	10	.48
12		4	.43	4	.47	4	.52	5	.46	5	.50	5	.53	6	.49	6	.54	7	.53	8	.53	10	.47	12	.48
13		4	.51	4	.55	5	.50	5	.54	5	.59	6	.53	6	.57	7	.55	8	.55	9	.55	10	.56	12	.57
14		4	.59	5	.53	5	.58	5	.63	6	.58	6	.61	7	.58	7	.64	8	.64	10	.58	12	.54	15	.53
15		5	.56	5	.61	5	.67	6	.61	6	.67	7	.61	7	.66	8	.65	9	.66	10	.67	12	.63	15	.61
16		5	.64	5	.69	6	.65	6	.70	7	.66	7	.70	8	.67	9	.66	10	.68	12	.64	12	.71	15	.70
17		6	.61	6	.67	6	.74	7	.68	7	.75	8	.70	8	.76	9	.75	10	.77	12	.73	15	.65		
18		6	.69	6	.75	6	.82	7	.77	8	.74	8	.78	9	.76	10	.76	12	.73	12	.81	15	.73		
19		6	.76	6	.83	7	.80	7	.86	8	.83	9	.78	9	.85	10	.85	12	.81	15	.73	15	.81		
20		7	.74	7	.80	7	.89	8	.84	8	.91	9	.87	10	.85	12	.79	12	.90	15	.81	15	.90		
21		7	.81	7	.89	8	.87	8	.93	9	.91	9	.96	10	.94	12	.87	15	.80	15	.90				
22		7	.89	8	.86	8	.95	9	.91	9	.99	10	.95	12	.87	12	.95	15	.88	15	.98				
23		8	.86	8	.93	8	1.03	9	.98	10	.98	10	1.03	12	.94	12	1.03	15	.95						
24		8	.94	8	1.02	9	1.01	9	1.08	10	1.07	12	.96	12	1.03	15	.92	15	1.05						
25		8	1.02	9	1.00	9	1.10	10	1.07	12	.98	12	1.03	12	1.12	15	1.00	15	1.13						

Note: Based on safe loads indicated, the thickness (inches) and the areas of reinforcement (square inches per joist) are the figures for average conditions, and are for general information only. Each particular operation should be designed in accordance with actual conditions.

The Natco Engineering Department is at the disposal of any one desiring further information.

Weight of Combination Slabs Per Square Foot

Tile, in.	3	4	5	6	7	8	9	10	12	15
Weight, lb.	45	50	55	60	65	70	75	80	90	105

Note: Load tables for general information only, as each particular operation should be designed in accordance with actual conditions.

NATCO COMBINATION LONG SPAN FLOORS

Continued on next page

NATCO GIRDER AND COLUMN COVERING

The purpose of beam, girder and column covering is to place a retardent to fire over the structural steel frame of buildings, and to provide a surface on which to plaster. This goes under the general name of "Fireproofing of Steel."

Natco Fireproofing Is Reliable

It is necessary that the steel columns and the girders and beams projecting below the floor slab, be protected by at least 2" of fireproofing material. Experience has proven that well-burned hollow tile (burned at temperature of about 2000° F.) has no equal as a covering for structural steel or iron. In case of a serious fire, the integrity of the whole structure depends upon the thorough protection of the columns and girders and floor beams, and no reasonable expense should be spared to accomplish this.

Natco Fireproofing Satisfies All Conditions

There is a shape of Natco Girder Covering to fit in with almost any condition of fireproofing which may be required. The lower flanges of rolled beams and girders of any size have a Natco Clip or Shoe Tile to fit them. Plate girders, double beams and riveted sections are protected by means of a hung soffit and angle tile (see Figs. 4 and 8). The sides of the beams are protected by proper thickness filler tile at heights designed to fit neatly the opening between top of clip or angle tile and floor slab or top flange of beam. (See illustrations.)

If heavy plaster cornices are used, the girders are protected first by the hollow tile, and the shape required for the plastering is obtained by iron brackets and metal lath. This latter, alone, is not sufficient protection.

Natco Fireproofing Saves Dead Load

Tile covering saves from 50 to 75% in weight over concrete or brick covering. Even on a small 12" I-beam the saving is 50% in weight; in the large girders it is much greater. (See Fig. 9.)

Natco Fireproofing Saves in Cost

Tile fireproofing can, in general, be put in place complete for close to the same price as it costs to erect box forms about the beams for the concrete. In addition, you have the cost of steel beam wrapper and of the concrete itself to add to form cost; therefore, a saving of approximately 25 to 50% in cost, over concrete covering, can be made by use of tile.

Natco Fireproofing Promotes Speed of Erection

No forms being needed to hold the tile in place, there is, of course, no period of waiting for concrete to set before shores and forms can be removed.

Natco Fireproofing Provides Best Plastering Surface

One of the greatest advantages of tile beam and girder and column covering is the excellent plastering surface which is given to receive this finish.

No other surface is more economical of plaster, nor has a better mechanical key or more capillary suction than has tile. The absorption of moisture is small and test shows that the tile and plaster become almost one body. Only two coats of plaster are needed on tile.

Where steel columns are to be stiffened with concrete or where concrete columns are to be finished with plaster, the forms for same may be built out of partition tile or column covering. The tile must be banded with steel wire or strap iron, and mortar must be allowed to set, however, before the concrete is poured so that there will be sufficient strength in the wall to take care of the side pressure of the wet concrete.

Natco Fireproofing Will Carry The Load Safely

Tile girder covering has always been used with flat arch construction of floors, but present day contractors are finding a great saving in its use with all forms of concrete and long span type of floors. Where the span is long and where there is a considerable load on the floor joists, it is customary to use tile filler with the cells vertical, so that concrete can run into them and give a continuous solid bearing of the concrete joints on the lower flange of the beam. (See Figs. 6 and 7.) Even horizontal fillers are amply strong enough to carry the total load of the ordinary floor safely and well within the allowance for tile walls under building codes.

Natco Fireproofing Lowers Insurance Rates

Due to the tendency of the time to lighten up in the construction of floors in order to effect saving in steel, there has come into recent use a great variety of floors of thin built-up sheet metal joists, of built-up joists of bars, and light weight structural beams with a thin slab of top concrete. These floors depend for fireproofing merely on a ceiling of plaster on metal lath.

It is self-evident that if the supporting steel beams are not protected by something other than these ceilings, fire breaking through a portion of the ceiling will get to the structural beams and the entire floor or structure will fall. Such supporting beams should be fireproofed entirely up to the underside of the concrete floor slab on top of the joists, in which case the floor slab might fail, but the structure will be intact. (See Fig. 10.)

Buildings constructed of heavy slow burning timbers and floors on a steel frame can be made much more secure and obtain a much better insurance rate if the beams and columns be encased in tile.

Natco Fireproofing a Barrier Against Corrosion

No better protection can be found for structural steel against corrosion than tile masonry with good cement mortar filling space between tile and steel. Exterior steel members should, therefore, be built in solidly with tile masonry.

Natco Fireproofing Service

The standard shapes entering into the construction of Natco Beam and Girder Covering are carried in stock at all times. Regardless of the size of the job, shipments can be started promptly and kept up as needed, provided, of course, that proper notice is given of the extent and nature of the requirements so that the factories can be scheduled to take care of them.

It is not necessary for the architect or contractor, when designing for or estimating on the use of Natco Hollow Tile Beam and Girder Covering, to worry about the sizes and shapes of the tile clips and filler which must be used on the various size beams.

It is part of the service provided by the National Fire Proofing Company to furnish with each order for this material, a set of schedules for the architect's approval and the contractor's use, designating just what will be furnished for each beam shown on the final steel erection plans. This material is all sold on a basis of the square footage of the actual outside surface of the tile surrounding the beam from bottom of floor on one side of beam to the bottom of floor on the other side.

Estimates can be made of the approximate amount of this tile by taking the linear distance in feet around (A + B + C) as shown in Fig. 1 or (A + B + C + D) as shown in Fig. 2, and multiplying this sum by the length of the beam in feet.

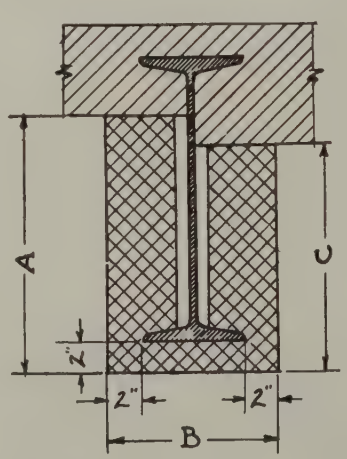


Fig. 1

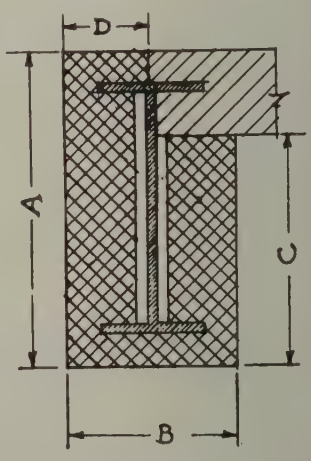


Fig. 2

After order is placed, a full set of the architectural drawings and a set of the final structural steel erection plans, as made up by the structural steel fabricator, should be forwarded to the National Fire Proofing Company as soon as possible, so that design can be made and submitted for approval at earliest date possible.

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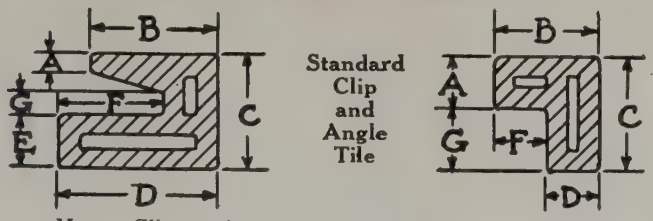
NATCO GIRDER COVERING



Note: Clips and angles are 12″ long. A percentage of halves is shipped with each order.

Die No.	Sq. ft. outside measure	Weight per piece	A	B	C	D	E	F	G
G20	.65	13	¾	3 3/8	3¾	3¾	2	2	¾
G25	.70	14	¾	3 7/8	4	4½	2	2½	1 3/16
G30	.75	15	⅞	4¼	4¼	4¾	2	3	⅞
G35	.80	16	¾	4⅜	4¼	5½	2	3½	1
G40	.85	17	¾	4⅜	4¼	6	2	4	1
G45	.90	18	¾	4⅜	4¼	6½	2	4½	1
G46	.95	19	¾	4¾	4¾	6⅝	2	4⅝	1½
G50	.95	19	¾	4¾	4¼	7	2	5	1
G55	1.00	20	¾	4¾	4½	7½	2	5½	1¼
G60	1.05	21	1	5½	4⅝	8	2	6	1⅜
G61	1.05	21	1	4½	4⅝	8	2	6	1⅜
G70	1.16	23	1	6	4⅞	9	2	7	1½
G71	1.16	23	1	4½	4⅞	9	2	7	1½
G75	1.25	25	1	6	5⅜	9½	2	7½	2
G80	1.35	27	1	8	5⅞	10	2	8	2½
L23	.60	12	2	4	5	2	.....	2	3
L26	.90	18	2	4	8½	2	.....	2	6½
L43	.65	13	2	6	5	2	.....	4	3
L46	.95	19	2	6	8½	2	.....	4	6½

How to Select and Order Proper Clip Tile for Beams

(1) Obtain the width of the beam flange, either by field measurement, or from manufacturer's handbook.

(2) Select in the above table the clip tile, having the "F" dimensions nearest to ½ the width of the flange.

(3) Order two pieces of clip tile for each linear foot of beams when the flange is covered on both sides.

Example—Beam having a flange width of 6¼″ will require a G-30, since ½ of 6¼″ is 3⅛″; and G-30 has "F" dimensions equal to 3″.

For some of the especially thick flanged beams, it is well to check the "G" dimension of the tile with the thickness of the nose of the flange of the beam.

Angle tile should be selected so that the "G" and "F" legs are long enough to cover the special condition for which it is needed.

Handling at the Job

In handling at the job, it is well to instruct your labor foreman that when a G-20 Clip is called for, the "F" or jaw dimension is two inches, a G-25 is 2½″, etc. on down the list. Similarly an L-23 is 2″ at the "F" and 3″ at the "G" dimension, etc. for all of the angles, except that the "G" dimension for the L-26 and L-46 angles is 6½″.

Caution: When material is received at the job, it is essential that all sizes of Clip, Angle and Filler Tile be piled in separate groups. If this be done, the handling of the shapes from pile to bricklayer will be greatly expedited.

Special Thickness of Fireproofing to Fulfill Ordinance Requirements

Where ordinances depart from the generally accepted standards nationally established, the National Fire Proofing Company in all cases provides Girder and Column covering of thickness and design that fulfill the ordinance requirements in that particular locality or district. In such cases special details, comparable to those illustrated under this heading, have been prepared and are accessible at the branch office serving the locality.

Our representatives are thoroughly familiar with all local building ordinance requirements pertaining to fire proofing within their respective territories—their advice and suggestions are always promptly available.

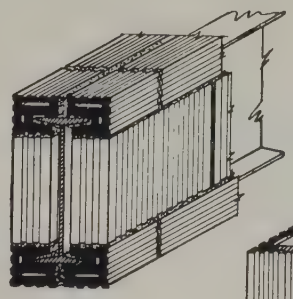


Fig. 3
Shows method of entirely enclosing a strut or beam which is in no way protected by the floor or other masonry

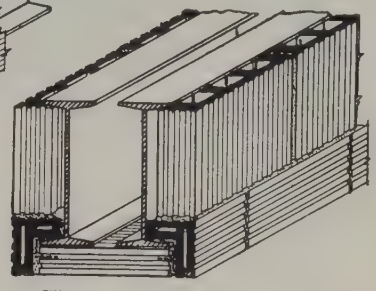


Fig. 4
Double beams, if not too far apart, may be protected on the bottom by long shoe or clip tile, however, if it be over 14″ from the outside of flange on one beam to the outside of flange on the other beam, a 3″ soffit tile is hung on metal hangers, which the contractor may make of No. 16 gauge or heavier strap iron. An angle tile is mortared over the end of this and after the mortar has set, the hanger serves as a reinforcement for the corner

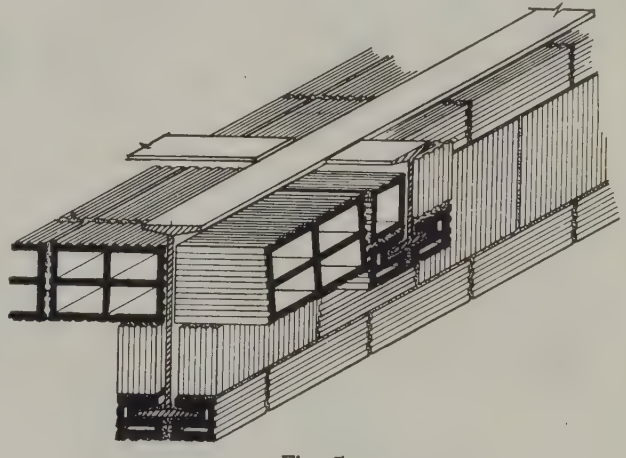


Fig. 5
Illustrates conditions of covering in flat arch work. Note especially covering where the arch is parallel to shoe on small beams and the full side covering at opening in floor

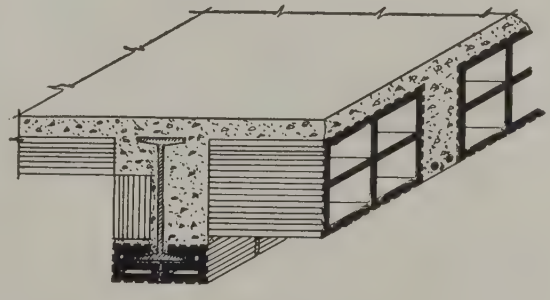


Fig. 6
Shows method of using tile fireproofing with long span concrete joist floor construction. It is economical either with structural tile or metal pan filler in the floor. You will note that the covering is put in place before the floor is poured and that the concrete of the joist fills the cells of the tile and bears directly on the flange of the beam

NATCO GIRDER AND COLUMN COVERING

Continued on next page

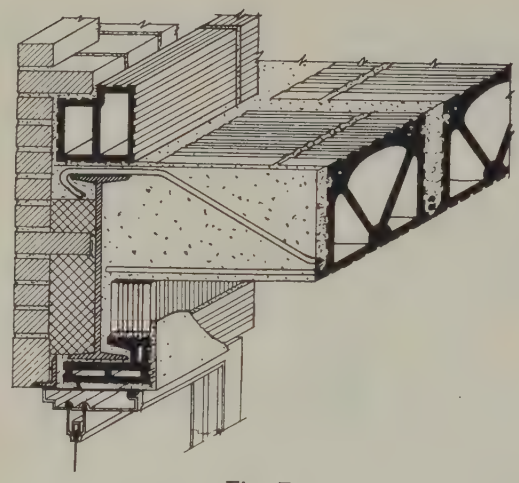


Fig. 7

At spandrel beams over window heads and in similar places, a long clip tile can be furnished to give a good return for plastering and at the same time thoroughly fireproof the underside of the beam. Note illustration of the "Natcoflor" system and of Natco Unibacker wall construction

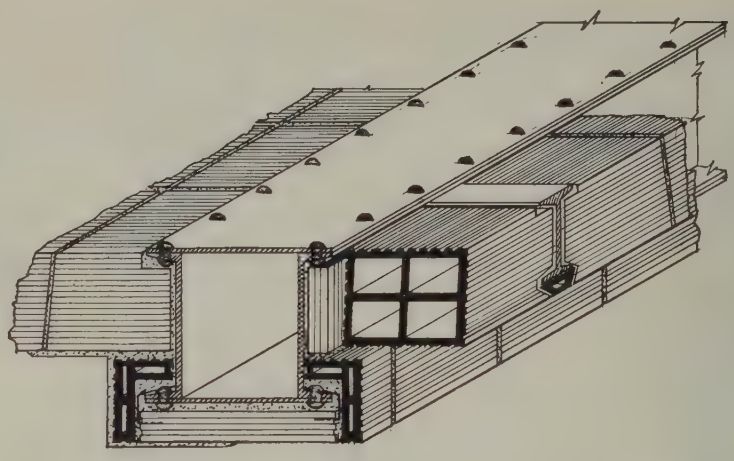


Fig. 8

Box Girders or any riveted sections are protected on soffit by hanging proper length of 3″ book tile on bottom by means of steel hangers (furnished by the contractor) and covering the ends of these with long lip angle tile. This fireproofing is done before the arches are set

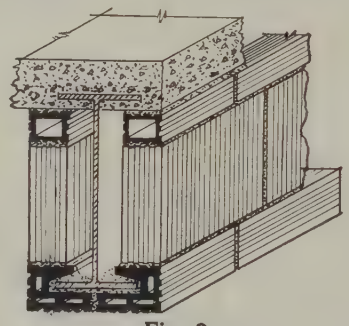


Fig. 9

Fireproofing with concrete slab floor construction. Note the extreme saving in dead load on these large girder beams due to the hollow construction. These beams are often covered after the floor is in place, thus permitting the use of the bottom flange to support floor forms

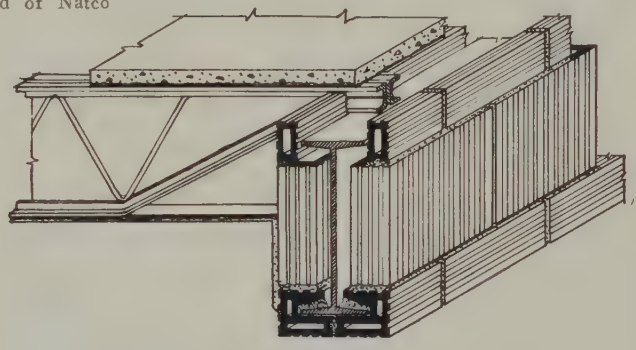


Fig. 10

The various types of light weight floors constructed of a thin slab of concrete on top of some form of light metal joist, which is protected only on under side by an ordinary coat of plaster on metal lath, are only rated as a semi-fireproof construction. We here show method of protecting the structural steel members used in connection with such construction by covering the tile entirely up to the under side of the concrete slab

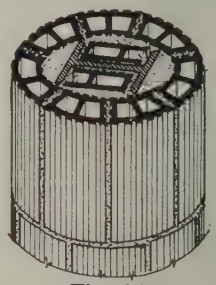


Fig. 11

Like the Bullnose Column Covering, not much of the 3″ Circular Covering is carried in stock, but any normally sized order can be manufactured in a reasonable time. The radius of the tile is 10″ on the outside and it is suitable for columns 16″ to 28″ in greatest dimension. This material is sold at a price based on the square foot of exterior surface.

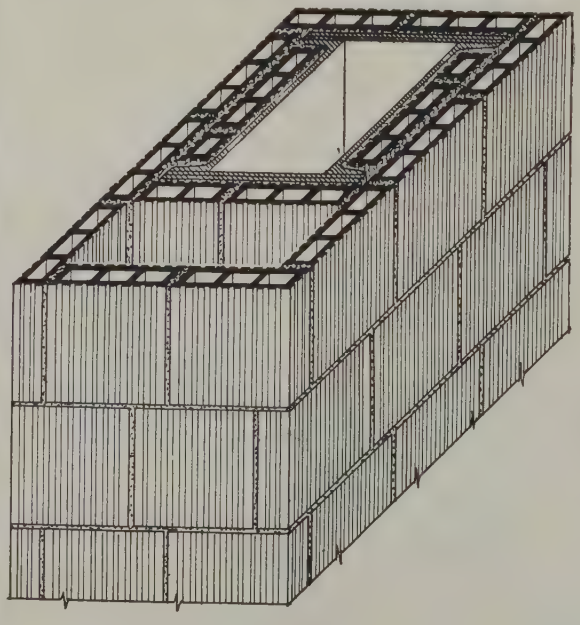


Fig. 12

Shows method of providing pipe space and vent ducts by building same in conjunction with the protection of the steel columns

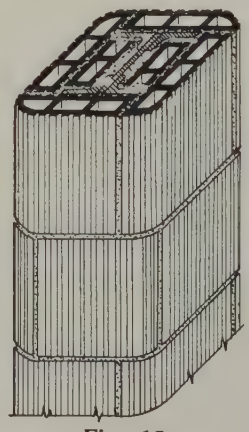


Fig. 13

Shows use of 3″ Natco Bullnose Tile in encasement of columns. No great quantity of this tile is carried in stock, but same can be manufactured on short notice, where requirements justify same

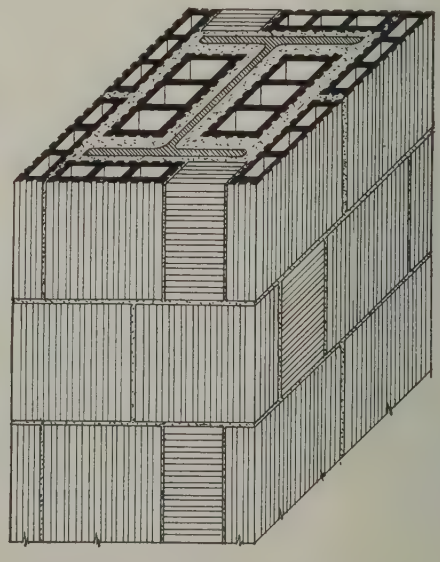


Fig. 14

Structural steel columns are most economically protected by encasing them with at least 3″ of hollow tile

NATCO GIRDER AND COLUMN COVERING

RARITAN HOLLOW TILE CORPORATION

47 West 34th Street, NEW YORK, N. Y.

FACTORY: KEASBEY, N. J.

Products

HOLLOW TILE BLOCKS for partitions, furring, column and girder covering, etc.; LOAD BEARING EXTERIOR WALL BLOCKS and RARITILE ENCLOSURE BLOCKS for use with face brick.

Facilities

The location of the company plant on the Raritan River two miles west of Perth Amboy and a direct connection with the Lehigh Valley R. R. places the RARITAN HOLLOW TILE CORPORATION in a position to make prompt shipment either by rail or water. And as all shipments are made direct from the factory, the company is solely responsible for materials and deliveries.

The clays are mined on the company property adjoining the factory, which is equipped throughout with modern machinery.

Raritile Enclosure Blocks

In the past few years, there has been a remarkable increase in the use of hollow tile blocks in conjunction with either common or face brick for building curtain walls for skeleton steel structures. This type of construction not only shows a marked saving in labor costs, but it also decreases the weight of the walls so constructed by about 30%, and thereby effects a proportional saving in the amount of steel required for wall columns and spandrel beams.

The Raritile Enclosure Tile protected by W. G. Demarest patents No. 1,426,048 and 1,479,379, has the good features common to systems in which hollow tile is tied in to face brick and has also the following additional advantages.

(1) A continuous vertical air cell on the interior of the wall running from floor to floor eliminates the necessity of additional separate furring blocks.

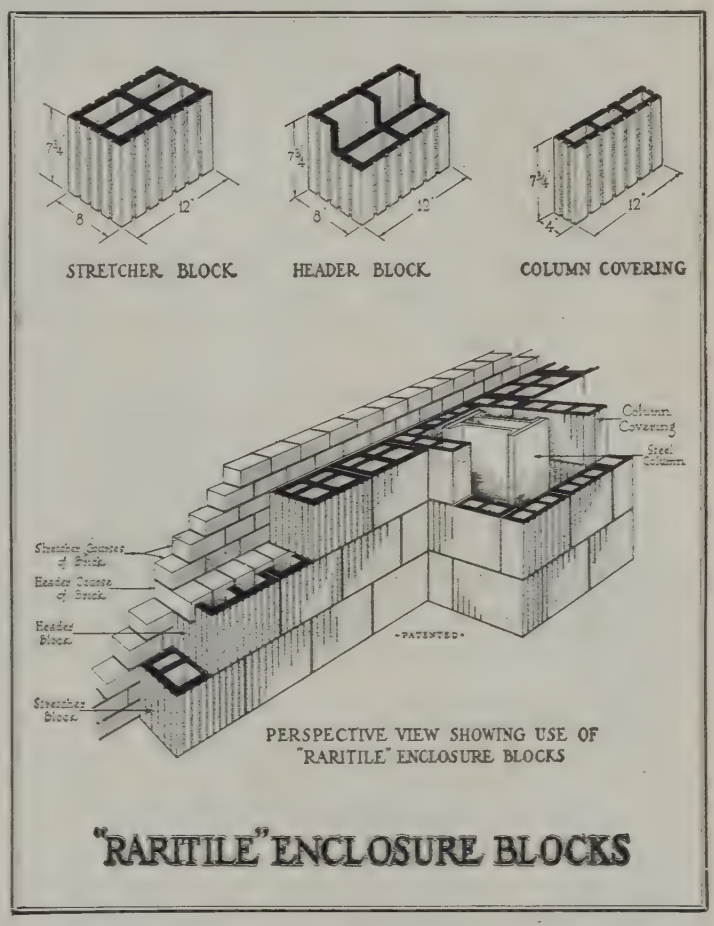
(2) The mortar joints are broken—there are no continuous joints through the wall.

(3) The blocks are of uniform height and approximately of uniform weight. This feature helps to speed up construction and makes it easy to tie in the face brick with any type of bond.

(4) The wall is so designed that webs and shells of the various blocks are in perfect alignment. In this way all material acts in compression and the full bearing strength of the tile is utilized.

Column Covering

For use with the Raritile standard wall block a 4-in. block of the same height is furnished for covering wall columns. This construction is simple and economical; the cost is approximately 30% less than a brick wall of the same thickness.



Some Recent Installations of Raritile Enclosure Blocks

New York, N. Y.

BUILDING AND LOCATION	CONTRACTOR	ARCHITECT
Equitable Trust Building, Broad St. and Exchange Pl.	Thompson-Starrett Co.	Trowbridge & Livingston, New York, N. Y.
Roosevelt Hotel, Madison Ave. and 45th St.	Thompson-Starrett Co.	Geo. B. Post & Sons, New York, N. Y.
Heckscher Apartment, 277 Park Ave.	Thompson-Starrett Co.	McKim, Mead & White, New York, N. Y.
Paramount Theater and Office Building, 43rd St. and Broadway	Thompson-Starrett Co.	C. W. & G. L. Rapp, Chicago, Ill.
Park Lane Apartments, 299 Park Ave.	George A. Fuller Co.	Schultz & Weaver, New York, N. Y.
Railroad Co-operative Building, 44th St. and Lexington Ave.	George A. Fuller Co.	Sloan & Robertson, New York, N. Y.
R. H. Macy & Co. Department Store, 34th St. and Broadway	Marc Eidlitz & Son, Inc.	Robert D. Kohn, New York, N. Y.
American Woman's Club Building, 357 West 57th Street	Marc Eidlitz & Son, Inc.	B. W. Morris, New York, N. Y.
Western Union Telegraph Building, Worth and Hudson Sts.	Marc Eidlitz & Son, Inc.	Voorhees, Gmelin & Walker, New York, N. Y.
New Madison Square Garden, 50th St. and Eighth Ave.	James Stewart & Co.	Thomas W. Lamb, New York, N. Y.
New York Central R. R. Office Building, 45th St. and Park Ave.	James Stewart & Co.	Warren & Wetmore, New York, N. Y.
Apartment House, 1 E. 87th St. and Fifth Ave.	D. P. Robinson Co.	J. E. R. Carpenter, New York, N. Y.
Apartment Houses, 1165 and 1175 Fifth Ave.	D. P. Robinson Co.	J. E. R. Carpenter, New York, N. Y.
National Bible Institute Building, 340 W. 55th St.	John Lowry, Inc.	McKenzie, Voorhees & Gmelin, New York, N. Y.
Mt. Sinai Nurses' Home, 5 to 17 E. 98th St.	Hegeman-Harris Co.	Robert D. Kohn & Chas. Butler, New York, N. Y.
Central Savings Bank and Office Building, 73rd to 74th St. and Broadway	Hegeman-Harris Co.	York & Sawyer, New York, N. Y.
Beth Israel Hospital, 16th St. and Livingston Place	George Backer, Inc.	Louis Allen Abramson, New York, N. Y.
Apartment Houses, 1125 Park Ave.	M. C. Reynolds Co.	Schwartz & Gross, New York, N. Y.
Office Building, 240 Madison Ave.	Edward Corning Co.	Cross & Cross, New York, N. Y.
McMillan Building, Fifth Ave. and 12th St.	Cauldwell Wingate Co.	Carrere & Hastings, Shreve & Lamb, New York, N. Y.

Other Cities

Jewish Hospital Buildings, St. Marks Ave. and Prospect Place, Brooklyn, N. Y.	Thompson-Starrett Co.	Crow, Lewis & Wick, New York, N. Y.
Penn Athletic Club, Philadelphia, Pa.	Thompson-Starrett Co.	Zantzinger & Borie & Medary, Philadelphia, Pa.
Shelbourne Hotel, Atlantic City, N. J.	George A. Fuller Co.	Warren & Wetmore, New York, N. Y.
Office Building, U. P. & Light Corp., Asbury Park, N. J.	D. P. Robinson Co.	Frank D. Chase, Inc., Chicago, Ill.
Halstead Apartments, White Plains, N. Y.	Fred T. Ley & Co.	H. C. Ingalls, New York, N. Y.
Five Apartment Houses, Standard Oil Co. of N. J., Bayonne, N. J.	Bayonne Housing Corp.	Andrew J. Thomas, New York, N. Y.
N. J. Bell Telephone Building, Broad and Lombardy Sts., Newark, N. J.	Turner Construction Co.	Voorhees, Gmelin & Walker, New York, N. Y.

UNIVERSAL UNIT TILE COMPANY

EXECUTIVE OFFICES

Scripps Building, SAN DIEGO, CAL.

LICENSED MANUFACTURERS

COLUMBUS, OHIO, Claycraft Mining & Brick Co.
DALLAS, TEX., Reliance Brick Co.
KANSAS CITY, MO., United Clay Products Corp.
LOS ANGELES, CAL., Rogers Building Materials Co.
MACON, GA., Cherokee Brick Co.
MINERAL WELLS, TEX., Mineral Wells Brick Co.
PUEBLO, COLO., Summit Pressed Brick & Tile Co.
ST. LOUIS, MO., Alton Brick Co.
SAN DIEGO, CAL., Atlas Brick & Clay Co.
SAN FRANCISCO, CAL., Port Costa Brick Co.

Product

Hollow Building Tile for structural purposes of novel and improved design, suitable for all types and varieties of buildings in which burned clay products can be used.

Design

The Universal Unit was designed to overcome the disadvantages of the present commercial forms of structural hollow tile and to facilitate and reduce the cost of manufacturing, shipping, handling, estimating and laying.

TRADE-MARK

Advantages of Universal Unit Tile

(1) One size and shape for all standard thicknesses of walls and details of construction. Starter, corner, jamb, sill, filler and all special shapes readily cut with trowel from standard unit leaving sections of usable size.

(2) Units are two bricks wide, three high and one long, with mortar joints, thus displacing six bricks in wall. Building construction can be designed with the Universal Unit same as for brick as they cut into any necessary combination of brick sizes.

(3) This construction offers maximum resistance to frost and dampness penetration. All mortar bed joints are offset, lead upward from exterior to interior face of wall and are interrupted by vertical rising voids. Stucco and plaster may be applied direct to tile without furring.

(4) Latticed interior construction and direct line continuation of webs through entire Unit insures maximum load bearing and lateral strength.

(5) No ties or reinforcing required except for arch and lintel construction; jamb tile make masonry bond with wall.

(6) Brick veneer work can be figured in supporting strength of walls as Unit bonds perfectly with it.

(7) Perfect balance, easy and quick to lay.

(8) Units nest perfectly, hence minimum breakage.

(9) Units simply yet positively interlock.

(10) Size, shape and cut-up features simplify quantity calculations.

(11) Facilitates placing grounds and plugs for interior finish without danger of moisture penetration.

Estimating and Construction Data

Face sizes of units 8x8x8 in. Two units lay exactly one face foot of 8-in. wall; three units for 13-in. walls; four units for 17-in. walls, etc. Units weigh between 17 and 18 lb. Lintels formed of standard units or cut sections reinforced and filled with concrete, as required.

Tests by recognized testing engineers show each unit to have crushing strength of 50,000 to 100,000 lb.

Use of Brick

As units are worked out to brick sizes in every dimension, walls can be built entirely without brick or brick can be used anywhere in construction and they line and bond with the tile.

Quality and Marking

All load-bearing Universal Units are composed of properly prepared grades of hard burning clay, shale, fire clay or mixtures thereof to provide maximum strength and fire resistance. Each unit has trademark "UU" impressed thereon.

Non-bearing Construction

Universal Unit tile offers superior advantages for curtain and filler walls in pier and girder construction. The convenient size and shape, ease and rapidity of handling and laying, make it compare favorably in cost with plain tile. Its lightness, in addition to its fireproof, frostproof and dampproof feature, renders its use most desirable in construction of this class.

In cities and localities where the Universal Unit is now available, it is rapidly being given preference over other forms of hollow filler wall construction.

Farm Buildings

The advantages of fireproof construction on the farm is rapidly being realized. Universal Unit is a superior material for all types of farm buildings, houses, barns, silos, corn cribs, etc. The one size and shape builds all.

The simplicity and economy of this construction especially recommend it for use where skilled labor is difficult to obtain and construction costs must be minimized.

Availability

Universal Unit tile is available for immediate shipment in many sections of the South, Middle West and Pacific Coast, and additional territory will soon be covered. The nearest sales office or agency can be obtained from the Executive Offices, Scripps Building, San Diego, Cal.

Patents

Universal Unit tile is manufactured and sold under the Richard S. Requa patent issued May 25th, 1920. Other United States patents allowed and pending. Patents pending, or issued, in all principal foreign countries.

Engineering Service

Free engineering service for advice or data concerning construction problems in connection with the use of Universal Unit tile is available at the Executive Offices. Architects, engineers and contractors are invited to freely avail themselves of this service.

Catalogues and Construction Details

Catalogues, detail sheets, miniature samples and general construction data will be supplied from the Executive office or any of the branch offices.

Continued on next page

Specifications for "Universal Unit" Structural Hollow Tile Work

Work Included—Exterior walls and wherever called for on drawings, to be built of hollow tile as hereinafter specified.

Quality and Make—All hollow tile to be in the interlocking and load-bearing type supplied under the trade-name of "Universal Unit." The tile shall meet the load-bearing and other requirements of the local Building Code.

Mortar—All mortar for tile work shall be composed of 1 part portland cement to not more than 3 parts clean sharp sand, to which may be added lime paste or hydrated lime not exceeding 15% of the volume of the cement.

Construction—Tile shall be laid in the wall with the voids running horizontally, with the lower projection on the exterior side of the wall, as per manufacturer's drawings. All horizontal joints shall be flushed solid, but the vertical section of the offset bedding joints shall be left free of mortar to prevent dampness being drawn through the wall. Tile shall be laid so that the wall throughout shall be thoroughly bonded with masonry bond. Corners to be formed with half-tile laid on end and filled with mortar where required for the additional strength.

Openings—All openings to be formed with the tile, cut to special shape as required. Jamb tile to be laid on end and all voids adjoining the exterior side of the wall shall be filled with mortar. Jamb tile shall be locked and bonded with the wall courses. There shall be no solid mortar joints extending through the wall.

Lintils—Lintils over openings may be formed of the tile with voids filled with concrete and reinforced as required for adequate strength, or they may be of reinforced concrete cast in place.

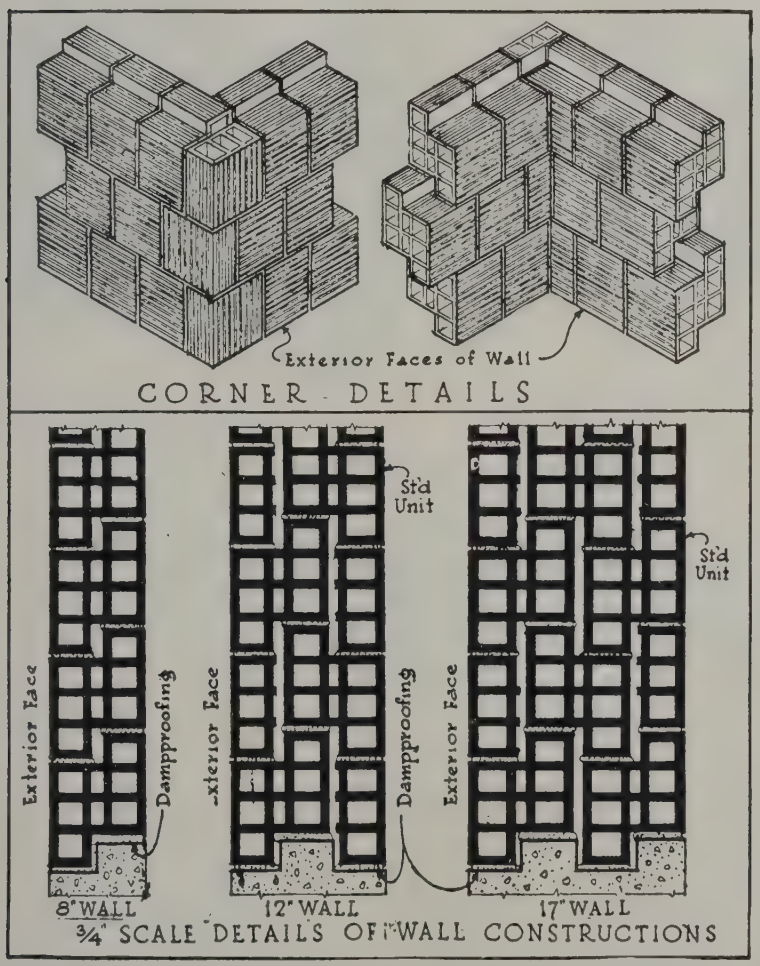
Anchoring Woodwork—The carpenter will place and accurately set all wood frames required in the openings in the tile walls, as the walls are built. Anchor these frames to the tile work each course with 10d nails driven partially into the frame and bent down over the tile. Bed ½-in. bolts supplied by and as directed by the Carpenter, every third course for securing end studs of frame partitions.

Joist Bearing, etc.—All joists, beams, etc., seated upon hollow tile walls shall extend into the wall so as to have full bearing on two supporting webs. Where heavy concentrated loads occur, the supporting section of the tile receiving the load shall be filled with concrete, and, if necessary properly to distribute the load, bearing plates of proper size or cast concrete shall be built in.

Stuccoed Work—Where walls are to be stuccoed on the exterior and plastered on the interior, the tile may be laid with no mortar in the vertical joints, the joints to be left open to provide an additional key for the plastering.

Chases for Pipes, etc.—Provide chases for pipes, conduits, etc., as directed. In no case shall the tile be cut through the second web so as to destroy the waterproof feature of the tile unless the spaces around the pipe are filled solidly with cement mortar.

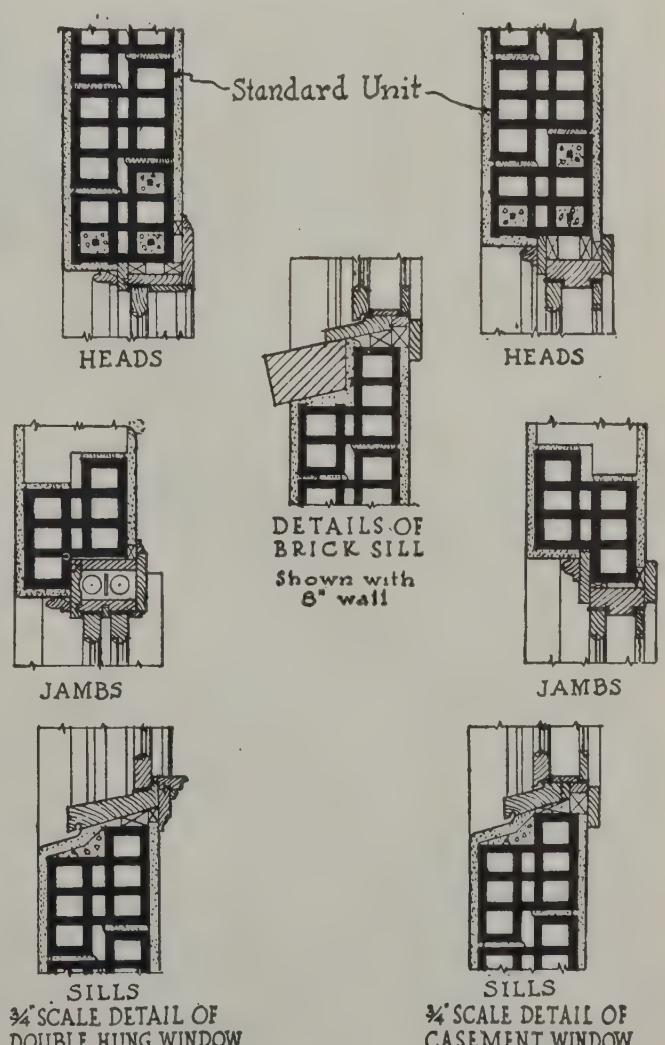
Flashings—All flashings shall be built into the walls to the depth of the rebate. In building parapet walls, the tile work shall be brought up not less than 4 in. or more than 8 in. above the roof level and the work stopped at that point until the roofing has been laid and flashed into the rebate of the course, when the walls shall be completed to their required height.



Detail Drawings, Showing Simplicity of Construction, Waterproof, Fireproof, Interlocking and Load-bearing Features

A dampproof joint can readily be formed with the foundation by rebating top of foundation wall. This is easily done by laying 2"x4" in top of concrete as foundation is being finished. This surface can be treated with hot asphalt or a bonding coat, just before first course of tile is laid.

Pockets for joists, concrete floors, etc., can be easily formed with this tile without weakening the construction or destroying the dampproof or fireproof features of the walls



Window Details

Note the interlocking bond around openings

THE WHITACRE-GREER FIREPROOFING COMPANY

Manufacturers of Hollow Building Tile

WAYNESBURG, OHIO

CHICAGO, ILL., Builders' Building, 228 North La Salle Street

Products

HOLLOW FIRE CLAY BUILDING TILE.

GLAZED BUILDING BLOCKS; RADIAL CHIMNEY BRICK.

Facilities and Production

Our Ohio Plants at Waynesburg, Malvern and Magnolia have a monthly production of 25,000 tons. Our Chicago Heights, Ill., factory, 5000 tons per month.

Quality and Physical Characteristics

Whitacre-Greer Tile is made from the best quality of fire clay which contains a high percentage of silica and alumina, the two components essential for insuring high fire resisting quality. They are burned at a temperature of about 2000° F. Plaster and stucco applied to our tile will not discolor.

Service

We manufacture a *complete line* of all standard sizes and are illustrating a few of the commonly used types on the following page. We maintain our own machine shop and can make up dies promptly for special shapes. No job is too large for us to handle. We give below some of our representative tile jobs:

The White House, Washington, D. C. (700 tons and 49 different sizes and shapes required)

New York Life Insurance Building, New York, N. Y. (15,000 tons), Cass Gilbert, Inc., Architect

Union Trust Building, Cleveland, Ohio (1200 cars, 42,000 tons tile), Graham, Anderson, Probst & White, Architects

and dozens of other similar jobs throughout the eastern portion of the United States.

Specifications

All hollow tile shall be of hard burned dense fire clay as manufactured by THE WHITACRE-GREER FIREPROOFING COMPANY, Waynesburg, Ohio. No badly split, cracked, warped or underburned tile shall be used.

Hollow Tile Fireproofing—The hollow tile fireproofing shall be capable of withstanding the tests prescribed by the National Board of Fire Underwriters' standards for fire resistive floor, wall and partition construction. All arches shall be flat arch end construction with side construction keys and either end or side construction skews. The faces of all tile that are to receive plastering or mortar shall have the standard scoring.

Fireproofing Steel—The thickness of fireproofing around steel members shall be 2 in. for soffit coverings on lower flanges of beams and 2 in. on flanges of all beams or girders extending below the floor arches. Thickness of web covering is to be governed by the dimensions of the girder to be covered, but in no case to be less than 2 in. (The above shall be subject to variation in any particular locality depending upon existing state or municipal ordinances or by-laws).

Tile covering for square or round columns shall be at least 2 in. thick.

Detail Drawings—The contractor shall submit to the architect for approval, detail drawings showing the form and method of applying the fireproofing to the steel work before starting the manufacture of material. Stock shapes shall be used throughout where they conform to the requirements of this specification and fit the contour of the steel.

Partitions—All partitions and division walls other than load bearing walls, shall be constructed of light weight standard scored hollow partition tile of the several thicknesses indicated on drawings. All partitions to be set in cement mortar and bonded by breaking joints at least 3 in. in every course. All partitions under 14 ft. in height shall be 3 in. thick; from 14 to 18 ft. to be 4 in. thick; higher than 18 ft. to be 6 in. thick.

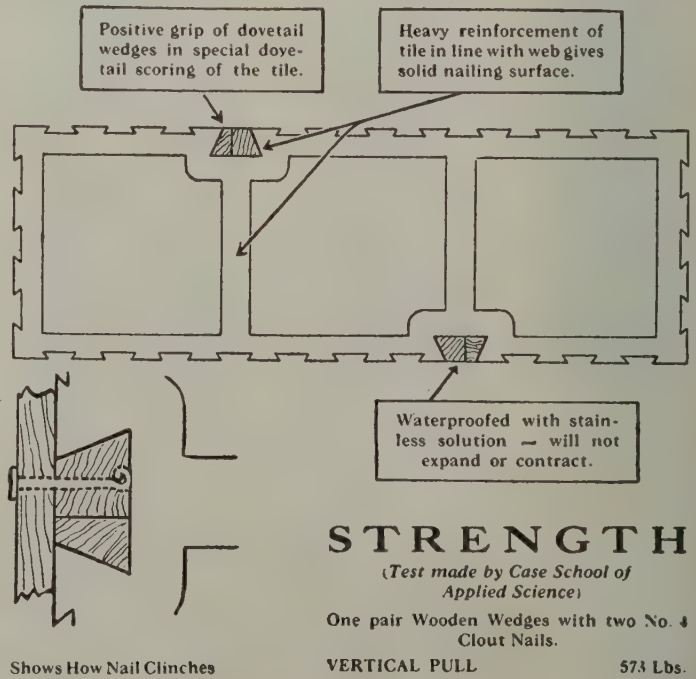
Load Bearing Tile—Standard load bearing tile shall have a heavy dovetail scoring and shall have an absorption of not more than 8%. Wherever possible, these tile shall be laid with cells vertical. All tile shall be capable of sustaining a load of 1200 lb. per sq. in. of gross area when laid with cells vertical.

"Wedge Tile"

"Wedge Tile" feature now supplied *without additional cost* with practically all standard sizes of hollow building tile, including partition, load bearing, perfection, backups, and the 4x5x12 and 8x5x12-in. backups. We also supply 100 pair of wooden wedges and No. 4 clout nails free with every thousand pieces of "Wedge Tile" and ship them in the car with the tile. This is sufficient for the ordinary job. If additional wedges are needed, we can supply them at 1¢ per pair.

"Wedge Tile" provides the *cheapest, strongest* and *most rigid* nailing bases ever devised. A saving to the builder of from 25 to 40% on plaster grounds, nailing blocks and labor.

"Wedge Tile"



Shows How Nail Clinches When it Hits the Tile.

STRENGTH

(Test made by Case School of Applied Science)

One pair Wooden Wedges with two No. 4 Clout Nails.

VERTICAL PULL	573 Lbs.
HORIZONTAL PULL	232 Lbs.

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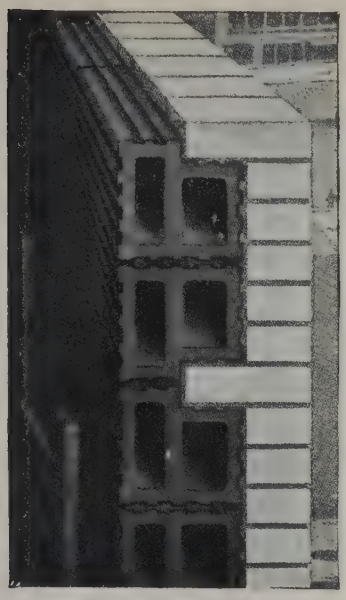


Typical Perfection Header-Backup Tile Construction

Perfection Backup Tile

Made in 6, 8, 10 and 12-in. widths so as to make 10, 12, 14 and 16-in. walls with face brick.

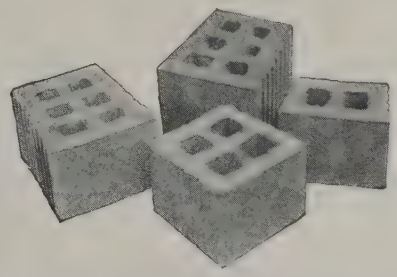
Advantages — Only one size tile on the job. No through mortar joints. Tile made with heavy web and shell, insuring a minimum of breakage in shipment and handling on the job. Nearly as strong as solid brick, yet effects a saving in labor and material of at least 25% over common brick.

Strength — Tests made at Columbia University for load bearing capacity, with following results:

8-in. averaged 2292 lb. per sq. in. gross area—cells horizontal

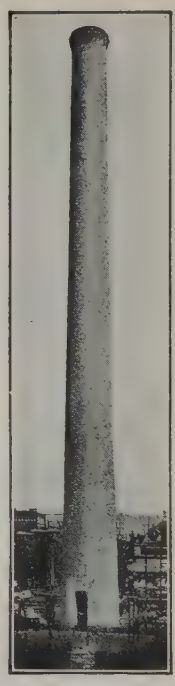
10-in. averaged 1544 lb. per sq. in. gross area—cells horizontal

12-in. averaged 1664 lb. per sq. in. gross area—cells horizontal.



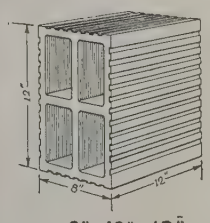
Buff Fire Clay Radial Chimney Brick

Dimensions of face—6⅜ in. wide x 4⅝ in. high. Thickness and weight—4-in., 7 lb.; 6-in., 9½ lb.; 7-in., 11 lb.; 8-in., 12½ lb.

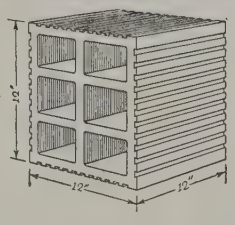


Radial Brick Chimney Built of Whitacre-Greer Buff Radial Brick

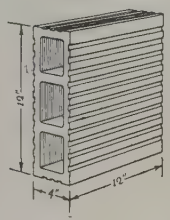
Heine Chimney Co., Builders



8"x12"x12"
4 cell
Wt. Approx. 30 lbs.



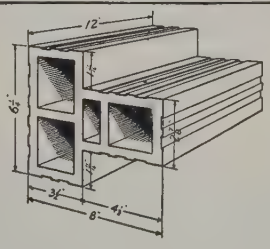
12"x12"x12"
6 cell
Wt. Approx. 40 lbs.



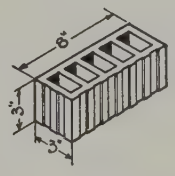
4"x12"x12"
3 cell
Wt. Approx. 16 lbs.

Partition Tile manufactured in sizes 2" to 12" inclusive. In Addition to being used in interior partition wall construction, they are particularly adapted for Combination Hollow Tile and Concrete Floors.

PARTITION TILE

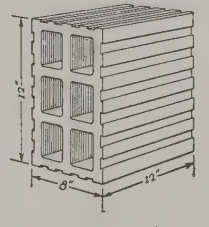


Standard Tee Tile

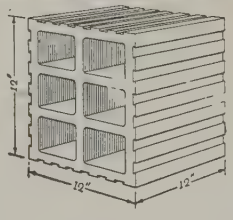


Standard Detail Block

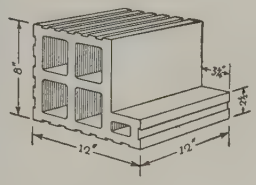
INTERLOCKING TEE TILE



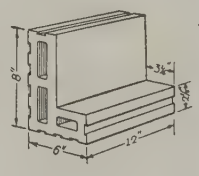
8"x12"x12"
6 cell
Wt. Approx. 36 lbs.



12"x12"x12"
6 cell
Wt. Approx. 48 lbs.



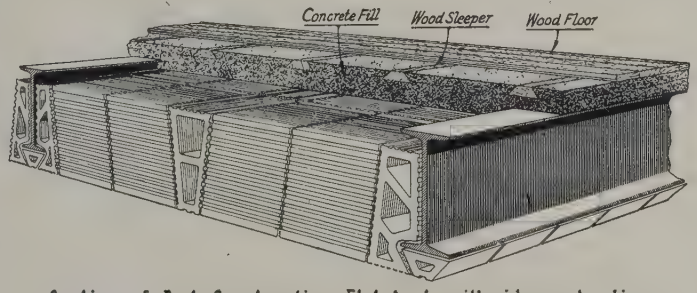
8"x12"x12" Full Jamb
5 cell



8"x6"x12" Half Jamb
3 cell

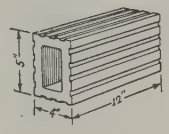
Load Bearing Blocks made in 4",5",6",8",10" & 12" thicknesses

LOAD BEARING TILE

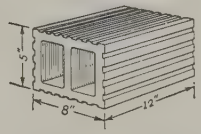


Section of End Construction Flat Arch with side construction skews and with wood floor, illustrating placing of units, concrete fill, and sleepers for finished floor

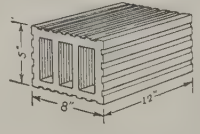
FLAT ARCH CONSTRUCTION



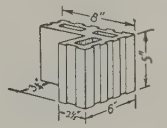
5"x4"x12"
1 cell
Wt. Approx. 9 lbs.



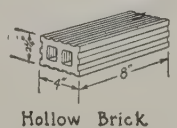
5"x8"x12"
2 cell
Wt. Approx. 16 lbs.



5"x8"x12"
3 cell
Wt. Approx. 16 lbs.

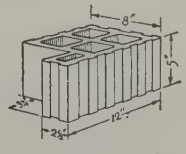


5"x8"x6" Half Jamb
3 cell



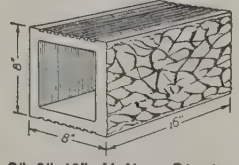
Hollow Brick
2¼"x4"x8"
2 cell
Wt. Approx. 3½ lbs.

Unless otherwise specified, Back-up Tile are furnished plain on one 5"x12" side.



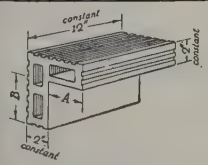
5"x8"x12" Jamb Block
5 cell

BACK UP TILE



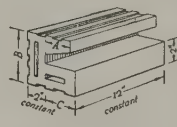
8"x8"x16" Hollow Block
1 cell
Wt. Approx. 32 lbs.

SALT GLAZED HOLLOW BLOCK



Angle Tile
3 cell

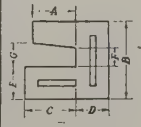
ANGLE TILE



Shoe Tile
2 cell

Table of Standard Shoe Dimensions

A	B	C	D	E	F	G
12	4	2	2	2	¾	1¼
2	4	2²	"	"	"	"
2²	4	3	"	"	"	"
3	4²	3²	"	"	1	1½
3	4²	4	"	"	"	"
3	4²	5	"	"	"	"
3	4²	6	"	"	"	"



Shoe Tile
2 cell

SHOE TILE

CERTAIN-TEED PRODUCTS CORPORATION

GYPSUM DIVISION

Manufacturers of Gypsum Partition and Furring Tile

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752

PLANTS

ACME, N. M. — ACME, OKLA. — ACME, TEX. — AGATITE, TEX. — LARAMIE, WYO. — AKRON, N. Y. — BLUE RAPIDS, KAN. — CEMENT, OKLA. — FT. DODGE, IOWA — NORTH HOLSTON, VA. — GRAND RAPIDS, MICH. — GYPSUM, OHIO

Product

CERTAIN-TEED GYPSUM PARTITION and FURRING TILE.

Index to Products Listed Under Other Classifications

For Asbestos Shingles, see pages A474-475.
For Asphalt Shingles, see page A479.
For Built-up Roofing, see pages A448-451.
For Decorative Panels (Asbestos), see pages C3770-3771.
For Gypsum Lath, see pages B1726-1727.

TRADE-MARKS

For Gypsum Plasters, see pages B1752-1758.
For Gypsum Wall Board, see pages B1618-1619.
For Fibre and Insulating Boards, see pages B1594-1595.
For Linoleum, see pages B1926-1928.
For Paint and Varnish, see pages B2044-2046.
For Reinforced Gypsum Roof Tile, see page A174.
For Roll Roofing and Building Paper, see page A433.

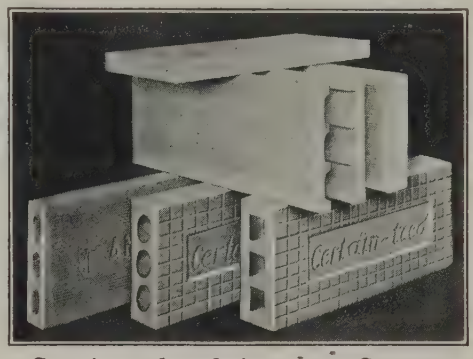
GYPSUM PARTITION AND FURRING TILE

Our gypsum partition and furring tile is now identified under the following brand names: *"Certain-teed"; "Acme"; "American" and "Southern."*

The following data is pertinent to all brands.

Gypsum Tile are used for non-bearing construction in building interiors, such as partitions and wall furring, used as protection against fire on columns, in elevator shafts, stair wells, etc. These Tile possess all the necessary physical requirements for a perfect fireproofing material and in addition are light in weight, permitting easier and faster handling and cutting away of openings in a standard wall if necessary.

Gypsum partition tile are also easily chased for conduits, switch boxes or pipe lines.



Certain-teed and American Gypsum Partition Tile

Grounds may be easily nailed to gypsum tile and bucks may be anchored by nailing with tenpenny cut nails directly into the end of each block course.

Another advantage of gypsum tile to be taken into consideration when designing the structural part of a building is the saving in dead load when using gypsum tile partitions.

Gypsum tile is not only considerably lighter than other tile, but because of the larger units, less mortar is required for setting and due to its uniform moulding in manufacture accurate weight of gypsum is assured and a saving of plaster effected. All these savings tend to lessen the dead load and naturally reduce the cost of construction.

Fire Protection

Gypsum tile have passed the required fire, water and strength tests of the Underwriters' Laboratories, Inc. and have received their approval for non-bearing fireproof partitions, stairways and elevator enclosures, and unplastered non-bearing warehouse partitions.

Three-inch hollow gypsum partition tile plastered with gypsum plaster have been given a two-hour fire retardant rating by the Underwriters' Laboratories, Inc., and three-inch hollow unplastered gypsum partition tile a one hour fire retardant rating.

Non-conductor of Sound

Gypsum partition tile are excellent non-conductors of sound and for that reason are recommended and successfully used in hospitals, schools, office buildings, apartments, hotels and all buildings where a soundproof partition is desired.

Authentic tests determine that less than 1/100 of 1% of incident sound is transmitted through gypsum tile partition plastered with gypsum plaster.

Other Advantages

Gypsum tile by test have been proved to embody maximum density, great crushing strength, supreme fire, sound, and vermin proof qualities, with slight water absorption and negligible breakage.

Certain-teed and *Acme* gypsum tile are marked off by inches both longitudinally and vertically. This feature minimizes labor expense and expedites erection.

Laying

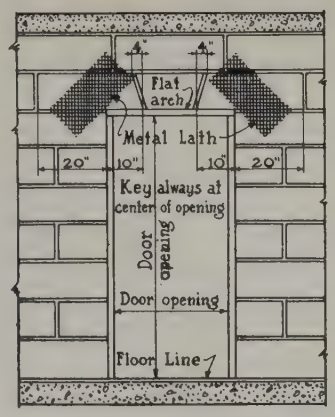
Gypsum unfibered plaster should always be used to lay these blocks. It makes a perfect bond and a stronger wall than either lime or Portland cement mortar. Approximately one-half ton of plaster is required to set a thousand square feet of block.

THICKNESS AND WEIGHTS OF CERTAIN-TEED AND AMERICAN GYPSUM 12x30-IN. BLOCK

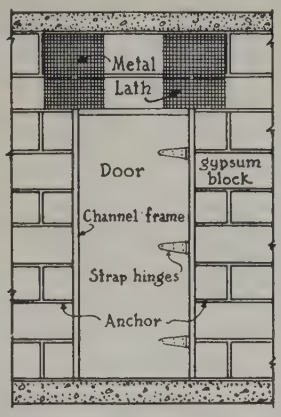
Thickness, in.	Ceiling heights up to —, ft.	Weight block per sq. ft., lb.	Weight mortar per sq. ft., lb.	Total Weight* per sq. ft., lb.	
				Plastered 1 side	Plastered 2 sides
1½, split	Furring	4.8	1.4	9.2	12.2
2, split	Furring	6.2	1.4	10.6	13.6
2, solid	10	9.4	1.5	13.9	16.9
3, hollow	13	9.6	2.0	14.6	17.6
3, solid	15	14.0	2.0	19.0	22.0
4, hollow	17	12.4	2.5	17.9	20.9
5, hollow	25	15.0	2.7	20.7	23.7
6, hollow	28	19.2	3.0	25.2	28.2

*Allowing 3 lb. per sq. ft. for plaster, one side; 6 lb. per sq. ft. for plaster, two sides. (½-in. grounds.)

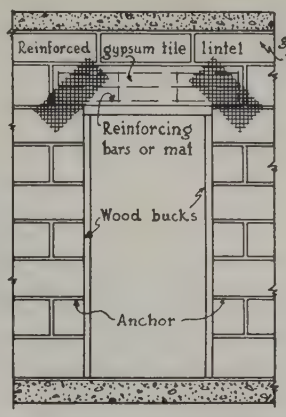
Continued on next page



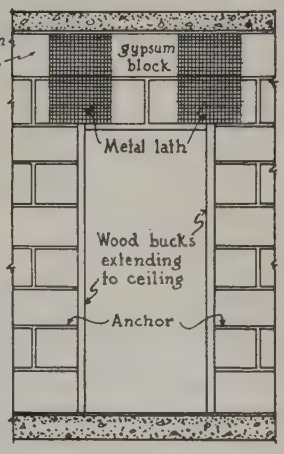
DETAIL SHOWING JACK ARCH CONSTRUCTION



DETAIL OF DOOR WITH CHANNEL IRON FRAME



DETAIL SHOWING REINFORCED GYPSUM LINTEL CONSTRUCTION



DETAIL SHOWING WOOD BUCKS

GYPSUM PARTITION TILE CONSTRUCTION DETAILS

Specifications for Gypsum Partition and Furring Tile

Work to be Done—All partitions and furring, unless otherwise specified or shown, shall be built of ..... Gypsum Tile as manufactured by CERTAIN-TEED PRODUCTS CORPORATION, of thickness specified.

General—In fireproof construction all Gypsum Tile shall be started with a gypsum mortar bed laid on fireproof construction. Tile courses shall not be started on frozen concrete nor on cinder concrete when such is used for the purpose of fill only.

Partitions—All non-bearing partitions of Gypsum Tile shall be laid with vertical joints broken. Such partitions shall extend from floor to ceiling, shall be wedged at the ceiling, and the joints slushed with gypsum mortar.

Intersections—All intersecting partitions shall be bonded by overlapping not less than at every third course.

Partitions intersecting brick, or other masonry walls, shall be securely anchored to such walls by means of "approved" masonry bond or metal anchors, or by 10d steel cut nails driven into the masonry joints at each gypsum tile course.

Corners—Partitions shall be bonded at the corners by overlapping alternate courses (log cabin fashion).

Furring—Gypsum Tile furring shall be laid as herein required for partitions. All furring in contact with the construction shall be securely anchored to the masonry by means of 10d steel cut nails driven into the masonry joints at intervals not greater than every 3 ft. horizontally and vertically. Free standing furring shall be of not less thickness, nor of greater height, than is required for partitions. Metal ties or other "approved" methods for securing furring to the masonry may be used.

Bucks—*Wood*—Where wood bucks are used they shall be of not less than 2-in. lumber and of a width equal to the total thickness of the tile and plaster constructions, and may or may not be rabbeted to receive the ends of the tile; or the bucks shall be of a width equal to the thickness of tile only and have not less than ½-in. grounds nailed to the sides and projecting beyond the buck not less than ¾ in., forming a rabbet to receive the ends of partition tile.

All wood bucks shall be secured to the ends of the partition tile with 10d cut nails driven into every course.

Metal—Where metal bucks are used they shall be of a width not less than the thickness of the tile construction, and of such form as to receive the ends of the tile. When the metal bucks are of a width equal to the thickness of the tile construction, furring strips of wood shall be secured to the buck as a stop for the plaster coats and for a nailing base for trim. Where metal bucks are of a width to include the total thickness of the tile and plaster construction, the trim shall be secured direct to the metal bucks or to wood nailing blocks bolted to the face of the bucks.

Lintels, Built-up—Openings in partitions of gypsum tile not more than 22 in. in width can be spanned by a gypsum tile. When such openings are more than 22 in. but not more than 4 ft. in width, the gypsum tile over the opening shall be laid in the form of a jack arch. Skew-backs shall be cut in the tile over the jambs, intermediate tile shall be beveled to fit the skew-backs, and a key tile to fit shall be set in the center. Bevel cuts shall not be less than 4 in. to the foot. The skew-back tile shall have a bearing on the jambs of not less than 12 in. nor shall they be set so as to project beyond the face of the jambs more than one-third of the bearing.

When jack arch construction is employed, the jack arch shall be reinforced with strips of not less than No. 14 gauge woven wire mesh not less than 2 in. in width, or the reinforcement may consist of two strips of not less than No. 24 gauge perforated metal not less than 1 in. in width. The reinforcement shall be continuous, and shall be laid in the mortar joint between the jack arch and the course immediately above, extending into the partition construction not less than 30 in. beyond the face of each jamb.

Lintels, Reinforced and Cast—Openings in partitions of gypsum tile which are more than 4 ft. but not over 6 ft. in width shall be spanned by lintels of reinforced gypsum of monolithic design.

(a) Mat Reinforcement—Mat reinforced lintels shall be 12 in. in height and shall be reinforced with a galvanized welded wire mat on each side (face) of the lintel. Each of the welded wire mats required shall consist of not less than three No. 12 gauge wires, for the full length of the lintel, spaced 5 in. on center, the bottom wire shall be 1 in. from the bottom of the lintel. The longitudinal wires shall be secured to transverse wires of not less than No. 12 gauge which shall occur at not less than 9-in. intervals and shall be welded to the longitudinal reinforcement.

(b) Rod Reinforcement—Rod reinforced lintels shall be 12 in. in height and shall be reinforced with not less than two ¼-in. twisted rods for the full length of the lintel. One of the required rods shall be straight and the other shall be bent up for shear. The horizontal part of the reinforcement, at the bottom, shall be 1 in. from the lower face of the lintel and both ends of both rods shall, at their extreme ends, be bent so as to form an anchor within the material.

All reinforced gypsum lintels shall have a bearing on each jamb of not less than 8 in.

Lintels, Metal—Openings in partitions of gypsum tile which are more than 6 ft. in width shall be spanned by metal lintels of approved design.

All metal lintels shall provide a distributed and uniform bearing on each jamb of not less than 8 in.

Mortar—All gypsum tile construction shall be laid up with a gypsum mortar composed of hydrated calcined gypsum thoroughly mixed in the proportions by weight of 1 part calcined gypsum to not more than 3 parts of clean, sharp, dry sand. Gypsum mortar shall not be retempered.

Plastering—All plastering on gypsum tile shall be done with gypsum plasters applied in accordance with the architect's specifications, or the specifications of the CERTAIN-TEED PRODUCTS CORPORATION— see our pages in Sweet's—Plaster Section.

NATIONAL STONE-TILE CORPORATION

Patentees, Licensors and Manufacturers of Stone-Tile
2 Pine Street, SAN FRANCISCO, CAL.
NEW YORK OFFICE, Graybar Building, 420 Lexington Avenue
For Local Licensees, see Telephone Book under "Stone-Tile"

Product
STONE-TILE.

Stone-Tile—A Load Bearing Concrete Tile

Stone-Tile is a pre-cast hollow concrete building unit, smaller and easier to handle than building block or hollow tile. It is one of the most economical materials for permanent, fireproof walls in houses, schools, churches and business or industrial buildings of every description.

Made to Rigid Specifications—The manufacture of Stone-Tile is conducted under Standard Specifications to which each manufacturer must adhere under his license contract. In the Stone-Tile mix the aggregates are graded and the water ratio controlled so as to secure a plastic or *quaking* consistency.

Produced in Quantity—Every Stone-Tile plant is equipped to fill the largest orders on short notice.

Distinctive Texture—Stone-Tile has a distinctive pitted surface which gives a pleasing texture to exterior walls and makes a firm bond with plaster.

Flexible in Treatment—The convenient sizes and shapes of Stone-Tile lend themselves to a wide range of architectural treatment. Can be used to form arches and lintels. See illustrations on following page.

Can Be Reinforced—Stone-Tile pilasters may be filled solid and reinforced where concentrated loads occur and the total cost will be less than reinforced concrete.

Easy to Handle—Stone-Tile units can be handled as easily as common brick. An average bricklayer can lay from 600 to 1200 of 6-in. size, and from 500 to 900 of 8-in. size, depending on nature of the wall.

Extremely Economical—Stone-Tile can be furnished and laid at a price seldom in excess of 35¢ per sq. ft. of 8-in. wall; other sizes in proportion.

A Unit That Meets Every Condition

Stone-Tile Units are furnished in three principal sizes: No. 4 for partitions; No. 6 for 6, 12 or 18-in. walls, and No. 8 for 8 or 16-in. walls. Half tile are also furnished, as well as other shapes listed below.

DIMENSIONS AND WEIGHT OF STONE-TILE

No.	Dimensions, in.	Approx. weight, lb.	Web thickness, in.	Ratio of air space
4	3¾x12x3½	8½	1¼	25%
6	5¾x12x3½	12½	1½	32%
8	7¾x12x3½	16½	1¾	32%

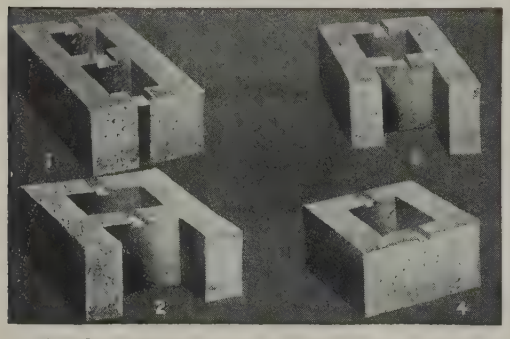
Mortar averages 1 cu. yd. per 1000 Stone-Tile of either size.

For Corners—Special corner tile are furnished in the No. 8 size. No. 6 tile require no special shapes at corners.

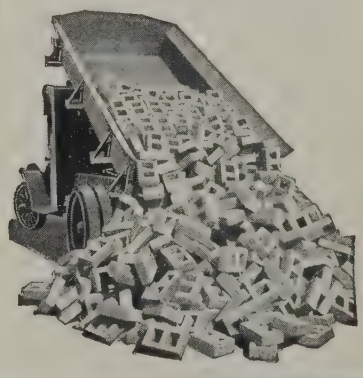
For Jambs—Appropriate jamb units (No. 6 or 8) are furnished for use at double hung windows, steel sash, and the like. (See first illustration on left below).

For Copings and Bearing Courses—Solid tile (No. 6 or 8) is used for bearing courses at joist lines and for capping walls at top.

For Arches, Pilasters, etc.—The standard units are adaptable for these purposes. Notice how these details are handled in the church building illustrated below on the left.



1—Jamb Tile for Steel Sash
2—8-in. Corner Tile
3—Recessed Jamb Tile
4—Half Tile



Stone-Tile Laid in Wall
Note the brick proportions

Church Built with Stone-Tile
Note the pleasing exterior appearance of Stone-Tile masonry and flexibility of use

Flexibility of Stone-Tile
Adaptable for arches, copings, cornices, etc.

Continued on next page

Where to Procure Stone-Tile

Because of its strength, economy, pleasing texture and exceptional flexibility of treatment, Stone-Tile is being widely specified by architects. For their benefit we maintain a Service Department at the home office, which will co-operate in plans and specifications.

Stone-Tile can be procured from independent licensees in different parts of the country, by whom it is manufactured under the rigid Stone-Tile specifications.

Look in the telephone book under "Stone-Tile" for your local licensee—or write us for information.

Where Used

Stone-Tile has been and is being successfully and economically used in the following type of structures:

Apartment houses	Factories
Churches	Railroad stations
Residences	Schools
Stores	Theaters
Office buildings	Vaults
Hospitals	Warehouses
Mills	Garages

The illustrations show the beauty, strength and versatility of Stone-Tile.

Wall and Gateway of Stone-Tile

The Stone-Tile are set a little askew, the joints are raked out to give shadow lines and the whole brush coated

Exterior Walls of Stone-Tile Masonry, Brush Coated

Witmer & Watson, Architects
Special "radius" units furnished for tower of this residence

Motor Mart Garage, Boston, Mass.

Ralph Harrington Doane, Architect
Largest of its kind in the world. Stone-tile backup throughout

CINDER CONCRETE BUILDING UNITS

MANUFACTURED UNDER STRAUB AND BO PATENTS—OWNED BY

NATIONAL BUILDING UNITS CORPORATION

1600 Arch Street

PHILADELPHIA, PA.

MANUFACTURED BY THE FOLLOWING COMPANIES

ALBANY, N. Y., Finch & Ostrander, Inc.
ALLENTOWN, PA., Hollywood Building Block Co.
ALTOONA, PA., Juniata Reconstructed Stone Co., Juniata, Pa.
APOLLO, PA., Apollo Steel Co.
ATLANTA, GA., Atlanta Cinder Block & Tile Co.
BALTIMORE, MD., Cinder Block Corp.
BINGHAMTON, N. Y., Straub Building Units, Inc.
BRAEBURN, PA., Braeburn Volcano Block Co.
BUFFALO, N. Y., Burnett-Wilson-Pfohl, Inc.
BUTLER, PA., Shufflin & Green
CAMDEN, N. J., Concrete Specialties Co.
CINCINNATI, OHIO, Cincinnati Cincrete Corp.
CLARKSBURG, W. VA., Cincrete, Inc.
DENVER, COLO., Cinder Block Co.
DES MOINES, IOWA, Iowa Concrete Crib & Cement Products Co.
DETROIT, MICH., Detroit Cinder Block & Tile Co.
DETROIT, MICH., R. E. Hamilton's Sons
EAST ST. LOUIS, ILL., Atlas Cinder Block Corp.
ELMIRA, N. Y., Elmira Building Units, Inc.
ERIE, PA., Erie Patent Block Co., Inc.
ESCANABA, MICH., Universal Magnesite Products Co.
FAIRMONT, W. VA., Fairmont Wall Plaster Co.
(Sub-licensees and distributers in West Virginia)
FLINT, MICH., Flint Cinder Block & Products Co.
FOREST PARK, ILL., Illinois Cincrete Products Corp.
GENEVA, N. Y., Geneva Brick Products Co.
GREENSBURG, PA., Building Materials Co.
HAMILTON, ONT., CANADA, E. J. Shepard, Ltd.
HARRISBURG, PA., Harrisburg Building Block Co.
INDIANAPOLIS, IND., Straub Cinder Block Co.
JAMESTOWN, N. Y., Jamestown Block & Tile Co.
JERSEY CITY, N. J., Cinder Brick and Tile Co.
JOHNSTOWN, PA., Art Stone Block Co.
KANSAS CITY, MO., Cinder Block Co.
LANCASTER, PA., Lancaster Concrete Tile Co.
LANSING, MICH., Universal Block Co.
LEMOYNE, PA., Pennsylvania Concrete Roofing Tile Co.
LEWISTOWN, PA., James L. Shreffler
McHENRY, ILL., Frett Brothers
MANORVILLE, PA., Eddy Brothers
MIDLAND, MICH., John A. Whitman
MILWAUKEE, WIS., Cincrete Products Corp.
MOLINE, ILL., Moline Cast Stone Co.
MT. POCONO, PA., L. T. Smith
NEW CASTLE, PA., Straub Block Co.
NEW KENSINGTON, PA., Straub Block Co.
NORFOLK, VA., Norfolk Building Block Corp.
NORTH BERGEN, N. J., Hudson Fireproof Block Co.
OMAHA, NEB., Ideal Cement Stone Co.
PHILADELPHIA, PA., Philadelphia Partition & Building Block Co.
PITTSBURGH, PA., Straub Block Co.
POTTSVILLE, PA., Pottsville Building Block Co.
PUEBLO, COLO., Pueblo Cinder & Cement Products Co.
READING, PA., Berks Building Block Co.
RIDGEFIELD PARK, N. J., Bergen Building Block Co.
RICHMOND, VA., Richmond Patent Building Block Corp.
RIVER GROVE, ILL., Chicago Granite Co.
ROCHESTER, N. Y., Rochester Cinder Block Corp.
ROCHESTER, N. Y., Genesee Brick & Supply Corp.
ROCHESTER, N. Y., Schaefer Bros. Builders Supply Co.
ST. JOSEPH, MO., Cinder Block Co.
ST. LOUIS, MO., Cinder Block Co., Clayton, Mo.
SEATTLE, WASH., Concrete Structural Units Co.
SELINSGROVE, PA., Cincrete Products Co.
SPRINGDALE, PA., Brown Building Block Co.
SPRINGFIELD, MASS., Springfield Sand & Tile Co.
SPRINGFIELD, OHIO, Springfield Cinder Block Co.
SYRACUSE, N. Y., Syracuse Cinder Products Corp.
TARENTUM, PA., Frank H. Thompson
TORONTO, ONT., CANADA, Toronto Brick Co., Ltd.
TRENTON, N. J., Concrete Specialties Company
UNIONTOWN, PA., Hankins-Paulson Co.
WARREN, OHIO, Straub Patented Block Co.
WARREN, PA., Wilson-Wetmore Lumber Co.
WASHINGTON, D. C., Washington Concrete Products Corp.
WAYNESBURG, PA., J. E. Drury
WESTFIELD, N. J., Hudson Fireproof Block Co.
WILKES-BARRE, PA., Nepenna Building Materials Co., Kingston, Pa.
WILLIAMSPORT, PA., Delvan Block Co., So. Williamsport, Pa.
WILMINGTON, DEL., Cinder Block Corp.
YORK, PA., York Patented Building Block Co.
YOUNGSTOWN, OHIO, Peter Klug
YOUNGSTOWN, OHIO, Garland Block & Sand Co.

Products

Foundation and Wall Bearing Blocks; Partition Tile; Brick; Reinforced Lintels; Sills; Chimney Blocks; Floor Arch Blocks.

Patents and License

The manufacture and sale of cinder concrete building units is protected by United States Patent No. 1,212,840 to Francis J. Straub, and United States Patent No. 1,466,083, to Sigurd Bo. Other patents pending. The Straub patent has been broadly sustained by unanimous decision of the United States Court of Appeals. All plants work under license agreement with National Building Units Corporation.

Advantages

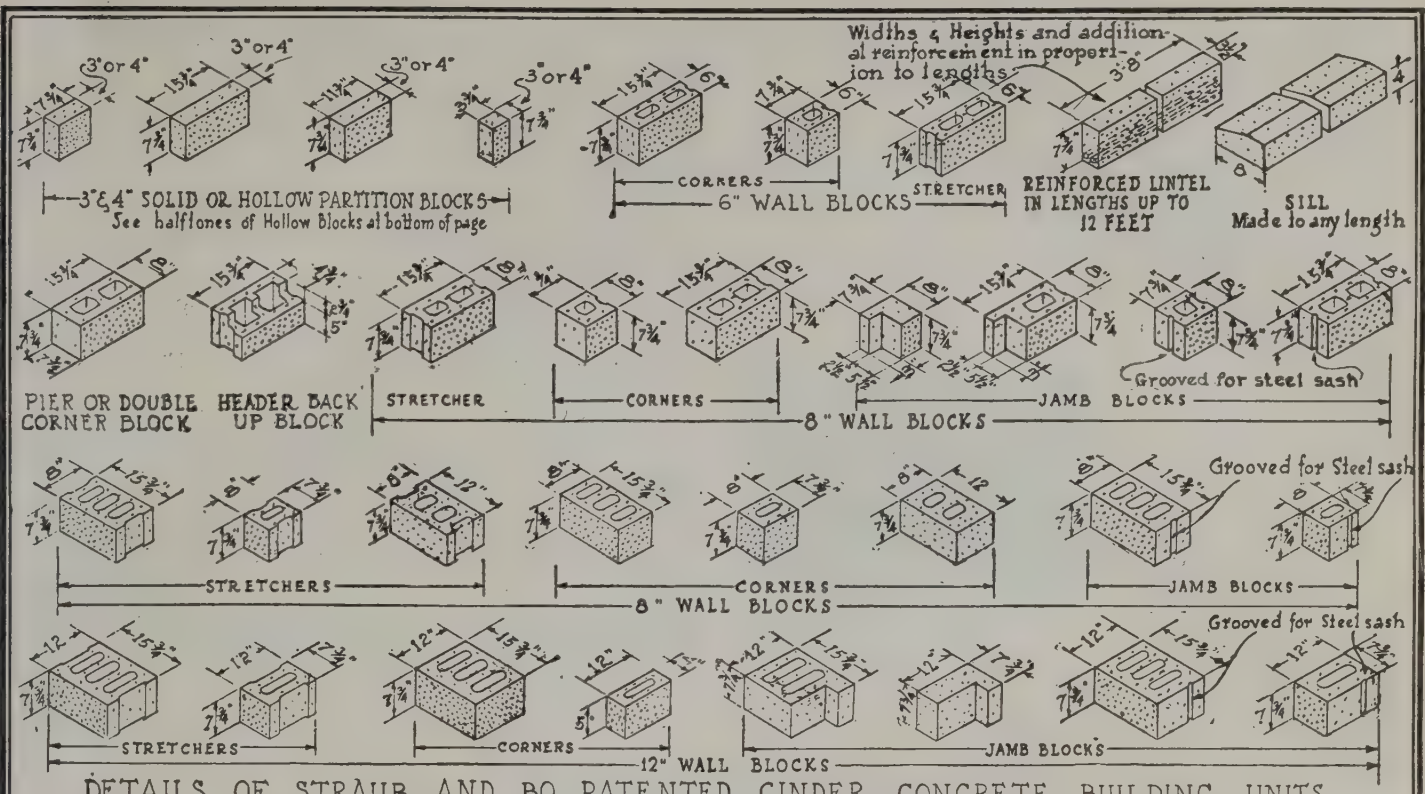
Economy—The lightness of the product effects a 20 to 40% saving over common brick, and 5 to 15% saving over clay tile. One 8x8x16-in. block displaces 12 brick and requires about one-quarter the mortar. Plaster is applied direct to cinder block, and the trueness of the wall, together with the texture, facilitate the application. No nailing strips or plugs are necessary. Other economies will be found under other subheadings.

Tests—Tests made by Underwriters' Laboratories, Inc., Watertown Arsenal, Columbia University, University of Toronto, University of Illinois, Ohio State University, Rutgers College, Johns Hopkins University, Lewis Institute, Pittsburgh Testing Laboratory, Detroit Testing Laboratory, Kansas City Testing Laboratory, E. L. Conwell & Co., Philadelphia, Pa., and other recognized laboratories.

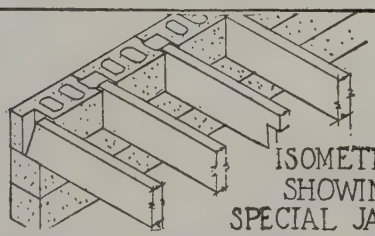
The National Building Units Corporation, or any of the plants listed will send copies of these tests and other pertinent data on request.

Strength—All plants are required to manufacture blocks having an average crushing strength of 800 lb. per sq. in. of gross area, which is equivalent to approximately 1200 lb. per sq. in. net area. Tests on cinder block walls at Columbia University show a ratio of wall strength to unit strength for cinder blocks of from 57 to 76%. This is the highest of any known masonry and consequently, carries a corresponding safety factor.

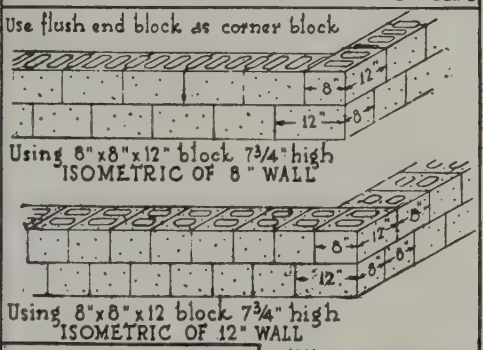
Continued on next page

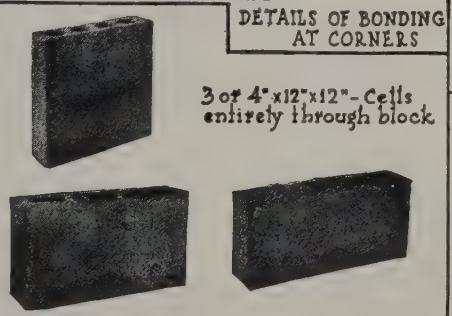


DETAILS OF STRAUB AND BO PATENTED CINDER CONCRETE BUILDING UNITS

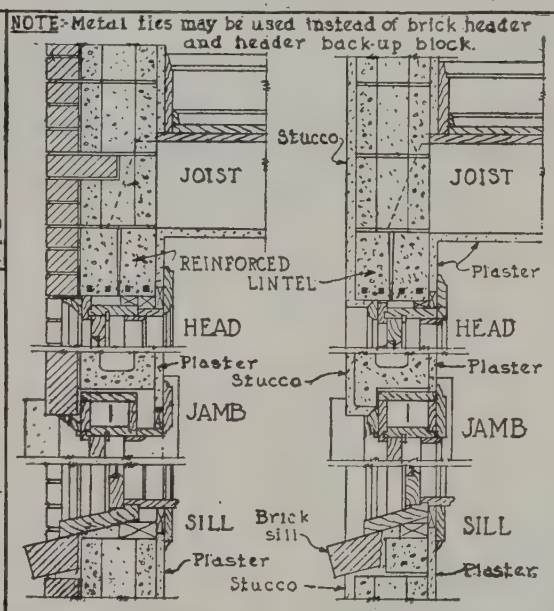


ISOMETRIC SHOWING SPECIAL JAMB BLOCKS IN RELATION TO WOOD JOIST

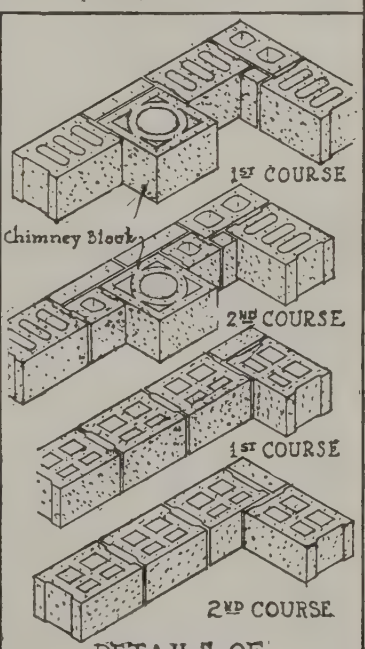




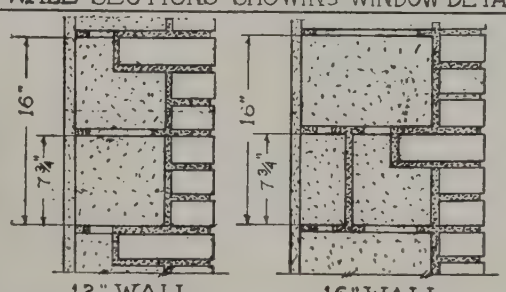
HOLLOW PARTITION TILE



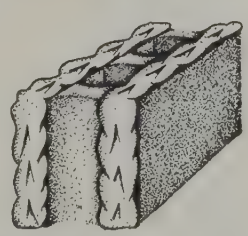
WALL SECTIONS SHOWING WINDOW DETAILS



DETAILS OF BONDING AT CORNERS.



METHOD OF BACKING FACE BRICK



Block is buttered on outside and inside edges - ribs are left free of mortar

MORTAR JOINTS

DRAWING	SIZES AND USES OF CINDER CONCRETE BUILDING UNITS	1

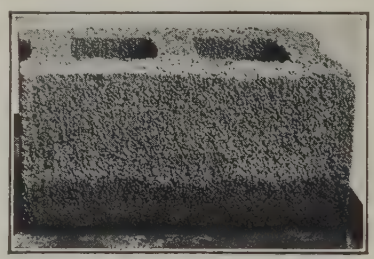
Continued on next page

Breakage—Practically no breakage, even when the block and tile are dumped from trucks.

Fireproof—The official tests made for the National Board of Fire Underwriters at the Underwriters' Laboratories, Inc., in Chicago confirm the many demonstrations and results of actual fires. Prolonged exposure to fire and application of water to the wall causes no cracking or spalling, and the loss in strength is negligible.

Timeproof—Age increases the strength of cinder concrete building units. They are not affected by freezing or temperature changes. This is due to the toughness and cellular structure of the material.

Dampproof—The illustration shows the low capillary attraction of cinder blocks. This feature accounts for the fact that no water is drawn through the wall, even during the heaviest rain storm. It is also of importance in producing a stronger mortar joint in that the mortar is not robbed of its moisture. For the same reason, stucco and plaster retain full strength on cinder concrete building units. The initial suction or absorption is rapid but limited. No wetting is necessary. The laying of these blocks during the winter months is thus made practicable.



Cinder Building Block Partly Immersed in Water
Illustrating the low capillary attraction of the material

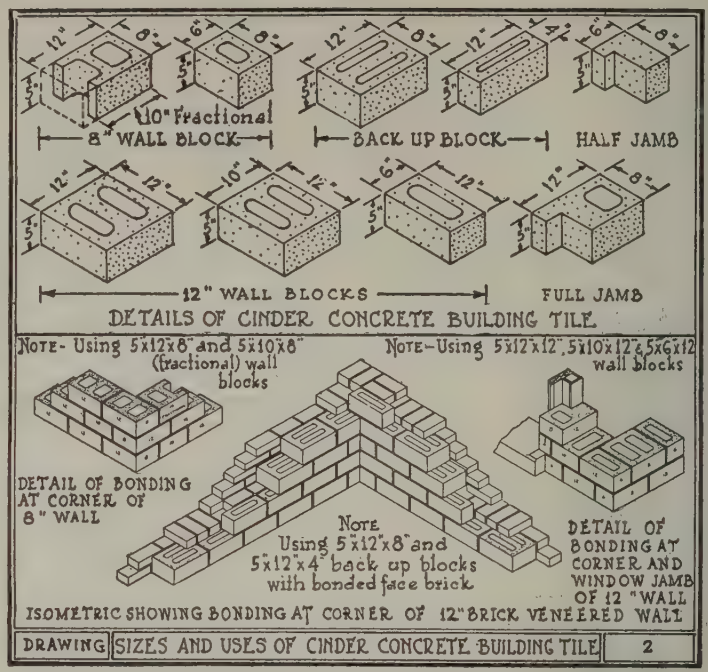
Non-conductor of Heat and Cold—The cork-like structure of the material builds insulation into the wall. It insures an even temperature within the house all year round and effects a substantial saving in fuel. The insulative nature makes lining with special insulative materials unnecessary. Cinder concrete building units never "sweat"; are rotproof and verminproof; no mold forms, and decorations are never injured where plaster has been applied direct to exterior walls, even in the severest climate. The material is ideal for icehouses, refrigeration plants, fruit storage, dry kilns, etc.

Soundproof—Cinder blocks are used extensively in schools, hospitals, churches, and the like where the acoustic design is of particular importance. A wall of this material, exposed or plastered, reduces the reverberation and absorbs the sound. Cinder tile forms the ideal partition, because it reduces the amount of sound transmission more than any other masonry material.

Stucco and Plaster—The rough texture affords a perfect key for plaster and stucco. These materials are readily applied and dovetail into the small crevices on the surface of the cinder block or tile.

No Through Mortar Joints—Cinder block and tile are always buttered on the outside and the inside webs, but not on the cross webs. Through mortar joints, with their tendency to conduct moisture, heat and cold through the wall are thereby avoided.

No Furring Required—The low capillary attraction and the high degree of heat insulation of cinder concrete building units make it possible to plaster direct without any furring or lathing.



Light of Weight—From 30 to 40% lighter than sand concrete. The hollow units 50 to 60% lighter than brick. This speeds up the laying and reduces the dead load of the wall.

Rapid Laying—Light weight, uniformity and a good mortar bed contribute to easy, rapid and economical wall erection. Less waste of mortar or time of setting than with clay tile.

Nailing—As good as wood for nailing; holding power is equal to yellow pine. Nails never rust. See Pittsburgh Testing Laboratory report. Holding power increases by age. Wood ground and trim can be thoroughly secured by toe nailing. Pipe hangers and other supporting members can be readily secured by means of lag screws, expansion bolts, etc.

Cutting—Cinder concrete building units are furnished in all fractions. They can, however, be readily cut and they can be chased and channeled for pipe and conduits without fracture.

Corners—Details of this on preceding page show several methods, all retaining full insulating value.

Steel Sash Installation—Grooves are moulded into jamb blocks to admit steel window frames. Two lintels to an opening provide this advantage without cutting or channelling.

Lintels—Reinforced lintels of cinder concrete provide all the advantages of strength, lightness, nailability and dampproofness.

Several standard sizes—see drawing No. 1. Specials on order.

Details, Catalogues and Data

Each plant is in position to submit details and give required information to architects, engineers and builders.

Address nearest plant or the head office of the National Building Units Corporation.

THE STOCKADE CORPORATION

228 North La Salle Street

CHICAGO, ILL.

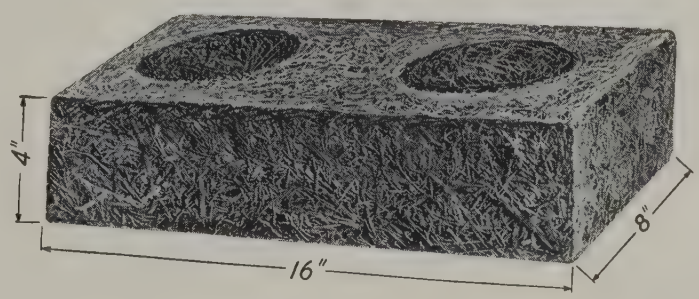
Product

STOCKADE BUILDING UNITS for Exterior Walls.

Description

Stockade is a wall-building material that received immediate approval from America's leading architects.

It is manufactured in blocks that are eight times larger than bricks and one-eighth as light in weight (see illustration). These blocks, in wall construction, are built up in brick fashion—only much faster because of the larger size, the light weight and because the joints take care of themselves—self-bonding.



The circular opening in each block forms a "column of holes" as the wall is laid. Concrete is poured into these holes, forming re-inforced concrete columns four inches in diameter and eight inches on centers. A test conducted at Armour Institute of Technology proved that a wall so constructed had the astounding strength of 67,000 pounds a lineal foot at eight feet high.

Stockade blocks provide an eight inch thickness of continuous, integral insulation equal to a two-inch layer of cork, more insulation than has been heretofore practical. It is fire resistant, moistureproof and verminproof. Does not disintegrate with time.

Advantages

(1) The strength of re-inforced concrete made practical for the modern home.

(2) Much more insulation at no extra cost.

(3) Any exterior or interior wall treatment without lath, furring strips or extra operations.

(4) Unusual architectural effects possible, deep reveals, at amazing small cost.

(5) No extra tools needed in using Stockade, only a saw is required.

Economy

Elimination of various wall materials—when stockade mould is laid, it is immediately ready for stucco and plaster.

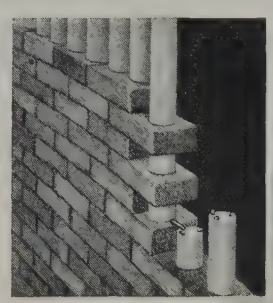
Substantial saving in labor because Stockade can be laid rapidly and is self-bonding.

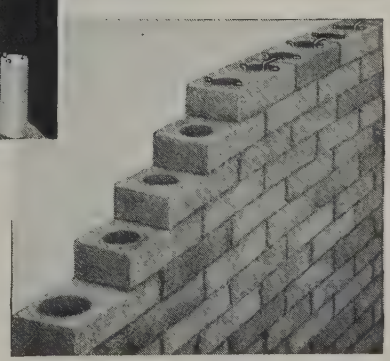
Quality

Stockade was invented by the well-known architect, James Monroe Hewlett. It is the result of extensive engineering and chemical research and is a product of the finest workmanship, true to size, shape and unchanging high quality.

Additional Information

Illustrated booklets and sample will be sent to contractors, builders and architects. Or when advice is desired regarding practice of construction, it will be cheerfully furnished by our engineers.





UNITED STATES GYPSUM COMPANY

Pyrobar Partition and Furring Tile; Beam and Column Covering

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see page A182

Products

PYROBAR PARTITION and FURRING TILE; PYROBAR BEAM and COLUMN COVERING.

For Acoustical Plaster, see page A23.
For Sound Insulation, see pages A24-25.
For Reinforced Roof Tile; Monolithic Roof and Floor Construction, see pages A182-187.
For Structolite Tile; Structolite Cement, see page A432.
For Fireproof Wallboard, see page B1621.
For Fireproof Sheathing, see page B1624.
For Dry Fill Insulation, see page B1668.
For Fireproof Lath, see page B1731.
For Gypsum Plasters and Finishes, see pages B1763-1765.
For Colored Finish Plaster, see page B1770.
For Exterior Stucco, see page B1780.
For Plastic Paint, see page B2135.

Service

We are the largest producers and manufacturers of gypsum products in the world. Our mills, economically distributed throughout the country, insure prompt delivery of any quantity of Pyrobar Tile.

We contract for the furnishing and erecting of Pyrobar partition tile, furring tile and fireproofing of beams and girders, and for all interior partition work complete.

Pyrobar Partition and Furring Tile

Moulded of 98% gypsum and 2% special fiber by continuous automatic machine process, insuring accurate proportions and uniform size, weight, strength, and density.

Approved by Underwriters' Laboratories, Inc., for:

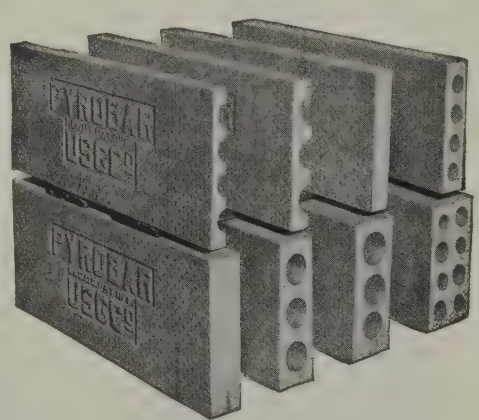
Non-bearing corridor walls, partitions, wall furring, false columns and pilasters, unplastered partitions and corridors in merchandise storage warehouses. Fire division walls. Elevators, stairways, dumbwaiter and corridor enclosures. Light wells, pipe chases, heat and vent ducts. As covering for columns, beams, girders and trusses and other steel members requiring fireproofing.

Advantages—

Fireproof	Light weight	Economical
Save plaster.	Speedily erected	Sound resistance
Perfect plaster base	Easily cut for alterations	

Distinctive Economy—Pyrobar units are 2½ sq. ft. each, speeding construction and making for economy in handling and erection costs. Pyrobar walls are straight and true, requiring uniform ½ in. of plaster on a side to finish.

Cost—Its extreme light weight and large, true units secure economy in freight, labor, handling, erection, and plastering. Note the comparisons.



Pyrobar Precast Gypsum Partition and Furring Tile

Approved by Underwriters' Laboratories, Inc.

SIZES AND WEIGHTS OF PYROBAR PARTITION TILE

Thickness (all tile 12x30 in.)	For ceilings, heights up to, ft.	Weight tile per sq. ft., lb.	Weight mortar per sq. ft., lb.	Total weight** per sq. ft., lb.	
				Plastered One side	Plastered Two sides
1½-in. split	Furring†	4.9	1.4	7.9	.....
2- in. split	Furring†	6.4	1.4	9.4	.....
2- in. solid	10*	9.4	1.5	12.4	15.4
3- in. hollow	13*	9.9	2.0	12.9	15.9
3- in. solid	15†	13.0	2.0	16.0	19.0
4- in. hollow	17*	13.0	2.5	16.0	19.0
5- in. hollow	20*	15.6	2.75	18.6	21.6
6- in. hollow	30*	16.6	3.0	19.6	22.6

*Underwriters' recommendation. †No Underwriters' recommendation. **Weight of plaster, one side 3 lb. per sq. ft., two sides 6 lb. per sq. ft. (½-in. grounds).

COMPARATIVE WEIGHTS OF PYROBAR AND CLAY TILE

Thickness	Weight per sq. ft., lb.		3-in. tile in place	Weight per sq. ft., lb.	
	Pyrobar	Clay Tile		Hollow Pyrobar	Clay Tile
2-in. hollow.....	6.4	12	Unfinished.....	9.9	15.
3-in. hollow.....	9.9	15	Mortar.....	2.	3.5
4-in. hollow.....	13.0	16	Plaster both sides..	6.	9.
5-in. hollow.....	15.6	19			
6-in. hollow.....	16.6	22	Total weight.....	17.9	27.5

Specifications for Pyrobar Partition and Furring Tile

Partitions—Unless otherwise specified or shown, all non-bearing partitions (*Note:* also mention vent shafts, pipe chases, column fireproofing or any other special items required with partitions) shall be built of UNITED STATES GYPSUM COMPANY'S Pyrobar Partition Tile, of thickness indicated on plans. All partitions shall start with a mortar bed, and the tile shall be set plumb, straight and true with vertical joints broken, and shall be wedged at ceiling and slushed with mortar. Corners of all partitions shall be built log cabin fashion, tile interlocking.

All partitions coming in contact with existing walls or partitions or with brick or other masonry walls shall be securely anchored to such walls by means of metal ties, anchor straps or other approved fasteners furnished and set by the masonry contractor, or by providing recess in wall.

Furring—All outside walls, where so shown on plans, shall be furred with Pyrobar Furring Tile of thickness and type indicated on plans, laid up against the wall, and securely anchored to the masonry every square yard with 10d cut nails, metal ties, anchor straps or other approved fasteners left in place by mason contractor.

Mortar and Laying—All Pyrobar Tile shall be laid up in mortar composed of UNITED STATES GYPSUM COMPANY'S Set-fast Cement—1 part cement to 3 parts, by weight, of clean, sharp dry sand, thoroughly mixed. *(Important: Do not use portland cement or lime mortar.)* No mortar shall be retempered. All tile shall be laid with full, flush joints to a line, with horizontal beds uniformly level on each course. All joints, chinks, and crevices between the tile and other work shall be filled with mortar well slushed in.

Grounds for Trim—Chair rail, picture moulding, plaster grounds, baseboards and similar trim shall be secured to grounds or to nailing blocks set in the tile construction for this purpose. Nailing blocks shall not be less than ⅞ in. thick, shall be nailed directly to the end of the gypsum tile and shall be of such other dimensions as to completely cover the end of the tile. When nailing blocks are used, they shall be spaced not to exceed 30 in.

Blackboards, toilet and heavy fixtures shall be secured by bolting through the tile construction, or shall be nailed to nailing blocks not less than 1½ in. thick of the character required for other trim, and spaced not to exceed 15 in.

Lintels—Openings not greater than 22 in. in partitions of tile may be spanned with a single tile, which shall have a bearing at each end of not less than 4 in. When such openings are more than 22 in. but not more than 4 ft., the Pyrobar Tile over these openings shall be laid in the form of a jack-arch. Openings over 4 ft. but not over 6 ft. shall be spanned by reinforced gypsum lintels. Openings over 6 ft. shall be spanned by metal lintels of approved design. *(Note: Specify under Miscellaneous Iron.)*

Wood Frames—(For Carpenter Specifications)—The carpenter contractor shall set and secure the rough bucks for openings ahead of the contractor for this work so as to cause no delay. These bucks shall be left plumb and true by the carpenter and shall be made of 2-in. lumber of the same width as the thickness of the tile, and there shall be ½x2¾-in. grounds nailed to the bucks to the height of the door forming a rabbet to receive the Pyrobar Tile.

Trim—(For Carpenter Specifications)—All wood or metal trim shall extend over the junction between bucks or grounds and the plaster coats. For narrow trim an unrabbetted buck may be used if securely anchored to the tile.

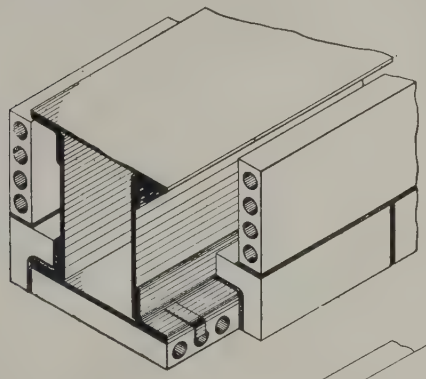
Note: For best construction, we recommend the use of door bucks which extend from floor to ceiling, and preferably anchored to the tile by means of metal ties, anchor straps, other approved fasteners or by 10d steel cut nails partially driven into the buck at each gypsum tile course. Bucks not extending to ceiling should always be well anchored. It is good practice to use a strip of metal lath, corrugated or perforated iron or a wire mesh in the mortar course over the tiles forming the lintel and extending 30 in. beyond the joint on each side. Where heavy doors are

Continued on next page

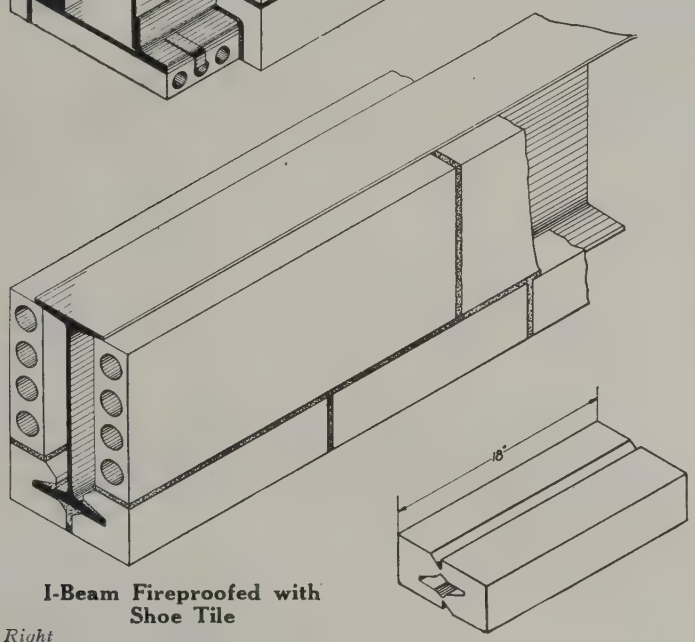
used, the plaster may be reinforced against cracking by use of a metal lath or wire mesh facing, nailed to the tile, over the corners of the door openings.

Pyrobar Column Fireproofing

Column fireproofing is accomplished with 2-in. solid or 3-in. hollow Pyrobar partition tile. When desired or required by code, the space between the covering and the steel may be solidly backfilled with broken gypsum blocks and gypsum mortar.



Built-up Girder Fireproofed with Angle and Soffit Tile



I-Beam Fireproofed with Shoe Tile

Right
Sketch of shoe tile as shipped to the job

Pyrobar Beam and Girder Fireproofing

Pyrobar beam and girder fireproofing consists of shoe tile which fit closely over the lower flanges of the steel, as illustrated, and side covering of Pyrobar partition units set in place as shown. Both shoe tile and side covering are of such dimensions as to provide 2 in. of fireproofing at all parts, thus fulfilling the requirements of the Underwriters Laboratories, Inc.

For built-up girders larger than may be accommodated with the standard sizes of shoe tile, a combination of angle and soffit tiles are used. The soffit pieces are usually cut to fit on the job from Pyrobar partition tile.

Shoe tile are machine moulded in a double unit 18 in. long and are easily split by the mason into the two individual units. The advantages of the double unit are less breakage, easier and less expensive to handle and the protection afforded the inner edges. The large light weight units facilitate rapid handling and decrease setting costs, require a minimum of mortar and a minimum of labor to place. The true, protected inside faces will be found to fit closely around the beam and girder flanges.

Fireproofing Efficiency

Authorities recognize that fireproofing the building members carrying the load is essentially a matter of insulating them from the effect of high temperatures. Steel commences to lose its strength at about 800° F. and the importance of an insulative fireproofing material cannot be over estimated.

Pyrobar gypsum tile do not burn or support combustion. Their low coefficient of conductivity will not permit the passage of heat sufficient to ignite inflammable materials on the side away from the fire. They will not expand sufficiently under actual fire conditions to cause warping, bulging, buckling and disruption of the structure in which they are a part.

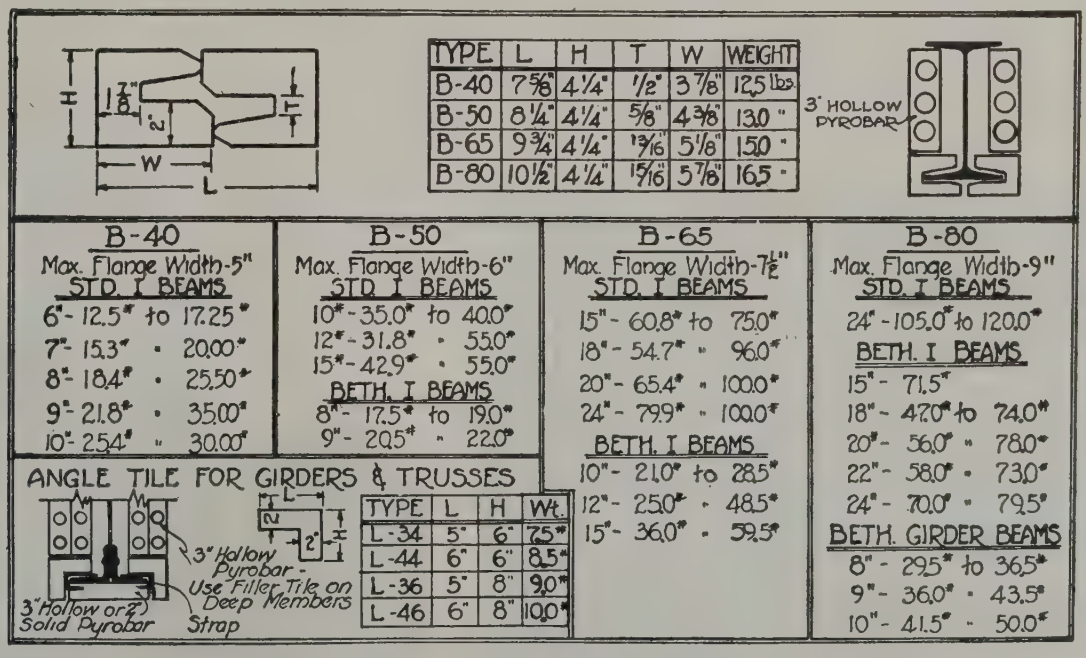
The tests of the Bureau of Standards and Underwriters Laboratories, Inc., definitely show, and their reports state, that *with gypsum fireproofing the maximum temperature in the steel was much lower than those obtained in comparable tests with other covering materials.**

Specifications for Pyrobar Gypsum Beam, Column and Girder Fireproofing

Girder and Truss Covering—All girders, beams and trusses, unless otherwise specified, shall be covered with Pyrobar Beam Shoe, or Angle and Soffit Tile in accordance with the standards of the United States Gypsum Company.

Mortar and Laying—See specification for mortar and laying Pyrobar Tile on preceding page.

*Digest of report giving comparable tests on clay tile, concrete and gypsum fireproofing available upon request.



Weights and Sizes of Pyrobar Beam and Girder Fireproofing

Per lineal foot of tile

New series Carnegie and Bethlehem Beam Section with a flange width of not over 9 in. can be fireproofed with the type of shoe tile corresponding to the flange width

UNITED STATES GYPSUM COMPANY

Manufacturers of Structolite Tile; Structolite Cement

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see page A182

Products

STRUCTOLITE LOAD-BEARING TILE; STRUCTOLITE CEMENT.

For Acoustical Plaster, see page A23.

For Sound Insulation, see pages A24-25.

For Reinforced Roof Tile; Monolithic Roof and Floor Construction, see pages A182-183.

For Pyrobar Partition and Furring Tile; Beam and Column Covering, see pages A430-431.

For Fireproof Wallboard, see page B1621.

For Fireproof Sheathing, see page B1624.

For Dry Fill Insulation, see page B1668.

For Fireproof Lath, see page B1731.

For Gypsum Plaster and Finishes, see pages B1763-1765.

For Colored Finish Plaster, see page B1770.

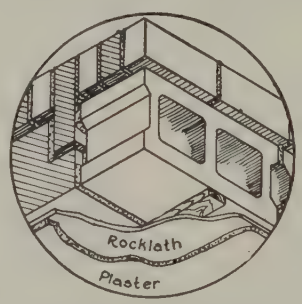
For Exterior Stucco, see page B1780.

For Plastic Paint, see page B2135.

STRUCTOLITE

Reg. U. S. Pat. Off.

Insulating Load-Bearing Tile
Quick Set, Light Weight Cement



Wall Section Showing Structolite Load Bearing Tile with Brick Exterior

Structolite Tile

Description—Structolite Tile are a fireproof, load bearing tile. They are manufactured of neat Structolite cement, without aggregates, are easily cut, and can be readily nailed into. Standard sizes are 8x16-in. face, with 6 and 8-in. thickness and 8x12-in. face with 4-in. thickness. All sizes are available in bond tile for backing up brickwork. The 8-in. unit weighs about 25 lb., the 6-in. about 20 lb., and the 4-in. about 12 lb. This light weight combined with their smooth surface makes them particularly easy to handle. Manufactured completely under the careful supervision of the United States Gypsum Company, they are uniform in size, shape, strength and quality.

Insulation—Insulation is an outstanding feature in walls of Structolite Tile construction.

Based on tests made by Peebles of Armour Institute and values from A. S. of H. V. E. Guide, the heat transmitted per square foot per hour, per degree difference Fahrenheit, through Structolite walls has been calculated as follows:

6 in. Structolite Tile, furred, lath and plastered, stuccoed over paper backed mesh	.165 B.t.u.
8 in. Structolite Tile, same as above	.154 B.t.u.
4 in. brick face, 1½ in. air space, 4 in. Structolite Tile (9½ in. wall) furred, lathed and plastered	.133 B.t.u.
6 in. clay tile, furred, lathed and plastered, stucco on the outside	.202 B.t.u.
8 in. clay tile, same as above	.190 B.t.u.
8 in. solid brick, plastered	.332 B.t.u.
8 in. solid brick, furred, lathed and plastered	.215 B.t.u.
Brick veneer over frame, not insulated, lathed and plastered	.216 B.t.u.

Fireproofness—Structolite Tile do not burn, will not transmit heat at high temperatures, and do not expand or contract under the action of the fire.

Adaptability—Structolite Tile are readily cut with a saw, or a mason's trowel. They are adaptable to any type of construction. Fewer shapes and sizes are required, decreasing the handling and erection costs. Manufactured from gypsum rock by a special process, Structolite develops a strength of 2000 lb. per sq. in., more than ample for exterior load bearing wall requirements.

Exterior Finishes—Exterior finishes may be of brick, stucco, stone or siding as the cost and appearance of the building requires. Practically any type of architectural finish can be applied easily and economically.

Value—Structolite Tile are economical to use. They result in better construction; are fireproof, and result in no added cost over types of masonry or combustible construction with special insulation.

Structolite Cement for Fireproof Slab Construction, Sleeper Fill, Fireproof Wall, and Fireproofing Structural Steel

Structolite Concrete—A mixture of "Structolite Cement" with a coarse aggregate of stone, gravel, blast furnace slag, or similar material, and sand.

Structolite cement is mixed on the job with water and the aggregate in a concrete mixer and poured into place similar to ordinary portland cement concrete.

Structolite concrete is being used for floor and roof slabs over steel joists, sleeper fills, saddle fills, fireproofing structural steel, and fireproof walls in apartments and residences. Its economy for these purposes is a strong argument for its use. The light weight of Structolite saves steel. Its quick set speeds construction. When the usual precautions of heating the mixing water, and removing the frost from the aggregates are employed, the Structolite concrete will set before it freezes, at working temperature.

Details, Booklets, Service

Details illustrating the use of the above products, and further descriptive literature are available on request.

Our Engineering Department will give prompt attention to special details or designs involving the use of Structolite Tile and Structolite cement. This service is free and you are invited to avail yourself of its use.

Structolite Tile in Residence Construction

Pouring Structolite Concrete Sleeper Fill

CERTAIN-TEED PRODUCTS CORPORATION

ROOFING DIVISION

Manufacturers of Roll Roofing, Felts, Building Papers and Asphalt Coatings

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752

ROOFING DIVISION PLANTS

ALBANY, N. Y. ANDERSON, IND. CHICAGO, ILL. EAST ST. LOUIS, ILL. KANSAS CITY, MO.
MARSEILLES, ILL. NIAGARA FALLS, N. Y. RICHMOND, CALIF. YORK, PA.

Products

CERTAIN-TEED SMOOTH SURFACE and SLATE SURFACED ROLL ROOFING.

CERTAIN-TEED ASPHALT FELT and DEADENING FELTS.

CERTAIN-TEED INSULATION and SHEATHING PAPERS.

CERTAIN-TEED ASPHALT ROOF COATING.

CERTAIN-TEED PLASTIC CEMENT.

CERTAIN-TEED ASBESTOS ROOF COATING.

TRADE-MARK

Index to Products Listed Under Other Classifications

For Asbestos Shingles, see pages A474-475.
For Asphalt Shingles, see page A479.
For Built-up Roofing, see pages A448-451.
For Decorative Panels (Asbestos), see pages C3770-3771.
For Gypsum Lath, see pages B1726-1727.
For Gypsum Partition Tile, see pages A422-423.
For Gypsum Plasters, see pages B1752-1758.
For Gypsum Wall Board, see pages B1618-1619.
For Fibre and Insulating Boards, see pages B1594-1595.
For Linoleum, see pages B1926-1928.
For Paint and Varnish, see pages B2044-2046.
For Reinforced Gypsum Roof Tile, see page A174.

Certain-teed Highest Quality Roofing Products

Nothing is omitted which can safeguard the quality of Certain-teed products. They are manufactured according to tried and proved formulas under the watchful supervision of experts. Only the best materials are used and each is carefully tested to make certain that it is of the required quality. You can rely on products bearing the Certain-teed label—it is a sure guide to satisfaction.

There is a Certain-teed roofing for every type of building—from temporary shelters to the most expensive structures. For built-up roofs of Certain-teed roofing, felts and asphalt see page A448.

Facilities and Distribution

Certain-teed products are handled by jobbers and dealers throughout the United States and in principal countries throughout the world.

Certain-teed Smooth Surface Roll Roofing

Certain-teed roofing is a first grade product manufactured by the CERTAIN-TEED PRODUCTS CORPORATION. Millions of squares are giving satisfactory service in all parts of the world under all conditions—from the extreme cold of the northern frontiers to the intense heat of the tropics.

There are many large important buildings throughout the world that are sheltered by Certain-teed roofs. Certain-teed was the choice for the roofs of the Pullman shops, the General Motors Company at St. Louis, Mo., etc.

Owners, architects and builders of such roof areas as these insist upon knowing before it is laid that the roofing will give long years of protection. They can rely on Certain-teed, the highest quality possible to manufacture, as long years of service and world-wide use have proved.

Put up in rolls of 108 sq. ft. Nails and cement are enclosed in the roll. Packed one square per roll—enough to cover 100 sq. ft. of roof surface with 8 sq. ft. for laps.

No. 1, light, about 35 lb. per square, guaranteed 5 years.
No. 2, medium, about 45 lb. per square, guaranteed 10 years.
No. 3, heavy, about 55 lb. per square, guaranteed 15 years.
No. 4, extra heavy, about 65 lb. per square, guaranteed 15 years.

Certain-teed Slate Surfaced Roll Roofing

Made from the same high grade felt used in Certain-teed smooth surfaced roofing. Surfaced with non-fading red, green, blue-black and color blend crushed slate. It is widely used on residences, bungalows, garages, etc., where a decorative roof at minimum expense is desired. Guaranteed ten years.

Put up in rolls of 108 sq. ft. Weight 85 to 90 lb.

Certain-teed Asphalt Felt

It is used extensively under slate, tile, asbestos shingles and other roofing materials requiring a waterproof sheathing or liner. It is extensively used for all sheathing and insulating purposes as it is absolutely waterproof and verminproof. It is also preferable to tarred felt as the felt layer in built-up roofs. It has the advantage of longer life than tarred felt.

Certain-teed asphalt felt is made in the following weights:

No. 15, 432 sq. ft., about 65 lb. per roll.
No. 30, 216 sq. ft., about 60 lb. per roll.

Certain-teed Insulating Paper

For insulating and sheathing against heat, cold, sound or moisture. A product superior to ordinary sheathing paper which is not moisture-proof, tarred saturated paper, etc. Saturated and coated; jet black and has a glossy finish. Waterproof and verminproof. When used for house lining, between double floors, etc., it saves fuel in winter and keeps out heat in summer. Used for residences, stores and industrial structures. Also used for refrigerator linings in dairies, refrigerators and icehouses and for packing cases, etc.

Furnished 36 in. wide, in rolls containing, approximately, 500 sq. ft. Made in two weights: Medium, about 35 lb. per roll; Heavy, about 50 lb. per roll.

Certain-teed Sheathing Paper

An inexpensive, non-waterproof sheathing paper used as a liner under clapboards, shingles, siding, etc. Put up in rolls 36 in. wide of approximately 500 sq. ft. in the following weights:

No. 20 about 20 lb.; No. 25 about 25 lb.; No. 30 about 30 lb.; No. 35 about 35 lb.; No. 40 about 40 lb.

Certain-teed Deadening Felt

A thick felt for laying between double floors and in walls for insulating against sound, heat and cold. It is made in 50 yard rolls 36 in. wide in the following weights:

No. 40, about 40 lb. to roll.
No. 50, about 50 lb. to roll.
No. 75, about 75 lb. to roll.

Certain-teed Asphalt Roof Coating

For re-saturating asphalt roofing (smooth surfaced). Renews the life of the roofing and, if applied at intervals of from three to five years, will preserve the roofing almost indefinitely. For waterproofing exterior of basement walls. Cellar walls may be waterproofed by applying the coating on the outside of the walls below grade. The walls should be free from dirt or other foreign substance before applying.

AMERICAN TAR PRODUCTS COMPANY

Coal Tar Products for Roofing, Waterproofing, Wood Preserving and Paving

GENERAL OFFICES
Union Trust Building, PITTSBURGH, PA.

CHICAGO OFFICE, Peoples Gas Building

PLANTS
MILWAUKEE, WIS. CHICAGO, ILL. ST. LOUIS, MO. BIRMINGHAM, ALA. FOLLANSBEE, W. VA.
YOUNGSTOWN, OHIO UTICA, N. Y. PROVIDENCE, R. I. JERSEY CITY, N. J.

ATP Products

ATP Roofs, with or without 20-year or 10-year guarantee bonds.

ATP Old Style Pitch (Underwriters' Label) for built-up roofing.

ATP Approved Tarred Felt (Underwriters' Label), weight 15 lb. per 100 sq. ft., for built-up roofing.

ATP No. 3 Tarred Felt, weight 13 lb. per 100 sq. ft., for built-up roofing.

ATP Waterproofing Pitch for membrane waterproofing or damp-proofing.

ATP Damp-proofing Paint, for cold applications.

ATP High Penetration waterproofing materials.

ATP Sub-floor Tar, prepared to protect wooden floor against vermin, decay and dampness. Can be used over concrete (Grade 2) or over cinders or natural earth (Grade 2 with top coat of Grade 1).

ATP Roof Cements; Fiber Coatings; Metal Paint; Wood Preserver, etc.

Features of the ATP Roof

An ATP Roof is a long-lived, low-cost roof built of pure coal-tar-pitch and the highest grade of tarred felt, armored on top with gravel or slag. It withstands the severest weather conditions for 20, 30—even 40 years, and takes Class A rating of Underwriters.

ATP Roofs are available with or without a 10 or 20-year guarantee bond. Whether bonded or not, any ATP Roof is identical—the materials and specifications are the same. There is a flat charge per square for the bond.

See "Specifications for ATP Roofs"—A.I.A. File 12b11.

Why You Should Specify an ATP Roof

The American Railway Engineering Association and the American Railway Bridge & Building Association, after a very thorough investigation, recommended to their members the use of coal-tar-pitch and gravel-surfaced roofs in preference to other types of roofs that are applicable to a flat surface. Gravel or slag absorbs the action of the elements, allowing the waterproofing material to carry on only one function, that of waterproofing. On roofs without a surfacing material, the waterproofing material must absorb the action of the elements, thus shortening the life of the roof.

The expansion and contraction of the roof under the influence of heat and cold, and movement of the deck, have a serious effect upon a roof unless the materials have high ductility. On ATP Roofs it is not necessary to use a heavy bottom ply of felt to keep the bitumen from cracking. Pitch has much greater ductility than other roofing materials.

A coal-tar-pitch roof will heal itself at the first warm weather. This is one of the distinctive qualities of pitch; it welds itself and seals up any minor cuts, tears or cracks.

ATP Approved Tarred Felt is made from the best quality of dry felt. It is saturated with a pure dehydrated coal tar, thus insuring a uniform finished product of maximum lasting qualities. The felt is thoroughly seasoned before shipment.

ATP ROOFS

ATP WATERPROOFING

ATP Old Style Pitch is distilled from pure coal tar and positively contains no asphalt. Its uniformity is assured by a large supply of crude tar.

Both of these materials are the result of many years' experience and much research. Both are listed by the Underwriters and meet all standard specifications and requirements, such as U. S. Government Master Specifications.

How to Specify an ATP Roof

Choose the type of roof that you wish from one of the fourteen specifications for ATP Roofs:

5-Ply Over Boards
4-Ply Over Poured Concrete
4-Ply Over Precast Concrete
4-Ply Over Precast Gypsum
4-Ply Over Book Tile
4-Ply Over Poured Gypsum
5-Ply Over Precast Gypsum
4-Ply Over Level Surface
4-Ply Over Boards
3-Ply Over Poured Concrete
3-Ply Over Precast Concrete
3-Ply Over Poured Gypsum
3-Ply Over Book Tile
5-Ply Over Concrete Under Promenade Tile Surface

This entire set of specifications is printed by the American Tar Products Company *and if there is not a copy in your A.I.A. File 12b11, one will be mailed to you.*

Suppose you choose a four-ply roof over a poured concrete deck. Simply specify "ATP Roof, 4-ply over poured concrete." If you want a 20-year guarantee bond, just add to your specifications, "The roofing contractor must furnish an ATP 20-year Guarantee Bond." Or a more simple form is, "ATP Roof, 4-ply over poured concrete, with bond." You will find a brief form of specification in the book of specifications above referred to.

Specifying in this manner insures long and dependable service and lowest last cost.

For equality in specifications, place any 3-ply ATP Roof over concrete, tile or gypsum equal to *any* smooth surface roof.

Specifications for ATP Roofs

The specifications that are recommended above are standard specifications and have been in use for many years by most architects and roofing contractors.

The following are the more commonly used roofing specifications:

5-Ply Over Boards

Deck—The roof deck shall be clean, smooth, free from knotholes, large cracks, and loose boards. The lumber shall be seasoned. If the roof deck is inclined, it shall be properly graded to the outlets. In such cases, the incline shall not exceed two (2) inches to the foot.

Materials—There shall be used one (1) thickness of unsaturated felt or sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, and five (5) thicknesses of ATP Approved Tarred Felt weighing not less than fourteen (14) pounds per one hundred (100) square feet, single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than one hundred and fifty (150) pounds of ATP Old Style Pitch and not less than four hundred (400) pounds of gravel, or three

Continued on next page

hundred (300) pounds of slag, from one-fourth (¼) to five-eighths (⅝) inch in size. The gravel and slag shall be dry and free from dirt. The ATP Old Style Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Application—The material shall be applied as follows:

Lay one thickness of unsaturated felt or sheathing paper, lapping each sheet one (1) inch over the preceding one.

Lay over the entire surface two (2) full thicknesses of ATP Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding one. Nail as often as may be necessary to hold the sheets in place until the remaining felt is laid. The ATP Approved Tarred Felt shall be laid without wrinkles or buckles.

Apply over the entire surface a uniform coating of ATP Old Style Pitch.

Lay over the entire surface three (3) full thicknesses of ATP Approved Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding one and mopping with ATP Old Style Pitch the full width of the twenty-two (22) inch lap, so that in no place shall felt touch felt. All nails shall be covered by not less than two (2) plies of ATP Approved Tarred Felt.

Pour over the entire surface a uniform coating of ATP Old Style Pitch into which, while hot, embed gravel or slag.

Bond—If an ATP 20-Year Guarantee Bond is required, the roof shall be inspected by an authorized ATP Inspector who shall cut the roof as he considers necessary. Such cuts shall be made before any slag or gravel is applied.

BRIEF FORM OF SPECIFICATION

The roof shall be an ATP Roof, 5-ply over boards, applied according to "Specifications for ATP Roofs."

(Where bond is required, add this sentence.)

An ATP 20-Year Guarantee Bond shall be furnished by the roofing contractor.

4-Ply Over Poured Concrete

Deck—The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined, it shall be properly graded to the outlets. In such cases, the incline shall not exceed one (1) inch to the foot.

Materials—There shall be used four (4) thicknesses of ATP Approved Tarred Felt, weighing not less than fourteen (14) pounds per hundred (100) square feet, single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than two hundred (200) pounds of ATP Old Style Pitch and not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag from one-fourth (¼) to five-eighths (⅝) inch in size. The gravel and slag shall be dry and free from dirt. The ATP Old Style Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Application—The material shall be applied as follows:

Apply a uniform coating of ATP Old Style Pitch to the concrete.

Lay over the entire surface four (4) full thicknesses of ATP Approved Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over the preceding one, mopping with ATP Old Style Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt. The ATP Approved Tarred Felt shall be laid without wrinkles or buckles.

Pour over the entire surface a uniform coating of ATP Old Style Pitch, into which, while hot, embed gravel or slag.

Bond—If an ATP 20-Year Guarantee Bond is required, the roof shall be inspected by an authorized ATP Inspector who shall cut the roof as he considers necessary. Such cuts shall be made before any slag or gravel is applied.

BRIEF FORM OF SPECIFICATION

The roof shall be an ATP Roof, 4-ply over poured concrete, applied according to "Specifications for ATP Roofs."

(Where bond is required, add this sentence.)

An ATP 20-Year Guarantee Bond shall be furnished by the roofing contractor.

4-Ply Over Boards

Deck—The roof deck shall be clean, smooth, free from knotholes, large cracks and loose boards. The lumber shall be seasoned. If the roof deck is inclined it shall be properly graded to the outlets. In such cases, the incline shall not exceed two (2) inches to the foot.

Materials—There shall be used one (1) thickness of unsaturated felt or sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet, and four (4) thicknesses of ATP Approved Tarred Felt weighing not less than fourteen (14) pounds per hundred (100) square feet, single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than one hundred and twenty-five (125) pounds of ATP Old Style Pitch and not less than four hundred (400) pounds of gravel, or three hundred (300) pounds of slag from one-fourth (¼) to five-eighths (⅝) inch in size. The gravel and slag shall be dry and free from dirt. The ATP Old Style Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Application—The material shall be applied as follows:

One (1) thickness of unsaturated felt or sheathing paper shall be laid, lapping each sheet one (1) inch over the preceding one.

Lay over the entire surface two (2) full thicknesses of ATP Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding one. Nail as often as may be necessary to hold the sheets until the remaining felt is laid. The ATP Approved Tarred Felt shall be laid without wrinkles or buckles.

Apply a uniform coating of ATP Old Style Pitch.

Lay over the entire surface two (2) full thicknesses of ATP Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding one and mopping with ATP Old Style Pitch the full width of the seventeen (17) inch lap so that in no place shall felt touch felt. All nails shall be covered by not less than one (1) ply of ATP Approved Tarred Felt.

Pour over the entire surface a uniform coating of ATP Old Style Pitch, into which, while hot, embed gravel or slag.

Bond—If an ATP 10-Year Guarantee Bond is required, the roof shall be inspected by an authorized ATP Inspector who shall cut the roof as he considers necessary. Such cut shall be made before any slag or gravel is applied.

BRIEF FORM OF SPECIFICATION

The roof shall be an ATP Roof, 4-ply over boards, applied according to "Specifications for ATP Roofs."

(Where bond is required, add this sentence.)

An ATP 10-Year Guarantee Bond shall be furnished by the roofing contractor.

3-Ply Over Poured Concrete

Deck—The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined, it shall be properly graded to the outlets. In such cases, the incline shall not exceed one (1) inch to the foot.

Materials—There shall be used three (3) thicknesses of ATP Approved Tarred Felt, weighing not less than fourteen (14) pounds per hundred (100) square feet, single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than one hundred and seventy-five (175) pounds of ATP Old Style Pitch and not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag from one-fourth (¼) to five-eighths (⅝) inch in size. The gravel and slag shall be dry and free from dirt. The ATP Old Style Pitch shall not be heated above four hundred (400) degrees Fahrenheit.

Application—The material shall be applied as follows:

Apply a uniform coating of ATP Old Style Pitch to the concrete.

Lay over the entire surface three (3) full thicknesses of ATP Approved Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding one, mopping with ATP Old Style Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt. The ATP Approved Tarred Felt shall be laid without wrinkles or buckles.

Pour over the entire surface a uniform coating of ATP Old Style Pitch, into which, while hot, embed gravel or slag.

Bond—If an ATP 10-Year Guarantee Bond is required, the roof shall be inspected by an authorized ATP Inspector who shall cut the roof as he considers necessary. Such cuts shall be made before any slag or gravel is applied.

BRIEF FORM OF SPECIFICATION

The roof shall be an ATP Roof, 3-ply over poured concrete, applied according to "Specifications for ATP Roofs."

(Where bond is required, add this sentence.)

An ATP 10-Year Guarantee Bond shall be furnished by the roofing contractor.

Note: The above specifications are printed in book form by the AMERICAN TAR PRODUCTS COMPANY, and if there is not a copy in your file, A.I.A. 12b11, one will be mailed free, upon request.

ATP Waterproofing

Waterproofing may be classified into (a) Membrane waterproofing; (b) Non-membrane Waterproofing; (c) Integral Waterproofing.

Membrane waterproofing is for surfaces which will be so protected that the membrane will not be punctured. ATP Membrane waterproofing consists of alternate layers of ATP Approved Tarred Felt and ATP Old Style Pitch. Specifications on request. Integral waterproofing does not come within the scope of this discussion. Non-membrane waterproofing consists of the application of various substances to the surface to be waterproofed, and ATP Dampproofing Paint and ATP High-Penetration Waterproofing come in this classification.

ATP High-Penetration Waterproofing is a low cost, deep-penetration method of waterproofing. Specifications on request.

THE BARRETT COMPANY

Manufacturers of Roofing Materials

FAIRFIELD, ALA. CHICAGO, ILL. NEW YORK, N. Y. MINNEAPOLIS, MINN.
BOSTON, MASS. SALT LAKE CITY, UTAH KANSAS CITY, MO. PHILADELPHIA, PA.

THE BARRETT COMPANY, LIMITED, MONTREAL, QUE.

Products

ROOFING MATERIALS:

For flat surfaces: BARRETT SPECIFICATION PITCH and BARRETT SPECIFICATION FELT; BLACK DIAMOND PITCH and BLACK DIAMOND FELT. For detailed specifications see Volume I, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

For steep surfaces: BARRETT SPECIFICATION FELT, BARRETT SPECIFICATION PITCH, ANCHOR ASPHALT, and S. I. S. ROOFING. For detailed specifications see Volume II, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

Waterproofing:

For foundations, reservoirs, swimming pools, subways, tunnels, floors, etc., special specifications submitted.

Insulating and Building Papers:

For sheathing, lining, etc.

Dampproofing and Preservative Paints, Wood Preservatives, Flooring.

For Flashings for Brick and Concrete Walls, see page A550, also Volume III, Barrett Architects' and Engineers' Built-Up Roofing Reference Series; for Roof Leader and Roof-Vent Connections, see page C2769, also Volume IV, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

The Barrett Specification Roof

A roof that is guaranteed by a twenty-year or ten-year surety bond, as desired.

A roof that passes the most rigid inspection.

A roof that is scientifically and mechanically correct in every detail.

A roof that contains more than twice as much actual waterproofing material as is generally used in other built-up roofing.

A roof that has a wearing surface which resists all sorts of abuse and the most severe weather conditions.

A roof that is fire retardant; it carries Class "A" rating by the Underwriters' Laboratories, Inc.

A roof that takes the base-rate of fire insurance.

A roof that needs no repairs or paint.

A roof that costs less per year of service than any other roofing suitable for flat surfaces.

The Guaranty Bond

A 20-year Guaranty Bond is offered on Barrett Specification Type "AA" Roofs and a 10-year Guaranty Bond on Barrett Specification Type "A" Roofs by THE BARRETT COMPANY without charge in accordance with Note 1 of The Barrett Specifications hereinafter printed. Guarantees and bonds do not keep out water, but The Barrett Guaranty Bond differs from every other roofing guarantee or bond, in that this Company does not apply the roof and has no contractor's profit as a motive for cheapening the roofing. When applied by experienced and reliable roofing contractors, and carefully inspected by competent inspectors, Barrett Specification Roofs applied in accordance with the specifications are just as economical and serviceable without the bond as with it.

The Barrett Company TRADE-MARK

Barrett Specification Roofs TRADE-MARK

THE BARRETT COMPANY has prepared an inspection manual, known as "Requirements Covering Application and Inspection of Barrett Specification Roofs," for use by architects, engineers, and owners where the Company's inspection service is not available.

The Barrett Specification, Type "AA" Roof—for Use over Board Sheathing—5 Plies

Bonded for 20 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt.

Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of felt.

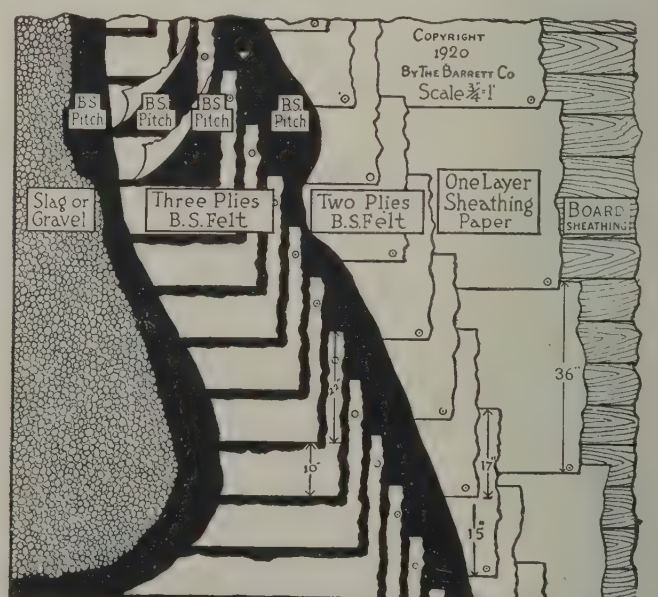


Diagram Showing Barrett Specification, Type "AA" Roof Over Boards
Bonded for 20 years

Continued on next page

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of Specification Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by The Barrett Company. He shall furnish The Barrett Company's Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Co., of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

20-year Guaranty Bond—*Note No. 1*—The Barrett Company will give its 20-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by The Barrett Company, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "AA," laid in accordance with The Barrett Specification (for use over Board Sheathing) by a roofing contractor approved by The Barrett Company. The roofing contractor shall furnish The Barrett Company's Surety Bond Guaranty for twenty (20) years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "AA" Roof—for Use over Concrete—4 Plies

Bonded for 20 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay four (4) plies of Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Specification Pitch the full twenty-four and one-half (24½) inches on each sheet, so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry, and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by The Barrett Company. He shall furnish The Barrett Company's Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

20-year Guaranty Bond—*Note No. 1*—The Barrett Company will give its 20-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by The Barrett Company, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "AA," laid in accordance with The Barrett Specification (for use over Concrete) by a roofing contractor approved by The Barrett Company. The roofing contractor shall furnish The Barrett Company's Surety Bond Guaranty for twenty (20) years, in accordance with Note No. 1 of said Specification.

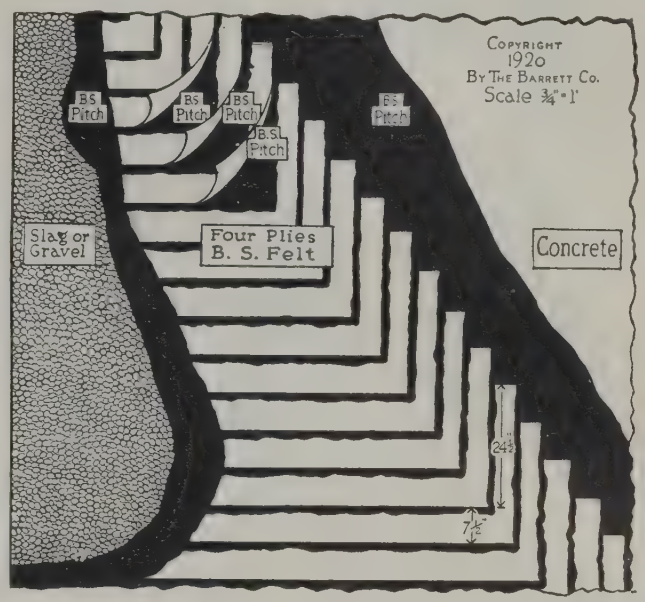


Diagram Showing Barrett Specification, Type "AA" Roof Over Concrete
Bonded for 20 years

The Barrett Specification, Type "A" Roof—for Use over Board Sheathing—4 Plies

Bonded for 10 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Specification Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than one (1) ply of felt.

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt.

Continued on next page

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and twenty-five (125) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

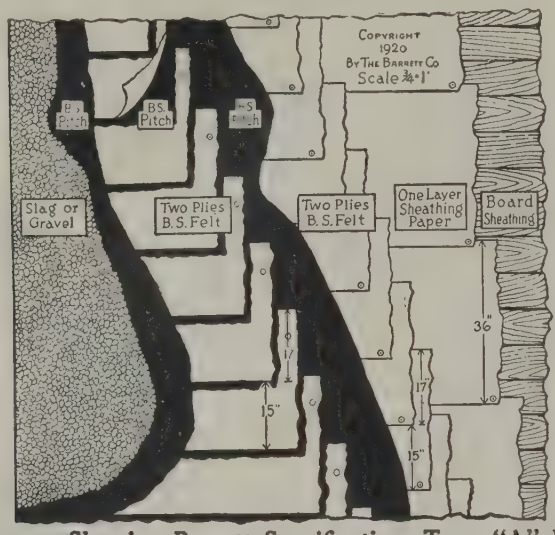


Diagram Showing Barrett Specification, Type "A" Roof Over Boards
Bonded for 10 years

10-year Guaranty—*Note No. 1*—THE BARRETT COMPANY will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "A," laid in accordance with The Barrett Specification (for use over Board Sheathing) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for ten (10) years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "A" Roof—for Use over Concrete—3 Plies

Bonded for 10 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry, and free from dirt.

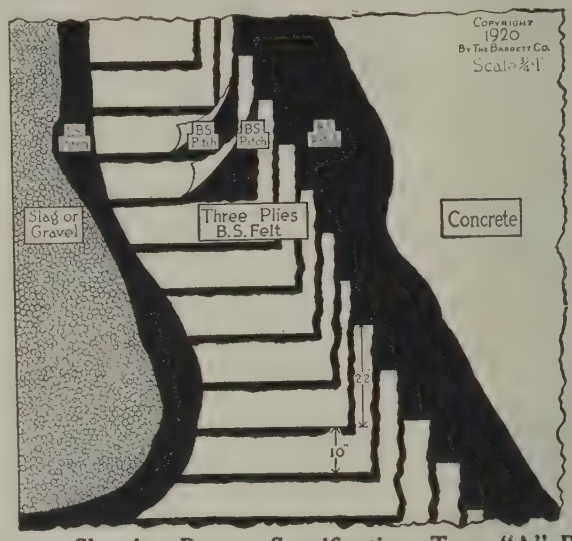


Diagram Showing Barrett Specification, Type "A" Roof Over Concrete
Bonded for 10 years

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and seventy-five (175) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

10-year Guaranty Bond—*Note No. 1*—THE BARRETT COMPANY will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "A," laid in accordance with The Barrett Specification (for use over Concrete) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S SURETY Bond Guaranty for ten (10) years, in accordance with Note No. 1 of said Specification.

Roofing for Steep Surfaces

Barrett built-up steep roofing specifications for sawtooth, monitor, umbrella, butterfly, hopper, plain hip, and other types of steep roof construction. Bonded for 10 years when applied in accordance with Note No. 1 in Volume II, Architects' and Engineers' Built-up Roofing Reference Series.

THE FLINTKOTE COMPANY

Manufacturers of Asphalt Roofing Products

609 Park Square Building

BOSTON, MASS.

BRANCH OFFICES

NEW YORK, N. Y. CHICAGO, ILL. NEW ORLEANS, LA. CINCINNATI, OHIO ATLANTA, GA. DALLAS, TEX.

Products

FLINTKOTE CERTIFIED FELT—Rexalt Saturated.
REXALT COMPOUND.
FLINTKOTE CONCRETE PRIMER.
REX FLINTOKE CAP SHEET.

Also other Asphalt Shingles, Roll Roofings and Building Papers, Asphalt Paints, Plastics and Emulsions.

For Thick Butt Shingles, see page A484; for Anaconda Copperclad Shingles, see page A506.

TRADE-MARK

Rexalt Constructed Roofs

Rexalt Constructed Roofs are built-up roofs of the highest type. In them are combined high quality materials in the proper proportions to insure long years of hard service under the most severe climatic conditions.

These roofs are suitable for use over concrete, gypsum or wood decks of flat, steep or sawtooth construction.

Specification Data

General

The felt in every case shall be Flintkote Certified Felt—Rexalt Saturated, either 15 or 30 lb. per 100 sq. ft., as indicated below.

The membrane shall be Rexalt Compound, brought to the job in the manufacturers' original container and should be heated to a temperature of not more than 375° F.

A thermometer must be used as all bituminous materials are easily destroyed by overheating.

On concrete or gypsum decks Flintkote Concrete Primer shall be used.

If desired, Rex Flintkote Cap Sheet may be used as an additional layer.

Rexalt Constructed Roofs Over Board Decks—Bills of Material Per Square

Medium Grade

2 layers Rexalt Compound (6 gal.)
1 layer 30-lb. Felt (½ roll—108 sq. ft.)
1 layer 15-lb. Felt (¼ roll—108 sq. ft.)

Standard Grade

3 layers Rexalt Compound (9 gal.)
1 layer 30-lb. Felt (½ roll—108 sq. ft.)
2 layers 15-lb. Felt (½ roll—216 sq. ft.)

Super Grade

4 layers Rexalt Compound (12 gal.)
5 layers 15-lb. Felt (1¼ rolls—540 sq. ft.)

Methods of Construction

The deck must be swept clean and free of all debris. Felt should be unwound and laid opposite to the roll. Each successive layer of felt and the entire final surface is to be mopped with a uniform coating of Rexalt Compound.

Fire walls and parapet walls are to be mopped with a heavy coat of hot Rexalt Compound.

Medium Grade

(1) Cover entire surface with one layer of 30-lb. felt lapped 2 in. and securely nailed at the lap every 6 in.

(2) Cover entire surface with Rexalt Compound using approximately 3 gallons per 100 sq. ft.

(3) Embed in the hot Rexalt Compound one layer of 15-lb. felt, lapping not less than 2 in.

(4) Cover entire surface with final coating of Rexalt Compound.

Standard Grade

(1) Cover entire surface with one layer of 30-lb. felt lapped 2 in. and securely nailed at the lap every 6 in.

(2) Cover entire surface with Rexalt Compound using approximately 3 gallons per 100 sq. ft.

(3) Embed in the hot Rexalt Compound two layers of 15-lb. felt, lapping each layer 19 in. over the preceding layer, mopping between the layers a heavy coating of Rexalt Compound.

(4) Cover entire surface with final coating of Rexalt Compound.

Super Grade

(1) Cover entire surface with two layers of felt lapping 19 in. and nailing at the lap every 12 in.

(2) Cover these layers of felt with Rexalt Compound.

(3) Embed in the hot Rexalt Compound three layers of felt, lapping each layer 24 in. over the preceding layer, mopping between the layers a heavy coating of Rexalt Compound.

(4) Cover entire surface with final coating of Rexalt Compound.

Rexalt Constructed Roofs Over Concrete or Gypsum Decks—Bills of Material Per Square

Method of construction of these roofs is identical with that of roofs over board decks except that concrete primer and one coating of Rexalt Compound are applied before the first layer of felt, and that instead of the laps being nailed they are sealed with Rexalt Compound.

Medium Grade

1 layer Concrete Primer (1 gal.) and
1 layer Rexalt Compound (3 gal.)
in addition to materials for use over board decks.

Standard Grade

1 layer Concrete Primer (1 gal.) and
1 layer Rexalt Compound (3 gal.)
in addition to materials for use over board decks.

Super Grade

1 layer Concrete Primer (1 gal.) and
2 layers Rexalt Compound (6 gal.)
in addition to materials for use over board decks.

THE PHILIP CAREY COMPANY

Manufacturers of Built-up Roofing

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products and Services

CAREY BUILT-UP ROOFS.

CAREY FELTS for Waterproofing, Weatherproofing and Roofing Purposes.

CAREY ASPHALT PITCH.

Also Roll Roofing.

Contracts taken to furnish and apply Carey Built-up Roofs in all locations.

For Waterproofing and Dampproofing material, see pages A62-64.

For Asbestos-Cement Shingles, Roofing, Siding and Wall Board, see pages A472-473.

For Pipe Covering, Boiler Insulation and Refractory Cements, see pages C3222-3223.

Carey PRODUCTS

REG. U.S. PAT. OFF.

TRADE-MARK

Experience and Facilities

Established in 1873, THE PHILIP CAREY COMPANY has furnished millions of squares of roofing, distributed and applied to buildings of every description throughout the world.

The Carey mills are modern, and facilities for handling large business are maintained at a high standard.

Advantages of Carey Built-up Roofs

It is important that architects, builders, engineers and owners know the following advantages of Carey built-up roofs.

(1) They are pliable and are readily adjusted around skylights, chimneys, ventilators, manholes, flashing and all roof irregularities.

(2) They are easy to apply, and are light enough in weight to avoid the necessity of heavy rafter construction.

(3) They are smooth surfaced—requiring no coating of slag.

(4) They can be adapted to any type of roof—flat or steep surface—over wood, tile, concrete, gypsum or steel.

(5) About 85% of the weight consists of genuine asphalt.

(6) They have proved their worth over long years on many of the finest buildings of the country—banks, theaters, industrial buildings, office buildings, apartments, schools, hospitals, department stores, factories, etc.

(7) Carey built-up roofs are built up on the building layer by layer. The materials consist of Carey Fiberock—single sheets of asphalt—impregnated asbestos felt; Feltex—asphalt saturated rag felt; and Carey Manco Asphalt. These materials are manufactured in Carey's own mills, under the supervision of Carey experts.

(8) Asphalt is used exclusively instead of coal tar pitch because it is far superior in its cohesive and binding properties, its enduring flexibility, waterproofing qualities and resistance to temperature changes.

(9) The Carey Branch and Distributor organization covers the country, and the men who apply Carey built-up roofs have back of them fifty years' experience in the manufacture of roofing materials and their application to buildings. They are thoroughly trained in all branches of roofing work, and every roof that they apply is fully guaranteed.

(10) Carey built-up roofs comply with the standards of the Underwriter's Laboratories and are so labeled.

Construction of Carey Asbestos Built-up Roofing

Carey Roofing Materials

Carey felts consist of the best grade of stock, carefully prepared and saturated in asphalt to insure absolute waterproofing protection and permanent flexibility.

Fiberock (Asbestos Asphalt Impregnated Felt)—Used in Carey built-up roof specifications, also for waterproofing and weatherproofing work.

Put up in rolls containing 324 sq. ft.; width 36 in.; weight about 45 lb. per roll.

Feltex (Asphalt Saturated Felt)—Used in Carey built-up roofs, waterproofing and weatherproofing work.

Furnished in rolls containing 432 sq. ft.; width, 36 in.; weight, about 60 lb. per roll.

Manco (Carey Asphalt)—More than forty years' experience in asphalt refining is back of Carey Manco. For roofing purposes no other asphalt has so far equaled its splendid qualities.

Manco is prepared with a high melting point, offering the greatest resistance to high and low temperatures.

Its flexible quality also offers all necessary protection when exposed to ordinary expansion and contraction.

If interested in high grade asphalt, write to this company stating requirements.

Correspondence

Information and advice respecting the adaptability of Carey Roof Specifications to meet any particular requirement, will be furnished on request.

Write for samples and further information.

Selecting the Right Roof

It is highly important, from the standpoint of durability and service, that the architect when preparing his roofing specifications should select materials of lasting quality and insist that laying instructions be strictly followed.

Continued on next page

Before a specification is recommended, information in answer to the following questions must be ascertained: What is the roof surface going to be—concrete, tile, gypsum block or wood sheathing, Is it to be a steep or flat roof? What kind of flashing is to be used? What temperature and atmospheric conditions must the roof withstand? Will it be subjected to fumes, steam, foot or mechanical wear of any kind, sparks, etc.?

With these facts at hand the most dependable type of roof can be selected, and the Carey Built-up Roof Specifications on the following pages will meet practically every condition encountered by the architect.

Key to Carey Built-up Specifications

Underwriters' Laboratory Classification

Over Concrete

Carey Asbestos Built-up Roof Specification 4-ply, for general class of mill and factory construction, surfaces flat or inclined.

Carey Asbestos Built-up Specifications No. 15A designed for use on both flat and steep surfaces, roofing for general type of mill and factory construction.

Carey Built-up Specification No. 15AAA for flat and steep surfaces, extra heavy type of construction for mills, factories, railroad roundhouses, boiler plants, etc.

Carey Built-up Specification No. 18 consisting of nine courses asphalt and rag felt, a roof that will offer maximum protection to the building.

Carey Built-up Roof Specification No. 8 asphalt saturated felt construction for general factory and mill purposes.

Over Wood

Carey Built-up Roof Specification No. 5, asphalt saturated felt construction for flat and steep surfaces, factory and mill constructions, low cost.

Carey Built-up Roof Specification No. 7, asphalt saturated felt roof for flat and steep surfaces, saw tooth, mill and factory construction general use.

Carey Built-up Roof Specification No. 14, asphalt saturated felt construction, flat and steep surfaces, greatest durability and protection for mills, factories, store rooms, business blocks and schools.

Carey Built-up Roof Specification No. 15, flat and steep surfaces, general type of mill and factory construction.

Carey Asbestos Built-up Roof Specification No. 15AA heavy type of asbestos construction for general mill and factory purposes, flat and steep surfaces.

Carey Built-up Roofing Specifications for Various Types of Roofing and Subbases

(For Flashing Details and Specifications See Sixth Page Following)

Specification No. 5

Feltex Built-up Roofing Over Wood Subbase

Note: The following paragraphs under the heading "General" should be inserted at the head of each of the following specifications selected, deleting any paragraph that does not apply to existing conditions.

General—Roof surface is to be prepared and made ready for us for the application of roofing with dry seasoned sheathing boards of uniform thickness, closely laid. All sheathing boards must be surface nailed with at least two nails to each purlin or rafter in addition to blind nailing.

General contractor is to remove or hammer down all projecting nail heads, cover all knot holes and fill in all open places between sheathing boards before the roofing contractor commences the application of the roofing.

Ends of all sheathing boards must terminate on solid rafter or purlin and be securely nailed thereto.

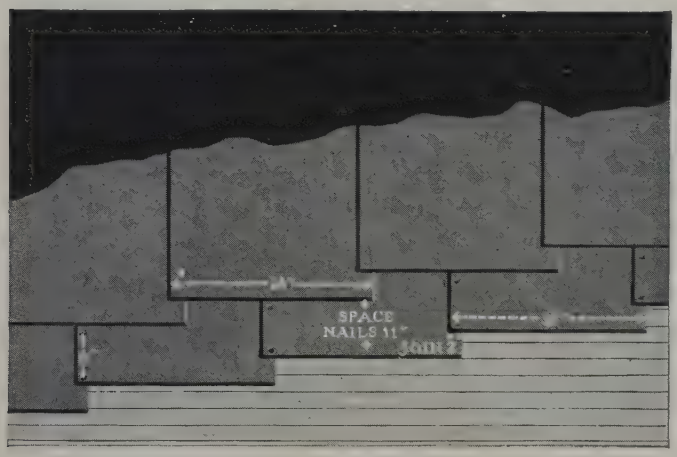
The roof surface shall be swept clean of all chips, nails, rubbish, etc.

General contractor to install cant strips and suitable nailing strips in the wall for flashing. Counterflash all walls with No. 24 or No. 26 gauge galvanized iron, or if preferred, copper may be used. Counterflashing to be firmly attached in the wall with suitable plugs and portland cement.

If counterflashing is furnished by the roofing contractor, both material and labor of installation shall be charged to the acceptor of the proposal as an extra, unless otherwise specifically stated in the proposal.

Work Proposed—This specification contemplates furnishing all materials and labor required to properly apply the roofing and base flashing and line the gutters. (No metal work of any kind is included.)

Sheathing must be dry before applying the roofing.



Application of Carey Feltex Built-up Roof Over Wood Subbase. Specification No. 5

Materials—The materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Feltex (weight 30 lb. per sq.)	30
(b) Carey Manco Asphalt	25
(c) Carey Feltex (weight 15 lb. per sq.)	15
(d) Carey Manco Asphalt	25
(e) Nails ⅞ in.	1

Weight per square, when applied, to be approximately 96 lb.

Application—The roof surface shall be covered with 1 sheet of Carey Feltex, 36 in. wide, weighing about 30 lb. per square. Lap the sheets not less than 2 in. then nail the sheets at the joints with ⅞ in. nails and flat tin caps on 6 in. centers with one additional row of nails and caps spaced 11 in. apart, lengthwise through the center of the sheet. After the 30 lb. Feltex sheet has been completed in accordance with above instructions, proceed to cover the same with 1 layer of Carey Feltex, 36 in. wide and weighing about 15 lb. per square. The 15-lb. sheet to be cemented with Manco Asphalt securely to the 30-lb. sheet, lapping the top sheets not less than 2 in. between the joints of the lower sheet—no nails to be used through the top sheet.

Base sheets shall be laid crosswise of the sheathing boards. The top sheets may be laid crosswise or with the bottom sheets as best suits the type of roof construction.

Gutters—Line all gutters in the same manner as described under "Application."

In certain types of construction it is desirable that all gutters and valleys should be reenforced with an extra sheet of felt, weighing not less than 15 lb. per square, well mopped in with Manco Asphalt. (If this extra reenforcement is required, it is to be charged for as an extra on a time and material basis.)

Note: All concrete or brick walls to be flashed should be primed to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at time of construction—usual size 2 x 4 in., also provide cant strips for bridging angle of wall and roof deck.

Note: Height of flashing, width of cant strips and flashing materials may be regulated to suit height of wall and other conditions prevailing.

Counterflashing—See "General" and refer to details on last page of this catalogue.

Roof Finish—The entire surface of the roof applied shall be mopped with Manco Asphalt, applied hot, and spread to a uniform finish.

Continued on next page

Specification No. 7

Feltex Built-up Roofing Over Wood Subbase

General—(Insert paragraph under heading "General," Specification No. 5.)

Work Proposed—This specification contemplates furnishing all materials and labor required to properly apply the roofing and base flashing, and line the gutters. (No metal work of any kind is included.) Sheathing must be dry before applying the roofing.

Materials—The materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Feltex (weight 30 lb. per sq.)	30
(b) Carey Manco Asphalt	25
(c) Carey Feltex (weight 15 lb. per sq.)	15
(d) Carey Manco Asphalt	25
(e) Carey Feltex (weight 15 lb. per sq.)	15
(f) Carey Manco Asphalt	25
(g) Nails ⅞ in., caps 1 in., ¾ lb.	1¾

Weight per square, when applied, to be approximately 137 lb.

Application—The roof surface shall be covered with sheets of Carey Feltex, 36 in. wide, weighing about 30 lb. per square. Lap the sheets not less than 2 in. then nailing the sheets at the join with ⅞-in. nails and caps on 6-in. centers, with one additional row of nails and caps spaced 11 in. apart lengthwise through the center of sheet.

After the 30-lb. Feltex Sheets have been completed in accordance with the above instructions, proceed to cover the same with 2 layers of Carey Feltex, weight about 15 lb. per square each, cementing solid between sheets and joining same to the 30-lb. sheet, so that at no place shall felt touch felt, each sheet to overlap the previous sheet so that 17 in. are left exposed, making a continuous 2-ply built-up over the 30-lb. base Feltex sheet—no nails to be used through the top sheets.

Base sheets shall be laid crosswise of the sheathing boards. The top sheets may be laid crosswise or with the bottom sheets as best suits the type of roof construction.

Valleys and Gutters—Line all valleys and gutters in the same manner as described under "Application."

In certain types of construction it is desirable that all gutters and valleys should be reenforced with an extra sheet of felt, weighing not less than 15 lb. per square, well mopped in with Manco Asphalt. If this extra reenforcement is required it is to be charged for as an extra on a time and material basis.

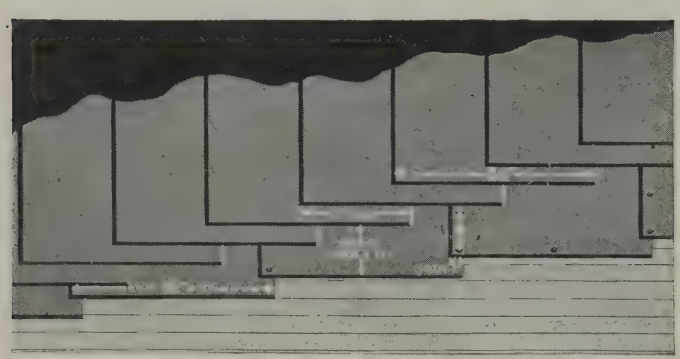
Note: All concrete or brick walls to be flashed should be primed to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at time of construction—usual size about 2x4 in., also provide cant strips for bridging angle of wall and roof deck. See flashing details on last page of this catalogue.

Note: Height of flashing, width of cant strips and flashing materials may be regulated to suit height of wall and other conditions prevailing.

Counterflashing—See "General," Specification No. 5.

Roof Finish—The entire surface of the roof applied shall be mopped with Manco Asphalt, applied hot and spread to a uniform finish.



Application of Carey Feltex Built-up Roof Over Wood Subbase. Specification No. 7

Specification No. 8

Feltex Built-up Roofing Over Concrete or Gypsum

General—All concrete and other surfaces shall be prepared for us for the application of roofing, with a comparatively smooth, hard finish, free from holes and loose particles of sand and cement, and the expense of rectifying any extensive irregularities, such as depressions in the plane of the roof surface, which must be filled, shall be chargeable to the acceptor of this proposal.

All sharp angles to be rounded out so as to avoid rough or sharp edges. On steep surfaces, provision shall be made for anchoring the roofing sheets, the anchor strip to consist of a wood strip embedded into the concrete surface at the ridge.

All down-spout openings must be lower than the roof surface and the gutters and surface properly graded by the cement contractor.

Counterflash all walls with No. 26 gauge galvanized iron, or, if preferred, copper may be used. Counterflashing to be firmly attached in wall with suitable plugs and portland cement. Also see details for Carey Fiberock Asbestos counterflash. If furnished by the roofing contractor, both materials and labor of installation shall be charged to the acceptor of this proposal as an extra, unless otherwise specifically stated in proposal.

General contractor to provide an opening in walls for inserting of counterflashing, approximately 1½ in. deep and ½ in. wide. The concrete surface must be thoroughly dry and swept clean before the roofing is applied.

Work Proposed—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work of any kind is included.)

Materials—The materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Asphalt Primer, (1 gal.)	9
(b) Carey Manco Asphalt	50
(c) Carey Feltex Felt	15
(d) Carey Manco Asphalt	25
(e) Carey Feltex Felt	15
(f) Carey Manco Asphalt	25
(g) Carey Feltex Felt	15
(h) Carey Manco Asphalt	25

Weight per square, when applied, to be approximately 179 lb.

Application—The concrete shall be coated with Carey Asphalt Primer, applied cold, and thoroughly brushed in. The surface shall be mopped with Carey Manco Asphalt, into which, while hot, embed 3 layers of Carey Feltex (Asphalt-saturated Felt), cementing solid between the sheets so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 11 in. are left exposed, making 8 courses, asphalt, felt and primer.

Gutters—Apply 3 layers of Carey Feltex Felt lengthwise with the gutter. Each sheet to overlap the previous sheet so that ⅓ of its length is left exposed. (Use sheets cut to uniform length.)

All gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets and are to be applied as specified under "Application."

Note: All concrete or brick walls to be flashed should be primed to full height of flashing with Carey Asphalt Primer.

Flashing—Cement strip of Feltex 6 in. wide in angle of wall, 3 in. to wall and 3 in. to flat deck. The Feltex sheets from main roof to be cut so they will extend up on all fire walls, skylights and other vertical surfaces to a height of 6 in.; this extension to be cemented to vertical surface. A cap sheet of Feltex cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck.

General Contractor to leave opening in the walls for inserting counterflash. See flashing details on last page of this catalogue.

Counterflashing—See "General."

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt, applied hot and evenly spread to a uniform finish.

Application of Carey Feltex Built-up Roofing Over Concrete or Gypsum. Specification No. 8

Specification No. 14

Carey Feltex Built-up Roofing Over Wood Subbase

General—(Insert paragraph under heading "General," Specification No. 5).

Work Proposed—This specification contemplates furnishing all materials and labor required to properly apply the roofing and base flashing and line the gutters.

No metal work of any kind is included. Sheathing must be dry before applying roofing.

Continued on next page

Materials—Materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Feltex (weight 30 lb.)	30
(b) Carey Manco Asphalt	25
(c) Carey Feltex (weight 15 lb.)	15
(d) Carey Manco Asphalt	25
(e) Carey Feltex (weight 15 lb)	15
(f) Carey Manco Asphalt	25
(g) Carey Feltex (weight 15 lb.)	15
(h) Carey Manco Asphalt	25
(j) Nails ⅞ in. (wt. 1 lb.)	1
(k) Caps 1 in. Flat	¾ lb.

Weight per square when applied to be approximately 176 lb.

Application—The roof surface shall be covered with sheets of Carey Feltex 36 in. wide weighing about 30 lb. per square. Lap the sheets not less than 2 in., then nailing the sheets at the join with ⅞ in. nails and caps on 6 in. centers with one additional row of nails spaced 11 in. apart lengthwise through center of sheet.

After the 30 lb. Feltex sheets have been completed in accordance with the above instructions, proceed to cover the same with 3 layers of Feltex, weight about 15 lb. per square each, cementing solid between sheets and bonding same to the 30 lb. sheet, so at no place shall felt touch felt, each sheet to overlap the previous sheet, so that 11 in. are left exposed, making a continuous 3-ply Built-up over the 30 lb. base Feltex sheet. On steep surfaces nail top sheets at upper edge.

Base sheets shall be laid crosswise of the sheathing boards. The top sheets may be laid crosswise or with the bottom sheets as best suits the type of roof construction.

Valleys and Gutters—Line all valleys and gutters in the same manner as described under "Application."

In certain types of construction it is desirable that all gutters and valleys should be reenforced with an extra sheet of felt, weighing not less than 15 lb. per square, well mopped in with Manco Asphalt. (If this extra reenforcement is required it is to be charged for as an extra on a time and material basis.)

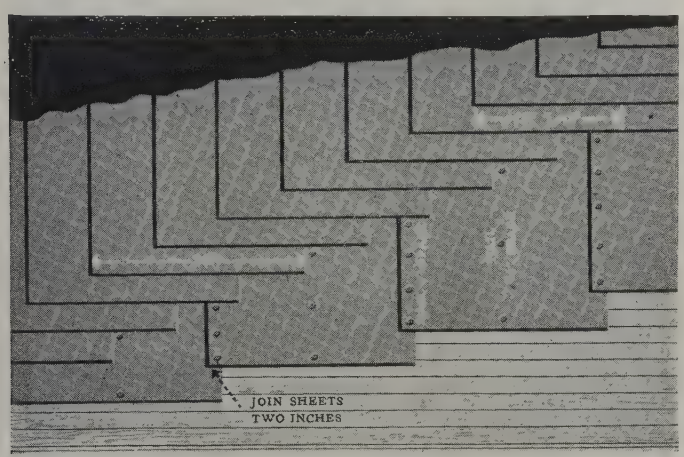
Note: All concrete or brick walls to be flashed should be primed to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at time of construction, usual size about 2x4 in., also provide cant strips for bridging angle of wall and roof deck. See flashing details on last page of this catalogue.

Note: Height of flashing, width of cant strips and flashing materials may be regulated to suit height of wall and other conditions prevailing.

Counterflashing—See "General," Specification No. 5.

Roof Finish—The entire surface of the roof applied shall be mopped with Manco Asphalt, applied hot and spread to a uniform finish.



Application of Carey Feltex Built-up Roofing Over Wood Subbase. Specification No. 14

Specification No. 15

Carey Asbestos Built-up Roofing for Application Over Wood Subbase

General—(Insert paragraph under heading "General," Specification No. 5.)

Work Proposed—This specification contemplates furnishing all materials and labor required to apply the roofing and base flashing, and line the gutters. (No metal work of any kind is included.) Sheathing must be dry before applying the roofing.

Materials—The materials for each square used in the construction of this roof shall be as follows:

One roll (110 sq. ft.) Carey Asbestos Asphalt Impregnated Roofing Felt, weight approximately 60 lb.

Two sheets (weight 15 lb. per sq. ea.) Carey Fiberock (Asbestos Impregnated Felt).

80 lb. Carey Manco Asphalt.

Nails and flat tin caps.

Weight per square, when applied, to be approximately 171 lb.

Application—The roof surface shall be covered with Carey Asbestos Asphalt Impregnated Roofing, lapping the sheets so that there will be a lap of not less than 3 in., cementing between the laps with Manco Asphalt, and secure with nails and caps, spacing the nails along the lap 4 in., also secure through the center of sheets with 2 rows of nails and flat tin caps staggered, spacing nails crosswise of sheet 11 in., and lengthwise of sheet 15 in. This surface to be mopped with Carey Manco Asphalt into which while hot shall be laid 2 layers of 1-ply Fiberock (Asphalt Impregnated Asbestos Felt), cementing solid between sheets, so that at no place shall felt touch felt, each sheet to overlap the previous sheet, leaving 17 in. exposed. All sheets shall be laid crosswise of the sheathing boards and so lapped that at no place shall one lap or cross seam occur upon another.

Valleys and Gutters—Line all gutters in the same manner as described under "Application," using sheets full length and cut to a width of not over 18 in. After the base sheet of heavy Asbestos Roofing has been nailed in position, then cement 2 sheets of 1-ply Fiberock over the base sheet, breaking joints in the usual manner.

Note: We recommend, wherever possible, adding an additional sheet of 1-ply Fiberock in all valley and gutter construction.

All valley and gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets, the heavy base sheet of Asbestos Roofing shall extend on all vertical surfaces approximately 2½ in., the extension to be uncemented.

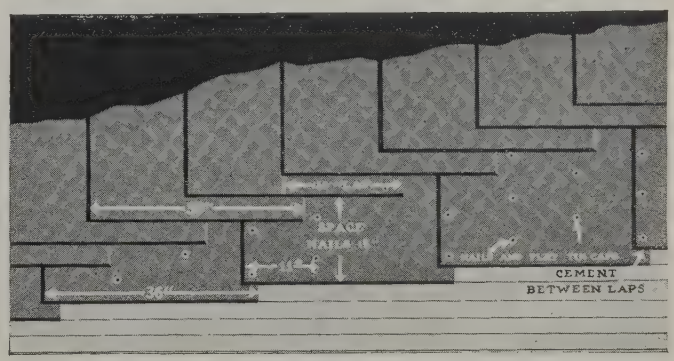
Note: All concrete or brick walls to be flashed shall be primed (Carey Asphalt Primer) to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at the time of construction, or raggle block, together with necessary cant strips, nailing strips, etc., to enable the roofing contractor to properly construct flashing work. See flashing details on last page of this catalogue.

Note: Height of flashing, width of cant strip and flashing materials may be regulated to suit height of wall, and other conditions prevailing.

Counterflashing—See "General," Specification No. 5.

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt, applied hot and spread to a uniform finish.



Application of Carey Asbestos Built-up Roofing Over Wood Subbase. Specification No. 15

Specification No. 15A

Carey Asbestos Built-up Roofing for Application to Concrete or Gypsum Subbase

General—(Insert paragraph under heading "General," Specification No. 8.)

Work Proposed—This specification contemplates furnishing all materials and labor required to apply the roofing and base flashing, and line the gutters. (No metal work of any kind is included.) Concrete or gypsum must be dry before applying the roofing.

Materials—The materials for each square used in the construction of this roof shall be as follows:

One roll (110 sq. ft.) Asbestos Asphalt-saturated Roofing Felt, weight approximately 60 lb.

One gal. Asphalt Primer, approximately 9 lb.

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Two sheets (weight 15 lb. per sq. each) Carey Fiberock (Asbestos-saturated Felt).

130 lb. Carey Manco Asphalt.

Nails and flat tin caps where required.

Weight per square when applied to be approximately 230 lb.

Application—The concrete or gypsum surfaces shall be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. Allow the Primer to dry, then mop surface with Carey Manco Asphalt, into which, while hot, embed 1 layer of Asbestos Asphalt-saturated Roofing Felt, weighing approximately 60 lb., lapping the sheets not less than 3 in. and cementing between the laps with Manco Asphalt. (When applying over gypsum block, these sheets may be secured by occasional nailing in addition to mopping.) After completing this first layer, mop surface with Carey Manco Asphalt, into which, while hot, embed 2 layers of 1-ply Fiberock (Asphalt-saturated Asbestos Felt) cementing solid between sheets so that felt will not touch felt, each sheet to overlap the previous sheet, leaving 17 in. exposed.

Valleys and Gutters—Line all gutters and valleys in the same manner as described under "Application," using sheets cut to uniform length and to a width of approximately 18 in. After the base sheet of heavy Asbestos Roofing has been placed in position, then cement 2 sheets of 1-ply Fiberock over the base sheet, breaking joints as described under "Application."

Note: We recommended adding an additional sheet of 1-ply Fiberock in the valley and gutter construction or on other sections of the roof that may be subjected to greater abuse or roughly used.

All valley and gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets. The heavy base sheet of Asbestos Roofing shall extend on all vertical surfaces approximately 2½ in., the extension to be uncemented.

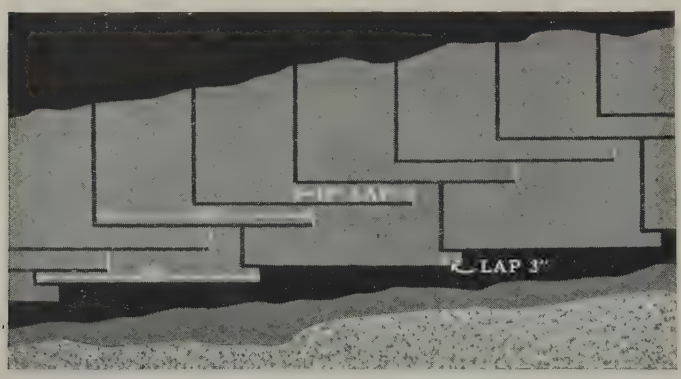
All concrete or brick walls to be flashed, shall be primed (using Carey Asphalt Primer) to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at the time of construction, or raggle block, together with necessary cant strips, nailing strips, etc., to enable the roofing contractor to properly construct flashing work. See flashing details on last page of this catalogue.

Note: Height of flashing, width of cant strip, and flashing materials may be regulated to suit the height of wall and other conditions prevailing.

Counterflashing—See "General," Specification No. 8, and refer to details on last page of this catalogue.

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt applied hot and spread to a uniform finish.



Application of Carey Built-up Asbestos Roofing Over Concrete or Gypsum Subbase, Specification 15A

Specification No. 18

Four Plies Asphalt-saturated Feltex Over Concrete or Gypsum Subbase

General—(Insert paragraph under heading "General," Specification No. 8.)

Work Proposed—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work of any kind is included.)

Materials—The materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Asphalt Primer (1 gal.)	9
(b) Carey Manco Asphalt	40
(c) Carey Feltex Felt	15
(d) Carey Manco Asphalt	25
(e) Carey Feltex Felt	15
(f) Carey Manco Asphalt	25
(g) Carey Feltex Felt	15
(h) Carey Manco Asphalt	25
(j) Carey Feltex Felt	15
(k) Carey Manco Asphalt	25

Weight per square when applied to be approximately 209 lb.

Application—The concrete or gypsum surface shall be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. After the Primer dries, mop the surface with Carey Manco Asphalt into which, while hot, embed 4 layers of Carey Feltex (Asphalt-saturated Felt), cementing solid between the sheets so that at no place shall felt touch felt, each sheet to overlap the previous sheet so that approximately 9 in. are left exposed, making nine courses of Asphalt and Felt.

Gutters—Apply 4 layers of Carey Feltex Felt lengthwise with gutter sheets to be cut to uniform length, each sheet to overlap the previous sheet so that ¼ of its length is left exposed.

All gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets, and are to be applied as specified under "Application."

Note: All concrete or brick walls to be flashed shall be primed to full height of flashing with Carey Asphalt Primer.

Flashing—For base flashing, cement strips of Feltex 6 in. wide, in angle of wall, 3 in. to wall and 3 in. to flat deck. The Feltex sheets from main roof to be cut so that they will extend up on all fire walls, skylights, and other vertical surfaces, to a height of 6 in.; these extensions to be cemented to vertical surfaces excepting where cant strips are used. A cap sheet of Feltex cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck. See flashing details on last page of this catalogue. General contractor to leave opening in the walls for inserting counterflash.

Counterflashing—See "General," Specification No. 8, and refer to details on last page.

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt applied hot and evenly spread to a uniform finish.

Application of Four Plies Asphalt-saturated Feltex Over Concrete or Gypsum Subbase, Specification No. 18

Specification No. 15AA

Carey Asbestos Built-up Roofing Over Wood Subbase

General—(Insert paragraph under heading "General," Specification No. 5.)

Work Proposed—This specification contemplates furnishing all materials and labor required to apply the roofing and base flashing, and line the gutters. (No metal work of any kind is included.) Sheathing must be dry before applying the roofing.

Materials—The materials for each square used in the construction of this roof shall be as follows:

One roll (110 sq. ft.) Carey Asbestos Asphalt Impregnated Roofing Felt, weight approximately 60 lb.

Three sheets (weight 15 lb. per sq. each) Carey Fiberock (Asbestos Impregnated Felt).

100 lb. Carey Manco Asphalt.

Nails and flat tin caps.

Weight per square, when applied, to be approximately 207 lb.

Application—The roof surface shall be covered with Carey Asbestos Asphalt Impregnated Roofing, lapping the sheets so that there will be a lap of not less than 3 in., cementing between the laps with Manco Asphalt, and secure with nails and caps, spacing the nails along the lap 4 in., also

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secure through the center of sheets with 2 rows of nails and flat tin caps staggered, spacing nails crosswise of sheet 11 in., and lengthwise of sheet 15 in. This surface to be mopped with Carey Manco Asphalt into which while hot shall be laid 3 layers of 1-ply Fiberock (Asphalt Impregnated Asbestos Felt), cementing solid between sheets, so that at no place shall felt touch felt, each sheet to overlap the previous sheet, leaving 11 in. exposed. All sheets shall be laid crosswise of the sheathing boards and so lapped that at no place shall one lap or cross seam occur upon another.

Valleys and Gutters—Line all gutters in the same manner as described under "Application," using sheets full length and cut to a width of not over 18 in. After the base sheet of heavy Asbestos Roofing has been nailed in position, then cement 3 sheets of 1-ply Fiberock over the base sheet, breaking joints in the usual manner.

All valley and gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets, the heavy base sheet of Asbestos Roofing shall extend on all vertical surfaces approximately 2½ in., the extension to be uncemented.

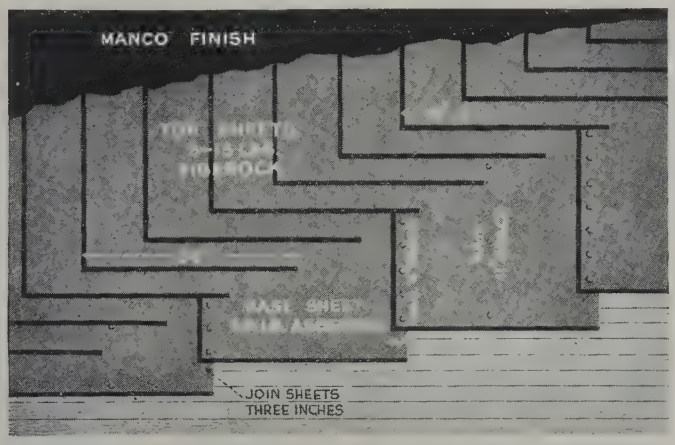
Note: All concrete or brick walls to be flashed shall be primed (Carey Asphalt Primer) to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at the time of construction, or raggle block, together with necessary cant strips, nailing strips, etc., to enable the roofing contractor to properly construct flashing work. See flashing details on last page of this catalogue.

Note: Height of flashing, width of cant strip and flashing materials may be regulated to suit height of wall, and other condition prevailing.

Counterflashing—See "General," Specification No. 5, and details on last page.

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt, applied hot and spread to a uniform finish.



Application of Carey Asbestos Built-up Roofing Over Wood Subbase, Specification 15AA

Specification No. 15AAA

Carey Asbestos Built-up Roofing Over Concrete or Gypsum Subbase

General—(Insert paragraph under heading "General," Specification No. 8.)

Work Proposed—This specification contemplates furnishing all materials and labor required to apply the roofing and base flashing, and line the gutters. (No metal work of any kind is included.) Concrete or gypsum must be dry before applying the roofing.

Materials—The materials for each square used in the construction of this roof shall be as follows:

One roll (110 sq. ft.) Asbestos Asphalt Saturated and Coated Roofing, weight approximately 60 lb.

One gal. Asphalt Primer, approximately 9 lb.

Three sheets (weight 15 lb. per sq. each) Carey Fiberock (Asbestos Saturated Felt).

150 lbs. Carey Manco Asphalt.

Nails and flat tin caps or large head felt nails.

Weight per square when applied to be approximately 264 lb.

Application—The concrete or gypsum surfaces shall be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. Allow the Primer to dry, then mop surface with Carey Manco Asphalt, into which while hot embed 1 layer of Asbestos Asphalt Saturated Roofing Felt, weighing approximately 60 lb., lapping the sheets not less than 3 in. and cementing between the laps with Manco Asphalt. (When applying over gypsum block, these sheets may be secured by nailing once through the center and along joints, spacing the nails from 6 to 8 in.) After completing this first layer, mop surface with Carey Manco Asphalt, into which while hot embed 3 layers of 1-ply Fiberock (Asphalt Saturated Asbestos Felt), cementing solid between sheets so that felt will not touch felt, each sheet to overlap the previous sheet, leaving 11 in. exposed.

Valleys and Gutters—Line all gutters and valleys in the same manner as described under "Application," using sheets cut to uniform length and to a width of approximately 18 in. After the base sheet of heavy Asbestos Roofing has been placed in position, then cement 3 sheets of 1-ply Fiberock over the base sheet, breaking joints as described under "Application."

All valley and gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets. The heavy base sheet of Asbestos Roofing shall extend on all vertical surfaces approximately 2½ in., the extension to be uncemented.

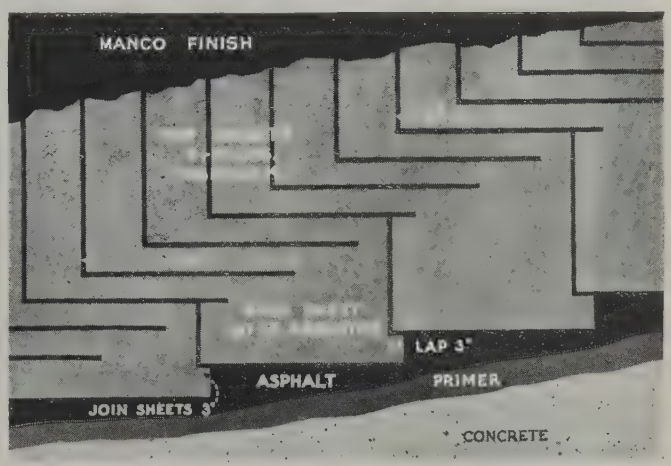
All concrete or brick walls to be flashed, shall be primed (using Carey Asphalt Primer) to full height of flashing.

Flashing—The general contractor or owner to provide suitable nailing strips in the walls at the time of construction, or raggle block, together with necessary cant strips, nailing strips, etc., to enable the roofing contractor to properly construct flashing work.

Note: Height of flashing, width of cant strip and flashing materials, may be regulated to suit the height of wall and other conditions prevailing.

Counterflashing—See "General," Specification No. 8, and details on last page.

Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt applied hot and spread to a uniform finish.



Application of Carey Asbestos Built-up Roofing Over Concrete or Gypsum Subbase, Specification 15AAA

Specification for Carey Preformed Membrane System of Waterproofing to Wood Subbase

General—(Insert paragraph under heading "General" Specification No. 5.)

Work Proposed—This specification covers material and labor required to properly apply the Carey Preformed Membrane System of Waterproofing to roof surfaces of wood construction.

Materials—Materials used in the construction of this roof shall be as follows:

	Lbs. per square
(a) Carey Preformed Membrane, ⅛ in., size of sheets 3x6 ft.	90
(b) Large Head Roofing Nails, 1 in. in length	3
(c) Carey Manco Asphalt	25
(d) Carey Feltex Asphalt-saturated Felt)	15
(e) Carey Manco Asphalt	25
(f) Carey Feltex (Asphalt-saturated Felt)	15
(g) Carey Manco Asphalt	25

Weight per square, when applied, approximately 198 lb.

Application—The preformed sheets (3x6 ft.) are laid on the roofing boards crosswise of the boards, butting the edges of the sheets closely. The sheets are then nailed along all the edges, spacing the nails on 3-in. centers. Two staggered rows of nails are driven through the middle of the sheets, spaced about 6 in. After the sheets have been nailed securely, fill

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all cracks along the joints with Manco Asphalt, heated and poured at a temperature of about 400° F. A strip of Feltex about 5 in. wide shall then be cemented over the joints. Mop over this surface 2-ply Built-up Feltex Roof composed of two 15-lb. Feltex sheets lapping the sheets ½ their width and embed the sheets into the hot asphalt. No nails to be used through the top sheets. The top sheets may be laid crosswise or with the preformed sheets, as best suits the type of roof construction.

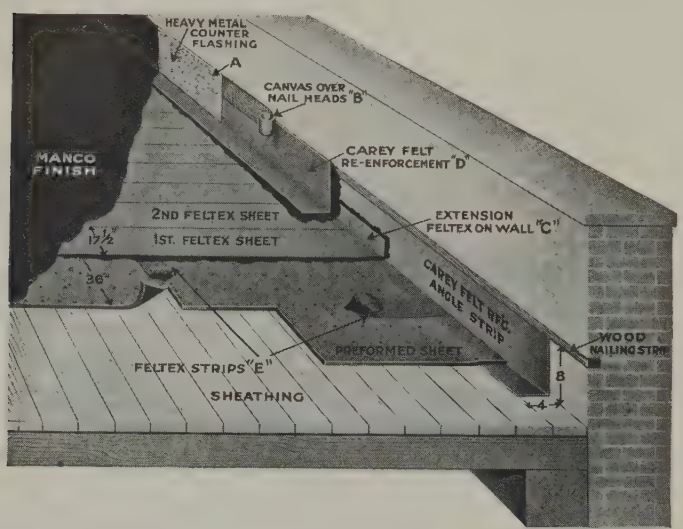
Gutters and Valleys—Line in the same manner as described in "Application."

Flashing—Prime all brick or concrete walls. The general contractor or owner to provide suitable nailing strips in the walls, also cant strips or crickets where necessary. (See illustration on last page of this catalogue for details in constructing flashing.) Height of flashing and flashing materials may be regulated to suit height of wall and other conditions prevailing.

Counterflashing—Illustration below shows two methods of counterflashing.

(a) With heavy galvanized iron or copper. (Recommended.)
(b) By cementing canvas over nail heads.

Roof Finish—The entire surface of the roof shall be mopped with Carey Manco Asphalt, applied at proper temperature and not over 1/16th of an inch in thickness.



Application of Carey Preformed Membrane System of Waterproofing to Wood Subbase

Specifications for Four Plies of Asphalt-saturated Asbestos Felt Over Concrete

General—(Insert paragraph under heading "General," Specification No. 8.)

Work Proposed—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work of any kind is included.)

Materials—The materials used in the construction of this roof shall be as follows:

	Lb. per square
(a) Carey Asphalt Primer (1 gal.)	9
(b) Carey Manco Asphalt	40
(c) Carey Asbestos Felt Fiberock	15
(d) Carey Manco Asphalt	25
(e) Carey Asbestos Felt Fiberock	15
(f) Carey Manco Asphalt	25
(g) Carey Asbestos Felt Fiberock	15
(h) Carey Manco Asphalt	25
(j) Carey Asbestos Felt Fiberock	15
(k) Carey Manco Asphalt	25

Weight per square when applied to be approximately 209 lb.

Application—The concrete surface shall be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. After the primer dries, mop the surface with Carey Manco Asphalt into which, while hot, embed 4 layers of Carey Asbestos (Asphalt-saturated Felt), cementing solid between the sheets so that at no place felt shall touch felt, each sheet to overlap the previous sheet so that approximately 9 in. are left exposed, making 9 courses of asphalt and felt.

Gutters—Apply 4 layers of Carey Asbestos Felt Fiberock lengthwise with gutter sheets to be cut to uniform length, each sheet to overlap the previous sheet so that ¼ of its length is left exposed.

All gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets, and are to be applied as specified under "Application."

Note: All concrete or brick walls to be flashed shall be primed to full height of flashing with Carey Asphalt Primer.

Flashing—For base flashing, cement strips of Fiberock 6 in. wide, in angle of wall, 3 in. to wall and 3 in. to flat deck. The Feltex sheets from main roof to be cut so that they will extend up on all fire walls, skylights, and other vertical surfaces, to a height of 6 in.; these extensions to be cemented to vertical surfaces excepting where cant strips are used. A cap sheet of Fiberock cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck. General contractor to leave opening in the walls for inserting counterflash. See flashing details on last page of this catalogue.

Counterflashing—See "General," Specification No. 8, and details on following page.

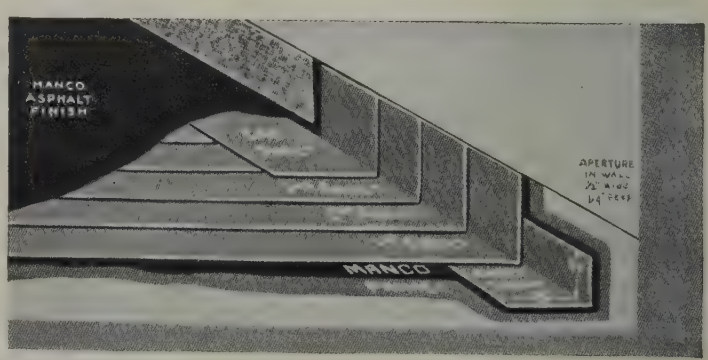
Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt applied hot and evenly spread to a uniform finish.

Application of Four Plies of Asphalt-saturated Asbestos Felt Over Concrete Subbase

Method of Flashing Built-up Roofs

Method of Flashing Asbestos and Asphalt Built-up Roof Over Concrete Subbase

The illustration shows method of flashing concrete surface without the use of a cant strip. Where the building is new and there is no specification for the flashing the roofer generally submits his proposal based on supplying a flashing to meet the particular requirements of the building or the roof construction. If a completed building and the job is re-roofing, the roof contractor will naturally recommend the type of flashing that best meets the requirements. Carey Specification No. 8 is illustrated in the drawing. The main roof deck is covered with 3 sheets of 15-lb. Feltex but in the flashing as outlined it requires the use of 5 thicknesses of felt in the angle of the wall or for the base flashing. First a strip of felt called the angle strip is fitted in the angle of the wall, next the 3 layers of felt from the main deck are extended on to the wall to the desired height and finally another strip of felt for a cap sheet completes the fifth layer of felt giving the roof extra



Method of Flashing Asbestos and Asphalt Built-up Roof Over Concrete. Specification No. 8

Continued on next page

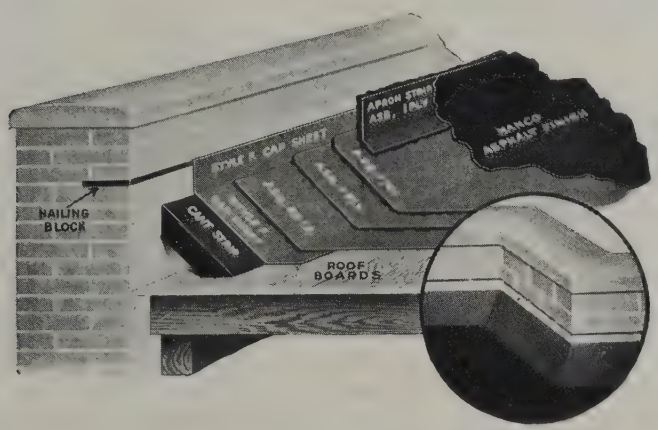
strength at this particular point. Over the base flashing a counterflashing of metal may be used.

Flashing Carey Asbestos Built-up Roofs

In this type of flashing which is suitable for either concrete or wood surfaces all metal is disposed of, almost entire flashing being completed with asbestos materials.

This type of flashing calls for the use of a cant strip which can be built in the angle of the wall either with wood, composition or, if a concrete deck, concrete. The roof construction shown in the illustration is Carey Asbestos Built-up Roof Specification No. 15., in which case the use of the style "F" flashing material cap sheet is laid as a base sheet underneath the main roof in order that the greatest resistance to natural wear will be afforded and the asbestos sheets given the greatest protection. The cap sheet style "F" is attached to the nailing strip in the wall and if a raggle block is used the top edge is fastened in the raggle. The sheet extends down over the cant strip and out on the main roof approximately 6 in. In preparing flashing work, all sheets may be cut to suit the height of the wall and the general conditions prevailing. The cap sheet may be nailed at the lower end on the roof deck sufficiently to hold it in place. In this specification the base sheet is of heavy asbestos weighing approximately 60 lb. per square. This sheet is run from the main deck up to the top edge of the cant strip. The 2 top sheets consisting of two 15 lb. asbestos sheets are feather-edged to the vertical wall over the style "F" cap sheet, the first sheet extends about 1 inch on the wall and the second about 2 inches, as shown in the illustration.

The apron strip covers the nail heads and serving as a counter-flashing is usually 5 to 6 in. in width, being laid in Fiberock cement. It is best to set this in place and then tamp it in carefully so that every portion of the strip will adhere. The entire surface of the completed flashing is then mopped with Manco asphalt.

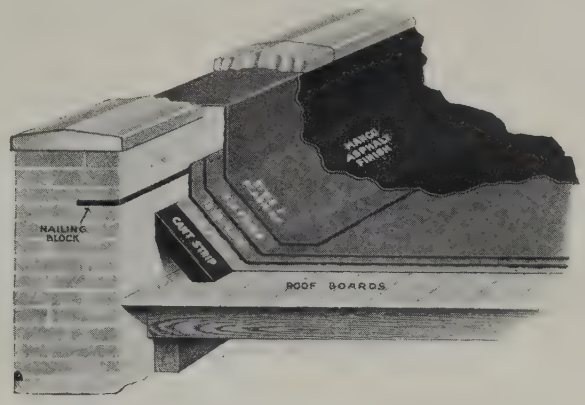


Method of Flashing Asbestos Built-up Roof

Wall and Roof Flashing

The most effective means of protecting both the wall and roof against leakage is the method of flashing illustrated herein. The cant strip is used to bridge the wall angle. First the heavy base sheet of roofing is laid to the top edge of the cant strip, the lighter roofing sheets from the main deck are laid to the top edge of the nailing strip in the wall and there secured by nailing to hold them in place. Over all is laid a cap sheet of style "F" flashing material that bridges the angle over cant strip extending from under the coping and out on to the roof deck approximately 4 in. This sheet is cemented solid with hot asphalt.

We recommend the use of the cant strip with this particular type of flashing although practically the same method may be used omitting the cant strip. The use of a cant strip makes the flashing more substantial and offers greater resistance to the natural wear and tear of the flashing. When the cant strip is not used, first cement in the angle of the wall a strip of 30 lb. Feltex at least 12 in. wide, 6 in. extending on the vertical wall and 6 in. on the roof deck. This strip cemented in solid. Then allow the roofing sheets from the main deck to extend on the vertical wall about 2 or 3 inches, uncemented. Cement another cap sheet of 30 lb. Feltex starting from the edge of the coping down the wall to roof deck, out on roof deck at least 4 in., cemented in solid, over this cement a cap sheet of style "F" roofing extending from underneath the coping down the wall and out on to the roof at least 5 to 6 in.

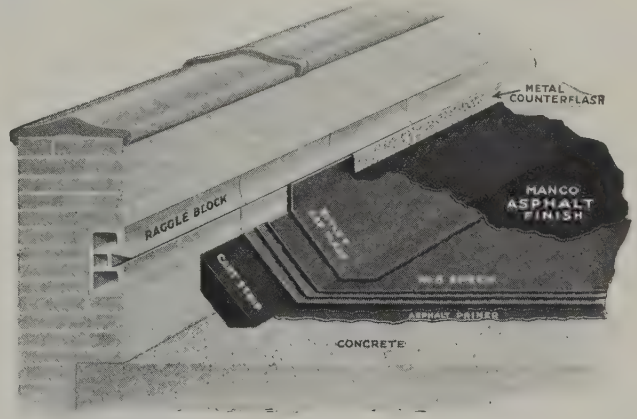


Application of Wall and Roof Flashing

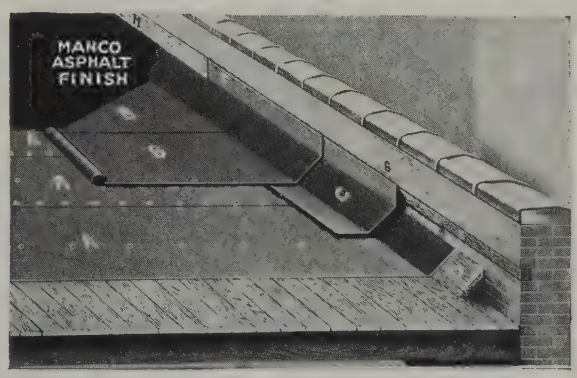
Raggle Block Flashing

The purpose of the raggle block is to provide an anchorage for the flashing strips to hold them permanently in place and to complete a water-tight barrier between the roof and the wall. Some raggle blocks are provided with 2 openings, 1 to receive the base flashing sheets and the other or upper opening for the inserting of the counter-flashing. The roofing sheets must be anchored in the raggle block by the use of plugs, oakum or other devices to insure their remaining in place.

The illustration shows the use of the customary cant strip in the wall angle in addition to the raggle block. It will be noticed that the main roofing sheets are run to the top edge of the cant strip cemented in place, over which is applied a cap sheet of Carey style "F" flashing, the upper edge of which is inserted in the raggle block and sufficiently anchored therein to hold firmly in place. The style "F" extending from the raggle out on to the roof deck at least 4 in. In addition to this there may be used a counterflashing of heavy galvanized iron or copper which offers an additional safeguard. In the case of concrete decks, the cant strip can be molded into place by the cement contractor at the time of the roof construction.



Raggle Block Flashing



Method of Flashing Feltex Built-up Roof. Specification No. 5

CERTAIN-TEED PRODUCTS CORPORATION

ROOFING DIVISION

Specifications for Built-Up Roofing

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752; for Plants, see page A433

Products

CERTAIN-TEED BUILT-UP CONSTRUCTION ROOFS.

TRADE-MARK

Index to Products Listed Under Other Classifications

For Asbestos Shingles, see pages A474-475.
For Asphalt Shingles, see page A479.
For Decorative Panels (Asbestos), see pages C3770-3771.
For Gypsum Lath, see pages B1726-1727.
For Gypsum Partition Tile, see pages A422-423.
For Gypsum Plasters, see pages B1752-1758.
For Gypsum Wall Board, see pages B1618-1619.
For Fibre and Insulating Boards, see pages B1594-1595.
For Linoleum, see pages B1926-1928.
For Paint and Varnish, see pages B2044-2046.
For Reinforced Gypsum Roof Tile, see page A174.
For Roll Roofing and Building Paper, see page A433.

CERTAIN-TEED BUILT-UP ROOFS

Advantages—Roofs built up of Certain-teed asphalt roofing and asphalt cement have many advantages over the old-fashioned coal-tar, pitch and gravel roofs. They can be used on roof decks ranging from flat to vertical surfaces, and are particularly well adapted to sawtooth skylights and valley construction.

The saving in weight when using built-up roofing is of utmost importance, especially on roofs covering extensive areas. Again, tar pitch has a very low melting point and will run off the roof in summer unless covered with weighty slag or gravel.

Maintenance—Certain-teed Built-up Roofs are practically free of maintenance costs. At the end of the guarantee period, these Certain-teed Roofs can generally be resurfaced with hot asphalt, which prolongs their life for many additional years. This resurfacing process when repeated at certain intervals makes the roof last indefinitely.

Principal Types—We have developed several principal types of built-up asphalt roofs. We recommend these roofs for any type of building upon which a composition roof can be applied.

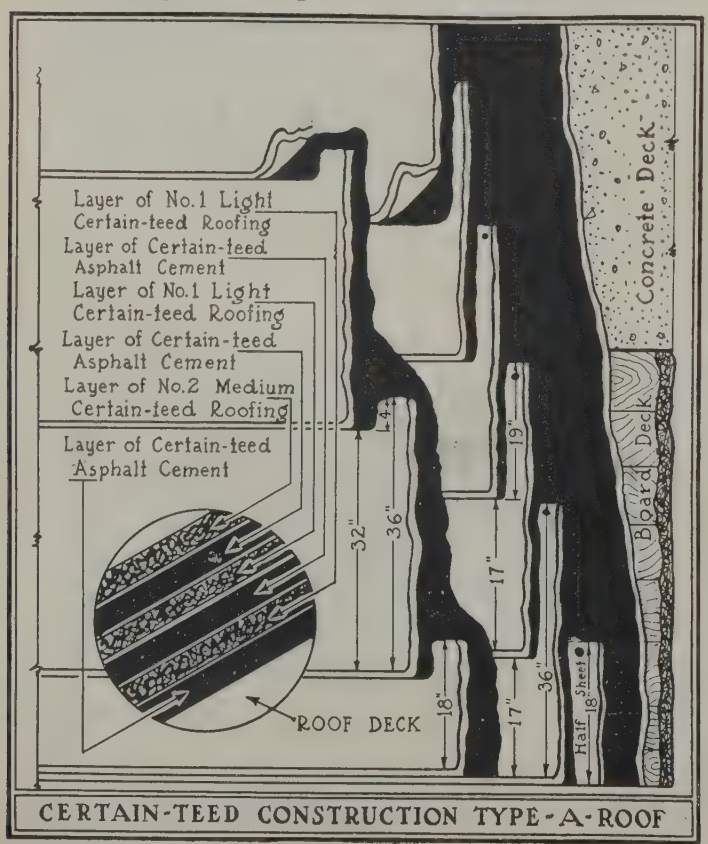
When the very best roof is desired, we recommend Certain-teed Type "A" and Type "B" Construction Roofs.

Certain-teed Type "A" Construction Roof

Guaranteed 15 Years

This form of construction is applicable where the roof deck is of board sheathing, concrete, gypsum tile, cement tile, book tile or steel deck.

The roof decks of wood must be well seasoned and well nailed, and all roof decks must be smooth and dry, and evenly graded to gutters and outlets.



CERTAIN-TEED CONSTRUCTION TYPE-A-ROOF

Type "A" construction is applicable to a roof deck of any incline, from a comparatively flat deck to the vertical wall of a pent house or roof house and is especially recommended for sawtooth skylight construction and valleys.

Certain-teed Type "A" Construction Roof is composed of the following, per square of roof area.

2 squares of No. 1 Smooth Certain-teed Roofing, weighing 30 lb. each	60 lb.
1.08 squares of No. 2 Smooth Certain-teed Roofing	40 lb.
Certain-teed Asphalt Cement	120 lb.
Total	220 lb.

Specifications for Certain-teed Type "A" Construction Roof

Notes: This roof is guaranteed for 15 years.

This specification is applicable where the roof surfaces are of wood sheathing boards, concrete, gypsum tile, cement tile, book tile or steel deck; also for roofs of any pitch, from flat decks to vertical walls; sawtooth roof construction and valleys.

General—All roof (and side wall) surfaces, where indicated on the drawings, shall be covered with Certain-teed Type "A" Construction Roofing in strict accordance with these specifications and the special instructions of the manufacturer.

This Contractor shall examine all surfaces to be covered and shall see that they are smooth and evenly graded to gutters and outlets, also that they are thoroughly dry. Where surface is of wood, the wood must be well seasoned and well nailed. If surfaces and materials are not satisfactory he shall report the defects to the General Contractor who will see that the work is rectified. All surfaces shall be broom clean before the roofing material is applied.

Note: The required materials and workmanship for the surfaces to receive roofing should be included in the specifications for Mason and Carpenter Work.

Materials—The material shall be 2 sheets of No. 1 Light Certain-teed Roofing, weighing 30 lb. to the roll of 108 sq. ft., single thickness, and one sheet (the cap sheet) No. 2 Medium Certain-teed Roofing, weighing 40 lb. to the roll of 108 sq. ft., single thickness, and not less than 120 lb. of Certain-teed Asphalt Cement to the 100 sq. ft. of roof area.

Continued on next page

Application—Beginning at the low point of the roof deck, lay one-half sheet of No. 1 Light Certain-teed Roofing, mopping same to the roof deck with Certain-teed Asphalt Cement applied at a temperature of approximately 300 degrees F., mopping the underneath side of the sheet being laid, its full width, as well as the roof deck. Then lay the second sheet, which is 36 in. wide, so that the edge comes even with the outside edge of the half sheet, mopping the underneath side of this sheet its full width, as well as the top surface of the sheet previously laid. Lay the third sheet so that it laps over the second sheet 1 in. more than half its width (19 in.), mopping both the underneath side of this sheet its full width, and the top surface of the sheet previously laid. In the same manner lay the succeeding layers, completing the roof with the same lap, so that the entire area has two thicknesses of Certain-teed Roofing and 4 layers of Certain-teed Asphalt Cement at every point. Then lay the cap sheet of No. 2 Medium Certain-teed Roofing, starting at the original low point, mopping the underneath side of this sheet its full width, as well as the top surface of the sheet previously laid. Lap this cap sheet 4 in., thus having 3 thicknesses of roofing and 6 layers of Certain-teed Asphalt Cement at every point. The top edge of the roofing shall be nailed when necessary on steep or vertical surfaces. Such nails shall be covered with no less than two layers of asphalt and one layer of roofing. Finally, the laps shall be mopped with hot Certain-teed Asphalt Cement to a distance of approximately 2 in. each side of the lap.

Note: In cases where the roof surfaces are of open board sheathing and not plastered or otherwise ceiled, the above paragraph should be revised to include the following procedure.

(To lay the first sheet of roofing dry on the boards, nailing with two rows of ⅞ in. large-head roofing nails, staggered, on the upper or back half of the sheet, mopping between plies as described above and coating over the entire top surface of the finished roof with a uniform coat of hot Certain-teed Asphalt Cement, thus giving the same weight and amount of material but putting the extra coat of asphalt over the top surface instead of on the board sheathing.)

Flashings—Base flashings shall be constructed by extending the roofing up the wall not less than 6 in. and securing the top edge with standard roofing cleats, unless otherwise specified or shown on the detailed drawings.

Notes: The following notes regarding various types of flashings are suggested for architects' consideration. When other than the above specified flashing is desired the Mason and Carpenter Specifications should include the proper provisions to receive the type of flashing selected, also the above paragraph (Flashings) should be revised accordingly.

Certain-teed flashings can be counterflashed with sheet metal or entered into raggle blocks. If Certain-teed flashing is entered into raggle blocks, same shall be calked in with tarred oakum and pointed with Certain-teed Plastic Cement. For brick walls, we recommend 50 lb. Certain-teed counterflashing, 12 in. wide, be laid up in the third or fourth course of brick above the roof line by the bricklayer, to be used as counterflashing by the roofer. All concrete or tile walls extending above the roof line, where raggle block or metal counterflashing is not provided, shall have a wood nailing strip embedded 6 or 8 in. above the roof line, so that the top edge of flashing can be permanently secured. The drip edge of concrete decks, vertical walls and curbs, shall be provided with wood nailing strips.

Identification and Labels—The materials above mentioned, shall bear the registered Certain-teed labels of the manufacturer, the Certain-teed Products Corporation.

Guarantee—This Contractor shall guarantee in writing, all roofing work for a period of fifteen (15) years from date of laying against all defects in materials and workmanship.

Any leaks that may develop in this roof within the period of this guarantee, due to defective material or workmanship furnished by this contractor, shall be repaired free of cost to the owner.

Certain-teed Type "B" Construction Roof

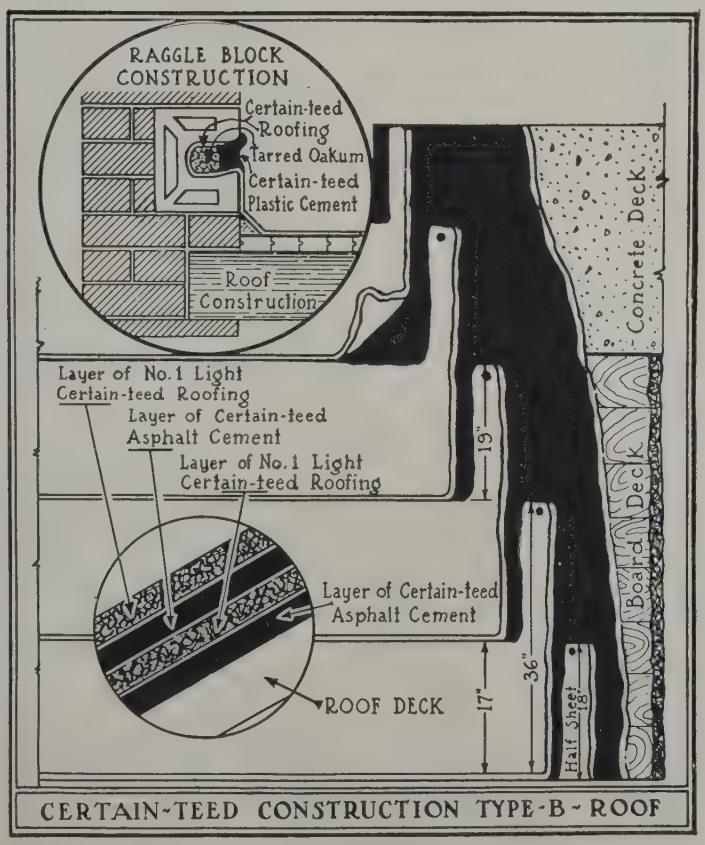
Guaranteed 10 Years

Type "B" construction applicable where the roof deck is of board sheathing, concrete, gypsum tile, cement tile, book tile or steel deck. The roof deck may be of any incline, from an approximately flat deck to a vertical wall of pent house or roof house construction. It is especially recommended for sawtooth skylight construction and valleys.

Roof decks of wood must be well seasoned and well nailed, and all roof decks must be smooth and dry, and evenly graded to gutters and outlets.

Certain-teed Type "B" Construction Roof is composed of the following, per square of roof area.

2 Squares of No. 1 Smooth Certain-teed Roofing, weighing 30 lb. each	60 lb.
Certain-teed Asphalt Cement	90 lb.
Total	150 lb.



CERTAIN-TEED CONSTRUCTION TYPE-B-ROOF

Specifications for Certain-teed Type "B" Construction Roof

Notes: This roof is guaranteed for 10 years.

This specification is applicable where the roof surfaces are of wood sheathing boards, concrete, gypsum tile, cement tile, book tile or steel deck; also for roofs of any pitch, from flat decks to vertical walls; sawtooth roof construction and valleys.

General—All roofs (and side wall) surfaces, where indicated on the drawings, shall be covered with Certain-teed Type "B" Construction Roofing in strict accordance with these specifications and the special instruction of the manufacturer.

This Contractor shall examine all surfaces to be covered and shall see that they are smooth and evenly graded to gutters and outlets, also that they are thoroughly dry. Where surface is of wood, the wood must be well seasoned and well nailed. If surfaces and materials are not satisfactory he shall report the defects to the General Contractor who will see that the work is rectified. All surfaces shall be broom clean before the roofing material is applied.

Note: The required materials and workmanship for the surfaces to receive roofing should be included in the specifications for Mason and Carpenter Work.

Material—The material shall be 2 sheets of No. 1 Light Certain-teed Roofing, weighing 30 lb. to the roll of 108 sq. ft., single thickness, and not less than 90 lb. of Certain-teed Asphalt Cement to the 100 sq. ft. of roof area.

Application—Beginning at the low point of the roof deck, lay one-half sheet of No. 1 Light Certain-teed Roofing, mopping same to the roof deck with Certain-teed Asphalt Cement applied at a temperature of approximately 300 degrees F., mopping the underneath side of the sheet being laid, its full width, as well as the roof deck. Then lay the second sheet, which is 36 in. wide, so that the edge comes even with the outside edge of the half sheet, mopping the underneath side of this sheet its full width, as well as the top surface of the sheet previously laid. Lay the third sheet so that it laps over the second sheet 1 in. more than half its width (19 in.), mopping both the underneath side of this sheet its full width, and the top surface of the sheet previously laid. In the same manner lay the succeeding layers, completing the roof with the same lap, so that the entire area has two thicknesses of Certain-teed Roofing and 4 layers of Certain-teed Asphalt Cement at every point. The top edge of the roofing shall be nailed when necessary on steep or vertical surfaces. Such nails shall be covered with no less than two layers of asphalt and one layer of roofing. Finally, the lap shall be mopped with hot Certain-teed Asphalt Cement to a distance of approximately 2 in. each side of the lap.

Note: In cases where the roof surfaces are of open board sheathing and not plastered or otherwise ceiled, the above paragraph should be revised to include the following procedure.

(To lay the first sheet of roofing dry on the boards, nailing with two rows of ⅞ in. large-head roofing nails, staggered, on the upper or back half of the sheet, mopping between plies as described above and coating over the entire top surface of the finished roof with a uniform

Continued on next page

coat of hot Certain-teed Asphalt Cement, thus giving the same weight and amount of material but putting the extra coat of asphalt over the top surface instead of on the board sheathing.)

Flashings—Base flashings shall be constructed by extending the roofing up the wall not less than 6 in. and securing the top edge with standard roofing cleats, unless otherwise specified or shown on the detailed drawings.

Notes: The following notes regarding various types of flashings are suggested for architects' consideration. When other than the above specified flashing is desired the Mason and Carpenter Specifications should include the proper provisions to receive the type of flashing selected; also the above paragraph (Flashings) should be revised accordingly.

Certain-teed flashings can be counterflashed with sheet metal or entered into raggle blocks. If Certain-teed flashing is entered into raggle block, same shall be calked in with tarred oakum and pointed with Certain-teed Plastic Cement. For brick walls, we recommend 50 lb. Certain-teed counterflashing, 12 in. wide, be laid up in the third or fourth course of brick above the roof line by the bricklayer, to be used as counterflashing by the roofer. All concrete or tile walls extending above the roof line, where raggle block or metal counterflashing is not provided shall have a wood nailing strip embedded 6 to 8 in. above the roof line, so that top edge of flashing can be permanently secured. The drip edge of concrete decks, vertical walls and curbs, shall be provided with wood nailing strips.

Identification and Labels—The materials above mentioned shall bear the registered Certain-teed labels of the manufacturer, the Certain-teed Products Corporation.

Guarantee—This Contractor shall guarantee in writing, all roofing work for a period of ten (10) years from date of laying against all defects in material and workmanship. Any leaks that may develop in this roof within the period of this guarantee, due to defective material or workmanship furnished by this contractor, shall be repaired free of cost to the owner.

Certain-teed Asphalt Felt and Asphalt Built-up Roof on Wood and Masonry Surface

Guaranteed 10 Years

This is a form of roofing employed over wood sheathing, concrete, gypsum, cement tile, book tile, steel deck, etc., of any pitch, from a comparatively flat deck to the vertical wall, and is especially recommended for saw-tooth skylight construction and valleys.

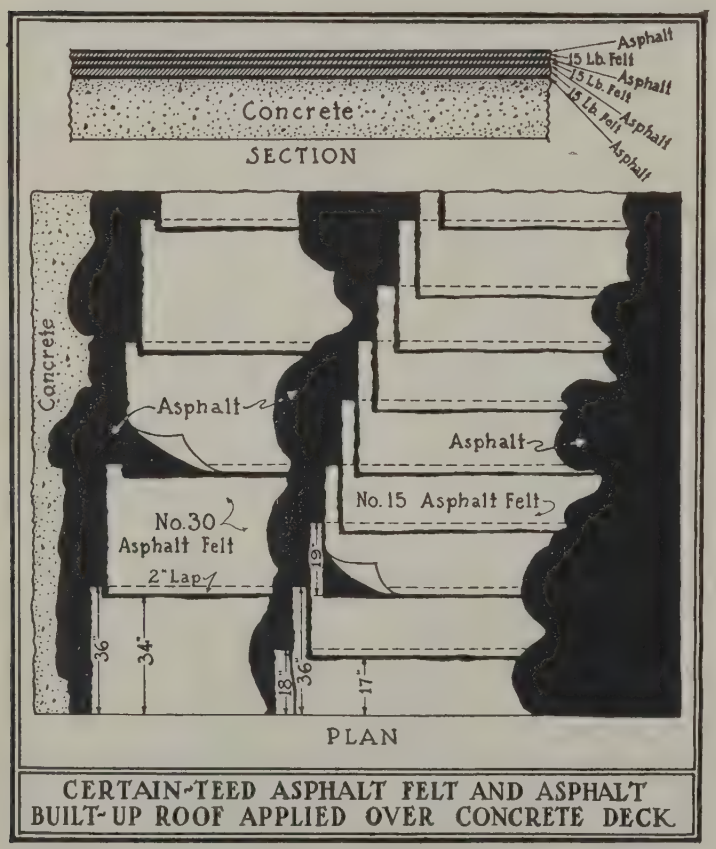
The roof decks must be smooth and dry, and evenly graded to gutters and outlets. Wood surfaces must be well seasoned and well nailed.

Asphalt Felt and Asphalt Built-up Roof over masonry is composed of the following, per square of roof area.

No. 30 Asphalt Saturated Felt per square	30 lb.
No. 15 Asphalt Saturated Felt per square (2 layers 30 lb. each)	60 lb.
Certain-teed Asphalt Cement	120 lb.
Total	210 lb.
When Asphalt Primer is required	1 gal.

Asphalt Felt and Asphalt Built-up Roof over wood is composed of the following, per square of roof area.

No. 30 Asphalt Saturated Felt per square	30 lb.
No. 15 Asphalt Saturated Felt per square (2 layers 30 lb. each)	60 lb.
Certain-teed Asphalt Cement	90 lb.
Total	180 lb.



CERTAIN-TEED ASPHALT FELT AND ASPHALT BUILT-UP ROOF APPLIED OVER CONCRETE DECK

Specifications for Certain-teed Asphalt Felt and Asphalt Built-up Roof on Masonry Surface

Notes: This roof is guaranteed for 10 years.

This specification is applicable where the roof surfaces are of concrete, gypsum tile, cement tile, book tile, steel deck, etc.; also for roofs of any pitch, from flat decks to vertical walls; sawtooth roof construction and valleys.

General—All roof (and side wall) surfaces, where indicated on the drawings, shall be covered with Certain-teed Asphalt Felt and Asphalt Built-up Roofing in strict accordance with these specifications and the special instructions of the manufacturer.

This Contractor shall examine all surfaces to be covered and shall see that they are smooth and evenly graded to gutters and outlets, also that they are thoroughly dry. If surfaces and materials are not satisfactory he shall report the defects to the General Contractor who will see that the work is rectified. All surfaces shall be broom clean before the roofing materials are applied.

Note: The required materials and workmanship for the surfaces to receive roofing should be included in the specifications for Mason Work.

Material—The material shall be one sheet of No. 30 Certain-teed Asphalt Felt, weighing approximately 30 lb. per 108 sq. ft., single thickness, and 2 sheets of No. 15 Certain-teed Asphalt Saturated Rag Felt, weighing approximately 15 lb. per 108 sq. ft., single thickness (the felt shall be 36 in. wide), and not less than 120 lb. of Certain-teed Asphalt Cement to the 100 sq. ft. of roof area. Asphalt to be applied at a temperature of approximately 350 degrees F.

Note: Where a priming coat is desired on the surfaces to be covered, include the following paragraph under above heading (Material):

(For the priming coat use not less than one gal. to 100 sq. ft. of Certain-teed Liquid Asphalt Cement, applied cold.)

Application—All surfaces to be covered shall receive a priming coat of Certain-teed Liquid Asphalt Cement, applied cold and well brushed in, using not less than 1 gal. to 100 sq. ft. Primer shall be allowed to dry before applying the hot asphalt.

Note: If primer is not desired, omit the above paragraph.

Beginning at the low point of the roof deck, lay one layer of 30 lb. Certain-teed Asphalt Felt, lapping each sheet 2 in., mopping same to the roof deck with approximately 30 lb. Certain-teed Asphalt Cement to the square. Over the 30 lb. Asphalt Saturated Felt thus laid, mop approximately 30 lb. of Certain-teed Asphalt Cement to the square, into which, while hot, lay 2 layers of 15 lb. Certain-teed Asphalt Felt (starting with one-half sheet), lapping each sheet 19 in. and mopping between sheets the full width of the lap with Certain-teed Asphalt Cement, using approximately 30 lb. of asphalt per square. Over the entire surface of the felt thus laid, mop a uniform coat of Certain-teed Asphalt Cement, using approximately 30 lb. of asphalt per square. This final or top coating shall be applied as the work progresses so that the felt shall not be left exposed.

Flashings—Base flashings shall be constructed by extending the felt up the wall not less than 6 in. Over the base flashing mop a strip of 15 lb. Asphalt Saturated Felt approximately 6 in. wide, the top edge of the felt shall be secured with a standard roofing cleat, unless otherwise specified or shown on the detailed drawings.

Notes: The following notes regarding various types of flashings are suggested for architects' consideration. When other than the above specified flashing is desired the Mason and Carpenter Specifications should include the proper provisions to receive the type of flashing selected, also the above paragraph (Flashings) should be revised accordingly.

Base flashings can be counterflashed with sheet or metal or entered into raggle blocks. If the asphalt felt base flashing is entered into raggle blocks, it shall be calked in with tarred oakum and pointed up with Certain-teed Plastic Cement. All concrete or tile walls extending above the roof line where raggle block or metal counterflashing is not provided, shall have a wood nailing strip embedded 6 or 8 in. above the roof line so that the top edge of the flashing can be permanently secured.

Identification and Labels—The materials above mentioned, shall bear the registered Certain-teed label of the manufacturer, the Certain-teed Products Corporation.

Guarantee—This Contractor shall guarantee in writing, all roofing work for a period of ten (10) years from date of laying against all defects in materials and workmanship. Any leaks that may develop in this roof within the period of this guarantee, due to defective material or workmanship furnished by the contractor, shall be repaired free of cost to the owner.

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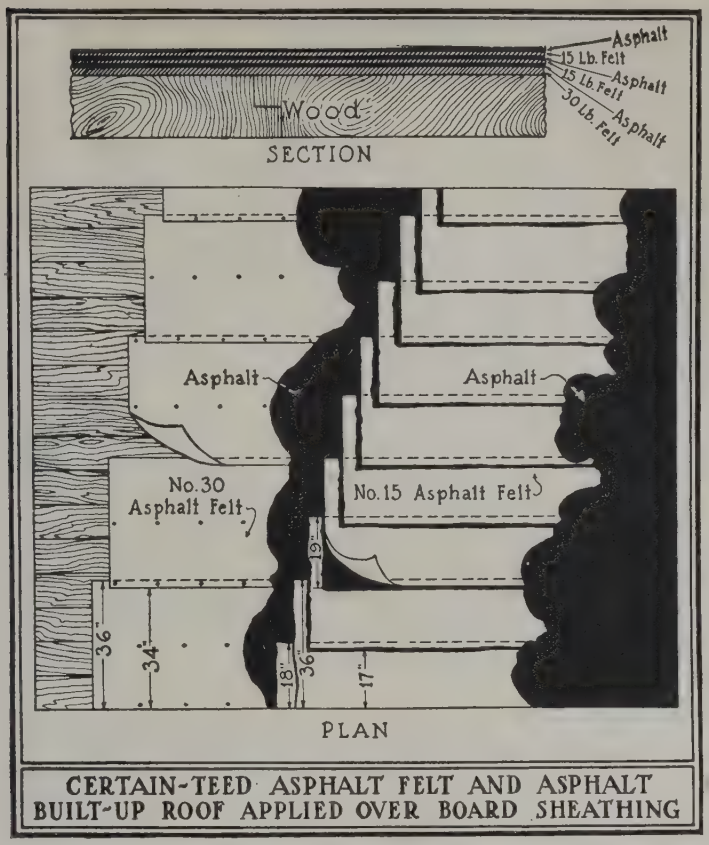


CERTAIN-TEED ASPHALT FELT AND ASPHALT BUILT-UP ROOF APPLIED OVER BOARD SHEATHING

Specifications for Certain-teed Asphalt Felt and Asphalt Built-up Roof on Board Sheathing

Notes: This roof is guaranteed for 10 years.

This specification is applicable where the roof surfaces are of wood sheathing; also for roofs of any pitch, from flat decks to vertical walls; sawtooth roof construction and valleys.

General—All roof (and side wall) surfaces, where indicated on the drawings, shall be covered with Certain-teed Asphalt Felt and Asphalt Built-up Roofing in strict accordance with these specifications and the special instructions of the manufacturer.

This Contractor shall examine all surfaces to be covered and shall see that the wood sheathing is well seasoned, well nailed, dry, smooth and evenly graded to gutters and outlets. If surfaces and materials are not satisfactory he shall report the defects to the General Contractor who will see that the work is rectified. All surfaces shall be broom clean before the roofing material is applied.

Note: The required materials and workmanship for the surfaces to receive roofing should be included in the specifications for Carpenter Work.

Material—The material shall be one sheet of No. 30 Certain-teed Asphalt Felt, weighing approximately 30 lb. per 108 sq. ft., single thickness, and 2 sheets of No. 15 Certain-teed Asphalt Saturated Rag Felt, weighing approximately 15 lb. per 108 sq. ft., single thickness (the felt shall be 36 in. wide), and not less than 90 lb. of Certain-teed Asphalt Cement to the 100 sq. ft. of roof area. Asphalt to be applied at a temperature of approximately 350 degrees F.

Application—Beginning at the low point of the roof deck, lay one layer of 30 lb. Certain-teed Asphalt Felt, lapping each sheet 2 in. and nailing through the laps and longitudinal centers with large-head, barbed roofing nails, 12 in. on center. Over the 30 lb. Asphalt Saturated Felt thus laid, mop approximately 30 lb. of Certain-teed Asphalt Cement, into which, while hot, lay 2 layers of 15 lb. Certain-teed Asphalt Felt (starting with one-half sheet), lapping each sheet 19 in. and mopping between sheets the full width of the lap with Certain-teed Asphalt Cement, using approximately 30 lb. of asphalt per square. Over the entire surface of the felt thus laid, mop a uniform coat of Certain-teed Asphalt Cement, using approximately 30 lb. of asphalt per square. This final or top coating shall be applied as the work progresses so that the felt shall not be left exposed.

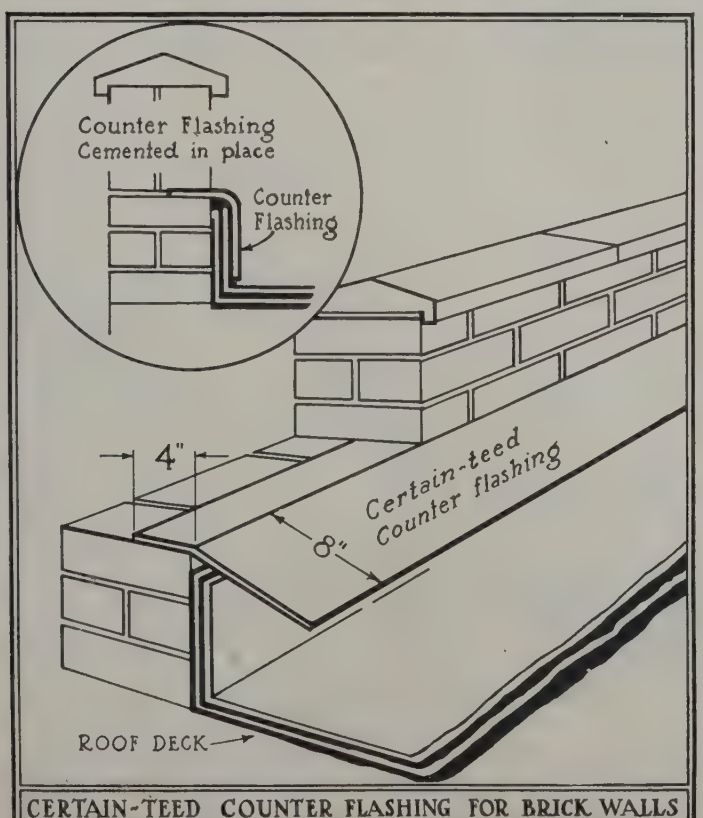
Flashings—Base flashings shall be constructed by extending the felt up the wall not less than 6 in. Over the base flashing mop a strip of 15 lb. Asphalt Saturated Felt approximately 6 in. wide, the top edge of the felt shall be secured with a standard roofing cleat, unless otherwise specified or shown on the detailed drawings.

Notes: The following notes regarding various types of flashings are suggested for architects' consideration. When other than the above specified flashing is desired the Mason and Carpenter Specifications should include the proper provisions to receive the type of flashing selected, also the above paragraph (Flashing) should be revised accordingly.

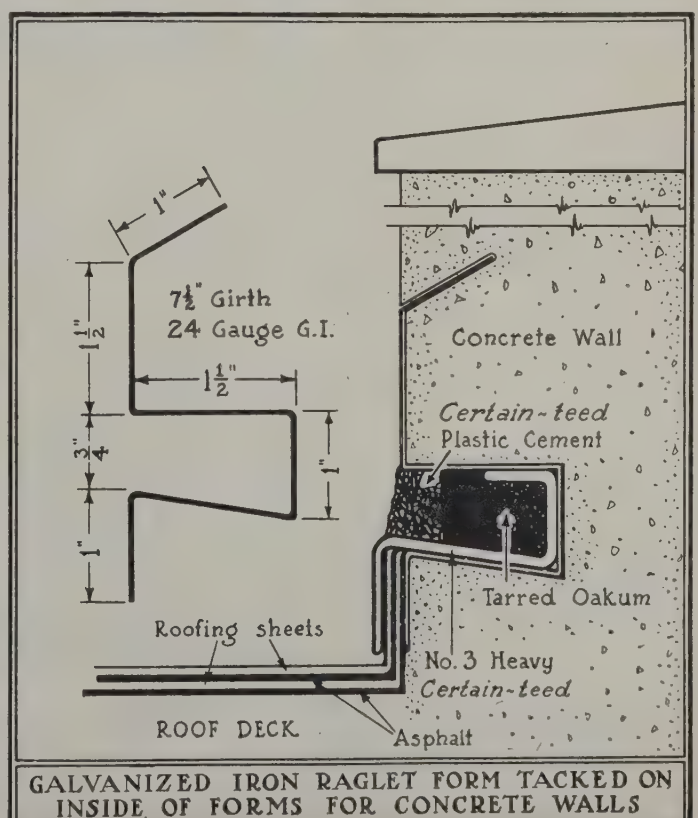
Base flashings can be counterflashed with sheet metal or entered into raggle blocks. If the asphalt felt base flashing is entered into raggle blocks, it shall be calked in with tarred oakum and pointed up with Certain-teed Plastic Cement. All concrete or tile walls extending above the roof line where raggle block or metal counterflashing is not provided, shall have a wood nailing strip embedded 6 or 8 in. above the roof line so that the top edge of the flashing can be permanently secured.

Identification and Labels—The materials above mentioned shall bear the registered Certain-teed labels of the manufacturer, the Certain-teed Products Corporation.

Guarantee—This Contractor shall guarantee in writing, all roofing work for a period of ten (10) years from date of laying against all defects in materials and workmanship. Any leaks that may develop in this roof within the period of the guarantee, due to defective material or workmanship furnished by this contractor, shall be repaired free of cost to the owner.



CERTAIN-TEED COUNTER FLASHING FOR BRICK WALLS



GALVANIZED IRON RAGLET FORM TACKED ON INSIDE OF FORMS FOR CONCRETE WALLS

JOHNS-MANVILLE CORPORATION

EXECUTIVE OFFICES

292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see page A15

Products

SPECIFICATION (BUILT-UP) ROOFING.

For other Johns-Manville Products, see pages in this edition, as follows:

Acoustical Treatment .....page A15
Transite Corrugated Asbestos.....page A175
Waterproofing and Dampproofing.....page A79
Rigid Asbestos Shingles.....page A478
Pipe Coverings and Insulations.....page B1672
Asbestos Ebony and Electrical Products.....page C3413

Also Packings for all purposes; Floorings; Refractory Cements and Furnace Linings; Asbestos Wood; Insulating Lumber; Asbestos Products of all kinds.

Specification (Built-up) Roofing

Applied only by the manufacturer or by approved roofing contractors.

A Johns-Manville Specification Roof consists of successive layers of asphalt impregnated felts embedded in and covered by asphalt. It has a smooth, black wearing surface; it will not rot or dry out; it does not need periodic repairs; and it is fireproof. No slag or gravel is ever used or needed on a Johns-Manville Roof. It will withstand the action of the elements because of the materials of which it is made.

Combinations of the materials listed below are used to make the three types of Johns-Manville Specification Roofs.

Materials—(1) Johns-Manville Standard Asbestos Built-up Roofing Felt—32-in. wide, asphalt-impregnated asbestos felt—60 lb. per square.

(2) Johns-Manville Asbestos Roofing Felt 15 lb.—32-in. wide, asphalt-impregnated asbestos felt—15 lb. per square.

(3) Johns-Manville No. 30 Base Felt—36-in. wide, asphalt-saturated rag felt—30 lb. per square.

(4) Johns-Manville Asphalt Roofing Cement.

(5) Johns-Manville Asphalt Concrete Primer.

Types of Specification Roofs—

Super Class A—Underwriters' Laboratories Classification. Composed of a base layer of Johns-Manville Standard Asbestos Roofing Felt 60 lb., and three layers of Johns-Manville Asbestos Roofing Felt 15 lb. Weighs 220 lb. per square over combustible construction and 250 lb. over non-combustible construction.

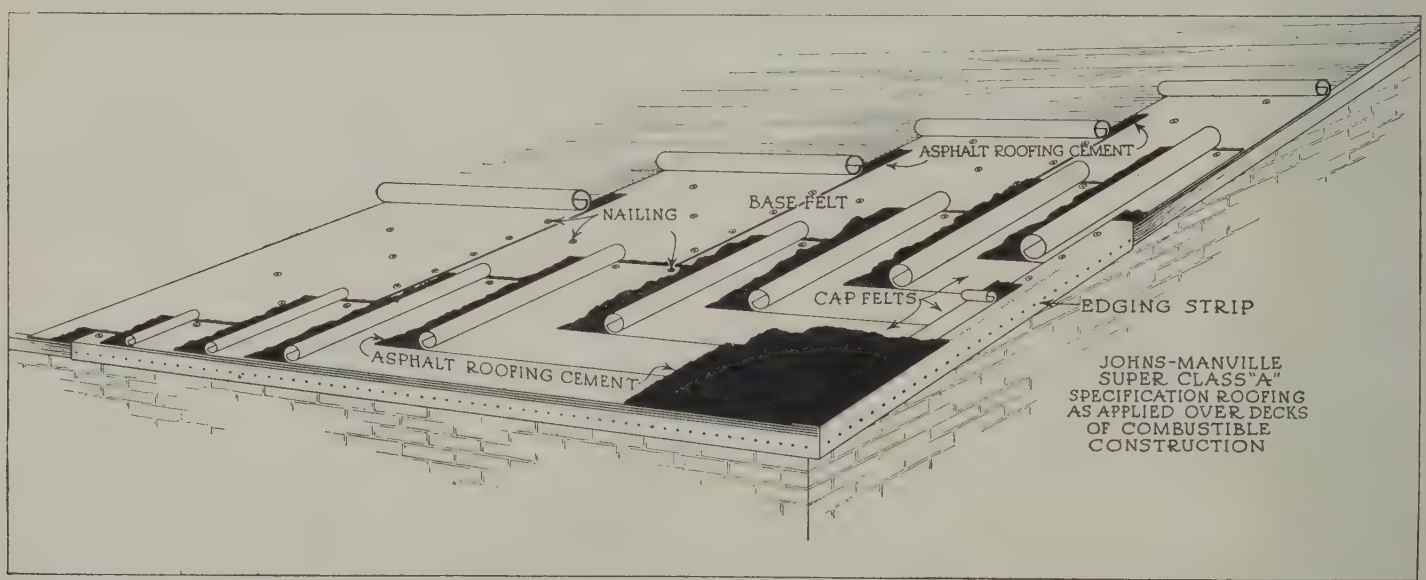
Class A—Underwriters' Laboratories Classification. Similar to Super Class A, except that there are only two layers of the 15-lb. cap felt. Weighs 175 lb. per square over combustible construction and 205 lb. over non-combustible construction.

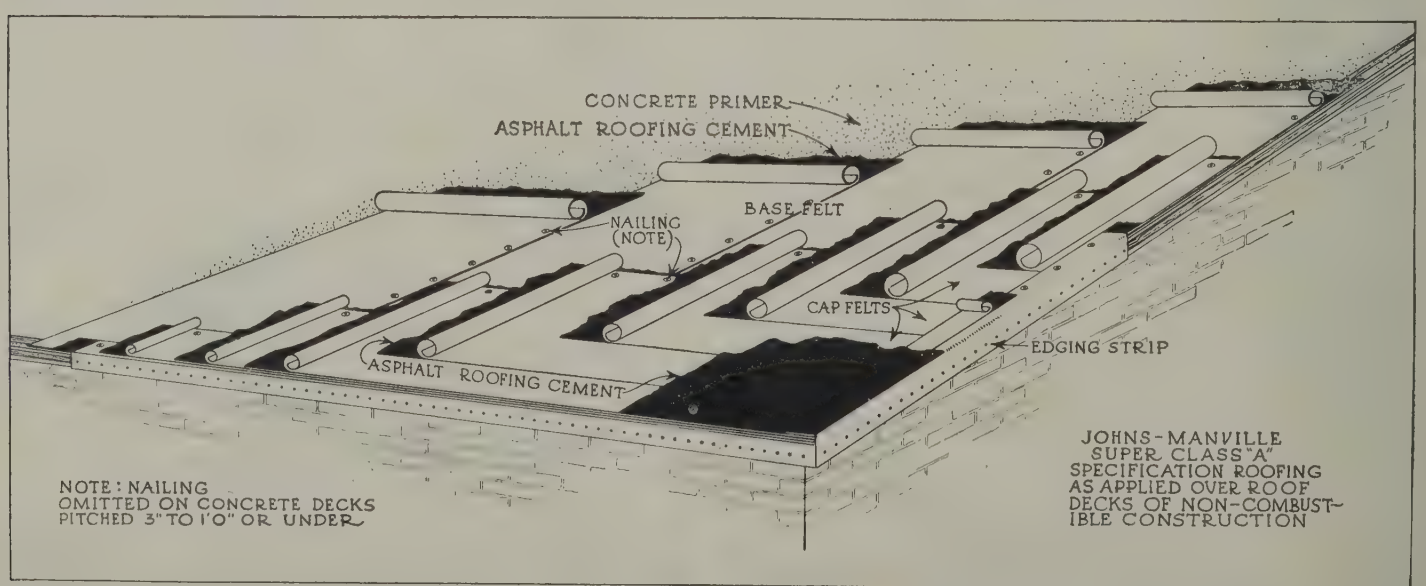
Combination—Similar to Class A, except that the base felt is Johns-Manville No. 30. Weighs 145 lb. per square over combustible construction, and 175 lb. over non-combustible construction.

Johns-Manville Service

Architects are urged to avail themselves of the free service of Johns-Manville Architects' Service Section and roofing engineers for consultation on any roofing problems.

Write for our detailed specifications.





F. J. LEWIS MANUFACTURING COMPANY

SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

Producers of Coal Tar Products Since 1887

200 Madison Avenue
NEW YORK, N. Y.

2500-2600 South Robey Street
CHICAGO, ILL.

PLANTS

CHICAGO, ILL.
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DOVER, OHIO
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FAIRMONT, W. VA.

Products

For the Roof:

Bonded Tarred Felt; Standard Tarred Felt; Asphalt Felt; Bonded Pitch; Victory Pitch; Standard Refined Tar; Liquid Roof Coating; Fibre Roof Coating; Plastic Cement.

For Other Constructions:

Slaters Felt; Threaded Felt; Waterproofing Pitch and Coating; Special Tar Paint; Wood Preservative.

For the Road and Walk:

Road Tars and Paving Pitch; Hot or Cold Patching Tar.

"Built-up Roofs"

Our Standard Tarred Felt and Victory Pitch used in the construction of built-up tarred felt, pitch and gravel roofs, are manufactured in accordance with the requirements of the U. S. Government Master Specifications, Underwriters' Laboratories, Inc. and the United Roofing Contractors Association of America. These products are accorded Class "A" rating by the Underwriters' Laboratories, Inc. and may be obtained with the Underwriters' labels, U.R.C.A. labels and our own manufacturer's labels, upon request.

Bonded Roofs—Our Bonded Felt and Bonded Pitch are especially selected for use only on 10-year and 20-year Bonded Roofs. A surety bond issued by the National Surety Company is furnished only upon completion of a 10-year or 20-year Bonded Roof, which has been subject to the rigid inspection of our own inspector during its entire construction by a reliable, responsible and approved roofing contractor. Specifications on our Bonded Roof provide for 5-ply construction for use over boards (entitled to 20-year guarantee bond) and 4-ply construction for use over boards (entitled to 10-year guarantee bond); also, 4-ply construction for use over concrete (entitled to 20-year guarantee bond) and 3-ply construction for use over concrete (entitled to 10-year guarantee bond).

Standard Construction Roofs—Where the surety bond and expert inspection service are not essentially of interest, the application of our Standard Tarred Felt and Victory Pitch in accordance with approved specifications, using 4-ply and 5-ply over boards and 3-ply and 4-ply over concrete, represent the most modern and satisfactory type of approved roof construction.

Specifications of Bonded Roofs

5-ply Roof for Use over Boards, 20-Year Guarantee Bond—(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Lay one (1) thickness of sheathing paper or unsaturated felt weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

(b) Over the entire surface lay two (2) plies of Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one and nail as often as is necessary to hold in place until remaining felt is laid.

(c) Coat the entire surface uniformly with Bonded Pitch.

(d) Over the entire surface lay three (3) plies of Bonded Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Bonded Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of felt.

(e) Over the entire surface pour from a dipper a uniform coating of Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(f) The use of copper or lead for flashings and counterflashings is recommended.

*(g) See Note below.

4-ply Roof for Use over Boards, 10-year Guarantee Bond—(Applies for flat surfaces or where the grade does not exceed two (2) inches per foot.)

The roof deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

(b) Over the entire surface lay two (2) plies of Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

(c) Coat the entire surface uniformly with Bonded Pitch.

(d) Over the entire surface lay two (2) plies of Bonded Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Bonded Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than one (1) ply of felt.

(e) Over the entire surface pour from a dipper a uniform coating of Bonded Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The felt shall be laid without wrinkles or buckles, not less than one hundred and twenty-five (125) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(f) The use of copper or lead for flashings and counterflashings is recommended.

*(g) See Note below.

4-ply Roof for Use over Concrete, 20-year Guarantee Bond—(Applies for flat surfaces or where the grade does not exceed one (1) inch to the foot.)

The roof deck shall be smooth, firm, dry and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Coat the concrete uniformly with Bonded Pitch.

(b) Over the entire surface lay four (4) plies of Bonded Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Bonded Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt.

(c) Over the entire surface pour from a dipper a uniform coating of Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(d) The use of copper or lead for flashings and counterflashings is recommended.

*(g) See Note below.

3-ply Roof for Use over Concrete, 10-year Guarantee Bond—(Applies for flat surfaces or where the grade does not exceed one (1) inch per foot.)

The roof deck shall be smooth, firm, dry and free from loose material. If roof deck slopes, it shall be properly graded to outlets.

(a) Coat the concrete uniformly with Bonded Pitch.

(b) Over the entire surface lay three (3) plies of Bonded Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Bonded Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt.

(c) Over the entire surface pour from a dipper a uniform coating of Bonded Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

The felt shall be laid without wrinkles or buckles, not less than one hundred and seventy-five (175) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above four hundred (400) degrees Fahrenheit.

(d) The use of copper or lead for flashings and counterflashings is recommended.

*(e) See note.

**Note:* Our twenty-year or ten-year bonded roof shall be applied by a roofing contractor approved by us. He shall furnish our Surety Bond issued by National Surety Company, covering said roof, exclusive of flashings, for a period of ten [10] or twenty [20] years from date of completion. Such bond is obtainable for all roofs, so applied when they are of sufficient size and in such localities where this organization's Inspection Services are available.

THE RUBEROID CO.

Manufacturers of Genuine Ruberoid Weatherproofing Products

NEW YORK, N. Y. CHICAGO, ILL.

OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

Genuine Ruberoid Products

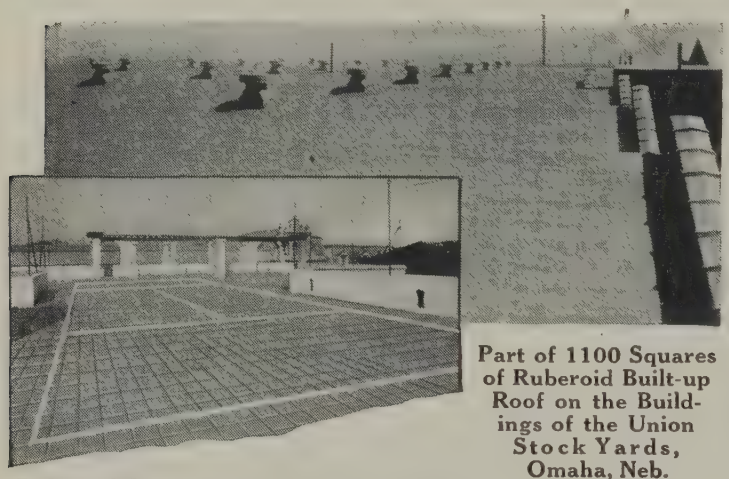
BUILT-UP ROOFING; ASBESTOS SLATES; ASPHALT SHINGLES (Massive Units and Massive Hex-strips, Standard Units, Standard Strips—Hexagonal, Octagonal and Square-tab); WATERPROOFING COMPOUND.

Also, Roll-roofing (Smooth-surfaced and Mineralized); Building Paper; Felts.

Samples and descriptive literature of any Ruberoid product will be gladly sent upon request.

Ruberoid Built-up Roofing

A Ruberoid Built-up Roof consists of one layer of Ruberoid Asphalt Felt and two layers of Ruberoid Cap-sheet bonded together with Ruberoid Roofing Asphalt. Every part is made of time-tested materials.



Part of 1100 Squares of Ruberoid Built-up Roof on the Buildings of the Union Stock Yards, Omaha, Neb.

Ruberoid Roof Showing Special Tile Finish

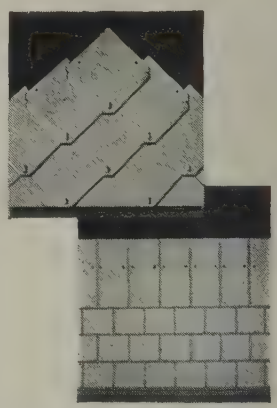
Ruberoid Cap-sheet in itself is a mechanically perfect barrier against the ravages of the weather. The felt, saturant and coating are the same as those used in Ruberoid Roll-roofing which has stood the test of service for more than 30 years. The fact that the asphalt coating is applied by machine in our factories reduces the risk from human error or negligence in application, and permits the use of a tougher, denser and more durable asphalt than could possibly be handled on the job by labor.

The heavy weather coating of Ruberoid Cap-sheet makes it unnecessary to apply a special surfacing. If special finishes are desired, however, Ruberoid Built-up Roofs are adaptable to a wide range of treatments. They may be painted with green or red Ruberoid Roof-coating or finished with slag, gravel, tile, etc.

The bonding material, Ruberoid Roofing Asphalt, is 98.5% pure. It is practically smokeless and free from dirt. Roofers' kettles seldom need cleaning until the job is finished. It heats readily to mopping consistency but will stand unusually high temperatures without flashing or altering in composition.

Specifications—There are several specifications for Ruberoid Built-up Roofs—a quality roof to meet all requirements and every appropriation. *Send for a bound set for your files.*

Ruberoid Asbestos Slates



Ruberoid Asbestos Slates

Ruberoid Asbestos Slates are made from ingredients long recognized for durability—asbestos and cement. They will not warp, crack or decay and are as fire-retardant as any materials known and used for roofing.

They may be obtained in two styles—the Hex-agonal and the American.

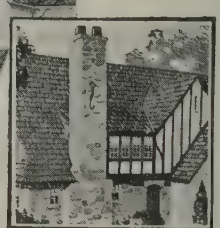
The 12x12-in. Hex-agonal type and the 8x16-in. American style slates may be obtained in colors of Apple-green, Variegated-green, Venetian-red, Variegated-brown, Mottled-brown, Natural-gray and Blue-black.

You have the same choice of colors in the 16x16-in. Hex-agonal slates with the exception of Variegated-brown and Blue-black.

Ruberoid Massive Unit and Massive Hex-strips

In *Genuine* Ruberoid Massive Unit-shingles or Massive Hex-strips, you have a choice of two substantial roof coverings. While widely different in design, they are identical in quality. Each is *40%* thicker than the usual shingle of its type. Each can be secured in a variety of rich non-fading colors and blends. The Hex-strips can also be had in 4-tones, pre-assorted, in the bundles for easy application.

Ruberoid Massive Hex-strips



Ruberoid Massive Units

Either of these extra-thick shingles give pronounced depth of shadow line—the roof massiveness you have heretofore looked for in asphalt shingles, but seldom found. In addition, the extra thickness assures greater protection and longer roof life. Due to labor-saving features, this finished roof costs no more than one laid with ordinary composition shingles.

Ruberoid Waterproofing Compound

Ruberoid Cement Waterproofing, when mixed with portland cement, makes leaky cellars or pits bone dry. Its use in stucco entirely eliminates "hair cracking." It differs from other waterproofing compounds in that it does not delay the set or reduce the strength of the mortar.

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street
CHICAGO, ILL.

Products

ASPHALT ROOFING; SATURATED FELT; RIDGE STRIP; ASBESTOS CEMENT SHINGLES; SLATE SURFACED SHINGLES; ASBESTOS ROOF CEMENT; ORIENTAL ROOFING.

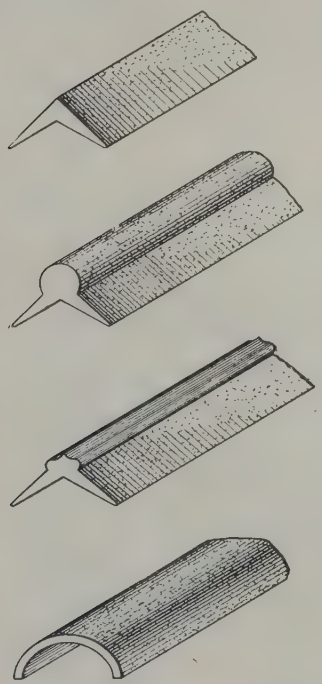
Also manufacturers of Acoustical Board, Baseboard Mouldings and Stair Tread.

For Expansion Joints, see page A131.

For Wall Copings, Flashing Block and Wall Aprons, see page A557.

For Insulation, Roof Cement, Asphalt Paint and Industrial Flooring, see page B1996.

For Sewer Liners, Caulking Belts, Sewer Pipe Compound and Bitupack, see page C2737.



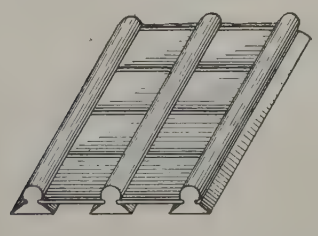
Servicised Ridge Strips

These are fabricated for the purpose of thoroughly waterproofing and covering ridges. Where composition roofing is utilized they are furnished with granular slate material or mineral material to suitably blend with the roof proper. They are better waterproofing; because moisture will not rust them and they will not rot. They are fabricated from bituminous material, linear fiber and mineral matter; formed in various designs, and are free from breakage by hail or shock. They are flexible and tough; can be readily handled and secured to the roof.

Servicised Artificial Slate Strips

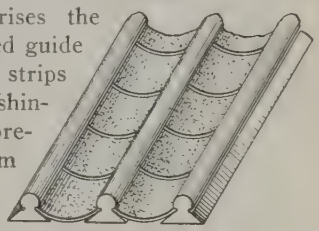
These comprise strip roofing fabricated from bituminous material, slate dust and linear fiber, making a tough, hard and flexible strip resembling slate, and are fabricated with various finishes. They will not blow up in the wind, and are practically fireproof—at least, extremely fire resisting because of a large mineral content. They are finished in various colors, making a highly satisfactory roofing material.

Servicised Asbestos Cement or Slate Roofing



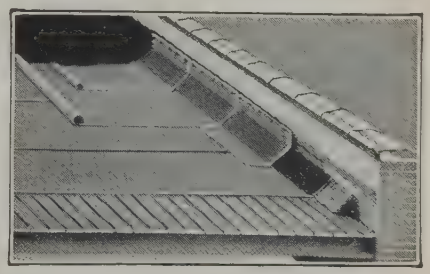
This style of roofing comprises guide strips prepared from bituminous material, linear fiber and mineral matter, finished in various colors, and as guides or anchoring strips for asbestos cement slates, genuine slate and tile materials, it effects economy, is light in weight, resists shock to better advantage and makes a fireproof roof. It is effective in design and economical in laying up.

Servicised Oriental Roofing



This comprises the use of Servicised guide and anchoring strips with cupped shingles. It is prepaired from either composition roofing or asbestos cement mixtures. Shingles may be utilized of various colors, as shown in the illustration, or a single strip may be utilized instead of the shingles for filling the space between the bituminous guides. It forms an effective, economical, Oriental design, beautiful in appearance and economically laid up.

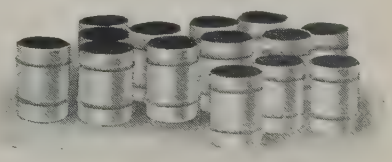
Servicised Saturated Felt



This is particularly adapted for built-up roofing purposes, comprising long linear fiber felt thoroughly saturated, and when employed with Servicised asphalt makes a highly effective built-up roof. The asphalt binder used for covering has a melting point approximating 250° to 260°, with a penetration at freezing approximating 21° to 23° insuring a highly flexible winter-wearing roof covering.

Asphalts ranging from 25° to 35° penetration at 32° F., having high melting point furnished on order.

Servicised Roofing Asphalt



This is adapted for waterproofing purposes, and coating over concrete surfaces. It is an effective asphalt for filling crevices, expansion joints and is a general utility asphalt.

Servicised Plastic Asbestos Cement and Liquid Roof Coating

These are well adapted to troweling and coating over old roofs, the plastic cement being particularly adapted for wall purposes, in making them waterproof and insulating them at the same time. This material is adapted for reservoir walls and old roofs, and for coating over brickwork on boilers, etc. It is a Servicised quality product.

H. F. WATSON COMPANY

Asbestos Built-up Roofings Adaptable to Any Type of Roof

ERIE, PA. CHICAGO, ILL.

Products

HEAVY BASE ASBESTOS BUILT-UP ROOFING over wood deck.

THREE-PLY ASBESTOS BUILT-UP ROOFING over concrete.

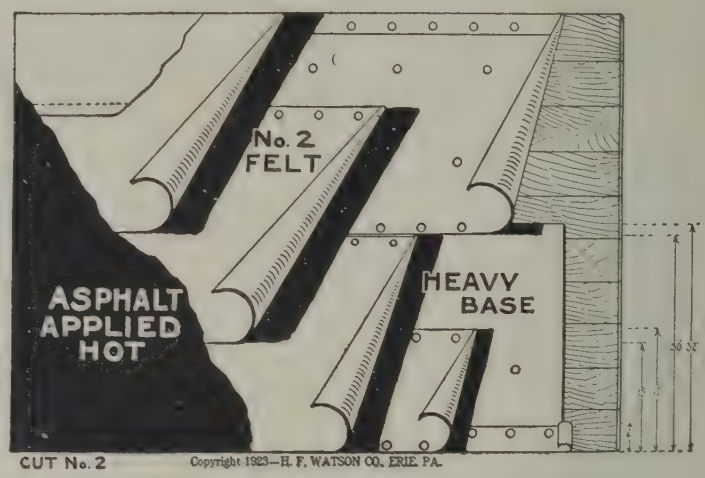
Heavy Base Asbestos Built-up Roofing Over Wood Deck

Abbreviated Specification No. A67-2-W—Roofing to be H. F. WATSON COMPANY'S 3-ply, three-layer Asbestos Built-up Roofing, Specification No. A67-2-W, applied in accordance with manufacturer's complete specifications for wood sheathing surface.

Approximate Materials Required—Approximate quantity of materials per 100 sq. ft. of rock deck surface:

One roll of Watson's No. 67 Asbescoat Asbestos Roofing, 108 sq. ft., 32 in. wide; approximate weight, 65 lb.

Two single plies of Watson's Imperial No. 2 Asbestos Asphalt Saturated Felt, 32 in. wide; approximate weight, 28 to 30 lb.



Watson's Imperial Asphalt, 50 lb.; Watson's Imperial Asphalt, for flood top coat, 20 lb.—total 70 lb.

One pound ⅞-in. small head roofing nails.

One pound flat tin discs.

Three-ply Asbestos Built-up Roofing Over Concrete

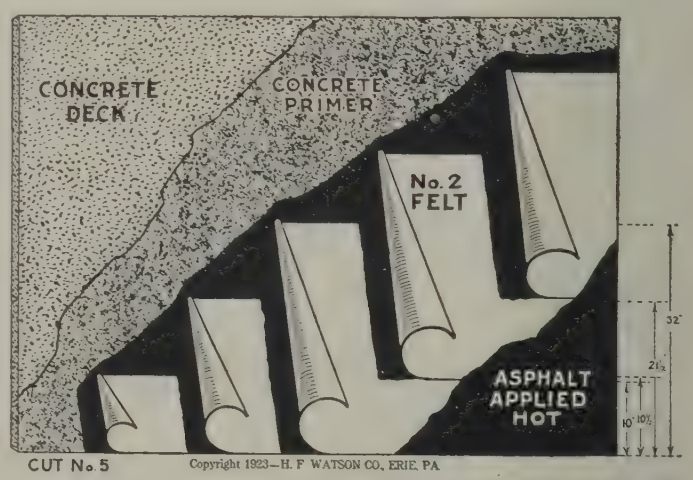
Abbreviated Specification No. A35-2-C—Roofing to be H. F. WATSON COMPANY'S 3-ply, three-layer Asbestos Built-up Roofing, Specification No. A35-2-C, applied in accordance with manufacturer's complete specifications for concrete surface.

Approximate Materials Required—Approximate quantity of materials per 100 sq. ft. of roof deck surface:

Watson's Asphalt Concrete Primer ¾ to 1 gal., 10 lb.

One (1) square Watson's No. 35 Imperial Asbestos Saturated Felt, 32 in. wide; approximate weight 35 lb.

Two single plies of Watson's Imperial No. 2 Asbestos Saturated Felt, 32 in. wide; approximate weight 28 to 30 lb.



Watson's Imperial Asphalt, 85 lb.; Watson's Imperial Asphalt, for flood top coat, 20 lb.—total 105 lb.

Detailed Specifications

Complete portfolio of detailed specifications will be furnished on request—A.I.A. File No. 12b1.

This portfolio includes specifications for various types of built-up asbestos roofs, also built-up asphalt saturated rag felt built-up roofs (smooth surfaced) as well as coal tar pitch, felt and gravel roofs.

H. F. WATSON COMPANY is absolutely unbiased as to type of felt and waterproofing compound used.

We manufacture all three of the most popular types of built-up roof coverings, i.e.: asbestos felt, asphalt felt and tarred felt.

We only recommend the type of roof most suitable for the particular construction.

Ready-to-lay Asbestos Roofings

Asbestos Roofings—White Top—

White Seal Three (3) Ply, in rolls

White Seal Three (3) Ply, in sheets
(Packed 6 squares to the crate)

White Seal Four (4) Ply, in sheets
(Packed 5 squares to the crate)

Fire Chief Four (4) Ply, in rolls (burlap centre)

Asbestos Roofings—Black Top—

Black Seal three (3) Ply, in rolls

Black Seal Three (3) Ply, in sheets
(Packed 6 squares to the crate)

Black Seal Four (4) Ply, in sheets
(Packed 4 squares to the crate)

SAMUEL CABOT, INC.

Stained Shingles

141 Milk Street, BOSTON, MASS.

For Branch Offices and Agencies, see page B2040

Products

CABOT'S CREOSOTE-STAINED SHINGLES.

For Building Insulation, see page B1625; for Paints, Stains and Wood Preservatives, see pages B2040-2041.

Cabot's Creosote-stained Shingles

Description—Grade A, U. S. Dept. of Commerce Standard, red cedar shingles, ready-stained with Cabot's Creosote Shingle Stains.

Sound live wood; uniform thickness; edge grain; even butts; do not warp or curl. Thoroughly preserved by complete immersion in Cabot's Creosote. Sold in original bundles, as packed at the mill, guaranteed full count.

The warmest, the most economical and the most picturesque house finish.

Standard Colors—***Weathering Browns, Light and Dark Bungalow Browns, Bark Brown, Warm Brown; Light and Dark Tile Reds, Maroons, etc.***—A complete range of these handsome and durable colors for roofs and walls.

Light, Dark and Medium Moss Greens—Our moss greens have a richness and depth of color such as can only be produced by the strongest and purest pigments.

Insulated with Cabot's Quilt; Exterior Walls, Cabot's Stained Shingles; Exterior Trim Finish with Cabot's Old Virginia White Collopakes

JOHNSON & CARLSON, Youngstown, Ohio, General Contractors

Weathered Grays—Our grays give the true natural seashore gray tones.

White Shingles—Cabot's Shingles are also furnished ready-stained with No. 1166 White Primer, to be finished after the shingles are laid, either with (1) a brush coat of No. 1166, (2) one or two brush coats of Cabot's Old Virginia White or (3) one or two coats of Cabot's Double-White. See page B2041 for description of these materials.

Blended Roofs—All color combinations are blended in the bundle so they can be laid without blending on the job.

Anteaks and Irregular Butts—"Royals" treated by our patented machines to give aged and antique effects, and with irregular butts, are sold under our trade-mark "Anteaks." Irregular butts are also furnished in regular type shingles, all sizes, at slight extra cost.

Samples

Samples of standard colors sent on request.

Cabot's Creosote Stained Shingles

Sizes

24-in. "Royals," 18-in. "Perfections" and 16-in. "XXXXX," the highest grade shingles made, are used exclusively for Cabot's Creosote-stained Shingles.

"Royals" for walls, laid with 10 to 12-in. exposure, are much more artistic than dressed siding, much warmer and the cost is actually lower. "Perfections" and "XXXXX" are the standard regular sized shingles for walls and roofs.

Deliveries

Prompt deliveries from staining plants in Boston, Chicago, Baltimore, Philadelphia, Newark, New Rochelle, Columbus, Cleveland, Los Angeles, Seattle, San Francisco, etc., and from warehouses at all central points.

COVERING CAPACITY OF CABOT'S CREOSOTED SHINGLES, SQUARE FEET PER SQUARE AT VARIOUS EXPOSURES—STANDARD GRADES—RANDOM WIDTHS

	Approx. weights per square, lb.	4-in. exp.	4½-in. exp.	5-in. exp.	5½-in. exp.	6-in. exp.	6½-in. exp.	7-in. exp.	7½-in. exp.	8-in. exp.	8½-in. exp.	9-in. exp.	10-in. exp.	11-in. exp.	12-in. exp.
1 square of 16 in. (4 bun. 20/20 pack)	160	80	90	**100**	110	120	130	140	150	...	...	...	...	...	...
1 square of 18 in. (4 bun. 18/18 pack)	180	...	...	...	**100**	109	120	129	138	148	157	...	...	...	...
1 square of 24 in. (3 bun. 14/14 pack)	167	...	...	...	...	...	...	...	75	80	85	90	**100**	110	120

Note: This table is based on 100 sq. ft. to each square. But Cabot's Shingles are all sold in the original bundles as packed at the shingle mills under the Official Grading and Packing Rules of the Shingle Manufacturers Association and the tables of the Red Cedar Shingle Bureau show that *our* square actually covers from 3% to 8% more than *our* table claims.

CREO-DIPT COMPANY, INC.

STANDARD STAINED SHINGLE COMPANY

Manufacturers of Stained Shingles

GENERAL OFFICES

NORTH TONAWANDA, N. Y.

FACTORIES

NORTH TONAWANDA, N. Y. MINNEAPOLIS, MINN. KANSAS CITY, MO. VANCOUVER, B. C.

SALES OFFICES IN PRINCIPAL CITIES

CANADA: Creo-Dipt Company, Ltd., General Office, TORONTO, ONT.

Products

Originators and sole manufacturers of genuine Creo-Dipt Stained Shingles for roofs and sidewalls.

Creo-Dipt Thatch Stained Shingles to produce the thatched effect.

Creo-Dipt Brushcoat Shingle Stains.

Creo-Dipt Dixie White Stain.

Creo-Dipt Preserving Oil.

CREO-DIPT
TRADE-MARK
(Reg. U. S. Pat. Off.)

Leading Lumber Dealers Everywhere Carry Stock

Creo-Dipt Stained Shingles are carried in stock by lumber dealers in all parts of the United States and Canada. Shipments are made from our plants at North Tonawanda, N. Y., Minneapolis, Minn., Kansas City, Mo., and Vancouver, B. C.

Write for New Unusual Roof Treatments

A Service Department is maintained to co-operate with architects, contractors and home builders. We go over plans carefully, giving the approximate quantity of Creo-Dipt Shingles required. This department also is continually developing new and unusual roof treatments. Write us for suggestions. There is a trained Creo-Dipt salesman in every locality who will welcome the opportunity to serve you. Look for the name *"Creo-Dipt"* in your phone book.

Superiority of Creo-Dipt Stained Shingles

Genuine Creo-Dipt Stained Shingles are made only from selected cedar with the grain of the wood running 100% straight from top to bottom of each shingle. This means that they will lay flat and will not split. They come stained, bundled, and ready to lay in grades, 16″, 18″ and 24″ long.

Genuine Creo-Dipts are now preserved by a patented exclusive Creo-Dipt process. These new process Creo-Dipts carry a 35% heavier coating of stain than we could secure by ordinary hand-dipping. They resist weather with the absolute minimum of upkeep.

Creo-Dipt Stain is made from the strongest pigments, ground to the finest possible condition in linseed oil in our own mills. Excepting Dixie White, Creo-Dipt Shingles do not require brushcoating after they are on the building. (See the paragraph on Dixie White.)

Stain for Retouching, Patching and Cutting

With every order of Creo-Dipt Shingles, a small can of Creo-Dipt Stain is shipped for retouching the shingles which have to be trimmed or cut to fit flashing, valleys and other conditions.

On Old Homes, Too

Many architects are now rebeautifying old homes with Creo-Dipts laid right over the old siding and roof. Write for photographs.

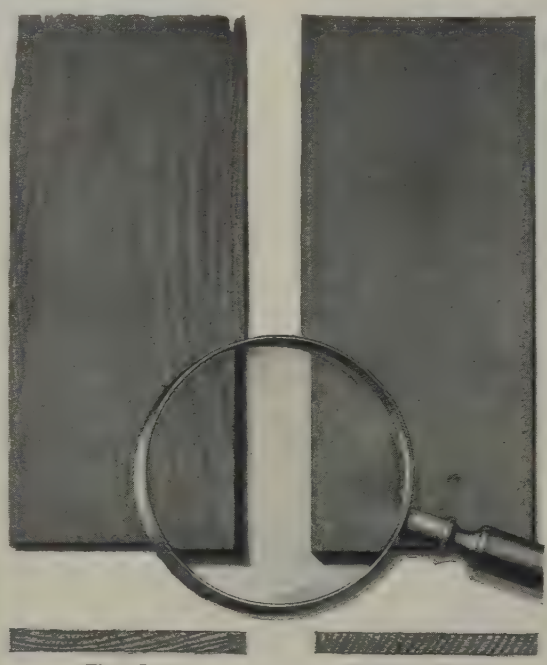
Sizes and Styles of Creo-Dipt Stained Shingles

Note: In specifying, give the name indicating the thickness in addition to the length of the shingles.

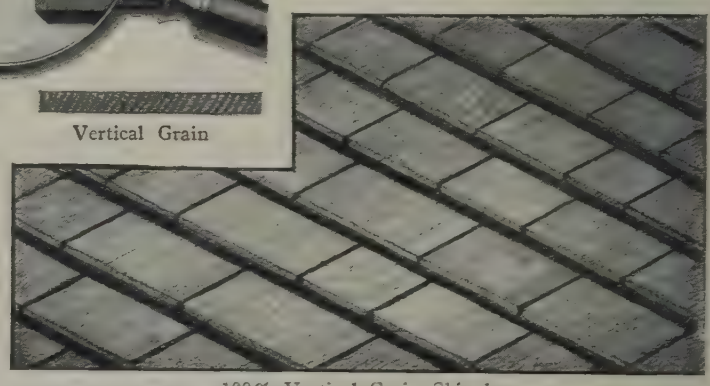
Thatched Effect—Special Creo-Dipt Stained Shingles are furnished for thatch roofs ready for application. Complete instructions and details will be supplied to architects and builders.

Graduated Exposure—The best effect is secured by starting at the eaves with the large Creo-Dipt Aristocrat at wide exposure, working through thinner grades at decreasing exposures up to the ridge.

Blended Color Treatment—Unusual artistic results can be obtained by using several shades of the same color starting with the darkest shade at the eaves, working to the lightest shade at the ridge.



Flat Grain Shingle
After a few years' service it curls, splits and rots



100% Vertical Grain Shingles
Sound and free from imperfections, they will not rot, split nor curl

Comparison of Flat Grain and Vertical Grain Shingles

Continued on next page

Variegated Effects—Creo-Dipt Shingles can be furnished packed promiscuously in each bundle in any proportion of the various shades which you select.

Dixie White—Creo-Dipt Dixie White is a soft velvety white shingle stain. Two brushcoats give the desired Colonial White effect to the Creo-Dipt Stained Shingles after they are laid—the shingles having been creosoted and stained at our factories with a special preparation, color No. 207, which acts as a filler, primer, binder and preservative. Special samples on request.

Creo-Dipt Aristocrats—24 inches long; random widths; 1 inch in thickness at the thick end.

Creo-Dipt Pilgrims—(Hand split) 22 to 24 inches long; random widths; ½ to 1¼ inches in thickness at the thick end.

Creo-Dipt Ambassadors—(Shakes) 24 inches long; random widths; ½ inch thick; corrugated face to give effect of old hand-split shingles.

Creo-Dipt Royals—24 inches long; random widths; ½ inch in thickness at the thick end.

Creo-Dipt Perfections—18 inches long; random widths; 5 shingles will measure 2¼ inches in thickness at the thick end.

Creo-Dipt Eurekas—18 inches long; random widths; 5 shingles will measure 2 inches in thickness at the thick end.

Creo-Dipt XXXXX—16 inches long; random widths; 5 shingles will measure 2 inches in thickness at the thick end.

Creo-Dipt XXX—16 inches long; random widths; 6 shingles will measure 2 inches in thickness at the thick end.

Covering Capacity of Creo-Dipt Stained Shingles

All shingles are sold on the basis of the square (100 square feet).

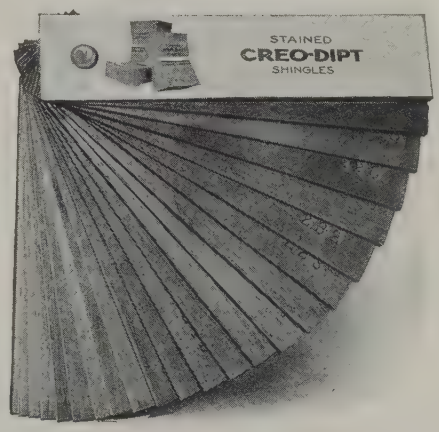
The table below gives the covering capacity of a square of shingles at various exposures:

Name	Length in.	Exposure to the weather, in.									
		5	5½	6	6½	7	7½	8	10	10½	11
Aristocrats*	24	....	....	....	....	....	75	....	100	105	110
Pilgrims*		....	....	....	....	70	75	....	100	105	110
Ambassadors*		....	....	....	....	....	75	....	100	105	110
Royals*		....	....	....	....	....	75	....	100	105	110
Perfections	18	....	100	111	120	129	138	148	....	....	....
Eurekas		....	100	111	120	129	138	148	....	....	....
XXXXX	16	100	110	120	130	140	....	....	....	....	....
XXX		100	110	120	130	140	....	....	....	....	....

*These shingles usually laid 10 inches to the weather on sidewalls and 7 or 7½ inches on roofs. Pilgrims, being hand-split, require a water-tight sub-roof.

Shades

Creo-Dipt Stained Shingles are manufactured in any color or combination of colors. A color pad, showing a wide choice of shades, will be sent on request. We will make special shades or submit samples without charge.



Creo-Dipt Color Pad

Do Not Be Mis-led

Do not be mis-led into thinking that any stained shingles are Creo-Dipt. The trade-mark, "Creo-Dipt" on every bundle protects you and your client. The quality of Creo-Dipt Shingles has no substitute. Be sure to get real Creo-Dipt.

Home at Scarsdale, N. Y.

Designed by W. Stanwood Phillips, New York, N. Y.
Showing how the true Thatched Roof effect is obtained with Creo-Dipt stained shingles

Home at Riverside, N. Y.

Dwight J. Baum, Architect, Riverdale-on-Hudson, N. Y.
24-inch Creo-Dipt stained shingles used on sidewalls for wide shingle exposure. Color, Dixie White for true Colonial white effect. 16-inch 5X Creo-Dipt stained shingles used on roof. Color, moss green

THE EDHAM COMPANY, INC.

Sole Manufacturers of Edham Kolored Shingles

GENERAL OFFICE
MINNESOTA TRANSFER, ST. PAUL, MINN.
MILL: VANCOUVER, B. C.
FACTORIES: MINNESOTA TRANSFER, ST. PAUL, MINN., TORONTO, ONT., and VANCOUVER, B. C.
SALES OFFICES IN ALL PRINCIPAL CITIES

Products

Sole manufacturers of EDHAM KOLORED SHINGLES for roof and sidewall covering, made in 31 colors, in addition to any variegated or mixed color effect. Special colors to order, as specified.

EDHAM KOLORED THATCH SHINGLES, to produce thatched effect.

Edham Kolored Shingles

They are manufactured from red cedar, which wood contains a natural preservative, and attains its greatest degree of perfection in the forests of the Canadian Province of British Columbia, owing to soil properties, rain fall and drainage peculiar to that region. Edham Kolored Shingles are cut from these forests and manufactured in one of British Columbia's most modern mills, located in Vancouver, B. C. They are 100% clear and edge grain—they cannot warp, cup or curl.

Following their manufacture they are placed in slow drying kilns that remove all excess moisture and make them receptive to color and oil without affecting the strength or lasting qualities of the wood. They are then distributed to our staining operations, where their treatment is completed.

A roof is no stronger than its weakest shingle. The illustrations we use here show the difference between the edge grain shingle and the flat grain shingle.

Edham KOLORED *Shingles*

The stain used in the treatment of Edham Kolored Shingles is manufactured from the raw color to the finished product in our own mills. The color used is made, in all cases, from 100% pure earth pigments ground with linseed oil in stone mills until they are of liquid smoothness. The pigments are then mixed in a vehicle of linseed oil containing sufficient creosote and other oils to insure maximum penetration.

The process of treatment adopted is what is referred to as the *hand dipping* process—the bundles, after the shingles have been thoroughly dried and are free from moisture, are broken open and each shingle treated separately and individually. Then, after the color has dried and thoroughly set, the shingles are repacked into bundles, tagged and piled on trucks ready for loading. This treatment insures unusually permanent colors which will not rub off, check or peel.

Edham Kolored Shingles have demonstrated that they will last two or three times as long as shingles that have been brush coated, painted or treated in any other manner on the job where they have first been exposed to the weather and dampness.

Samples submitted without charge. Color pads and miniature panels showing the different variegated effects obtainable will be sent to architects upon request.

A Flat Grain Shingle—It Will Warp

Note the uneven grain of the wood, which indicates uneven stresses and strains that will cause warping, cupping and curling

Edham Kolored Edge-grain Shingles Will Not Warp

Note the parallel and vertical grain of this Edham Edge-grain shingle. It positively cannot warp, cup or curl

Continued on next page

Edham Kolored Variegated Effects—The variegated effects are obtained by using two or more shades of Edham Kolored Shingles. The shingles are packed promiscuously in the bundles ready for the workmen to lay. Many artistic effects are thus achieved which would be impossible to secure in any other way.

They Save Labor—A considerable saving in labor can be effected by the use of Edham Kolored Shingles, as compared with shingles stained on the job. The bundles, in both straight colors and in variegations of two or more shades, are packed ready to lay, and can be carried in pack to any position required, in this way greatly reducing the cost of handling.

They save the labor of dipping and of additional brush-coating which is often necessary for shingles stained under other conditions.

Adaptable to Many Styles of Architecture—Architects know that the beauty of a house is largely dependent upon certain essentials of good design—rhythm and repose; proportion and scale; texture and color. One architect summed up the possibilities of Edham Kolored Shingles in this respect, in the following manner:

"The great variety of color schemes possible with Edham Kolored Shingles, combined with the harmonious blending of each shingle and surface in general, give, on wall or roof, life and interest and the essentially distinctive color values."

Sizes and Covering Capacity—Edham Kolored Shingles are procurable in every grade, thickness and length manufactured. Standard grades and colors are carried in lumber yards in most cities.

Where we have no local representative, we will be glad to arrange for delivery of material upon request from architect.

Sizes—***Edham Kolored Supremes***—24 in. long; random widths; 1 in. thick at the butt.

Edham Kolored Process Shakes—24 in. long; random widths; $\frac{9}{16}$ and 1 in. thick at the butt. Sawn to produce the hand split effect.

Edham Kolored Royals—24 in. long; random widths; ½ in. thick at the butt.

Edham Kolored Perfections—18 in. long; random widths; 5 shingles will measure 2¼ in. at butt.

Edham Kolored Eurekas—18 in. long; random widths; 5 shingles will measure 2 in. at butt.

Edham Kolored XXXXX—Clears—16 in. long; random widths; 5 shingles will measure 2 in. at the butt.

Edham Kolored XXX—Clears—16 in. long; random widths; 6 shingles will measure 2 in. at butt.

Edham Kolored Thatch Shingles—16 in. long; random widths; 5 shingles will measure 2 in. at the butt; sawn in patterns to specifications.

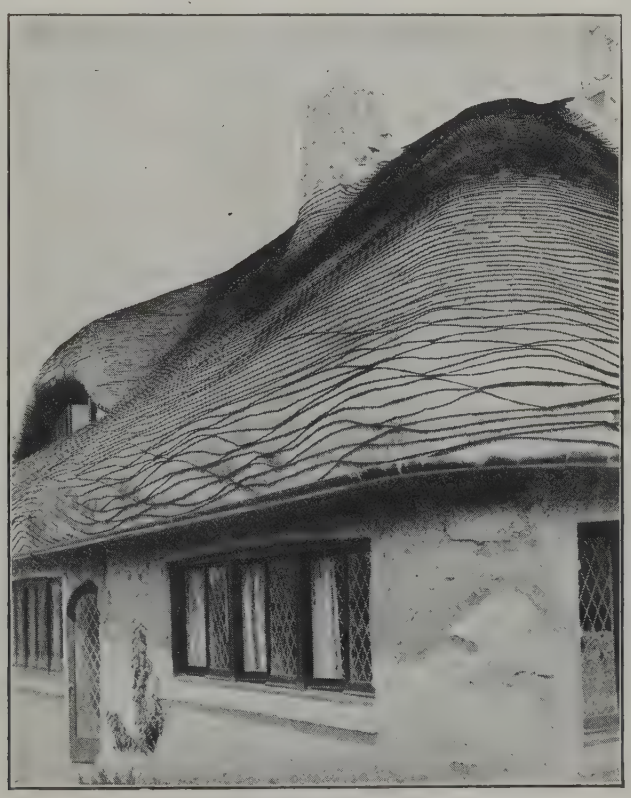
Covering Capacity—All shingles are sold on the basis of the square (100 sq. ft.). The table following gives the covering capacities in square feet of the square of shingles on various exposures:

Name	Length, in.	*Exposure to weather, in.									
		5	5½	6	6½	7	7½	8	10	10½	11
Supremes Royals Process Shakes	24	...	...	...	...	...	75	...	100	105	110
Perfections Eurekas	18	...	100	111	120	129	138	148	...	...	...
XXXXX Clears XXX Clears	16	100	110	120	130	140	...	...	...	...	...

*In choosing amount of exposure, due consideration should be given to location, i.e., steep roofs, rather flat roofs, sidewalls, etc.
24-in. Supremes, 5 $\frac{8}{8}$ course bundles constitute one square.
24-in. Shingles, 3 $\frac{13}{14}$ course bundles constitute one square.
18-in. Shingles, 4 $\frac{18}{18}$ course bundles constitute one square.
16-in. Shingles, 4 $\frac{20}{20}$ course bundles constitute one square.

Edham Kolored 24-in. Shingles for Sidewalls

Many architects have specified the Edham Kolored 24-in. Shingles for sidewalls, during the past year. They desire to give the effect of the old-fashioned shingle of Colonial days, and these shingles are especially



Thatch Roof of Edham Kolored Shingles

Continued on next page

applicable to the Colonial style of architecture. Shingles are generally laid 10 in. to the weather on sidewalls and 7½ in. on the roof.

Prompt Shipment

Edham Kolored Shingles are shipped promptly to all parts of the United States and Canada, from our factories at Minnesota Transfer, St. Paul, Minn., Toronto, Ont., and Vancouver, B. C.

Architectural Service

We are always glad to send architects, on request, specific information, samples and special literature. Edham Kolored Shingles are nationally advertised for the purpose of creating consumer acceptance. All Edham Kolored Shingle advertising recommends that the homebuilder employ the services of an architect.

Specifications for Roofs and Sidewalls

Shingles—All roof and sidewall surfaces shall be covered with Edham Kolored Shingles (here specify grade and color), as manufactured by The Edham Company, Inc., Minnesota Transfer, St. Paul, Minn., and bearing the Edham Kolored red tag and Edham Kolored bandstick. Shingles shall be laid with well broken joints with....in. exposures to weather.

Nails—Shingles shall be nailed with (here specify type of nails required); each shingle shall be nailed with at least two nails under cover of the following course.

Note: We recommend zinc-clad, pure zinc or copper nails.

Red Cedar Attains This Marvelous Degree of Perfection in British Columbia As a Result of Soil Properties, Rainfall and Drainage

We own and operate our own mills in British Columbia

Standard Specifications for Edham Kolored Shingles Laid Irregularly for Thatch Effects

Shingles—All roof surfaces to be covered with Edham Kolored bent or straight shingles manufactured by The Edham Company, Inc., of Minnesota Transfer, St. Paul, Minn., in the following grades and colors (here clearly specify grades and colors required).

Preparation of Roof—All surfaces and angles of the roof timbers, including eaves, gables, hips and ridges, valleys, etc., to be furred and blocked or shaped to present rounded, cambered or hollowed surfaces, to carry out the intention of the drawings, and to produce the thatch effect in the finished roofs.

Nails—All shingles to be nailed with (specify hot-dipt zinc-clad, pure copper or zinc nails), using the 3d ordinary 1¼-in. nail for bent shingles, and 3d fine for flat surfaces, and an occasional 6d nail at quick bends.

Note: On high class work, the architect is recommended to specify copper nails; and in specifications for sheet metal work, is urged to specify copper flashings and eaves troughs, etc.

Working Specifications—The standard working specifications or recommendations and the standard illustrative details of The Edham Company, Inc., are to be read as a part of this specification.

(Copies of the standard working specifications for Edham Kolored Thatch Roofs may be had on request to The Edham Company, Inc., Minnesota Transfer, St. Paul, Minn.)

Edham Shingled Home of W. W. Gretchell, 4506 Woodale Avenue, Minneapolis, Minn.

Kenneth B. Worthen, St. Paul, Minn., Architect

Edham Shingled Home Designed and Constructed by Art Kenyon, Elgin, Ill.

THE ELHIDE COMPANY

JOHN C. RUNKLE, President

Manufacturers of Elhide Hand-Split British Columbia Red Cedar Shingles

CAMBRIDGE, MASS.

Products

Elhide Hand-split British Columbia Red Cedar Shingles.

Also Elhide 20-year Bonded Roof, Gravel or Slag Surface (send for detailed specifications); Elhide Monson Maine Roofing Slate; also Stained Shingles.

TRADE-MARK

Elhide Hand-Split British Columbia Red Cedar Shingles

These shingles are remarkable for beauty of texture and rough simplicity. Their large size and heavy butts combine to make a most charming effect for either siding or roofing.

We split these shingles by hand in the virgin forests of British Columbia from the finest straight-grain red cedar. After being split they are sawed diagonally so as to make a tapered shingle, hand-split on the upper side and smooth on the lower side.

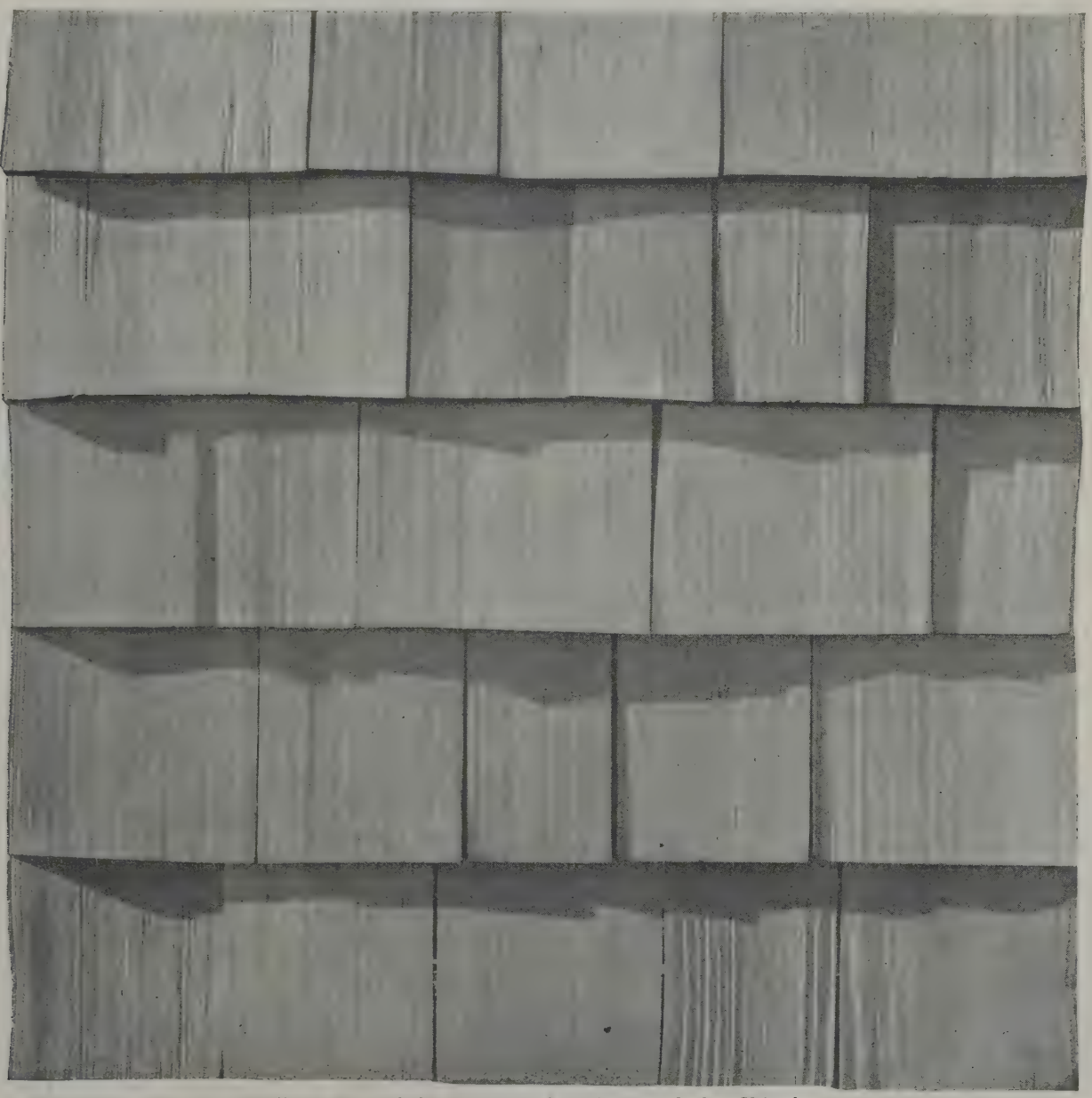
We call special attention to the possibilities of these shingles for graduated roofs, running from 2-in. butts at the eaves to ½-in. butts at the ridge with very beautiful results.

Sizes—25 in. long, random widths 4 to 12 in. Three thicknesses: ½, ¾ and 1-in. butts. Thicker butts up to 2 in. to order for graduated roofs.

Specifications—Cover roofs and sides with Elhide Hand-Split British Columbia Red Cedar Shingles (following with thickness of butts and exposure to weather desired) as manufactured by The Elhide Company, Cambridge, Mass. (Full specifications upon request.)

Installations—List of buildings covered with Elhide Hand-Split Shingles gladly furnished.

Samples and Layouts—Send for a sample shingle. It will show you better than any illustration the beauty of its texture. Layouts for graduated roofs also furnished.



Elhide Hand-Split British Columbia Red Cedar Shingles
Patented March 23, 1926

FITITE COLONIAL SHAKE COMPANY

Manufacturers of Western Red Cedar Fitite (Fit-tight) Colonial Shakes

White Building, SEATTLE, WASH.

SOLD BY

NORTH TONOWANDA, N. Y., Creo-Dipt Company, Inc.
MINNESOTA TRANSFER, MINN., The Edham Co., Inc.
DETROIT, MICH., Wolverine Creosoted Products Co.
TOLEDO, OHIO, C. A. Mauk Lumber Co.
BOSTON, MASS., Samuel Cabot, Inc.
CHICAGO, ILL., Samuel Cabot, Inc.
LOS ANGELES, CAL., E. K. Wood Lumber Co.
SAN FRANCISCO, CAL., Santa Fe Lumber Co.
VANCOUVER, B. C., Huntting-Merritt Lumber Co.
KANSAS CITY, MO., Creo-Dipt Company, Inc.
NEW YORK, N. Y., Arthur E. Lane Corporation

And Retail Lumber Dealers Throughout the United States

Fitite Colonial Shakes

Description—Fitite Colonial Shakes are manufactured from select Western Red Cedar, all clear, all vertical grain, no defects and free from sap.

Three-quarters of the length of the shake is unevenly grooved or processed, leaving one-quarter of the thin or upper end and all of the underside of the shingle smooth sawn, as in the ordinary shingle. This Fitite feature insures a tight fit where shingles overlap.

It is possible to obtain from Fitite Colonial Shakes all the beauty, texture and graceful lines obtained from the old hand-split shake. Yet they are laid as easily as ordinary shingles.

Protected by patents and trade-mark in the United States and Canada.

An Example of the Beautiful Effects Possible with Fitite Colonial Shakes

J. Charles Stanley, Seattle, Wash., Architect

Fitite Tile—Fitite Tile is manufactured of select Western Red Cedar, processed and grooved three-quarters of its length, to give tile effect. Top quarter and back of shingle left smooth—the Fitite feature.

Sizes and Styles—

Fitite Sovereigns—Made from stock 1 in. thick, 24 in. long. Packed 6 bundles per square for 10-in. weather exposure. 7/7 course bundles. Shipping weight, 300 lb.

Fitite Regents—Made from stock ¾ in. thick and 24 in. long. Packed 4 bundles per square for 10-in. weather exposure. 10/10 course bundles. Shipping weight, 225 lb.

Fitite Sultans—Made from stock $\frac{9}{16}$ in. thick by 24 in. long. Packed 3 bundles per square for 10-in. weather exposure, 13/14 pack. Shipping weight, 160 lb.

Fitite Majors—Made from stock ½ in. thick by 24 in. long. Packed 3 bundles per square for 10-in. weather exposure, 13/14 pack. Shipping weight, 145 lb.

Fitite Juniors—Made from stock 9/20 in. thick and 18 in. long. Random widths. Packed 3 bundles per square for 7½-in. weather exposure, 18/18 pack. Shipping weight, 120 lb.

Fitite Shingle Tile—$\frac{9}{16}$ in. thick, 6 in. wide and 24 in. long. To be exposed 7½ in. to weather and laid like shingle. Packed 84 pieces to bundle, 4 bundles for each square covered. Shipping weight, 225 lb.

Fitite Senior Tile—1 in. thick, 6 in. wide and 24 in. long. Weather exposure, 10 in. Laid like shingle. Packed 42 pieces in bundle, 6 bundles for each square covered. Shipping weight, 300 lb.

Methods of Laying Fitite Roofs

Fitite Shakes should project 1 to 1½ in. at the edges and ¾ to 1 in. over gable edge. They should be spaced ⅛ in. apart. For roof break all joints 1½-in. sidelap. Breaks or joints should not be over the preceding breaks for at least three laps or courses. Nails used to be either zinc, galvanized coated or copper.

Note: Use either Fitite Sovereigns or Regents for Methods A and B.

Method "A," Single Course—Lay course double exposure 7½ to 9 in., use 4d nails, two to each shake, 8 to 10 in. from butt, sheathing solid.

Method "B," Double Course—First course triple, others double, maximum exposure 15 in., sheathing solid. Undercourse shingles to be ½x24 in. No. 1 Royals, nailed with 3½d nails, and outer course nailed with 4d nails, two to each shake, set about 16 in. from butt.

Note: Use either Fitite Sultans or Fitite Majors in Methods E, F, or G.

Method "E," Single Course—First course double, maximum exposure 7½ in. to weather. Use 3½d nails, two to each shake, 8 to 10 in. from butt. Sheathing solid or 7½-in. centers. 7½-in. exposure requires 4 bundles per square.

Method "F," Double Course—Lay first course triple, others double, maximum exposure 11 in., sheathing solid. Nail undercourse shingles with 3½d nails, top course with 4d nails, two to each shake, set 12 in. from butt. Undercourse to be ½x24-in. shingles. 2¾ bundles of shakes and 2¾ Royals required per square for 11-in. exposure.

Method "G," Triple Course—Maximum exposure 17 in. First courses to be first grade ½x24-in. shingles, nailed with 4d nails, two to each shingle, set 15 in. from butt. Outside course to be Fitite Shakes, nailed with two 6d galvanized copper bearing or solid copper nails, set 3 to 5 in. from butt and 1 in. from edge. 3½ bundles of shingles and 1.8 bundles of shakes required per square, 17-in. exposure.

In each method the weather exposure and the quantity of shingles needed are governed by the style of Fitite Shake used.

Fitite Colonial Shake

Methods of Laying Fitite Walls

Note: Use either Fitite Sultans or Fitite Majors in Methods H and M.

Method "H," Single Course—Lay first course double, single thereafter, maximum exposure 11 in., two 3½d nails to each shake, set 12 in. from butts. 2¾ bundles required per square for 11-in. exposure.

Method "M," Double Course—Maximum exposure 17 in. First course shingles to be nailed with 4d nails, two to each shingle. Outside course to be nailed with two 6d galvanized casing nails set 3 in. from butt and 1 in. from edge. Solid sheathing applied over good grade of building paper will make extra warm when wanted. 1.8 bundles each grade of shakes or shingles required per square for 17-in. exposure.

Service to Architects

The Fitite Colonial Shake Company is prepared to give technical data and further specifications for laying upon request.

DIMENSIONS OF FITITE COLONIAL SHAKES

Code reference	Stock made from, in.	Shipping weight per square, lb.	Pack	Bundles per square	Exposure basis, in.
Fitite Sovereigns	1x24 random widths	300	7/7	6	10
Fitite Regents	¾x24 random widths	225	10/10	4	10
Fitite Sultans	$\frac{9}{16}$x24 random widths	160	13/14	3	10
Fitite Majors	½x24 random widths	145	13/14	3	10
Fitite Juniors	9/20x18 random widths	120	18/18	3	7½
Fitite Shingle Tile	$\frac{9}{16}$x24 width, 6 net	225	84 pc.	4	7½
Fitite Senior Tile	1x24 width, 6 net	300	42 pc.	6	10

JAMES LUMBER COMPANY

"Blue Jay" Hand Made Cypress Shingles

88 Broad Street
BOSTON, MASS.

"Blue Jay" Cypress Shingles

"Blue Jay" Shingles are hand split—riven with the grain—which preserves all the wonderful weather-resisting qualities of heartwood cypress, "The Wood Eternal." No single generation lives long enough to renew a hand split and shaved cypress roof that has been properly laid.

"Blue Jay" Cypress Shingles are made by exactly the same methods as were followed by the pioneers of South Carolina and their slaves, who as far back as 1640 did a thriving business in this line. Some of the roofs on which they were laid in those days are still in service today—weatherproof after nearly three centuries of exposure.

Today, descendants of those same slaves, working in the same southern swamps, are felling selected trees, cutting bolts and with frow, maul and drawshave, are making "Blue Jay" Shingles for American homes.

When split and tapered, they are piled loosely and left to season and to weather in the sun and air. Therefore, as delivered to the job, "Blue Jay" Shingles are already semiweathered.

Further exposure to inland air deepens their wonderful soft brown tones, while along the shore they weather to a silver gray.

To the Colonial type of house, "Blue Jay" Shingles add years—both in appearance and weatherproofness. For other types, or wherever desired, they may be painted or stained.

All "Blue Jay" Shingles are carefully selected, graded and fully guaranteed.

Sizes—"Blue Jay" Cypress Shingles are made in the two sizes most favored in Colonial days and still considered best:

7x24 in., with 5/8-in. butts and 1/8-in. tops
6x20 in., with 1/2-in. butts and 1/8-in. tops
Samples gladly supplied on request.

Laying—For roofing, the larger size should be laid 7 in. to the weather, and the smaller size 6 in. to the weather. For sidewalls, the 7-in. shingles may be placed 8 or even 9 in. to the weather. The 6-in. size should be laid 7 or 8 in. to the weather.

Nailing—Specify copper (1¾ to 2¼ in. in length), "yellow metal" or old-fashioned dipped galvanized nails, 5d or 6d according to exposure. The less the amount of shingle exposed to weather the longer the nail should be. On sidewalls, 4d nails may be used. Prices on nails will be quoted if desired.

Staining—Although "Blue Jay" Shingles never have that "new," "raw" look and never actually require staining—either for appearance or preservative purposes—they may be whitened or colored with paint or any standard stain.

Prices—Prices for "Blue Jay" Shingles loaded on cars Boston, Mass., shipped from stock, are as shown below. Freight and carting additional. Freight to most New England stations will not exceed $1.00 per square; carting not exceeding 10 miles about $1.00 per square.

6x20-in. Shingles*

Laid	6 in. to weather	$17.00 per 100 sq. ft.	covered
Laid	7 in. to weather	14.50 per 100 sq. ft.	covered
Laid	8 in. to weather	13.00 per 100 sq. ft.	covered

7x24-in. Shingles*

Laid	7 in. to weather	$20.75 per 100 sq. ft.	covered
Laid	8 in. to weather	18.00 per 100 sq. ft.	covered
Laid	9 in. to weather	16.00 per 100 sq. ft.	covered
Laid	**10 in. to weather**	**14.50 per 100 sq. ft.**	**covered**

*For recommended exposures, see paragraph "Laying," above.

Prices for points outside of New England furnished upon request, based on shipments made from nearest available stock.

Specifying—To obtain the genuine article specify as follows: "For roof and sidewalls use genuine cypress, clear, all heart, hand made, split and shaved shingles, "Blue Jay" Brand, supplied by JAMES LUMBER COMPANY, 88 Broad Street, Boston, Mass.

Sidewalls and Roof of "Blue Jay" Hand Made Cypress Shingles—Residence of Thomas Sanders, Topsfield, Mass.
ANDREWS, JONES, BISCOE and WHITMORE, Architects

WEATHERBEST STAINED SHINGLE COMPANY, INC.

Manufacturers of Red Cedar Hand Dipped Stained Shingles

NORTH TONAWANDA, N. Y.

FACTORIES: NORTH TONAWANDA, N. Y. AND ST. PAUL, MINN.

Products

WEATHERBEST EDGE GRAIN RED CEDAR STAINED SHINGLES for roofs and sidewalls; WEATHERBEST 24-IN. COLONIAL WHITE STAINED SHINGLES; WEATHERBEST THATCHED EFFECT STAINED SHINGLES; WEATHERBEST "DOUBL-THIK" STAINED SHINGLES; WEATHERBEST OLD COLONY HAND RIVED SHAKES.

Used on Roofs and Sidewalls

WEATHERBEST stained shingles are used on sidewalls as well as roofs and are adaptable to practically every type and style of building—from the small cottage or bungalow to the stately country home. The soft, semi-transparent colors add much to the attractiveness of a home. WEATHERBEST stain emphasizes the grain in the wood just enough so that the flat tone of a painted surface is absent. WEATHERBEST stained shingle sidewalls cost 30% to 50% less than walls of bevel or Colonial siding and will last fully as long. A WEATHERBEST stained shingle roof laid with zinc coated nails will give perfect service for over 50 years.

Reliability

There is sixteen years' experience behind this rigorous policy: *"Not to cheapen materials or process to meet price competition."*

Each bundle of WEATHERBEST stained shingles carries the green WEATHERBEST label and is our guarantee of perfect material and lasting colors.

Quality of Weatherbest Shingles

Only the finest grade of all clear, strictly 100% edge (vertical) grain, red cedar is used in the manufacture of WEATHERBEST stained shingles. Every shingle is perfect from tip to butt. Extreme care is exercised that all shingles are entirely free from any trace of dampness before being subjected to the WEATHERBEST process of staining.

Quality of Weatherbest Stain

WEATHERBEST stain consists of the strongest color pigments obtainable, high grade wood creosote preservatives and pure linseed oil as binder. These ingredients are mixed in our factories by our color and oil experts in the correct proportion to insure colors that are rich and soft in tone, and, above all—durable.

Weatherbest Staining Process

All shingles are unbundled at our factories and stained separately—not bundle-dipt as is the case with many other stained shingles. The WEATHERBEST process treats each shingle thoroughly and perfectly. After staining, the shingles are dried, inspected and any imperfect shingles replaced with good ones, then rebundled.

Always Lie Flat

Because they are 100% edge (vertical) grain and because of the WEATHERBEST preserving solution, WEATHERBEST stained shingles always lie flat. They will not check, crack or curl during their many years of service. The edge grain is also, to a large degree, responsible for the exceptionally long life of WEATHERBEST colors, as edge grain allows the color pigments to enter deep into the pores of the wood.

Weatherbest Variegated Color Roofs

WEATHERBEST stained shingles in several shades of one color, or different colors, may be used on roofs with decidedly pleasing results. For this purpose, there are standard WEATHERBEST variegated color schemes in browns, greens, reds, grays, etc., worked out to just the correct proportion of colors. No extra labor is required to lay, as the different colored shingles are mixed and then re-bundled at our factories so that the carpenter lays them as received. Ask for panels in miniature showing variegated colors.

Sizes, Colors and Covering Capacity

WEATHERBEST stained shingles are furnished in following sizes:

12 in.	WEATHERBEST XXXXX	5 butts to 2 in.
16 in.	WEATHERBEST XXXXX	5 butts to 2 in.
16 in.	WEATHERBEST XXX	6 butts to 2 in.
16 in.	WEATHERBEST "Doubl-Thik"	5 butts to 3½ in.
18 in.	WEATHERBEST Eurekas	5 butts to 2 in.
18 in.	WEATHERBEST Perfections	5 butts to 2¼ in.
24 in.	WEATHERBEST No. 1 Royals	½ in. butts
24 in.	WEATHERBEST "Doubl-Thik"	1-in. butts

Note: See next page for sizes of Weatherbest Old Colony Shakes.

The standard WEATHERBEST colors consist of 20 different shades of greens, browns, reds and grays. WEATHERBEST stained shingles are also furnished in a color combination similar to weathered straw for WEATHERBEST thatched effect roofs, and in many variegated color schemes. Special colors are also furnished without extra charge. Color samples on request.

NUMBER OF SQUARE FEET A SQUARE OF WEATHERBEST STAINED SHINGLES WILL COVER WHEN LAID AT VARIOUS EXPOSURES

Size of shingles, inches	Exposure to the weather, inches									
	4½	5	5½	6	6½	7	7½	8	10	11½
12	84	92	100	.....	.....	.....	.....	.....	.....	.....
16	90	100	110	121	131	141	151	.....	.....	.....
18	.....	.....	100	110	120	129	138	148	.....	.....
24	.....	.....	.....	.....	.....	.....	76	80	100	115

Residence of Architect Joseph Norman Hettel, Merchantville, N. J.

Designed by LACKEY & HETTEL, Camden, N. J.
Roof: 16-in. Green WEATHERBEST Stained Shingles. Walls: 24-in. WEATHERBEST in Colonial White

Continued on next page

Weatherbest Old Colony Hand Rived Shakes

To those desiring the true beauty of the oldtime shake we unhesitatingly recommend WEATHERBEST Old Colony genuine hand rived tapered red cedar shakes.

These shakes are manufactured in 25, 31 and 37-in. lengths. They are of random width and vary in thickness as did those split by the oldtime settlers and provide an ideal roof and sidewall covering where "something different" is desired.

We have prepared a brochure showing details of WEATHERBEST Old Colony shakes as used on roofs and sidewalls as well as pictures of houses covered with WEATHERBEST hand rived shakes. Send for literature descriptive of shakes and request samples.

24-in. Weatherbest Colonial White Shingles

The large 24-in. heavy butt, WEATHERBEST Colonial white stained shingles are used extensively on sidewalls for the wide course effect. The wide exposures possible (10 in. and 11½ in.), and the pure, non-glaring white of WEATHERBEST Colonial white stain combine to make a sidewall that is far more attractive than the monotonous white of a painted clapboard siding. WEATHERBEST Colonial white stained shingles are first treated at our factories with a filler coat of our No. 500 white preserving stain. After they are laid on the sidewalls, the shingles should then receive two light brush coats of WEATHERBEST Colonial white stain to produce the true whitewashed effect.

Weatherbest Standard Specifications

To guard against substitution of inferior material, we advise incorporating the following in specifications:

Shingles: To be (insert size and color) WEATHERBEST, all clear, all edge grain stained shingles, as manufactured by WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y., and St. Paul, Minn.

Weatherbest Thatched Straw Effect Roofs

Combining attractiveness with long life, a WEATHERBEST thatched effect stained shingle roof offers the means of a radical but artistic departure from the conventional sharp angle roof.

WEATHERBEST thatched stained shingles are furnished ready for application. They come bent with the grain (lengthwise) to a 20-in. radius for the rounded surface of hips and valleys and for capping the ridges; bent with the grain to a 10-in. radius for the curves or roll at rakes; bent to a 20-in. radius against the grain (crosswise) for the curve at eaves and rounding of ridges, and flat for the flat surfaces of the roofs. On all WEATHERBEST thatched stained shingles except for the double first course at eaves, butts are specially sawn so that when laid, irregular, wavy courses will result.

Weathered Straw Color

Colored in three shades of weathered straw with an occasional spot of dull red and brownish green, the WEATHERBEST color scheme is a true reproduction of weathered straw. The different colored shingles come properly mixed and are laid as received. WEATHERBEST thatched stained shingles are also furnished in other color combinations if desired. One very pleasing color treatment is the WEATHERBEST method of graduating colors so that a roof may be green at eaves and gradually shade into a brown at ridges.

Thatched Effect Instruction Book and Service

Full information for constructing a WEATHERBEST thatched effect stained shingle roof is given in our book, "The Construction of WEATHERBEST Thatch Roofs," which is furnished on request. This book is complete in every respect, showing actual photographs of WEATHERBEST thatched effect roofs, working drawings showing rafter construction, furring, blocking, and method of laying shingles to secure the true thatched effect.

When thatched effect roofs are specified we ask that a set of plans be sent to us in order that we may estimate the quantities required of the different shingles.

Standard Specifications for a Thatched Effect Roof

The following specifications are standard for a WEATHERBEST thatched effect roof and should form part of the general specifications when this type roof is planned. Adherence to these specifications will insure complete satisfaction in finished roof by avoiding substitution of improperly bent, inferior flat grain shingles.

Special Rafter Construction—All rafter construction at ridges, rakes or gable ends, hips, valleys and eaves is to be in accordance with the instructions and detail drawings appearing in the book, "Construction of WEATHERBEST Thatch Roofs," furnished on request by the WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y.

Furring of Rafters—(While desirable to accentuate the convex appearance of the roof, it is not entirely essential and may be omitted.) Main rafters to be furred to a height of 5 to 6 in. midway between eaves and ridges, diminishing to nothing at eaves and ridges where it merges with curves. Ridge board to be furred to height of 5 or 6 in. at center of roof diminishing to nothing at apex of gables.

Shingle Lath—Rafters at eaves and ridges and blocking at valleys, hips, rakes or gable ends to be covered with 1x2-in. shingle lath, spaced 1 in. apart, running parallel with rafters at rakes or gable ends, hips and valleys and at right angles to rafters at eaves and ridges.

Roof Shingles—All roof surfaces shall be covered with WEATHERBEST thatch stained shingles as manufactured and supplied by the WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y., and St. Paul, Minn.

At eaves lay one double course of square butt WEATHERBEST stained shingles bent against the grain. Cover the curve at eaves with WEATHERBEST thatch stained shingles bent against the grain. Flat WEATHERBEST thatch stained shingles are to be used on all flat surfaces of roof and those bent with the grain to a radius conforming with curve for hips and valleys. Cover roll at rakes or gable ends with WEATHERBEST thatch stained shingles bent with the grain to a 10-in. radius. Cover curve of roof on each side of ridge board with WEATHERBEST thatch stained shingles bent against the grain, capping the ridge with those bent with the grain to a 20-in. radius.

Exposure of Shingles—Lay all shingles in irregular, wavy courses following procedure given in WEATHERBEST instruction book. Exposure to be from 1 to 3 in. (average 2 in.) on curve at eaves and 1 to 5 in. (average 3 in.) on all other sections of roof.

Nailing—Nail all shingles bent against the grain (at eaves and ridges) with 6d zinc coated nails, nailing 3 in. from the butt. Shingles on all other portions of the roof to be nailed with 3½d zinc coated nails in regular manner.

Color of Shingles—Color of shingles to be WEATHERBEST weathered straw. (If other color scheme is desired change to color number shown in our samples, or "to match.....")

Weatherbest Thatched Straw Effect Roof, Residence of A. G. Sharp, Ottawa Drive, Youngstown, Ohio

M. M. MILEY and LEO CROELL, Architects
Color: Dark Straw

ASBESTOS SHINGLE, SLATE & SHEATHING CO.

AMBLER, PA.

BRANCH OFFICES

BOSTON, MASS. CHICAGO, ILL. DETROIT, MICH. MINNEAPOLIS, MINN. OMAHA, NEB. PITTSBURGH, PA.
BUFFALO, N. Y. CLEVELAND, OHIO MILWAUKEE, WIS. NEW YORK, N. Y. PHILADELPHIA, PA. ST. LOUIS, MO.
WASHINGTON, D. C. WILKES-BARRE, PA.

SOUTHERN DISTRIBUTERS: Dixie Asbestos Co., Birmingham, Ala.; Berry Asbestos Co., Atlanta, Ga.

WESTERN DISTRIBUTER: Farrington Engineering Co., Los Angeles, Calif.

DIRECT SHIPMENTS MADE FROM OUR FACTORIES AT AMBLER, PA. AND ST. LOUIS, MO.

Products

Ambler Asbestos Shingles for roofs and sidewalls, Ambler Asbestos Corrugated Roofing and Siding; Ambler Asbestos Roofing Tile; Ambler Ebonized Asbestos Lumber; Asbestos Fireproof Sectional School Buildings.

For Ambler Linabestos (Asbestos) Board, Ambler Linabestos (Asbestos) Siding, Ambler Asbestos Lumber, Ambler Asbestos Waltile, see page B1623.

The Company and Its Products

This Company supplies all the necessary appurtenances required in the installing of its products. All nails, clips, etc., exposed to the weather are heavy gauge copper, and the concealed nails are triply galvanized. Copper driving nails supplied if desired.

Ambler Asbestos Shingles

Ambler Asbestos Shingles are fireproof and waterproof, made of selected asbestos fibers and portland cement scientifically combined in water and formed under enormous hydraulic pressure. They are made in two general styles—uniform thickness, and tapered.

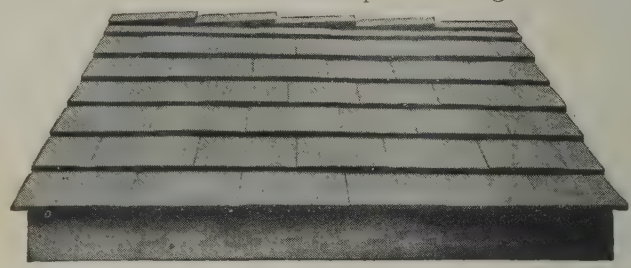
American Method No. 9—A ¼-in. shingle of uniform thickness, 9 in. wide and 18 in. long. The approximate weight per square is 675 lb. Furnished in straight butts, except when broken butts are specified. The colors are: Newport gray, Pearl gray, Indian red, Tuscan red, Spanish brown, purple, buff, blue-black and green veneer.

American Method No. 16—A $\frac{5}{32}$-in. shingle of uniform thickness, 8 in. wide, 16 in. long. Approximate weight per square, 425 lb. Furnished in broken butts if so specified; otherwise straight butts furnished. Made in the following colors: Newport gray, pearl gray, red, brown, black, green, buff and purple.

Honeycomb Method No. 4—A $\frac{5}{32}$-in. shingle of uniform thickness, 16 in. square, with the lower corners cut off so that when laid they produce a honeycomb or hexagonal effect. Weight approximately 290 lb. per square. Furnished in the same colors as American Method No. 16, listed above.

Tapered English Thatch Method—A tapered shingle, ½-in. butt, ⅛-in. upper end. Rough surface, edges and butts. Random widths, 6½ to 18½ in., 20 in. long. Approximate weight per square, 978 lb. Made in a variety of reds, browns, purples, greens, buffs and grays, and in black.

Tapered Colonial Method—A tapered shingle, ½-in. butt, ⅛-in. upper end. Random widths, 6 to 17 in., 19 in. long. Smooth surface; edges and butts cut square—designed for use where ordinary wood shingles might be specified, but where the architect desires to obtain a fireproof roof. Approximate weight per square, 930 lb. Colors same as for Tapered "English Thatch."



Tapered Ambler "Colonial" Asbestos Shingle Roof

Specifications for American Method of Laying Ambler Asbestos Shingles

Sheathing—All roofs specified to be covered with asbestos shingles, to be tightly sheathed with well seasoned boards, free from loose knots and to be well spiked to the rafters.

Felt—Over roof boards lay 1-ply slater's felt, weighing 15 lb. to the square, tacked on with 4-in. lap, and on hips and valleys with at least 1-ft. lap.

Ambler Asbestos Shingles—

Note: The following specification is written for both the $\frac{5}{32}$-in. No. 16 and the ¼-in. No. 9 shingle. To specify the No. 16, omit bracketed items; for No. 9, use bracketed items, omitting the others.

Over the felt, apply Ambler Asbestos Shingles (give color), as manufactured by the Asbestos Shingle, Slate & Sheathing Co., according to the American, or straight laid, method, following the manufacturer's details. Nail $\frac{3}{16}$x1-in. cant strip flush with the lower edge of roof board. Apply 1 course of No. 16A [No. 9A] shingles end to end laterally, overhanging the eaves 1½ to 1¾ in. Over this lay 1 course of No. 16 [No. 9] shingles with long edge at right angles to eave line breaking joints. Lay next course in same way, allowing 6-in. exposure. Balance of roof to be covered with No. 16 [No. 9] shingles 8x16 in. [9x18 in.] laid perpendicularly, breaking joints and exposed 7 in. [8 in.] to the weather. Each shingle to be nailed with two 1¼-in. galvanized iron needle point nails as indicated by the nailhole in the shingles, nails not to be driven down too tight. Hips and ridges to be covered with Ambler Asbestos Ridge and Hip Roll, properly flashed and fastened to hip or ridge pole of sufficient height, rabbeted to fit hip or ridge, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge roll. (Hip and ridge can be covered according to regular Boston hip scheme, if desired.)

Flashing—At all hips, valleys, chimneys, and against all abutting sidewalls, except as otherwise specified, flash and counterflash with each course of Ambler Asbestos Shingles, using

. . . . . .

Specifications for Honeycomb Method of Laying Ambler Asbestos Shingles

Sheathing—See specifications for American Method.

Felt—See specifications for American Method.

These specifications also cover the application of No. 20, 12x12-in. Honeycomb shingles, using No. 21 Under Eave and No. 20 second starter.

Ambler Asbestos Shingles—Over the felt, apply Ambler Asbestos Shingles (give color), as manufactured by the Asbestos Shingle, Slate & Sheathing Co., according to the Honeycomb Method. Apply 1 course of No. 16-B end to end overhanging the eaves 1½ to 1¾ in., over which lay a course of No. 4 entirely covering the No. 16-B exposed 13x13 in. to the weather. Each shingle to be nailed with two 1¼-in. gal-

Continued on next page

vanized iron, needle-point nails, and the No. 4 to be fastened down at the tip with patented copper "Storm" nails. Hips and ridges to be covered with Ambler Asbestos Ridge and Hip Rolls, fastened in place to hips or ridge poles of sufficient height and rabbeted to fit hips or ridges, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge rolls.

Flashing—See specifications for American Method.

Specifications for "English Thatch" or "Colonial" Tapered Ambler Asbestos Shingles

Note: The following specifications are written to cover both the "English Thatch" and "Colonial" Tapered Ambler Asbestos Shingles, as sold by the Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

Tapered Ambler "English Thatch" Asbestos Shingle Roof

When specifying the "English Thatch" omit the items in brackets; for "Colonial" substitute those bracketed and omit the others.

Felt—Apply the sheathing boards so that the distance between same shall not be more than ¼ in.; then apply a 30-lb. saturated asphalt felt over entire roof surface. This felt should be lapped 6 in. on all joints and a double thickness should be used on all hips, ridges and in valleys.

Starting Course—Asbestos starters, 9x18 in. x ¼ in. thick, designated as No. 9-A, shall be laid end to end laterally, covering the eaves and projecting over the edge of the roof boards 1½ or 2 in. However, before these starters are applied, a wood strip 1¼x¼ in. shall be nailed to the roof flush with the eaves, to give the starters and shingles the proper cant.

Shingles—Over top of and flush with the starters, "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles shall be applied. Details regarding the random exposures and various widths shall be supplied by the architect in charge of construction. We, however, recommend that none of these "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles be applied with less than a 3-in. headlap.

Nails—We recommend that copper nails be used, of sufficient length so that they will be driven into the wood sheathing boards at least 1 in. Care should be taken in application to eliminate the possibility of nailing the shingles too tightly to the roof as there is a certain amount of expansion and contraction in a cement product and this must be considered. Galvanized nails can be used in place of copper if desired.

Hips and Ridges—All hips and ridges shall be covered with "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles 6 in. wide (or any other width desired), and applied according to the Boston Method (or, if desired, the last course of shingles may be mitered on hips and ridges and thus eliminate additional covering).

Flashing—All metal flashings and counterflashings shall be 16-oz. soft, cold rolled copper and sufficient shall be used so as to guarantee a watertight application. Lead may be used in place of copper if desired.

Ambler Asbestos Corrugated Roofing and Siding

This material is made of asbestos fiber and hydraulic cement and is the same as Ambler Asbestos Shingles in its structure and quality. It is made in two widths of sheets, 42 in. and 27½ in.

The 42-in. material is $\frac{11}{32}$ in. thick on the ridges and in the valleys, and $\frac{9}{32}$ in. thick at center of slope. Corrugations are 2⅝ in., center to center. Sheets are available in lengths of 4, 5, 6, 7, 8 and 8½ ft. Weight, 3¾ lb. per sq. ft.

The 27½-in. material is $\frac{5}{16}$ in. thick on the ridges and in the valleys, and ¼ in. thick at center of slope. Corrugations are 2½ in., center to center. Sheets are available in lengths of from 4 to 10 ft., inclusive. Weight, 3½ lb. per sq. ft.

A separate catalogue covering this commodity more completely will be furnished on request.

Ambler Asbestos Roofing Tile

Ambler Asbestos Roofing Tile lays up 200 pieces per square (100 sq. ft.). When no definite number of top and pan tile is specified an equal number of each is shipped.

Weight of tile, laid on roof, per square, 775 lb.

Weather exposure of tiles, 13½ in.

Ambler Asbestos Roofing Tile is supplied in red veneer and green veneer only.

Ambler Ebonized Asbestos Lumber Switchboard

Ambler Ebonized Asbestos Lumber

Because of its high dielectric properties, Ambler Ebonized Asbestos Lumber is ideal for use in place of wood or slate for mounting electrical switches, fuse boxes, etc., in residential work.

Ambler Ebonized Asbestos Lumber has primarily the inherent strength qualities of the non-impregnated asbestos lumber. Thorough impregnation with a specially developed compound gives a product superior in physical and electrical insulation properties, as well as in appearance.

On account of its greater strength, switchboards made of this material may be greatly reduced in thickness, thereby reducing materially the weight of the board, as well as permitting economy in the amount of copper used.

Ambler Ebonized Asbestos Lumber is listed by the Underwriters' Laboratories, Inc., and meets the United States Navy specifications.

Asbestos Fireproof "Liberty" School Buildings

Simplicity of Construction—These buildings are regular "sectional" type buildings using Ambler Asbestos Lumber, and can be erected in extremely short time by local carpenters.

Cost—Taking into consideration the present high cost of skilled labor necessary to erect a frame, brick, stone, plaster or hollow tile building that would even approximately compare in appearance and durability, the cost would be substantially more, especially for frame or like type of construction that has to be painted.

"Liberty" School Building Built of Ambler Asbestos Products

BIRD & SON, inc.

Manufacturers of Roofings, Building Papers and Wall Board

MILLS AND GENERAL OFFICES
EAST WALPOLE, MASS.

CHICAGO OFFICE AND PLANT: 1472 West 76th Street NEW YORK OFFICE: 295 Fifth Avenue
HAMILTON, ONTARIO, CANADA: Building Products Ltd., Bird & Son Division

Products

Bird's Asphalt Slate Surfaced Shingles, Paroid Roofing, Bird's Built-up Roofs, Neponset Wall Board, Neponset Black Building Paper and other Waterproof Building Papers.

Experience and Facilities

Bird & Son, inc., was established in 1795, and after years of experience in paper manufacturing became one of the pioneers in specializing in the manufacture of waterproof building paper and asphalt roofings.

The highest quality of materials is maintained through the most up-to-date machinery and methods and a highly efficient personnel. The several mills and warehouses of the company provide for prompt shipment anywhere.

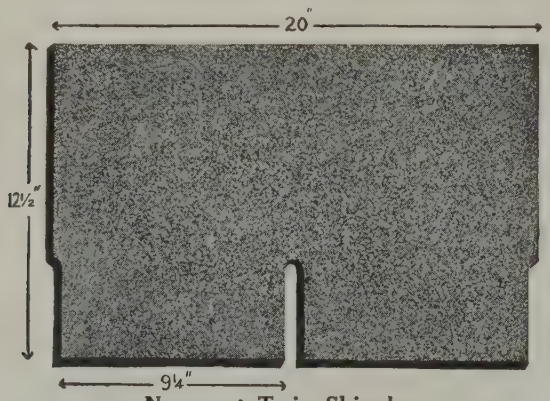
Bird's products have been distributed and applied to buildings of every description throughout the world and have long been known to be of the highest grade.

Bird's Asphalt Shingles

Bird's Asphalt Shingles are distinctive. They are made in a variety of styles suitable for all sorts of buildings, from the low price house to the costly residence.

They are made of long fibre felt and pure asphalt with maximum saturation, super-surface and coated back.

Bird's Asphalt Shingles are made in plain shades of red, green and blue-black. They are also made in an unusually attractive and colorful effect, produced by a selection of several shades of brown, reds and russets, known as "Bird's Art-Blende."



Neponset Twin Shingle

The following types of shingle are particularly recommended for the architect's specifications. All but the Standard Individual are available in the Art-Blende color.

Neponset Twin Shingles—12½x20 inches, laid 4 inches to the weather, giving a ½-inch overlap beyond three layers.

Bird's Super Twin Shingles—12x20 inches, laid 5 inches to the weather. An extra heavy twin shingle combining the features of Neponset Twins with extra weight and massive appearance.

Bird's Standard Individual—8x12½ inches, laid 4 inches to the weather. A high grade individual shingle of standard dimensions. Recommended for residential work.

Giant Individuals—10x15½ inches, laid 5 inches to the weather. An unusually heavy and massive giant shingle giving an impression of thickness and weight adequate for the more expensive residences.

Application—Bird's Asphalt Shingles should be applied over dry roof boards laid close together, sheathed with Neponset Black Building Paper; roofer to follow instructions enclosed in each bundle of shingles.

Paroid Roll Roofing

Paroid Roll Roofing is of the highest quality, protected with a coating on both sides and with a special talc surfacing of bright gray color.

Paroid is most satisfactory for specifications for large roof surfaces, such as: barns, freight sheds, train platforms, garages, etc. It may also be specified for low pitch roofs on porches and dormers of all types of residences.

Paroid comes in rolls of either 108 or 216 square feet with lap cement and nails. Made in three weights, 45, 55 and 65 pounds per square. Roofer should apply according to directions enclosed in each roll.

Neponset Black Building Paper

Neponset Black Building Paper has been known and specified by architects for years as a waterproof building paper of the highest grade. A strong bodied paper thoroughly saturated with asphalt, protected with asphaltic coating on both sides, giving an absolutely waterproof paper. Recommended particularly for use:

(1) Under all kinds of roofing.
(2) Behind clapboards and shingles or stucco on the walls of buildings.
(3) Between floors.
(4) Between double floors that extend over an open porch.
(5) Within walls of house, store or factory in place of backplaster.
(6) For cellar lining.
(7) For cold storage work.

Put up in rolls 36 inches wide containing 500 square feet, weighing 50 pounds per roll.

Specifications for use of Bird's Neponset Black Waterproofing Building Paper—

Beneath Clapboards and Shingles—Underneath the clapboards or shingles shall be applied 1 layer of Bird's Neponset Black Waterproof Building Paper, lapped not less than 2 inches and tacked to hold in place.

Beneath Roofing—Underneath the roofing, 1 layer of Bird's Neponset Black Waterproof Building Paper shall be applied; paper to be lapped not less than 2 inches and tacked along the seams, sufficient to hold in place.

Back of Stucco—Over the sheathing boards 1 layer of Bird's Neponset Black Waterproof Building Paper lapped not less than 2 inches. Hold paper in place with furring strips spaced about 16 inches on center. Nail metal lath firmly to furring strips and apply stucco to the lath.

Beneath Double Floors—Between the double floors or underneath the parquetry shall be placed 1 layer of Bird's Neponset Black Building Paper. Paper to be lapped not less than 2 inches and tacked sufficiently to hold in place.

Continued on next page

Neponset Wall Board, Cream White Finish

Neponset Board is a high grade laminated fibre board that will not chip or crack. The finish is a beautifully embossed cream white surface thoroughly moisture-proofed. The reverse is a tan color, waxed to keep out moisture. The cream white surface may be painted for any desired effect. Neponset Board comes in sheets 48 inches wide, 7 to 12 feet long. Nailhole positions are indicated by dents along the edge of the boards.

Bird's Paroid Built-Up Roof

Bird's Paroid *Built-Up* Roof, built up of successive layers of asphalt felt, asphalt compound applied hot, and Paroid Cap Sheet, gives a heavy, impenetrable mass of absolutely weatherproof materials, capped with the well-known Paroid Smooth Surfaced Roofing. There is no slag or gravel to fall off and clog the gutters.

The illustration and specification which follow are for the most usual type of Paroid Built-Up Roof over sheathing boards. We will furnish on request specifications as follows:

(1) Bird's Paroid Built-Up Roof, light, over sheathing boards.

(2) Bird's Paroid Built-Up Roof, standard, over sheathing boards. (See specification below.)

(3) Bird's Paroid Built-Up Roof, extra heavy, over sheathing boards.

(4) Bird's Paroid Built-Up Roof, light, over non-combustible roof decks.

(5) Bird's Paroid Built-Up Roof, standard, over non-combustible roof decks.

(6) Bird's Paroid Built-Up Roof, extra heavy, over non-combustible roof decks.

Specifications for Bird's Paroid Built-Up Roof, Standard for Application over Sheathing—

Preparation of Sheathing—The roof shall be laid upon seasoned sheathing preferably tongued and grooved, not over 6 inches in width. All rubbish and projections shall be removed from the roof by the contractor preceding the roofer. The ends of all sheathing boards shall rest on rafters or purlins, properly nailed and secured. The sheathing shall be reasonably free from knots and holes, and where holes do occur these shall be covered with metal securely nailed. The roof shall be properly graded to outlets and all drainage connections set to permit the free flow of water. All this work to be done by the general contractor preceding the roofing contractor. Triangular wood strips about 2 inches high shall be installed by owner or general contractor in all angles formed by the roof and a vertical surface.

Flashings—All brick or concrete walls, etc., shall be primed with Bird's Asphalt Primer before flashing with the roofing material. Where not otherwise shown on plans, walls and all elevations above the roof such as skylights, curbs, etc., shall be flashed at least 6 inches high. The flashings to be built up in the same manner and of the same material as the roof itself. Flashings shall be reinforced by a base flashing of Bird's Cap Sheet 9 inches wide, mopped 6 inches up the wall and 3 inches on the roof. An approved metal counterflashing shall extend down over the wall flashing at least 4 inches, and where pipes, vents, etc., come through the roof, they shall be flashed with a lead collar, both to be furnished and installed by the general contractor or owner.

Material—Materials required per 100 square feet of completed roof surface—gross weights:

2 layers Bird's 14-lb. Asphalt Felt (36-inch width)	31	pounds
2 layers Bird's Built-Up Roof Compound	50	pounds
1 layer Bird's Paroid Cap Sheet (coated one side only, 36-inch width)	37½	pounds
Flexible extra large head roofing nails (⅞ inch long)	1	pound
Total weight of finished roof	119½	pounds

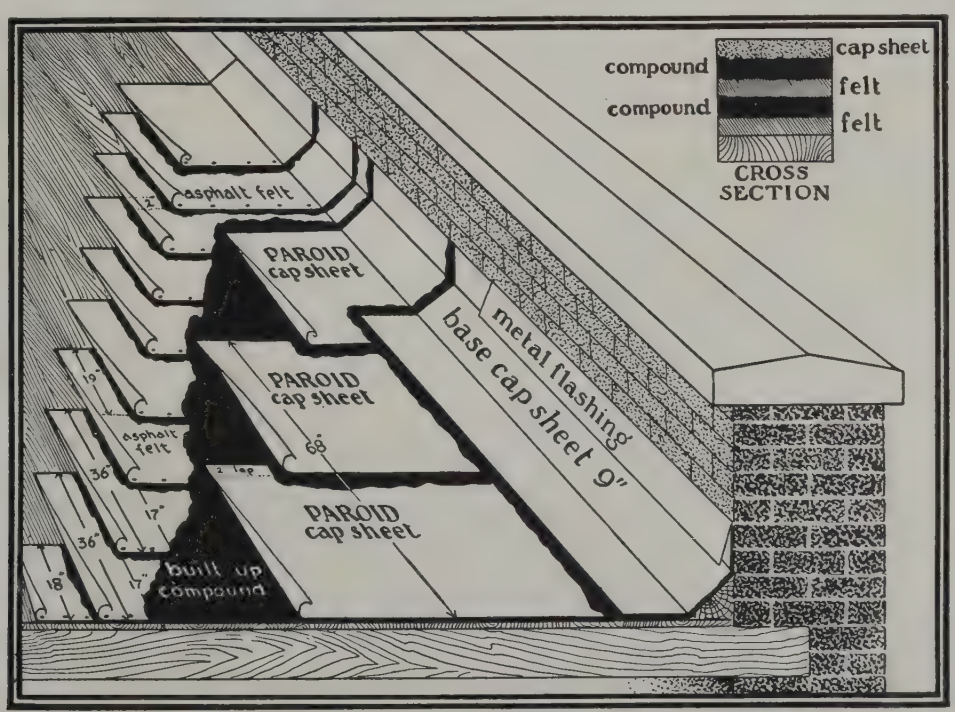
The quantities above stated do not include the material necessary for flashings nor do they include wastage.

Note: Many roofers recommend the use of a layer of sheathing paper to be used next to the sheathing boards. This is especially good over roof boards that contain pitch or sap.

Application—First: A sheet of Bird's Asphalt Felt 18 inches wide shall be laid along the lowest edge of the roof. This felt shall be mopped with Bird's Compound heated to not less than 400° F. and while hot a second sheet of asphalt felt 36 inches wide shall be rolled into same. Similarly succeeding sheets of asphalt felt 36 inches wide shall be laid lapping each sheet 19 inches until the surface of the roof shall be covered with two layers of asphalt felt mopped together with hot compound, so that felt does not touch felt. Flexible large head roofing nails shall be used, nailing 4 inches apart along the lower edge of each sheet, as applied.

Second: The Bird's Asphalt Felt along the lower edge 36 inches wide shall be mopped with Bird's Compound heated to not less than 400° F. and while hot a sheet of Bird's Paroid Cap Sheet 36 inches wide rolled into same. The cap sheet must follow mop closely to insure a perfect bond. In a similar manner the second and succeeding sheets of Bird's Cap Sheet 36 inches wide shall be mopped in, overlapping the preceding sheet 2 inches. All cross laps of the cap sheet shall be mopped and lapped 4 inches.

The surfaced side of Bird's Cap Sheet shall be laid to the weather.



Bird's Paroid Built-Up Roof, Standard Over Sheathing

THE PHILIP CAREY COMPANY

Manufacturers of Shingles and Roofing Material

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, OHIO

Products

CAREYSTONE ASBESTOS - CEMENT SHINGLES.

CAREY ASFALTSLATE SHINGLES.

CAREY CORK INSULATED SHINGLES.

CAREY STRIP SHINGLES.

CAREYSTONE ASBESTOS-CEMENT SHEATHING.

CAREYSTONE ASBESTOS-CEMENT WALL BOARD.

CAREYSTONE CORRUGATED ASBESTOS-CEMENT ROOFING and SIDING.

For Waterproofing and Dampproofing Materials, see pages A62-64.

For Built-up Roofing, see pages A440-447.

For Pipe Covering, Boiler Insulation and Refractory Cements, see pages C3222-C3223.

Careystone ASBESTOS-CEMENT PRODUCTS
TRADE-MARK

Careystone Asbestos-Cement Products

Careystone Asbestos-Cement Building Materials are made of two of the most durable fire-resistant materials known—asbestos and special portland cement.

They are verminproof, dampproof, dustproof, fireproof, and will not rot or rust. They are manufactured in a new million dollar plant recently added to the Carey manufacturing resources at Lockland, Cincinnati, Ohio. The guaranteed quality of these asbestos products is backed by the Carey reputation—and over fifty years of service to the building trades.

Careystone Asbestos-Cement Shingles

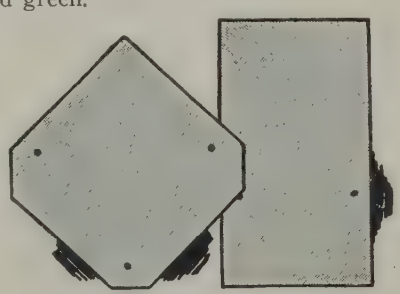
Furnished in a variety of shapes for application by the French or American method.

For the French method, one shape is available, in two sizes —16x16 in. and 12x12 in.

For application by the straight, or American method, two shapes are available with two sizes for each shape—8x16 in. and 6x12 in.

Colors—Careystone Asbestos-Cement Shingles, in all shapes and sizes, are available in six colors—brown, pottery red, blue-black, slate gray, purple and green.

Advantages—Careystone Asbestos-Cement Shingles can be laid over old wooden shingles as easily as on new roof construction. They will outlive the building itself, for they actually grow stronger with age. They are light enough to need no special supporting construction. And the variety of shapes, sizes and colors give the architect an unlimited field for designing a roof to meet individual tastes.



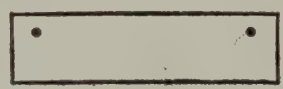
French Shingle American Shingle

Rating—When laid over Carey Fiberock Felt, French method, Careystone Asbestos-Cement Shingles take a Class "B" rating of the Underwriters' Laboratories, Inc. With the American method, they take a Class "A" rating.

The French Method—No. 415 shingle when laid honeycomb or French method, is exposed 13x13 in. to the weather, and requires 87 shingles to cover one square of roof area. The shingles weigh approximately 270 lb. per square.

No. 416 shingle when laid honeycomb or French method is exposed 9½x9½ in. to the weather, and requires 160 shingles to cover one square of roof area. These shingles weigh approximately 285 lb. per square.

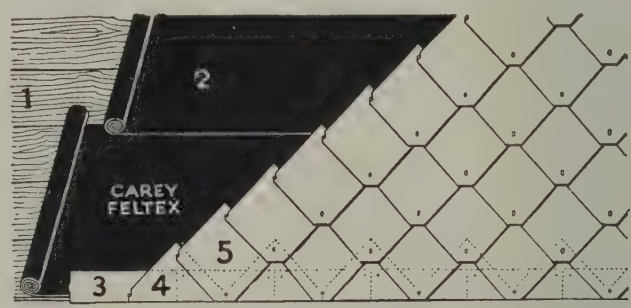
Application of Careystone Asbestos-Cement Shingles (French Method)—Cover sheathing on entire roof surface with Carey Fiberock before laying Asbestos Shingles. To insure proper application of Careystone Asbestos-Cement Shingles, a vertical chalk-line should be stretched on the roof deck from the center of the eave to the ridge pole. Snap this chalk-line and place a 4x16 in. eave starter at the exact center of the eave. Allow the starter to extend 1 in. over the sheathing and apply the full line of starters to both gable ends. At each gable end the last starter should extend 1 in. beyond the gable line, and, if necessary starters should be cut to make them fit.



Eave Starter

Second Starter

To assist in lining up the first course or eave starters, a horizontal chalk-line should be snapped on the roof. Then proceed by applying a triangular, or second course starter over the eave starter, with the ends meeting at the exact center of the eave starter, directly over the vertical roof line. Place copper storm nails in the slot provided in the ends of the triangular starter. Each starter, when properly placed, should be nailed to the sheathing through the two holes provided for the purpose.



Application of Careystone Asbestos-Cement Shingles (French Method)

The next step is the application of the main body shingles. Place the first shingle at the center line, with the hole in the lower end over the storm nail, and the opposite end of the shingle in line with the vertical roof line.

Proceed in this manner, using care to see that the storm nail notches at the sides of the shingles are opposite, and that the nails are inserted properly. Then nail the shingles to the roof deck with galvanized nails, using the nail holes provided for that purpose in each shingle.

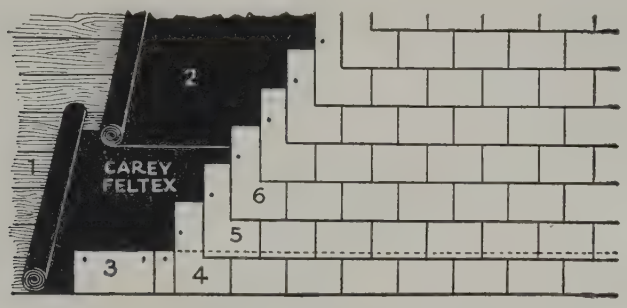
On a re-roofing job, the ridge pole should be covered with a strip of Fiberock before the application of the last row of shingles at the ridge. On a new roof, this felt laps over the ridges about 12 in., and for a new roof this same distance is specified. After main body shingles have been set in place, remove exposed portions of felt.

The American Method—Careystone Asbestos-Cement Shingles, American method are stocked in two sizes.

Continued on next page

Nos. 435, 436, 440 and 441 when laid in American method are exposed 7 in. to the weather and require 260 shingles to cover one square of roof area. In the $\frac{5}{32}$ in. thickness they weigh approximately 400 lb., and in the ¼ in. thickness 575 lb. per square.

No. 437 when laid American method is exposed 5 in. to the weather and require 480 shingles to cover one square of roof area. These shingles weigh approximately 450 lb. per square.



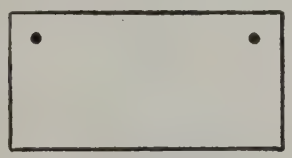
Application of Careystone Asbestos-Cement Shingles (American Method)

Application of Careystone Asbestos-Cement Shingles (American Method)—The application of Careystone Asbestos-Cement Shingles under the American or straight laid method is as simple as applying wooden shingles.

The first step is to apply one course of eave starters, allowing them to extend 1 in. over the eave. Then proceed with the first course of main body shingles, laid at right angles to and over the starter course, breaking all joints.

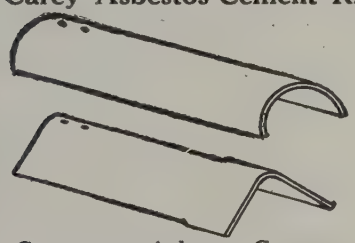
Proceed in this manner with the remainder of the roof, exposing 7 in. of each shingle to the weather, and secure each one to the roof deck with galvanized nails driven through the holes provided for them.

In driving the nails avoid unnecessary blows after nail is driven home.



American Starter

Carey Asbestos-Cement Ridge Roll



Careystone Asbestos-Cement Ridge Rolls

Made in the same manner as Carey Asbestos-Cement Shingles—with special portland cement and tough asbestos fibres.

The roll is designed to blend perfectly with the shingles and to give added attractiveness to the roof.

Furnished in both curve and angle shapes as illustrated.

Carey Asfaltslate Shingles

For use on any roof having a pitch of not less than 4 in. in 12 in. They combine beauty, durability and economy and will not curl.

Composed of a heavy rag felt base, thoroughly saturated with a highly refined asphalt saturant, and are coated on both sides with a uniform layer of pure asphaltic cement. The shingles are then surfaced with a uniform layer of natural crushed slate, thoroughly rolled into the hot coating asphalt under roller pressure.

Carey Asfaltslate Shingles are made in two sizes 8x12¾ in. and 10x15¾ in.

The regular 8x12¾ in. shingles come 53 shingles per bundle, are packed 8 bundles per square and weigh 240 lb. per square. They are laid ½ in. apart and exposed 4 in.

The 10x15¾ in. shingles come 34 per bundle, are packed 8 bundles per square and weigh approximately 300 lb. per square. They are laid ¾ in. apart and exposed 5 in.

Carey large size Asfaltslate Shingles are especially well adapted for application over old wood shingles. Being unusually large it requires fewer shingles to cover the roof, and cost of nails and labor are reduced considerably.

Furnished in red, green, blue-black and color blend. Applied with ordinary roofing nails, no clamps, locks or cleats are used.

Carey Cork-Insulated Shingles

Made in the same manner as the regular Carey Asfaltslate Shingle with a layer of granular cork added to the underside.

Tests made by Mellon Institute of Industrial Research show that when these shingles are laid in the regular way (three thicknesses) they are equivalent in insulating value to ½ in. of fibre insulating material, 4½ in. of slate, 10 in. of sandstone, 8 in. of concrete and are 231% better heat insulators than ordinary felt shingles.

They are 50% thicker than the ordinary shingle and cast deep dark shadow lines giving texture to the roof, an effect wholly lacking when thin shingles are used.

Carey Cork Insulated Shingles are made in 10x15¾ in. size, weighing approximately 350 lb. per square. Furnished in red, green, blue-black and color blend. Applied like the regular plain back Carey Asfaltslate Shingles.

Carey Strip Shingles

Square tab strip shingles, 4 in 1, two sizes: 36x10 in., 190 lb. per square; 36x12½ in., 240 lb. per square. Hexagonal strip shingles, three sizes: 10x40 in., 3 tab, 160 lb. per square; 12½x36 in., 2 tab, 225 lb. per square; 12x40 in., 3 tab, 210 lb. per square. Furnished in red, green, blue-black and color blend. Directions for application packed in each bundle.

Package

Carey individual shingles are packed in bundles containing one-eighth square, or metal strap packages containing one-quarter square. One square of shingles packed for shipment occupies 7 cu. ft. of space. Carey strip shingles 36x10 in. are packed two bundles per square; 36x12½ in.—three bundles per square. Carey hexagonal strip shingles are packed two crates per square.

Underwriters' Label

Carey shingles are tested and accepted as standard by the Underwriters' Laboratories, Inc.

All Carey shingles bear the Underwriters' Class "C" label.

Shingle Specifications

Shingles shall be Carey (state brand here) shingles, and shall be delivered on the job in packages bearing Carey labels.

Sheathing boards must be thoroughly dried and well seasoned, 6 in. wide and laid parallel with eaves. Line valleys with valley lining, 18 in. wide, nailing 4 in. in from either side (nails 12 in. apart); do not nail in center. Lay 9-in. wide starter strips along eaves, extending over ½ in. Nail 1 in. from lower edge, nails 6 in. apart.

To apply Carey individual shingle begin with full sized shingle parallel to and flush with outer edge of roof, lower end flush with lower edge of starter strips. Use large headed 1-in. galvanized nails, 2 nails to each shingle, 4½ in. from lower end and 1 in. from sides. Allow ½ in. space between 8x12¾ in. shingles and ¾ in. between large size 10x15¾ in.

Start second row using two-thirds width shingle, leaving 4 in. of first row exposed.

Start third row using one-third width shingle, same spacing. In starting fourth row use a full size shingle and continue as shown in sketch.

Careystone Asbestos-Cement Sheathing

Careystone Asbestos-Cement Sheathing can be sawed, joined and fitted very easily by any ordinary mechanic. This sheathing is fire-proof, tough and practically indestructible.

Can be grained, veneered or painted to a beautiful finish, making it particularly desirable for interior as well as exterior use. It is unsurpassed in its fire-resisting qualities and its ability to withstand adverse temperature conditions. Supplied in its natural light gray color. Sizes, 42x48, 42x96, 48x48 and 48x96 in. Thickness ⅛ to 1 in.

Careystone Asbestos-Cement Wall Board

An ideal material for lining and fireproofing all classes of buildings. The material cuts and nails like ordinary lumber. It can be washed, scrubbed and cleaned with ease, and can be painted, grained or stained to represent natural wood. Made in two sizes, 48x48 in.; 48x96 in.; $\frac{3}{16}$ in. thick.

Corrugated Asbestos-Cement Roofing and Siding

Is fireproof and practically indestructible. It comes in sheets; is easily cut and applied. It offers an excellent covering for the roofs and sides of buildings.

CERTAIN-TEED PRODUCTS CORPORATION

Manufacturers of Asbestos Shingles

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752

Product

CERTAIN-TEED ASBESTOS SHINGLES.

TRADE-MARK

Index to Products Listed Under Other Classifications

For Asphalt Shingles, see page A479.
For Built-up Roofing, see pages A448-451.
For Decorative Panels (Asbestos), see pages C3370-3371.
For Gypsum Lath, see pages B1726-1727.
For Gypsum Partition Tile, see pages A422-423.
For Gypsum Plasters, see pages B1752-1758.
For Gypsum Wall Board, see pages B1618-1619.
For Fibre and Insulating Boards, see pages B1594-1595.
For Linoleum, see pages B1926-1928.
For Paint and Varnish, see pages B2044-2046.
For Reinforced Gypsum Roof Tile, see page A174.
For Roll Roofing and Building Paper, see page A433.

CERTAIN-TEED ASBESTOS SHINGLES

Certain-teed asbestos shingles are made from a high grade Canadian asbestos fibre and Portland cement, both of which are practically indestructible. They are manufactured under a method known as laminated, and have unusual toughness and strength.

The asbestos and Portland cement are thoroughly mixed in a beater and the mixture is run over a forming machine to form a sheet from which the shingles are cut.

Certain-teed asbestos shingles are trimmed in an automatic die press, which at one operation shapes the shingles, punches the holes and clips the corners, so that all shingles are identical as to dimensions.

Colors

Certain-teed asbestos shingles are made in a variety of colors. The colors are permanent, and this fact should be taken into consideration when comparing with other types of shingles having a surface or veneer color. *With Certain-teed asbestos shingles the colors are permanent.*

Durability of Certain-teed Shingles

These shingles are as lasting and indestructible as the asbestos and Portland cement from which they are made. They are fireproof and meet all requirements of the Underwriters' Laboratories.

Materials Required for a Certain-teed Asbestos Shingle

The pieces making up a Certain-teed asbestos shingle roof are 1st course starters (eave starter), 2nd course starter (eave shingle), main body shingle and ridge roll.

The shingles are manufactured in the 16x16 in. size. The fixtures consist of an asphalt saturated asbestos felt sheathing (for a new roof only), zinc coated needle point galvanized nails, copper storm nails and ridge roll fasteners. 1¼ in. needle point nails are used for new work, and 2 in. needle point nails for re-roofing over old wooden shingles.

For Application to Old Roofs

Certain-teed asbestos shingles are ideal for reroofing as well as for new roofs. They may be applied over the old wooden shingles, thus eliminating the expense and inconvenience of removing the old shingles.

Do not remove the old roof. It serves as an additional insulation against summer heat and winter cold. This applies to re-siding as well as re-roofing, as Certain-teed asbestos shingles can be applied on the side of a building in the same manner as over an old roof.

Suggested Specifications for Architects Use

For new work only

(1) All roof surfaces shall be covered with (.... [insert color here]) Certain-teed Asbestos Shingles 16x16 in. hexagon shaped, as manufactured by CERTAIN-TEED PRODUCTS CORPORATION.

(2) **General**—This Contractor shall examine all roof board surfaces and shall see that they are smooth, clean and dry before proceeding with the roof covering.

(3) **Application**—Furnish and apply a ¼x1½-in. cant strip or lath securely nailed flush with the edge of all eaves. Furnish and apply on all ridges and hip ridge and hip poles of the required size, all securely nailed in place.

(4) On all new work the wood roofs shall be covered with a sheathing of asphalt saturated asbestos felt weighing not less than .. lb. laid in horizontal layers, with joints lapped towards eaves and at ends as necessary, to properly hold the felt in place and protect the structure until covered by the shingles. This felt shall be lapped over all hips and ridges and shall be lapped 2 in. over the metal of any valleys or built-in gutters. This felt shall be preserved unbroken, tight and whole.

(5) After the felt has been applied, the Contractor shall lay the shingles according to the hexagonal method and in strict accordance with manufacturers instructions. Each shingle shall be secured with two (2) 1¼ in. zinc coated needle pointed galvanized nails and copper storm nails, as directed by the manufacturer.

(6) All ridges shall be covered with asbestos ridge roll secured in place as provided for by the manufacturer.

(7) All hips shall be covered with hip rolls similar to the ridge roll above specified and applied in the same manner. The intersection of all hip and ridge rolls shall be covered and finished with sheet lead or copper terminals, securely fastened in place.

(8) **Flashings, Gutters and Downspouts**—All metal flashings, gutters and downspouts will be provided by the Sheet Metal Contractor. This Contractor shall co-operate with the Sheet Metal Contractor so that all flashing and shingle work shall be installed in a manner that will guarantee the weather-tightness of the entire roof.

Note: Plain copper, lead coated copper or sheet lead is recommended for all flashings, gutters and downspouts.

For old work only

(a) All present roof covering shall remain and shall be treated as hereinafter specified. All roof surfaces shall be covered with (.... [insert color here]) Certain-teed Asbestos Shingles 16x16 in. hexagon shaped, as manufactured by CERTAIN-TEED PRODUCTS CORPORATION.

(b) **General**—This Contractor shall examine all present wood shingles and shall proceed as follows:

(c) Remove old shingles at all gable ends about 6 in. from the edge of gable moulding and insert a 6 in. wide board of sufficient thickness to bring the board flush with the tops of the old shingles. Where old shingles are badly warped or curled, they shall be split in the center and ends nailed down. At all ridges and hips remove last course of old shingles and place a hip or ridge pole of sufficient height for nailing of the ridge or hip roll.

(d) **Application**—No felt will be required over the old shingles.

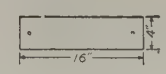
(e) The Contractor shall lay the shingles according to the hexagonal method and in strict accordance with manufacturers instructions. Each shingle shall be secured with two (2) 2 in. zinc coated needle pointed galvanized nails and copper storm nails, as directed by the manufacturer.

(f) (Use paragraph (6) as per above specification for new work.)

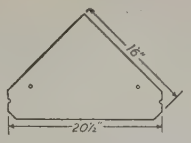
(g) (Use paragraph (7) as per above specification for new work.)

(h) **Flashings, Gutters and Downspouts**—(Use paragraph (8) as per above specification for new work.)

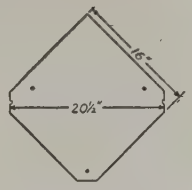
Continued on next page



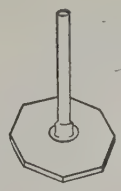
FIRST COURSE STARTER
(EAVE STARTER)



SECOND COURSE STARTER
(EAVE SHINGLE)

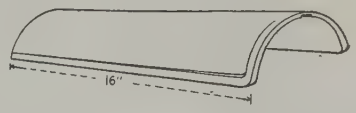


MAIN BODY SHINGLE

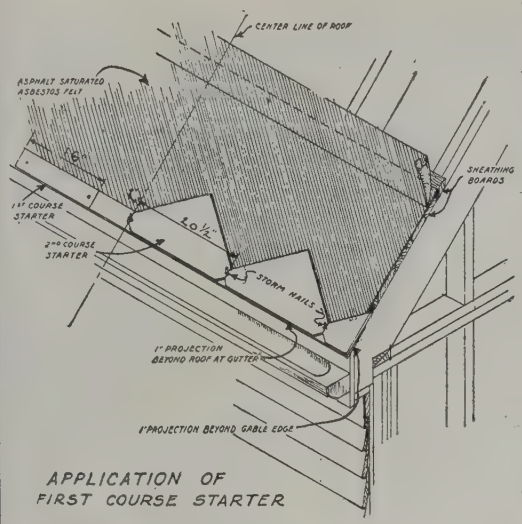


COPPER STORM NAIL

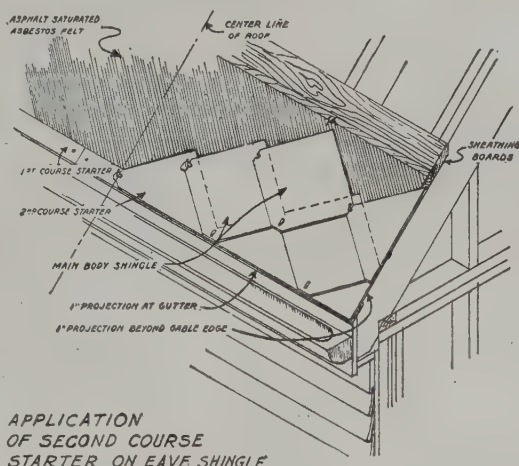
RIDGE ROLL FASTENER



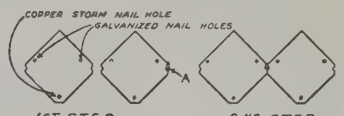
RIDGE ROLL — OPEN EDGE



APPLICATION OF
FIRST COURSE STARTER



APPLICATION
OF SECOND COURSE
STARTER ON EAVE SHINGLE

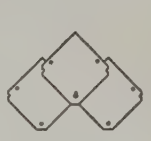


1ST STEP

PLACE COPPER STORM NAIL IN SLOT PROVIDED AT POINT "A" WITH HEAD UNDERNEATH SHINGLE.

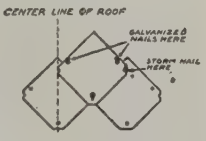
2ND STEP

TAKE SECOND SHINGLE AND PLACE OVER EXPOSED PORTION OF COPPER STORM NAIL IN LINE WITH FIRST SHINGLE.



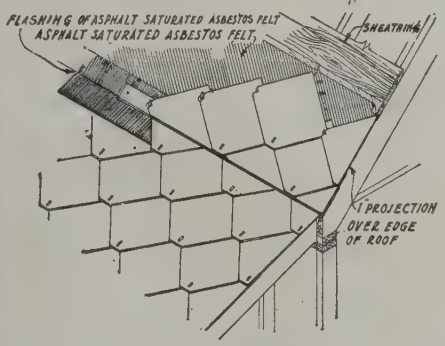
3RD STEP

THE THIRD SHINGLE SHOULD BE PLACED IN POSITION AS ILLUSTRATED ABOVE.

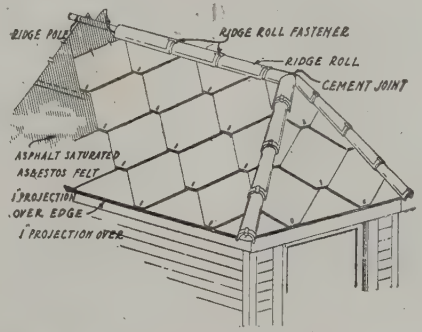


4TH STEP

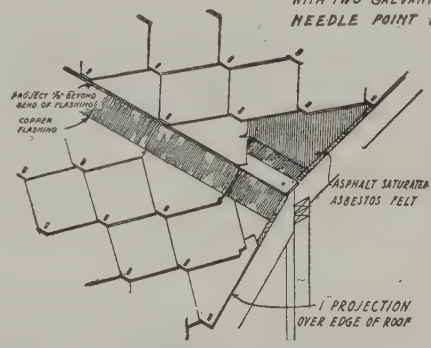
PLACE SECOND STORM NAIL IN POSITION AT POINT "B" AND THEN BEND FIRST STORM NAIL DOWN. THIS GROUP SHOULD BE LAID ON ROOF BY PLACING LEFT SHINGLE OVER CENTER ROOF LINE. THIS CENTER SHINGLE SHOULD BE FASTENED WITH TWO GALVANIZED NEEDLE POINT NAILS.



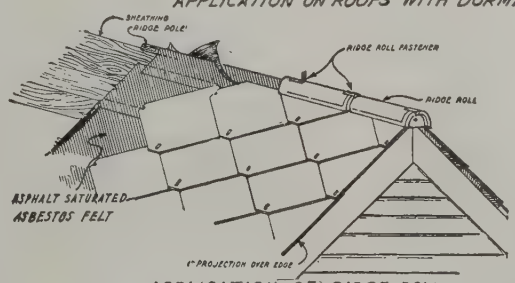
SWEEP BREAK ROOF



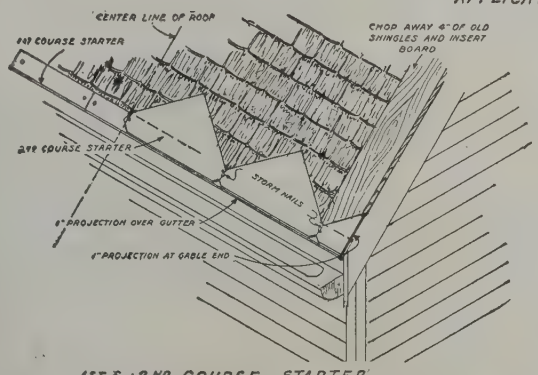
APPLICATION ON ROOFS WITH DORMERS



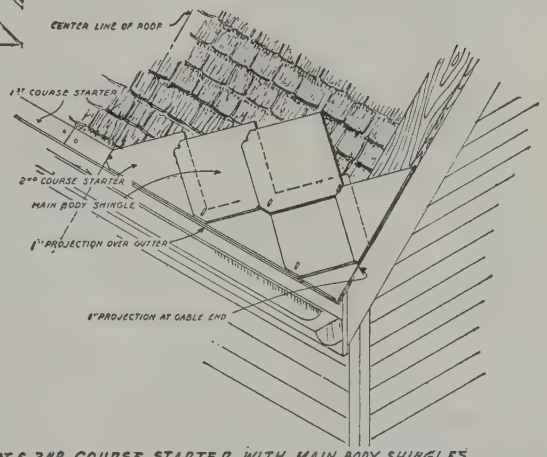
MANSARD ROOF BREAK



APPLICATION OF RIDGE ROLL



1ST & 2ND COURSE STARTER



1ST & 2ND COURSE STARTER WITH MAIN BODY SHINGLES

APPLICATION OVER OLD SHINGLES

CERTAIN-TEED PRODUCTS CORPORATION

CERTAIN-TEED ASBESTOS SHINGLES

METHODS OF APPLICATION FOR NEW AND OLD WORK

DRAWING No. 1
NOT DRAWN TO SCALE

ETERNIT, Inc.

Asbestos Shingles, Asbestos Lumber and Asbestos Corrugated Sheets

ST. LOUIS, MO.

BRANCH OFFICES

PHILADELPHIA, PA. JACKSONVILLE, FLA. NEW ORLEANS, LA.

Products

ETERNIT ASBESTOS SHINGLES, rigid shingles made of portland cement and asbestos fibre.

ETERNIT ASBESTOS LUMBER, a fireproof insulating board made of the same materials as ETERNIT Shingles, but furnished in large sheets.

ETERNIT ASBESTOS CORRUGATED SHEETS, made of the same materials as ETERNIT Lumber and Shingles.

Eternit

TRADE-MARK

The Eternit Process

In 1900 Ludwig Hatschek, an Austrian, invented the process for making asbestos-cement products and coined the name Eternit. Asbestos shingles were first manufactured under the Eternit process, then asbestos lumber and corrugated asbestos sheets. The newest development in the Eternit process is a method of producing colors that will never "bloom" or fade. Eternits are absolutely colorfast and fadeproof.

Services and Samples

Complete instructions for the application of Eternit Asbestos Shingles, including full information on flashings, valleys and curved surfaces, will be sent to any architect upon request. These instructions are illustrated with drawings and this work represents one of the most complete texts on shingle roofing.

Small samples in the various colors or full size samples will be sent to any architect upon request.

Literature, illustrating the different designs and colors and giving more detailed information, is available to any architect.

To Specify—Your specification should read:

All roof surfaces shall be covered with Eternit Asbestos Shingles,..... method,.....size,..... color, laid in accordance with the specifications of ETERNIT, INC.,....[copper] [galvanized] nails shall be used.

ETERNIT ASBESTOS SHINGLES

General Description

An Eternit Asbestos Shingle is a rigid slab of rock. A shingle is just as permanent and fireproof as its component parts. Only two of nature's minerals—both indestructible materials are used in the manufacture of Eternits.

Asbestos rock, centuries old, has been defying the elements for ages without the slightest sign of rot or disintegration. The asbestos used in Eternits is made up of long, talc-free, rough-surfaced fibers. Portland cement—the only other ingredient—is also a fireproof, everlasting, rotproof material. Only highest grade portland cement, made to Eternit specifications, is used.

An Eternit Autumn Bronze Roof Enhances the Attractiveness of This Beautiful Home

The Eternit process (not cast or moulded) consists of a gradual building up of these two materials. Eternit machines use a mixture of asbestos fiber and portland cement. They gradually build up a large homogeneous sheet of material. This sheet is later cut up into shingles which are subjected to enormous hydraulic pressure. Then an amazing, new Eternit process makes the colors fast.

This gradual building up process insures that the reinforcing asbestos fibers will lie parallel to the surface of the shingle and that they will be *distributed uniformly.* The asbestos fibers act as a reinforcing binder. Fibers for Eternits are rough-surfaced like a steel bar. The Eternit process secures an absolutely even distribution of the asbestos fibers. That is why Eternits are stronger, tougher, more resilient.

So that you may be protected against substitution of inferior materials, the Eternit trade-mark is embossed on every Eternit asbestos-cement product.

Color Fast Shingles

Architects everywhere are using more and more color. Outside as well as inside the home, color has come to be an essential part of the design. The day of the drab, ugly, colorless house is gone. One of the most important features in the use of color, however, has been the necessity for tones and shades which would retain their original beauty and neither "bloom" nor fade.

This Eternit Roof Replaced a Slate Roof on the First Presbyterian Church, Jacksonville, Fla.

Now an exclusive process enables Eternit to offer to the architect the result of years of research. Deep, rich colors in asbestos shingles which *will not fade.* The colors you select originally for your roof are those which will be there years from now, for Eternits are everlastingly fadeproof. Your roof will withstand weather, fire and general wear and tear.

Continued on next page

Colors and Sizes

Standard—Each of the five standard Eternit colors—Emerald Green, Autumn Bronze, Indian Red, Quarry Blue and Colonial Gray—is furnished in all Eternit styles and sizes. The Horizontal Method (12x24 in.); the American Method (8x16 in., 9x18 in. and 12x24 in.); the Hexagonal Method (16x16 in. and 12x12 in.).

Different Color Combinations Are Secured by Varying the Proportions of the Five Heatherblend Colors

Heatherblend—The Heatherblend is a combination of five special colors—moss, terra cotta, olive, meadow, sienna—used in equal proportions. Furnished in the American Method in the 8x16 and 9x18-in. (¼-in. thick) sizes only.

The Eternit Horizontal Method Offers Architectural Distinction at Low Cost

Methods of Laying Eternits

There are three distinctive methods of laying Eternit Asbestos Shingles. Each of these has its appropriate use and location and the architect will be surprised and pleased with the harmonious effects produced.

American Method—This method is laid with straight edges like slate and provides pleasing roof lines, deep shadows and variance of shade. It furnishes a two-thickness, sturdy roof, giving double protection from the elements.

This Charming Eternit Roof Presents Pleasing Lines and Harmonious Colors

This Eternit Heatherblend Roof Is a Tapestry of Beautiful Colors

Horizontal Method—This is an exclusive Eternit design and is obtainable nowhere else. Needless overlapping is eliminated and the shingles are easily and rapidly applied. Each shingle is laid with a side lap of 4 in. and a top lap of 3 in. This gives a long horizontal effect which is most attractive. This design costs the same as the inexpensive Hexagonal Method.

Hexagonal Method—Because it requires a minimum of material, the Hexagonal Method costs very little more than the flimsiest type of temporary roofings. Unusual lines and shadows make this method most appropriate for any type of structure.

Specifications

Complete specifications for any method may be obtained upon request, or the architect may select the color and size of shingle to be used and state that they shall be applied in accordance with the manufacturer's directions.

ETERNIT ASBESTOS LUMBER AND CORRUGATED SHEATHING

Eternit Asbestos Lumber

Eternit Asbestos Lumber is made by the same process and from the same materials as are Eternit Asbestos Shingles. This lumber has all the strength, toughness and resiliency of Eternit Shingles and it is just as fireproof. There is no rot or decay. It may be painted if desired, although this is not necessary. Can be installed by any carpenter with ordinary tools. It may be used for both inside and outside construction, and in industrial plants its uses are almost unlimited. Ceilings, walls, partitions, shaft enclosures, laboratory furniture, fire doors, heat-treatment oven doors, acid and gas conveyors represent only a few of the many uses.

Eternit Asbestos Lumber comes in ⅛-in. thicknesses up to 1 in. A special $\frac{5}{16}$-in. thickness is recommended for wall board use. Standard sheets in all thicknesses are 42x96 and 48x96 in. Half sheets 42x48 and 48x48 in. furnished without extra charge.

Eternit "Big-Seven" Corrugated Asbestos Sheathing

This product is used principally for roofing and siding of industrial structures. Made from the same materials as Eternit Shingles the first cost is the last cost. Corrugating the material increases its strength. In tests conducted under the supervision of the Robert W. Hunt Co., these sheets over a 45-in. span supported 3175 lb. before breaking. Special Eternit fasteners secure the sheets.

Colors are Colonial Gray and Indian Red. Corrugations, 7 in. center to center; height, 2¼ in.; thickness, ¼ in.; width, 38½ in.; over all lengths, 3 ft., 3 ft. 6 in., 4 ft., 4 ft. 6 in., 5 ft., 6 ft., 7 ft., 8 ft., 8 ft. 6 in., 9 ft., 10 ft. Other lengths can be furnished.

A Lifetime Industrial Roof of "Big-Seven" Corrugated Asbestos

JOHNS-MANVILLE CORPORATION

EXECUTIVE OFFICES
292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see page A15

Products

Rigid Asbestos Shingles.

For other Johns-Manville Products, see pages in this edition as follows:

Acoustical Treatment.....page A15
Transite Corrugated Asbestos....page A175
Waterproofing and Dampproofing..page A79
Specification (Built-up) Roofing..page A452
Pipe Coverings and Insulations...page B1672
Asbestos Ebony and Electrical Products .....page C3413

Also Packings for all purposes; Floorings; Refractory Cements and Furnace Linings; Asbestos Wood; Insulating Lumber; Asbestos Products of all kinds.

Rigid Asbestos Shingles

Asbestos fibres and portland cement are combined under hydraulic pressure to make Johns-Manville Rigid Asbestos Shingles. Since they are made of indestructible materials, they are permanent. They cannot burn; they do not curl, split, crack, or rot; they are easily laid, and, by a judicious use of the many colors and color combinations, they make an attractive roof that will harmonize with any style of architecture.

Johns-Manville Service

Architects are urged to avail themselves of the free service of Johns-Manville's Architects' Service Section for consultation on any roofing problems.

Write for our detailed specifications.

GENERAL DATA

	Hexagonal Method*		American Method**					
Catalogue No. of main body shingle	70	60	5	150	152	160	170	180
Size, in.	16 x 16	12 x 12	8 x 16	9 x 18	18 x 9	9 x 18	9 x 18	9 x 18
Thickness, in.	⅛	⅛	Tapered ¼ butt	¼	¼	¼	Tapered 7/16 butt	Tapered 7/16 butt
Number required per square	87	160	260	204	230	218	204	218
Weather exposure, in.	13 x 13	9½ x 9½	7 x 8	8 x 9	18 x 3½	Average 7½	8 x 9	Average 7½
Weight per square applied, lb.	295 to 320	300 to 320	535	650	740	665	790	845

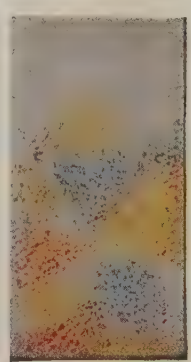
*Minimum pitch—5 in. per ft.
Colors: Mottled gray, mottled red, mottled blue black, solid red rough texture, green veneer rough texture.

**Minimum pitch—4 in. per ft.
Colors: Mottled gray—No. 5 only; mottled red—No. 5 only; mottled blue black—Nos. 5, 170, and 180 only; rough texture gray—all except Nos. 170 and 180; solid red rough texture—all except Nos. 170 and 180; green veneer rough texture—No. 5 only; conglomerate browns (shades Nos. 1, 2, 3, and 4)—all except Nos. 170 and 180.
Colorblende Roofs are obtained by the use of conglomerate browns alone or in combination with rough texture gray, or rough texture red.

American Method Shingles

Mottled Red

Mottled Blue Black


Mottled Gray

Green Veneer

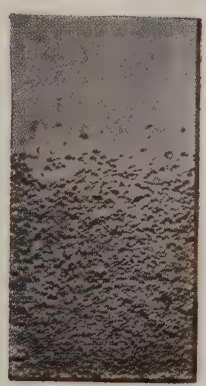
Solid Red

Mottled and Solid Shades

(Hexagonal Method Shingles Are Furnished in All the Above Colors)

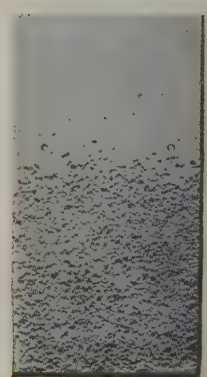
Shade No. 1

Shade No. 2


Shade No. 3

Shade No. 4

Indian Red


Solid Gray

Colorblende Shades

CERTAIN-TEED PRODUCTS CORPORATION

ROOFING DIVISION

Manufacturers of Asphalt Shingles

GENERAL OFFICES

100 East 42nd Street, NEW YORK, N. Y.

For Sales Offices, see page B1752

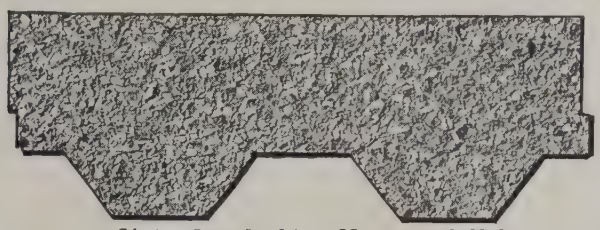
For Plants, see page A433

There Is a Certain-teed Asphalt Shingle for Every Type of Roof

Certain-teed asphalt shingles are made in various types for every roofing requirement. They are built to give the very best service and are guaranteed for 10 years.

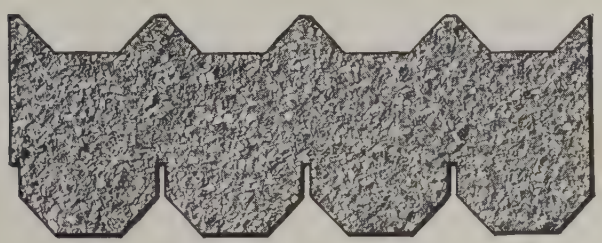
They check and resist fire as they will not support their own combustion, and are proof against sparks and brands. They are fire-resistant as well as weather and water proof. All our shingles carry Fire Underwriters' labels.

They are made of the best quality roofing felt and blended, Mexican asphalts, surfaced with crushed minerals of soft-toned colors. Furnished in red, green, blue-black or color blend; also in attractive assortments of skilfully blended colors.



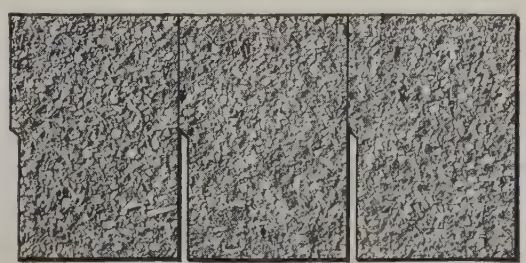
12⅔ in. Interlocking Hexagonal Slab

These slab shingles are self-spacing and interlock at ends. Furnished in an assortment of solid colors and blends of varied colors. Size 12⅔x36 in. Standard weight 215 lb. per square, Jumbo weight 280 lb. per square



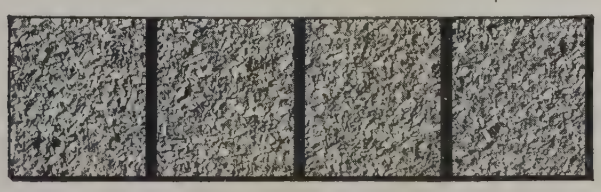
Double-tite Strip Shingle

The only octagon designed shingle giving double thickness and double wear at all points. Furnished in red, green, blue-black and color blend. Size 12x32 in. Standard weight 200 lb. per square



Self-Spacing Individual Shingle

Shingles automatically space and seal slots through our exclusive shoulder design. Furnished in solid colors of red, green, blue-black and assorted blends of beautiful colors. Jumbo weight, size 11x16 in., 325 lb. per square, also in standard weight, 8¼x12½ in., 240 lb. per square, which comes only in red, green and blue-black surfacing



4-Width Strip Shingle

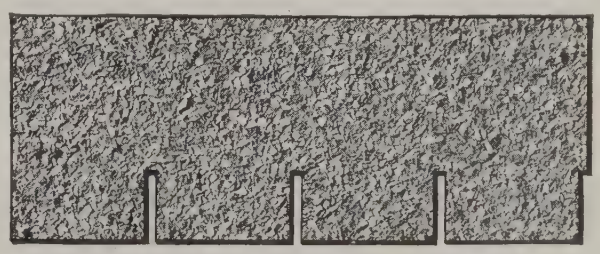
A solid strip creating a maximum weatherproof form of roof covering. Each strip is divided into four shingles separated by ½ in. channels free from surfacing. Furnished in red, green, blue-black and color blend. Standard weight, size 10x36 in., 196 lb. per square, and Jumbo weight, 12½x36 in., 247 lb. per square

13¼ in. Interlocking Hex Slab Shingle

Especially suited for re-roofing over old shingle roofs. Furnished in red, green, blue-black and an assortment of colorful blends. Jumbo weight, size 13¼x36 in., 215 lb. per square

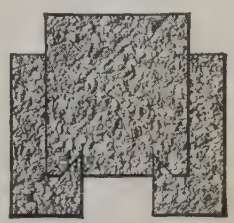
Hexagonal Slab Shingle

The hexagonal type is the only strip shingle permitting the variegated roof pattern so popular today. Furnished in red, green, blue-black and color blend. Standard weight, size 11⅓x36 in., 160 lb. per square, and Jumbo weight, 11⅓x36 in., 200 lb. per square



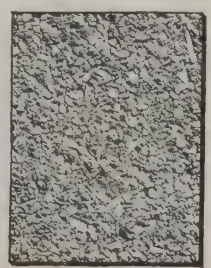
Cut-Out (Square Butt) Strip Shingle

Similar to the 4-Width Strip Shingle except that the slots between shingles are cut out 4 in. deep. Furnished in red, green, blue-black and color blend. Standard weight, size 10x36 in., 196 lb. per square, and Jumbo weight, 12½x36 in., 247 lb. per square



Universal Shingle

Used principally over old shingle roofs. Gives an interwoven thatched effect. An economical quality shingle for single or double thickness roofs. Each shingle is doubly locked in place on the roof deck—they cannot leak, bend up, curl, warp, flap or work loose. Suitable for every type of roof. Size 16x18 in. Weight 132 lb. per square. Furnished in red, green, blue-black and color blend



Individual Shingle

The standard type of individual shingles. Furnished in red, green, blue-black and color blend. Standard weight, size 9x12½ in., 235 lb. per square, and Jumbo weight, 12x16 in., 306 lb. per square

LANCASTER ASPHALT, INC.

Manufacturers of Mastic Slate Surfaced Shingles

GRAYBAR BUILDING, 420 LEXINGTON AVENUE

NEW YORK, N. Y.

A HEAVY BUTT SHINGLE WITH CHARACTER

Lancaster thick butt, tapered and slate surfaced shingles have all the good points of an asphalt shingle combined with the aesthetic appeal of the character, color, shades and blends of genuine slate or heavy wood.

For all roofing purposes, Lancaster shingles have many advantages. They are enduring, strong, slightly flexible and free from the mechanical effect characteristic of all manufactured roofing.

Only High Melt Point Asphalt Used

The mastic is made up of the finest grade high melt point asphalt, fibre and a mineral filler. This mastic is shaped into shingles under great pressure. The surfacing is of slate granules thoroughly embedded into the mastic. The shingles are manufactured by a patented continuous process ensuring uniformity of quality of product. The component materials and the proportioning of same ensure a roof which is practically indestructible.

Irregular, Heavy, Thick Butt—Varying Widths

The heavy, thick undercut butt has a slightly irregular edge adding character to the shingle and enhancing the appearance of the finished roofing with a very heavy shadow line under each row of shingles.

The use of three different widths produces a roof absolutely free of any rigid mechanical appearance.

Lancaster shingles can be used for all pitched surfaces exceeding 4 in. to the foot, and are suitable for schools, residences, churches, clubs, etc. They can be applied directly over old wooden shingles. While the butt is thick, the weight per square is much less than slate or tile.

Fire Resistance and Insulation

They are fire safe and do not splinter or crack when suddenly drenched after being subjected to flame. They have a high insulation value.

Cost

Owing to the advanced method of manufacture, the cost of Lancaster Shingles is very much less than slate, tile or asbestos and less than some grades of asphalt and wood shingles. The price does not fluctuate.

COLORS AND BLENDS

Lancaster Shingles are produced in six different colors and six blends of these colors:

Lancaster No. 1 Green
Lancaster No. 2 Blue Black
Lancaster No. 3 Buff
Lancaster No. 4 Purple
Lancaster No. 5 Light Red
Lancaster No. 6 Dark Red
Lancaster No. 7 Blend of Green, Buff and Blue Black
Lancaster No. 8 Blend of Green and Blue Black
Lancaster No. 9 Blend of Green, Purple and Blue Black
Lancaster No. 10 Blend of Dark Red and Buff
Lancaster No. 11 Blend of Buff and Light Red
Lancaster No. 12 Blend of Dark Red, Blue Black and Buff.

Beautiful effects are obtained by combining several of these colors on the roof.

Burma Red

Jade Gray

Continued on next page

SUMMARY OF CHARACTERISTICS

(1) The shingle is semi-rigid and cannot warp, curl or shrink.

(2) Having a thick undercut butt, this roofing casts a very heavy shadow line.

(3) Being laid in random widths, a mechanical effect is avoided.

(4) Durable; the component parts when mixed are imperishable and will last indefinitely.

(5) Nailing does not fracture this shingle.

(6) Will not lift with wind.

(7) Will stand repeated blows without cracking.

(8) After heating will bend to any desired shape and will retain that shape.

(9) Will stand rough handling.

(10) Affords better insulation than almost any other type of roof.

(11) Fire resisting.

SIZES AND METHODS OF APPLICATION

Sizes and Covering Area

Lancaster Shingles are produced in three sizes:

10 in. wide by 16 in. long
12 in. wide by 16 in. long
15 in. wide by 16 in. long

The covering area (number required for one square) is as follows:

	10 in.	12 in.	15 in.
6½-in. exposure, 3-in. headlap...	222	185	148
7 -in. exposure, 2-in. headlap...	206	172	138

The shingles are laid on the roof in random widths. For a square, mixed sizes, 6½-in. exposure, 60 shingles of each size are required.

The shingles are shipped in bundles, six bundles to the square.

Application

Lancaster Shingles are easily and cheaply applied. Cutting, even in the hottest weather, is readily accomplished by means of an ordinary linoleum knife. For hips and ridges, the shingles may be heated and bent to shape. After cooling they will retain that shape.

SPECIFICATIONS FOR APPLICATION OF LANCASTER SHINGLES

Roofing Felt

All roof boarding (as specified under "Carpenter Work") shall be covered with one thickness of paper or felt and laid in horizontal layers with joints lapped toward eaves at least 3 in. and tacked down.

Flashing

A base flashing course (of 16-oz. copper, 4 lb. lead) extending 4 in. on the roof and not less than 4 in. vertically, shall be laid against all chimneys, parapet and party walls, roof posts and porch roofs where they connect with walls. Similar flashings 4x4 in. by length equal to "weather" plus "lap" laid in with each course of shingles, shall be carried up all rakes.

When base flashings are not covered by shingles or siding, a cap or counterflashing course (of 16-oz. copper, 4 lb. lead) shall be tightly built into masonry at least 2 in. and shall cover the vertical leg of the base flashing at least 3 in. All vertical joints of cap flashings to be sealed tight with elastic roofing cement.

Ridges and Hips

Cover ridges and hips with Lancaster shingles 15 in. wide, bent to shape after slow heating, each ridge and hip shingle to have not more than 6½ in. exposure, to be bedded in elastic roofing cement and be securely nailed by two nails located 2 in. above exposure line.

Open Valleys

Provide 16-oz. soft rolled copper flashing 24 in. wide, nailed at top only.

Closed Valleys

Flash all closed valleys with 16-oz. copper flashing over each course. Flashing shall lap 2 in. and shall extend 12 in. on each side of the valley.

Roof Areas

The main (and porch) roofs, the roofs and sides of dormer windows, and all other surfaces so indicated on the drawing shall be covered with Lancaster Shingles laid 6½ in. to the weather.

The shingle shall project 2 in. at the eaves and ½ in. at all gable ends, and shall be laid in horizontal courses, so that the third course shall lap 3 in. over the first, and each course shall break joints with the preceding one, side lap to be not less than 3 in. The shingle shall begin at the cornice line or eave with a starting course canted $\frac{3}{16}$ in. so that the succeeding courses will contact.

The shingles shall be fastened to the roof boards with broad flat headed galvanized (copper or yellow metal) nails, two to each shingle and of sufficient length to penetrate roof boarding 1 in. Each shingle shall be nailed 9½ in. from the butt.

On completion, all shingles must be sound, whole and clean and the roof shall be left in every respect tight and a neat example of workmanship.

MOHAWK ASBESTOS SLATE CO., INC.

Mohawk Tapered Asbestos Shingles

Main Office: UTICA, N.Y.

Factory: ONEIDA, N.Y.

SALES OFFICES

NEW YORK, N.Y., 101 Park Avenue — PHILADELPHIA, PA., 630 Real Estate Trust Bldg. — RALEIGH, N. C., 301 Lawyers Bldg.

CHICAGO, ILL., D-18 Builders' Exposition, 228 North LaSalle Street — CLEVELAND, OHIO, Builders' Exchange, Rose Bldg.

Products

TAPERED ASBESTOS SHINGLES

Mohawk Tapered Asbestos Shingles

Mohawk Shingles are made with a real taper and the butts are available in thicknesses of 3/8, 5/8, and 7/8 of an inch. They are composed solely of pure asbestos fiber and portland cement with mineral oxides for the coloring. The result is a uniting in one product, qualities usually attributed to several.

In the first place they are fireproof for there is absolutely nothing to burn. The asbestos and the cement give exceptional insulation, cooler in summer, warmer in winter. They will not crack, chip or exfoliate —age only improves them. The use of mineral oxides is your insurance for permanency in color. When comparative thickness is taken into account, Mohawk Shingles have the advantage of lightness in weight. No climate is too severe a test for them for these shingles have always met every extreme of heat or cold.

The thick butt gives a deep shadow line and the texture is of an interesting roughness. When furnished with the hand-hewn butts or random widths, a further element for variety and originality is available. The combinations of effects are practically unlimited and Mohawk Shingles can be successfully adapted to any period of architectural design.

Specifications and Method of Application

Made in standard size, 8″ x 16″. Random widths 6″, 8″, 10″, 16″. Laid 7″ to the weather. Not less than 2″ headlap. 260 shingles per square. Ordinary roof construction will carry Mohawk Shingles, as they are lighter than natural slate or tile. Mohawk Shingles, 3/8″ butt average a weight of 650 pounds to the square (100 square feet). Average weight of Mohawk Shingles, 5/8″ butt, 800 pounds to the square; 7/8″ butt, 1300 pounds to the square.

Thickness of butts, 3/8″, 5/8″ and 7/8″. Plain butts and Rustic Colonial type (Rough Butt).

Two sets of *countersunk* holes (4 holes) are provided in Mohawk Shingles, instead of the single set of holes as in all other roofing materials. This enables the Mohawk to be laid securely and regularly, no matter where the boards of the roof come underneath.

The Mohawk Shingle has bevelled edges, insuring a perfect, weather-tight joint.

Roof boards laid in the usual manner, breaking joints and nailing securely, leaving no loose ends. Roofing boards must be well seasoned and preferably of narrow width. Lay one thickness of good quality slater's felt with a 4″ lap, and not less than 10″ lap on hips and valleys. Apply cant strip, lathe or other material 3/8″ thick at eaves. Apply one course of Mohawk Tapered Asbestos Shingles cut 11″ from butt as starters parallel with eaves, overhanging the eaves about 1½″. Apply the second course Mohawk Shingles, covering the first course, breaking joints. Then proceed with laying in precisely the same manner as with natural slate or wood shingles, exposing Mohawk Shingles 7″ to the weather. Use only galvanized needle point nails or copper wire roofing nails as recommended by manufacturer. Drive nails flush with Shingle surface, *but not down too tight.*

PANEL ONE—3/8″ thick butt shingles, Plain. The darker colors are in greater proportion at the bottom, and the lighter colors toward the top, giving a graduated lightening effect.

COLORS—*Brown, Buff, Dark Gray*

PANEL TWO—5/8″ and 3/8″ thick butt shingles, Plain and Rough, random widths. Graduation in color and effect with darker colors and the wider shingles graduating to the lighter shades and narrower widths at the top.

COLORS—*Brown, Purple, Dark Gray, and a few Black*

Continued on next page

The Seven Natural Colors of Mohawk Shingles

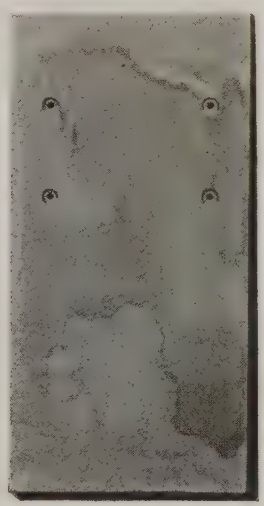
BROWN

PURPLE

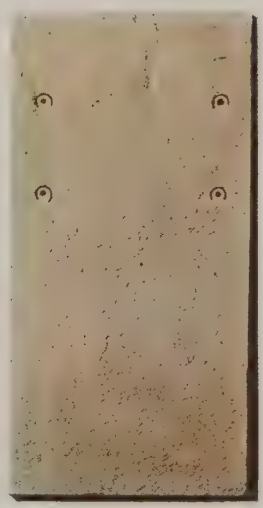
RED

BLACK

BUFF



DARK GRAY



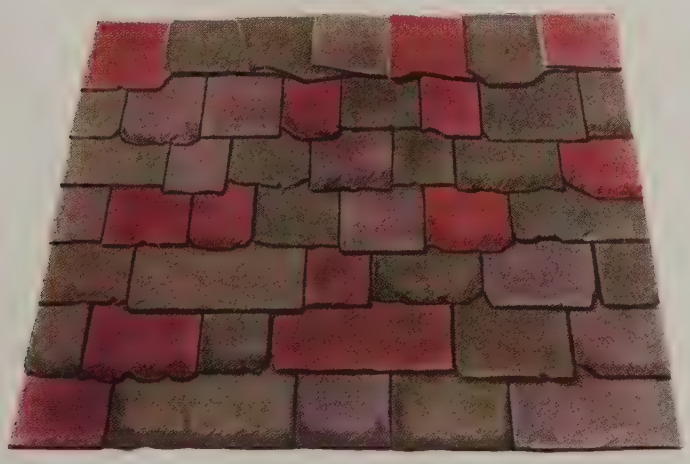
LIGHT GRAY

Hip and Ridge Roll made in all colors in sections 16″ long. Ninety-three sections of Ridge Roll required to cover 100 lineal feet of ridge or hip. Special Hip Tile for hips only laid two pieces to each course, being exposed approximately 4½″ to the weather.

In applying Ridge Roll, use a wood strip one inch by two inches, inch surface to ridge or hip, nailing Ridge Roll to the strip with 3″ lap, using copper clips lapped over the butt of each section.

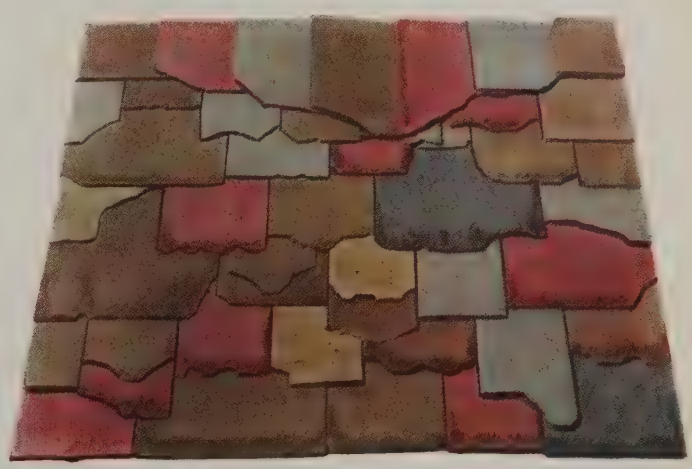
Make all ridges and hips water-tight before applying hip or ridge roll.

Mohawk Tapered Asbestos Shingles are guaranteed to last a lifetime if applied in accordance with our specifications.



PANEL THREE—⅞″, ⅝″ and ⅜″ thick butt shingles. Plain and Rough, random widths. Laid in graduated effect with slightly staggered courses. Beautiful blend of color.

COLORS—*Brown, Purple, Red*



PANEL FOUR—⅞″, ⅝″ and ⅜″ thick butt shingles. Plain and Rough, random widths. Laid in a very irregular manner—tapestry effect. An especially striking treatment over a wide expanse of roof.

COLORS—*Brown, Red, Buff, Dark Gray and a few Black*

THE FLINTKOTE COMPANY

Asphalt Thick Butt Shingles

THE RICHARDSON ROOFING COMPANY

NEW ORLEANS, LA. CINCINNATI, OHIO
NEW YORK, N. Y. BOSTON, MASS.

THE CHATFIELD MANUFACTURING CORPORATION

ATLANTA, GA. DALLAS, TEX.
CHICAGO, ILL.

Products

THICK BUTT SHINGLES.

Also Hexagon and Square Butt Strip Shingles, Super Giant Individual Shingles, Rex Lox Shingles, Roll Roofings and Building Papers, Asphalt Paints, Plastics and Emulsions.

For Asphalt Roofing Products, see page A439; for Anaconda Copperclad Shingles, see page A506.

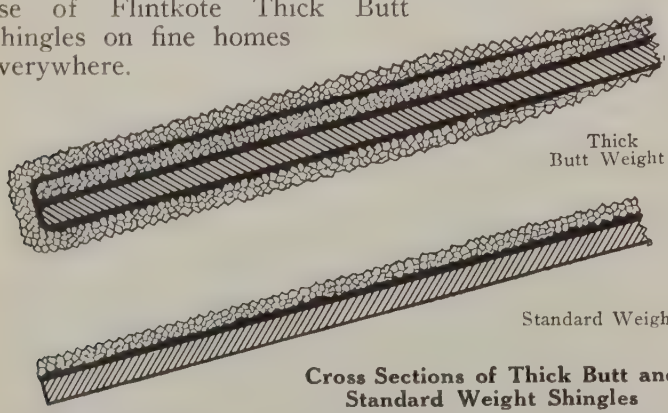
Construction

Thick Butt Shingles are a handmade product. Therefore, they allow distinctive color combinations not available in machine made shingles. Greater thickness and greater texture combined with the many beautiful colors produce a most attractive asphalt shingle roof.

Every exposed part of a Flintkote Thick Butt Shingle is completely protected against destructive elements, by an extra coating of the best protective agent known—*asphalt.* In addition to this sealed sheet of weather resisting asphalt, all exposed edges and the backs of the tabs are protected by an additional wearing surface of crushed minerals.

The *supersaturating process* prolongs their endurance. By this process, an additional amount of asphalt is absorbed into the sheet of felt, bringing the degree of saturation to approximately 100% of capacity. Supersaturation increases the life of the roofing without adding to its cost to the consumer.

The thick-butting process brings to Flintkote Thick Butt Shingles softly rounded contours, an appearance of massiveness, deep artistic shadow lines and all the charm of a hand-wrought roof. These beautiful effects partially account for the growing use of Flintkote Thick Butt Shingles on fine homes everywhere.



Cross Sections of Thick Butt and Standard Weight Shingles

The above comparison of cross sections of a regular shingle and a Thick Butt Shingle show just why Thick Butts offer such substantial protection

Colors

In addition to the standard Flintkote red, green and blue black, the following exclusive hues and color blends assure a shade and color value to exactly suit any home or decorative scheme:

Colordrift
Montauk green
Teaneck brown
Tile red

Designs

10-in. Rex-Tyle Thick Butt Strips—For maximum economy in the substantial thick butt weight.

12½-in. Rex-Tyle Thick Butt Strips—The extra weight and extra headlap furnishes added protection when desired.

12-in. Giant Rex-Tyle Thick Butt Strips—The giant size gives added protection due to its extra heavy construction. Their massiveness especially recommends them for homes of the large or rambling type.

Fan-Tyle Thick Butt Shingles—An unusual shingle which provides a most distinctive and beautiful pattern.

Application

Thick Butts can be applied at the same low cost as other strip shingles. Their scientific design reduces manual operations to a minimum and obtains greater effectiveness from each nail, making fewer nails necessary. Being self-aligning and self-spacing they assure a correctly applied roof. There are no openings between shingles in the strip design to allow wind, rain or dirt to penetrate to the roof boards. They afford greater roof security at a lower application cost.

Fire Protection

The Class C label of the Underwriters' laboratories, Inc., warrants effective safety, not only in resisting fires from without, but in checking fires from within. A Flintkote Thick Butt Roof is safe from flying fire brands and from chimney sparks.

DIMENSIONS, ETC., THICK BUTT SHINGLES

	10-in.	12½-in.	12-in. Giant	Fan-Tyle
Tabs per strip	4	4	3	.....
Size of strip.....in.	10x36	12½x36	12x36	10x36
Width of each shingle.....in.	8¼	8¼	11	11¼
Exposure.....in.	4	4	5	4
Head-lap.....in.	2	4½	2	2
Strips per square	100	100	80	100
Bundles per square	4	4	4	6
Nails per strip	5	5	4	4
Average weight per square lbs.	300	350	345	355
Underwriters' label	Class C	Class C	Class C	Class C

How Obtainable

Similar products are supplied under the well-known Richardson and Chatfield brands by:

The Richardson Roofing Company
The Chatfield Manufacturing Corporation

The nine thousand distributors of THE FLINTKOTE COMPANY, The Richardson Roofing Company and The Chatfield Manufacturing Corporation can give prompt service and shipments anywhere from their complete stocks of high grade roofing products. Their distributor and sales representative in your locality will gladly furnish prices, literature, samples and lists of installations upon request, or this material can be obtained direct from The Flintkote Company, Advertising Department, 809 Park Square Building, Boston, Mass.

ESTABLISHED 1870

THE AULD & CONGER COMPANY

Producers of Slate for Roofs, Floors, Terraces and Garden Walks

GENERAL OFFICES
1920 East 75th Street
CLEVELAND, OHIO

QUARRIES: POULTNEY, VT. AND BANGOR, PA.

Products

SLATE for Roofs, Floors, Terraces, Garden Walks, and for Structural Use.

Roofing Slates

Since the establishment of this company in 1870 many thousands of buildings have been roofed with our "Slates of Quality," and many floors, terraces, and garden walks installed. Our Architectural Service Department will gladly furnish samples of our slate and cooperate with architects with suggestions, if desired, as to size, color, thickness, texture, and method of application best suited to the type of building contemplated, all of which are important—taking into consideration location, rafter lengths, surroundings, etc., of the building.

We shall be glad to send you suggested specifications we have formulated for distinctive types of architecture.

Vermont Colored Slates

Our Mammoth Vein Weathering Greens, Purple Vein Slates, Unfading Greens, Unfading Mottled Grays, Unfading Clear Purples, etc., are all well known; as are our "Agecraft Rustics" assembled by us with extreme care to create a charming color-blend roof, we having in mind the necessity of varying the percentages of color exposure for the different lengths of rafters.

Pennsylvania Blue-black Slates

Our Genuine Bangor Slate is famous for its unfading and lasting quality and architects are requested to be careful in specifying as noted below, so that inferior material with some "Bangor" name will not be substituted.

Size—Thickness of Roofing Slate

In Vermont we make all sizes and thicknesses—standard (to average $\frac{3}{16}$ in.), $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 in.

In Pennsylvania, we make all sizes and standard thickness only (to average $\frac{3}{16}$ in.).

Roofing Slate Specifications

In specifying Genuine Bangor Slate write "Genuine Bangor Slate, the slate to be labeled and with certificate of the Bangor Slate Association," and then see when the material is delivered to the building the slates have this label on them. Otherwise, they are not the Genuine Bangor Slate that you specified. Insist on seeing, too, a certificate sent with every shipment.

For "Agecraft Rustics"

Preparation—Slate roofer shall examine roof boards and advise carpenter of anything likely to be detrimental to the durability of the finished roof, and shall see that any defects are corrected before applying felt. Carpenter shall apply a cant strip nailed about 2 in. above eaves and shall apply saddles back of chimneys and elsewhere required. Carpenter shall also build up forming where curved slate valleys are shown and place all blocking required by roofer. Roofer shall furnish and apply elastic cement wherever necessary.

Felt—Cover surfaces, including dormer cheeks, with asphalt felt weighing 30 lb. to 100 sq. ft., lapped 6 in. where joined (Note A). Where curved valleys are shown felt shall be of double thickness.

Slate—When surfaces are prepared as above, cover with "Agecraft Rustic" Slate, as quarried by THE AULD & CONGER COMPANY, Cleveland, Ohio, the thickness, colors, exposure and method of laying to be as indicated on roof layout prepared by THE AULD & CONGER COMPANY and approved by the architect.

Nails—Copper nails (Note B) of proper length shall be used.

Flashing—Sheet metal contractor shall furnish and roofer shall install 16-oz. soft rolled copper built-in flashings, as required, at closed valleys, chimneys, dormers, and necessary places. Flashing shall extend not less than 4 in. under slate and have not less than 4 in. exposed above the slate on a line at right angle to the roof. Roofer shall insert all aprons required. These to be furnished by sheet metal contractor. Sheet metal contractor shall apply counterflashing and make secure against leaks.

Open Valleys—Shall be 16-oz. soft rolled copper (Note C) 20 in. wide, nailed only at top. When applying slate care must be used that nails do not penetrate sheet metal valleys.

Closed Valleys—Shall be flashed with 16-oz. copper flashing over each course. Flashing to lap at least 2 in. and to extend 10 in. either side of valley.

Rounded Valleys—Are to be carefully fitted and laid with long slate, carefully flashed.

Ridges, Hips—Shall be laid mitered or Boston style if design so requires, ridges and hips shall have 16-oz. copper ridge and hip rolls (Note D) as shown.

Guarantee—Roofer shall furnish guarantee to keep all slate roof surfaces in a watertight condition for one year from completion.

Using Standard Slate in "Agecraft Rustics," etc.

Preparation—Felt Guarantee, same as for "Agecraft Rustics," with necessary modifications.

Slate—When surfaces are prepared as above cover with "Agecraft Rustics" (Note E) as quarried by THE AULD & CONGER COMPANY, Cleveland, Ohio; the colors, exposure and method of laying to be as indicated on roof layout prepared by THE AULD & CONGER COMPANY and approved by the architect.

Specification Notes

Note A: For standard slate we recommend a No. 1 asphalt felt.

Note B: Away from salt air or for less expensive work galvanized or copper-clad nails.

Note C: Substitute zinc galvanized iron or tin, but copper is recommended.

Note D: Substitute 4-lb. sheet lead or galvanized iron.

Note E: Substitute, if desired. Purple Vein, Weathering Green, Unfading Mottled Gray, Genuine Bangor (insert full wording), one size, or random lengths and widths.

BANGOR SLATE ASSOCIATION

BANGOR, PA.

MEMBER COMPANIES

AULD & CONGER CO., Cleveland, Ohio
BANGOR IDEAL SLATE MINING CO., Bangor, Pa.
BANGOR QUARRY COMPANY, Bangor, Pa.
BANGOR WASHINGTON SLATE CO., Bangor, Pa.
BANGORVEIN SLATE CO., Bangor, Pa.
COLUMBIA BANGOR SLATE CO., Bangor, Pa.
THOS. DITCHETT ESTATE, Bangor, Pa.
EAST BANGOR CONSOLIDATED SLATE CO., East Bangor, Pa.
HOUSTON BROS. CO., Pittsburgh, Pa.
NORTH BANGOR SLATE CO., Bangor, Pa.
OLD BANGOR SLATE CO., Bangor, Pa.
VENDOR SLATE CO., Easton, Pa.
J. W. WILLIAMS SLATE CO., Easton, Pa.

Product

The members of the BANGOR SLATE ASSOCIATION are the Sole Producers of GENUINE BANGOR ROOFING SLATE—a blue-gray slate of the highest quality.

Purposes of the Association

The BANGOR SLATE ASSOCIATION is a non-profit membership corporation formed, (1) to bring about a wider appreciation of the real value of slate as a roofing material, (2) to invite the co-operation of architects, contractors and roofers in formulating and disseminating information regarding the most advantageous methods of application, (3) to protect the high reputation and standards of Genuine Bangor Slate. To accomplish these objects, the Association is constantly furnishing to the building world detailed information desired regarding Genuine Bangor Slate.

To insure that the architect obtains slate of a uniform grade and quality, an inspection service is maintained to inspect and label with the trade-mark all Genuine Bangor Slate. In addition, a certificate of quality and grade is furnished to each purchaser of Genuine Bangor Slate.

Service

The Association will welcome the opportunity to co-operate with the architect, contractor and roofer on all roofing problems.

Genuine Bangor Slate

The reputation of Genuine Bangor Slate is so well established that for many years it has been the standard by which other slate has been judged. Without sacrificing tensile strength or hardness, this slate possesses toughness and flexibility to a degree far beyond that of the majority of slates. Genuine Bangor Slate is practically non-weathering, and years of exposure on the roof show no appreciable change in color.

Mill stock for structural purposes, Genuine Bangor Slate Flagging, and Blackboards, are also produced by some of the members of the Association.

(Reg. U. S. Pat. Off.)
Look for Label Bearing This Trade-mark on All Shipments of Genuine Bangor Slate

Label and Certificate Protection

All Genuine Bangor Slate bears the trade-mark of the Association and all shipments are accompanied by a certificate of identification. Genuine Bangor Slate is guaranteed by the Association to conform to rigid specifications for material and workmanship. To insure the protection afforded by this guarantee, architects should insist on only slate bearing the Genuine Bangor label and compel the contractor to furnish a certificate.

This certificate should be checked by the architect, as substitutions of other slate for Genuine Bangor Roofing Slate are common occurrences.

The trade-mark shown has been identified for a generation with the superior slate produced in the Bangor, Pa., district.

Selections of Genuine Bangor Slate

No. 1 Clear—The finest grade of blue-gray slate produced. Uniform throughout as to color and texture, and free from knots and knurls that in any way interfere with the safe conveyance or the laying of the slate on the roof. Entirely clear stock. The customary tolerance to be allowed for thickness. Corners to be square.

No. 1 Ribbon—Similar in all respects to No. 1 Clear stock except that one or more ribbons of darker material may cross the slate in such manner that when laid with the regulation 3-in. lap, the ribbons shall not be exposed to the weather. Fracture tests prove that the ribbon is stronger than the slate.

To Specify Genuine Bangor Slate

Architects who desire Genuine Bangor Slate should specify only by the full name "Genuine Bangor Slate, with labels and certificate of BANGOR SLATE ASSOCIATION." This wording will protect the architect and his client against the substitution of inferior materials.

Small Size of Facsimile Certificate Issued with Every Car of Genuine Bangor Slate

Continued on next page

Stock Sizes Available at All Times

Due to the vast production of the Bangor Quarries, a complete stock of the sizes given in table and in standard thickness of approximately $\frac{3}{16}$ in. is available at all times. All shipments are made from quarries at Bangor or East Bangor, Pa. Heavier slate are manufactured promptly to order.

STANDARD SIZE SLATE AVAILABLE AT ALL TIMES

Type	Sizes are in inches, length by width in the order given						
No. 1 Clear.....	24x14	22x12	20x12	18x12	16x12	14x10	12x10
	24x12	22x11	20x10	18x10	16x10	14x 8	12x 8
	.....	.....	.....	18x 9	16x 9	14x 7	12x 7
	.....	.....	.....	.....	16x 8	.....	12x 6
No. 1 Ribbon.....	24x12	22x12	20x12	18x12	16x12	14x10	12x 8
	.....	22x11	20x10	18x10	16x10	14x 8	.....
	.....	.....	.....	18x 9	16x 8	14x 7	.....

QUANTITIES REQUIRED AND WEIGHT PER SQUARE FOR VARIOUS SIZES

Size of slate, in.	Weight per square, lb.	Number per square	Exposure with 3-in. lap, in.	Nails per square 3d copper, lb. and oz.	Size of slate, in.	Weight per square, lb.	Number per square	Exposure with 3-in. lap, in.	Nails per square 3d copper, lb. and oz.
24x14	641	98	10½	1–4	16x12	692	185	6½	2–4
24x12	641	115	10½	1–7	16x10	692	222	6½	2–12
22x12	652	127	9½	1–9	16x 9	692	247	6½	3–1
22x11	652	138	9½	1–12	14x10	716	262	5½	3–3
20x12	664	142	8½	1–12	14x 8	716	328	5½	4–0
20x10	664	170	8½	2–2	14x 7	716	374	5½	4–10
18x12	674	160	7½	1–15	12x 8	750	400	4½	4–15
18x10	674	192	7½	2–6	12x 7	750	457	4½	5–10
18x 9	674	214	7½	2–9	12x 6	750	534	4½	6–9
18x 8	674	277	6½	3–3					

Standard Specification "A"

Preparation of Roof—Before proceeding with roofing work of any nature whatsoever, the roofer shall examine all roof surfaces so intended for the application of slate, and report for correction any and all defects therein which will interfere with the execution of his work and guarantee thereof.

Cant Strip—Carpenter contractor shall provide in place at all eaves a beveled cant strip 1 in. in thickness at the lower side and 2 in. or more in breadth, so beveled that the slate will rest evenly thereon.

Paper—Cover all roof surfaces so intended for slate application with an approved brand of 30-lb. asphalt impregnated roofing felt. This felt shall be laid to shed water and accordingly lapped 4 in. on the rafter and 12 in. where vertical joints are occasioned. It must be in perfect, undamaged condition and free from holes when slate is applied.

Cement—Within 1 ft. of dormers, vertical walls, valleys, ridges, hips and similar places, slate shall be laid in an approved brand of elastic cement approximating the general color of the slate. (Within 2 ft. of the eaves where parapet walls require the use of a copper cricket, slate shall be laid in cement as above indicated.) *Note if required.*

Nails—Each slate shall be secured with two copper slating nails of sufficient length to penetrate the roof sheathing 1 in. in every instance. In no case shall nails be driven through (copper) flashings except when applying same.

Slate—Cover all properly felted roof surfaces as above detailed with No. 1 Genuine Bangor Certificate Roofing Slate (size) identified with certificate and labels of the Bangor Slate Association.

Manner of Laying—All slates shall be laid in proper weathertight manner with well broken joints and preserving a headlap of at least 3 in. above the second course below in all instances.

Valleys—All valleys shall be closed type and shall be properly slip flashed in each and every course. (*Where open valleys are required see foot note below.)* At valley intersections, all courses throughout the entire roof shall meet.

Ridges—Ridges shall be of Boston Type and laid horizontally in such a manner as to form a regular course of slate. There shall be no demarcation between the last course of slate and the ridge course. The holes in the ridge slate shall be punched to intersect the joints of the next course below. It is understood that the top course of slate shall be laid in elastic cement and so arranged that a first class waterproof job will result. In no instance shall the cement be so applied that it will run over face of the slate.

Diagram Showing Method of Laying Boston Ridge

Hips—All hips shall be applied in the Boston Style as per sketches supplied by the Bangor Slate Association, Bangor, Pa.

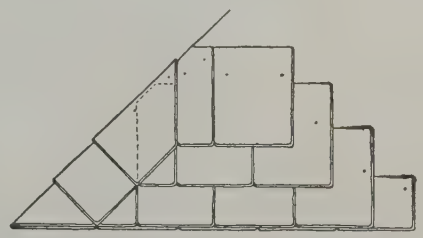


Diagram Showing Method of Laying Boston Hip

Flashings—Flashings on dormer cheeks and where the roof meets other vertical surfaces, shall be of sufficient size to lap 4 in. under the next above and extend 8 in. under slate on each side.

Cleaning Up and Guarantee—The contractor shall guarantee his work for a period of at least ... years, replacing or repairing any broken slates or leaks until the end of his guarantee period. Any stains of any nature whatsoever, excluding stains or dirt streaks caused by other contractors at time of building, shall be removed before acceptance of his work will be granted.

It is not the intent or purpose of the above guarantee to require the roofer to replace slates or repairs, leaks caused by other contractors or by causes beyond his reasonable control. This guarantee refers to faulty slate or workmanship which will not be allowed in connection with the application of this roof.

Note: For abbreviation purposes the following form of specification may be used in place of above: "All materials and labor in connection with slate work shall be furnished and performed in strict compliance with Specification 'A' of the Bangor Slate Association, Bangor, Pa. The slate shall be Genuine Bangor Certificate Slate (grade and size) with labels and certificate of the Bangor Slate Association."

Note: For the sheet metal work we recommend the specifications published by the Copper and Brass Research Association.

Slate on Flat Surfaces

Genuine Bangor Slate for this purpose are applied in small sizes, butt to butt over standard prepared roof surfaces in place of slag or gravel as per specifications issued by the manufacturers of prepared roofing materials.

Copies of such specifications will be mailed upon request.

ESTABLISHED 1873

THE JOHN D. EMACK CO.

Thatchslate and Olde Stonesfield Roofs and Flagging

ARCHITECTURAL SERVICE AND DISPLAY ROOMS

112 South 16th Street
PHILADELPHIA, PA.

17 East 49th Street
NEW YORK, N. Y.

REPRESENTED BY

CHICAGO, ILL., Burt T. Wheeler Brick Co., 1222 Builders Building, 228 North La Salle Street
DETROIT, MICH., Thomas Bros. & Co. Ltd., 415 Brainard Street
ATLANTA, GA., F. Graham Williams Brick Co., Candler Building
BOSTON, MASS., Mitchell-Vance, Inc., of New England, 11 Beacon Street
ST. LOUIS, MO., John J. Ward, Rialto Theatre Building
CINCINNATI, OHIO, Baldwin-Tarvin Company

Products

Olde Stonesfield Roofs.
Olde Stonesfield Flagging.
Thatchslate.
Also Commercial Roofing Slate.

Olde Stonesfield Roofs

Olde Stonesfield Roofs are inspired by the age-old stone roofs of the Cotswold district but offer the added feature of unlimited variety, for in Olde Stonesfield Roofs the greatest range of colors, size, and texture are available and as designed by our Architectural Department fully meet the requirements of the individual building.

Thatchslate

In Thatchslate Roofs, designed and produced by The John D. Emack Co., exclusively, the designer is offered a roof of rich color and texture at a cost between that of an ordinary commercial slate and the more expensive Olde Stonesfield Roofs.

Olde Stonesfield Flagging

Interesting colors and textures in irregular, semi-irregular and random rectangular shapes for inside floors, terraces, walks, steps, coping, etc.

Olde Stonesfield Flagging is also offered cut-to-pattern assuring the designer in advance of the ultimate effect of the work.

Stocks

We carry large stocks of both roofing and flagging for immediate shipment.

Olde Stonesfield Roof
Lewis Bowman, Architect

Circulars

Circulars regarding Thatchslate, Olde Stonesfield Roofs and Olde Stonesfield Flagging will be mailed on request.

Architectural Service

We will be pleased to co-operate with you in the preparation of specifications or designs of roofs or floors, estimating cost or furnishing such information as may be desired.

Continued on next page

Suggested Specifications for Olde Stonesfield Roofs and Thatchslate Roofs

(1) **Roofing**—All sloping roofs (and sides of all dormers), except where otherwise indicated on plans, shall be covered with slate as hereinafter specified.

(2) **Felt**—All surfaces which are to be covered with slate shall first be covered with an approved asphalt saturated felt weight 40 lb. [30 lb.] to the square. Lap well at all joints and fasten with the proper metal clips and nails to the roof sheathing.

(3) **Cant Strips**—At all eaves provide a wood strip of sufficient thickness to give the slate the proper cant. (The thickness of this strip is controlled by thickness of slate at eave.)

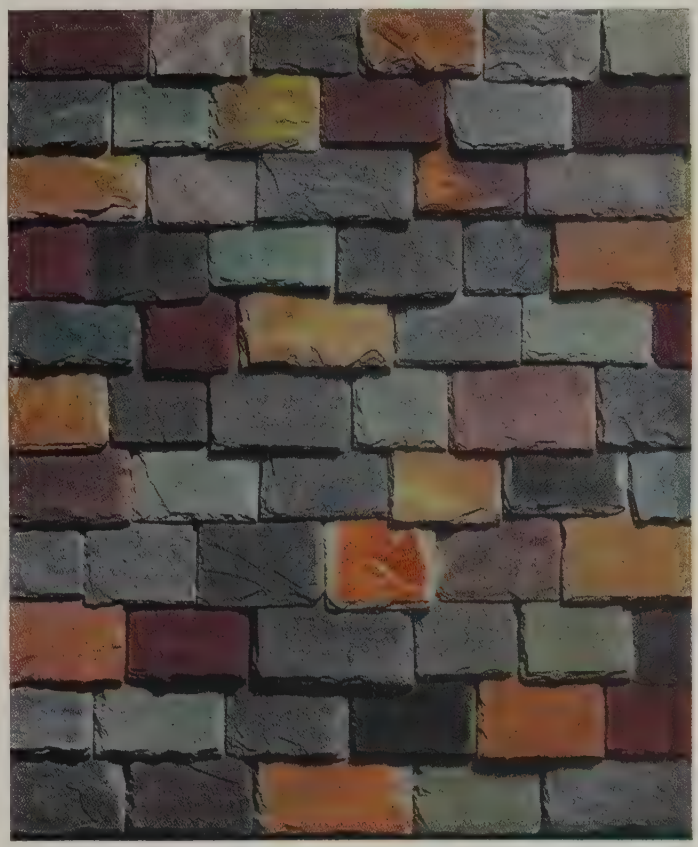
(4) **Slate**—*Note:* Use either paragraph A or B.

(A) Over the felt lay an Olde Stonesfield Roof designed and produced by The John D. Emack Co., Philadelphia and New York. Roof to be laid in accordance with roof layout and instructions furnished by The John D. Emack Co. and approved by architect.

(B) Over the felt lay a Thatchslate Roof designed and produced by The John D. Emack Co., Philadelphia and New York. Roof to be laid in strict accordance with roof layout and instruction sheet furnished by The John D. Emack Co. and approved by the architect.

(5) **Head Lap**—All slate shall be laid with at least a 3-in. head lap.

(6) **Hips and Ridges**—Mitered hips shall be used throughout. Finishing or ridge courses shall be of slate of same average exposure and widths as courses of roof immediately below. No long stretchers are to be used.



Olde Stonesfield Slate, in Full Range of Colors, as Produced from Our Own Quarries

(7) **Valley**—*Note:* Use either paragraph C or D.

(C) All valleys, except where otherwise indicated, shall be round. Carpenter to build valley framing and roofer shall cover with slate in accordance with instructions and working drawing furnished by The John D. Emack Co.

(D) Straight closed valleys shall be used as shown or indicated on the architect's drawings.

(8) **Flashing**—All flashing shall be of copper [lead] [galvanized iron] as specified under sheet metal.

(9) **Nails**—Slate shall be fastened to the roof with copper [re-dipped galvanized iron] nails of sufficient length to penetrate the sheathing at least 7/8 in.

(10) **Cement**—A high grade elastic roofer's cement shall be used liberally in valleys, hips, ridges, at dormers and in any other place where necessary.

(11) **Guarantee**—The roofing contractor shall guarantee all workmanship and material furnished under these specifications free from defects for a period of one year and shall make good at his expense all defects arising within this time.

Suggested Specifications for Olde Stonesfield Flagging.

For (here mention the rooms) floors as well as exterior walks, terraces, and wherever indicated on architect's drawings, furnish Olde Stonesfield Flagging produced by The John D. Emack Co., Philadelphia and New York, in shapes as indicated on architect's plans and in colors as selected and approved by architect.

At left

Detail of Thatchslate Roof
Norman W. McBurney, Architect

The interesting feature of Thatchslate (an exclusive Emack production), as shown on the left, is the exceptional, fine texture that is obtained at a minimum cost and you will note that the exposure of no two slates in any one roof are exactly alike. Thatchslate is not to be confused with material having broken corners as used in imitations

At right

Olde Stonesfield Flagging in Random Rectangular for Interior Floor

THE CHAPMAN SLATE COMPANY

BETHLEHEM, PA.

Member of the National Slate Association

Products

Makers and shippers of "William Chapman" Black Roofing Slate in all regular stock sizes, also in graduated lengths and thicknesses and random widths.

Quarries

The quarries of The Chapman Slate Company were opened in 1850, and today, with a capacity of over 3000 squares per month, produce more roofing slate than any other single hard vein quarry operating in the country.

The Chapman product today is quarried from a depth of over 200 ft.; is made by highly skilled mechanics, many of whom have long been in the service of the company, and the entire output is most carefully inspected to insure the proper grading.

Heavy "Old English Cleft" Special Rough Slate

Owing to the numerous and constantly increasing demands from architects, the company has, for the past years, been making a heavy rough "Old English Cleft" slate ranging from ¼ to 1 in. in thickness, and in graduated lengths and random widths.

The artistic effect of a roof laid with the genuine "William Chapman" "Old English Cleft" special rough slate gives tone and character to a building which can not be produced by the use of any other roofing material.

For manufacturing plants or other places where particularly hard wear is required, the company recommends the use of "William Chapman" special rough slate, ¼ in. thick.

Standard Roofing Slate

The excellence of the "William Chapman" roofing slate lies in the toughness of the fiber, which is very hard and close grained, thus insuring a durability beyond any known limit of time. "William Chapman" roofing slate absorbs no moisture and will not decompose. Largely owing to these characteristics there is practically no breakage in transportation.

The stock of regular sizes is large and complete.

These slate are about $\frac{3}{16}$ in. thick, weighing approximately 680 lb. to the square, allowing for the standard 3-in. lap.

There are 14 different sizes ranging from 6x12 to 14x24 in. Special sizes will be made to order when required.

Labels

To prevent substitution of inferior quality slate, the company has instituted the practice of labeling about 2% of each shipment of genuine "William Chapman" roofing slate with a label, facsimile of which is reproduced herewith, on which is indicated the grade, whether No. 1 or No. 2.

"William Chapman" Slate Label

Colored Slate

Quotations furnished on colored slate upon request.

Shipping Facilities

The company ships direct from the Chapman quarries to every state in the Union, to Canada and Mexico, or to seaboard for export to Europe or South America.

With the present capacity, any size order for "regular" stock can be supplied promptly.

References

Herewith is given a partial list of buildings covered with "William Chapman" slate roofs:

Brooklyn Bridge Buildings, New York, N. Y.
Holy Trinity Church, New York, N. Y.
Central Park Buildings, New York, N. Y.
Isabella Heimath Residence, New York, N. Y.
Long Island Historical Society, New York, N. Y.
Metropolitan Opera House, New York, N. Y.
Philadelphia & Reading Railway Freight Station, Subway, Philadelphia, Pa.
Roman Catholic Cathedral, New York, N. Y.
Roman Catholic Church of the Epiphany, Philadelphia, Pa.
St. George's Church, New York, N. Y.
St. Vincent's Hospital, New York, N. Y.
U. S. Military Academy, West Point, N. Y.
First Presbyterian Church, Newark, N. J.
Mt. St. Mary's Convent, Plainfield, N. J.
St. Barnaby's P. E. Church, Philadelphia, Pa.
The Orphanage, Paterson, N. J.
Hackensack Water Co., New Durham and New Milford, N. J.
Essex County (N. J.) Insane Asylum, Overbrook, N. J.
Morris Plains Asylum, Morris Plains, N. J.
U. S. Fort Terry, Plum Island, N. Y.
U. S. Fort H. G. Wright, Fishers Island, N. Y.
Convent Buildings, Lodi, N. J.
State Capitol, Albany, N. Y.
St. Ladislaus Polish Catholic Church, Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Consolidated Gas Co. of New York, New York, N. Y.
Midvale Steel Co., Philadelphia, Pa.
Bethlehem Fabricators, Inc., Bethlehem, Pa.
Brethren Church, Ambler, Pa.
Hotel Dennis, Atlantic City, N. J.

KNICKERBOCKER SLATE CORPORATION

E. J. JOHNSON, PRESIDENT

355 West 26th Street, NEW YORK, N. Y.

Products

ROOF SLATES; GARDEN FLAGGING; SLATE BLACKBOARDS; STRUCTURAL SLATE; SNOW GUARDS; SLATING NAILS.

Slaters' Tools.

Experience and Consulting Service

We are distinctly a slate concern: our personal experience in this line covering a period of forty years during which time we have operated quarries in both Vermont and Pennsylvania; making up and supplying slate in all its various forms.

This seasoned experience is available to architects through our consulting service. Our service includes the working out of the most advanced installation problems, supplying of technical facts covering actual quarry possibilities in slate, specification suggestions and lay outs.

Old European Graduated Slate Roofs

Our Old European slate roof is all that modern artistic demands can possibly desire. Marked in texture, graduated in exposures and thickness, random in widths, colors placed haphazard throughout the roof, with more or less departure from symmetry of lines, gives a brief word picture of these beautiful roofs.

Colors range in purples, grays, greens, reds and blacks of varying shades, with some weathering to buffs. A distinguishing color feature of these roofs is the fact that they grow in beauty with age in direct contrast with manufactured roofings.

Cost will vary in range from about that of the ordinary slate roof upwards. Low cost roofs in this line can be worked out to contain some of the attractive features.

For a roof of this character we make up a roof plan outlining each and every course therein, noting the length and thicknesses of every course, thereby making clear the proper placing of laying of the slate. Blue prints furnished as desired.

Old European Terrace, Floor and Garden Flagging

The features of these floors are their pleasing texture and beautiful color effects which are everlasting. The colors are generally purple and green with black, red and buff introduced in such quantities as the individual job requires. The material offers a pleasing texture in its natural quarry surface. The individual pieces are either irregular shapes, varying in size from about 1 sq. ft. to 4 sq. ft.; or square and rectangular. The thickness approximates 1 in., which is sufficient for any purpose.

A Knickerbocker Old European Slate Roof

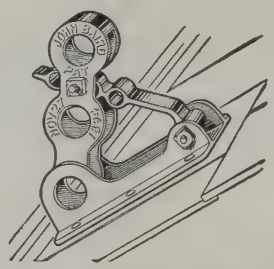
Snow Guards

The patent snow guard standard, in connection with ¾-in. (outside measurement, 1 in.) galvanized gas pipe, composes the "pipe" or "rail" guard. This standard is adjustable to any pitch of roof. The plate is made the thickness of Standard No. 1 slate and of the same dimensions as the slate upon the roof where used, the plate taking the place of a slate and being well secured to the roof with wood screws or otherwise as may be desired.

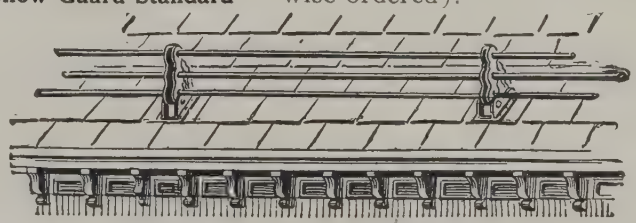
Standards with plates of greater thickness than Standard No. 1 slate will be made to suit heavier slate at an additional charge. Plates will also be made of suitable form for use on tile or other roofs.

Standards are placed along the eaves of all roofs from 5 to 6 ft. apart and are made for 3 pipes.

When ordering, specify the size of slate to be used on the roof (Standard No. 1 thickness is understood unless otherwise ordered).



Snow Guard Standard



Pipe or Rail Guard Complete

Slating Nails

Most slate roof troubles are due to slates falling out because the nails have corroded, therefore cut yellow metal or copper wire nails are recommended.

Our nails are made up and shaped distinctly for slating purposes—the result of many years' experience.

Structural Slate

Furnished in various shapes and sizes for use for steps, platforms, risers, wainscoting, base, toilet slabs of all kinds, floors, electrical slabs, etc. This can be supplied in regular ribbon black, clear black, light green and mottled purple and green.

The light green and mottled purple and green slates present a very fine appearance and are especially suitable for use in entrances, lobbies, stairways, etc., where architectural beauty is desired. They compare favorably with marble but are considerably cheaper.

Slate Blackboards

These are made from the best black slate with the highest grade of machine rubbed finish. Spaces made up of stated dimensions.

ESTABLISHED 1876

NORTON BROTHERS

E. R. NORTON, SOLE OWNER

Manufacturers of Roofing Slate

GRANVILLE, N. Y.

MEMBERS OF

Products

Commercial Standard and Architectural Roofing Slate; Garden Flagging and Floor Slate.

Quarries

The quarries of Norton Brothers were opened in 1876. They are located in the towns of Wells and Pawlet, Vermont, where the finest veins of quality roofing slate exist. All Norton Slate is quarried and produced at these two locations and all shipping is done from Granville, N. Y., where large quantities of standard sizes and colors are available for immediate distribution.

Colors

All kinds of Norton Slate are available in the following colors: weathering green, unfading green, unfading mottled green and purple, purple and green variegated, silver gray green and mottled gray black.

Weathering Green—A commercial sea green which is exceedingly strong and tough and of excellent texture. Upon exposure to the elements some slates weather and are transformed into soft tones of brown, buff and gray while others retain their original shade. This weathering action of the elements serves to beautify a roof of this material and in no way affects the durability of the slate. Most widely known and used Vermont basic slate color.

Unfading Green—A true sea green. Whatever slight fading or weathering takes place is so uniform that a permanently green roof color is assured.

Unfading Mottled Green and Purple—No two slates have exactly the same markings or colors. They consist of slightly varying shades of purples, sometimes almost clear, frequently clouded with spots or traces of green, others with light and dark clouds of purple. Occasionally there are some having only a purplish tint that might otherwise pass for green slate.

Purple and Green Variegated—These slates are of a predominating purple tone, some having spots or streaks of green of varying size. In a small percentage, green may predominate with only tints of purple. Some change upon exposure to harmonious shades of brown, while others present an unchanged appearance.

Silver Gray Green—A unique and beautiful light colored slate. Basicly green with shadings of silver and a darker tone of gray. A semi-fast color product.

Mottled Gray Black—Some are unfading and others weather. Most of the gray slates are mottled by streaks of darker gray and for this reason are often used to advantage with other slates.

These slates will make a very handsome appearance when used for the entire surface, without combining with others.

Commercial Standard Roofing Slate

Because of the great demand for Vermont slate for standard roofing, Norton Brothers have specialized in producing an excellent slate for this use.

The surface is straight and reasonably smooth the full length both front and back. Each slate is free from knots or knurls that in any way might interfere with the safe conveyance or the laying of the slate on the roof.

The corners are reasonably full so that no nailing strength is sacrificed and the roof may be laid watertight.

Made in the standard thickness of approximately $\frac{3}{16}$ in. and in lengths of 12 to 24 in.

Architectural Roofing Slate

The architectural slate can be furnished in various sizes, thicknesses and colors or combinations of colors to specifications. This slate is used extensively by architects and gives a beautiful effect as it weathers. It is of a rougher texture than the standard. Varying shades are frequently used to enhance the color effect, which, with the characteristics just mentioned, add interest in line and texture to the roof design, as well as harmonize with the general character of the building.

We especially recommend Norton's Renaissance, a natural stone slate of rough texture, which has a color-blend feature of unusual merit.

Samples and details gladly sent upon request.

Roofing Layouts and Estimates

Norton Brothers with their 50 years' experience in the layout of roofs for many important installations throughout the country, are prepared to furnish layouts and cost estimates for any style of slate roofing. They also will be pleased to collaborate with architects in the preparation of layouts and specifications.

Garden Flagging and Floor Slate

Made to order or furnished from stock in irregular sizes. Can be furnished with split surface and natural edges, or split surface and trimmed edges. In mixture of colors if desired.

References

Slate furnished by us has been used on various buildings throughout the country, among others the following:

Union College, Schenectady, N. Y.
Great Meadow Prison, Comstock, N. Y.
Middlebury College, Middlebury, Vt.
Felsdale Estates, Winchester, Mass.
State Fair Grounds, Syracuse, N. Y.
Hartford Seminary Foundations, Hartford, Conn.
Palisades Interstate Park Commission, New York, N. Y.
Metry Club Gardens, New Orleans, La.
Johns Hopkins University, Baltimore, Md.
St. Josephs Church, Worcester, Mass.
Home for Feeble Minded, Secaucus, N. J.

F. C. SHELDON SLATE COMPANY

GRANVILLE, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Builders Bldg., 228 N. La Salle St.
CINCINNATI, OHIO, 35 Poinciana Apartment
MONTREAL, QUE., 9 Olier St.
DETROIT, MICH., 1115 Francis Palms Bldg.
NEW YORK, N. Y., 101 Park Avenue
TORONTO, ONT.

PLANTS AND ASSEMBLING YARDS AT POULTNEY, PAWLET, AND RUPERT, VT., GRANVILLE AND MIDDLE GRANVILLE, N. Y.

The Company and Its Service

We are generally recognized as the largest individual producers of colored roofing slate and slate products of every kind for both commercial and architectural purposes, from quarries actually owned and operated under our personal supervision and unlimited manufacturing facilities. This fact not only enables us to maintain the uniform quality which has established the superiority of Sheldon's slates, but insures the prompt and satisfactory execution of all commissions entrusted to us.

Exclusive Specialties

Sheldon's Unfading Green and Gray—Separate shades of deep green and light gray, steadfast in color. Can be furnished singly or in such percentage of either color as may be desired.

Sheldon's Unfading Mottled Purple and Green—A mixture of green and purple tones in each individual slate. No two alike. Some with more green than purple—others vice versa—of steadfast color and durability.

Sheldon's Hard Vein Antiques—From rock formations centuries old—of a character that will not permit the manufacturing into slate less than $\frac{3}{8}$-in. thick. The background is green, but the predominating color values of the exposed surface of these slates reflect in light and dark shades of bronze an effect of age such as only the action of time and the elements could create.

Sheldon's Olde English Special Rough Cleft—Furnished in any individual color or combination of colors; random lengths and widths and promiscuous thicknesses ranging from $\frac{3}{16}$ to $\frac{3}{8}$ in. The use of these slates, in accordance with our layout and specifications, guarantees the finest low priced architectural roof extant.

Sheldon's National Black—A strictly high grade Sheldon product. Guaranteed absolutely unfading. Delivered to many localities at a considerable saving in cost over Maine, Peachbottom, or Buckingham.

Sheldon's Slate Flagging—In all sizes, colors, shapes and finishes for interior and exterior uses.

Sheldon's Semi-Weathering Green and Gray Slates

Sheldon's Semi-Weathering Green and Gray are produced from the Sheldon mines in Vermont, the largest in the district, from the deep slate formations of the Cambrian period. A uniform percentage remains unchanged; the balance, upon exposure to the elements, weather to soft tones of brown and buff—all blending together in natural harmony with no suggestion of sharp contrasts.

Prompt deliveries guaranteed. Any size or thickness.

Strength, Absorption and Acid Tests—Made by Cambria Steel Company, Johnstown, Pa., and certified by S. M. Marshall, Engineer of Tests, March 26, 1914, to establish the strength and absorption of *No. 1 Com-*

Exact Reproduction at Full Maturity of Sheldon's Semi-Weathering Green and Gray Roofing Slate of Standard Commercial Thickness Averaging $\frac{3}{16}$ in.

Continued on next page

mercial Semi-Weathering green and gray slate. The results are a correct basis for comparison as to real strength when compared to other roofing material.

Thickness, in.	Width, in.	Load, lb.	Span, in.	Breaking stress, lb.
0.165	10	385	8	17,000
0.165	10	435	8	19,200
0.160	10	395	8	18,500

Some specimens of the slate were put in water for 24 hours and others in a 5% sulphuric acid solution for the same period of time, to determine the absorption and loss in acid action.

Gain in weight 24 hours in water	Loss in weight 24 hours in 5% acid solution	
	Actual loss	Corrected for absorption
0.49% (less than ½ of 1%)..	0.29%	0.39%

Sheldon's Slate for Architectural Purposes

All of the slate described, herewith, are available, and are being extensively furnished from the Sheldon quarries, in thickness ranging from $\frac{3}{16}$ to 2 in. (antique ⅜ to 2 in.), and in graduated, or random sizes as desired.

Layout Suggestions for Architectural Slate—

A—20% each 1, ¾, ½, ⅜ and ¼-in. thickness.

B—20% each ¾, ½, ⅜, ¼ and $\frac{3}{16}$-in. thickness.

C—10% 1 in., 15% ¾ in., 20% ½ in., 25% ⅜ in., 30% ¼-in. thickness.

D—10% ¾ in., 15% ½ in., 20% ⅜ in., 25% ¼ in., 30% $\frac{3}{16}$ in. thickness.

Sizes as desired. Lower percentages of thick and higher percentages of thin slate than in graduation "C" and "D" are not recommended. Percentages are based on length of rafter. Heavier slates can be furnished when required up to a thickness of 2 in.

Shipping Weight in Pounds per Square—

Commercial $\frac{3}{16}$ in. 750, ¼ in. 1000, ⅜ in. 1500, ½ in. 2000, ¾ in. 3000, 1 in. 4000, 1¼ in. 5000, 1½ in. 6000.

Waveline Roof

Here is something new—we call it the Waveline roof. Available in Semi-Weathering Green and Gray, Unfading Mottled Purple and Green, and Arabian Red. Applied with standard 3-in. lap, same as the ordinary slate roof. Nominal thickness $\frac{3}{16}$ to ¼ in. Can be furnished in other thicknesses when required.

The Waveline Roof

Sheldon's Olde English Architectural Slate Combination No. 12

As shown below in actual natural colors, consists of a combination of various thicknesses, sizes and colors, designed particularly for producing the finest type of architectural roof after much research and exhaustive experiments.

These slate can be furnished in any range of thicknesses and exposures, either in medium or extremely rough textures with exposed ends straight or irregular. The same combination of colors is also available in random rectangular flagging for flooring, garden walks, etc.

The illustration shows a range in thickness from 1 to ¼ in. with exposures varying from 10½ to 5½ in. The slate are of *medium* texture.

Due to the extent of our quarrying operations and production facilities, timely deliveries are assured. Simply specify—"Roofs to be covered with Sheldon's Olde English Slate Combination No. 12" (following with maximum and minimum thicknesses and exposures) "as manufactured by F. C. Sheldon Slate Company, Granville, N. Y., in accordance with detailed layout to be furnished by them and approved by architect."

Olde English Architectural Slate Combination No. 12

Continued on next page

Sheldon's Heather Combination

A grouping of commercial slates combining attractiveness and low cost. Full beauty is revealed after 4 to 6 months exposure to elements. Roof illustrated is fully matured—commercial thickness, averaging $\frac{3}{16}$ in., exposures 8½ to 4½ in., random widths. Single sizes and all thicknesses available.

Sheldon's Heather Combination

Specify—"Roof to be covered with Sheldon's Slate Heather Combination (state size or sizes, exposures, etc.) as manufactured by F. C. Sheldon Slate Co."

Note: A roof layout for architect's approval should be requested when random lengths are desired.

Sheldon's Olde English Rough Cleft Unfading Arabian Red—Deposits Unlimited

A particularly low priced architectural roof—exclusive and distinctive—steadfast color. ⅜ to $\frac{3}{16}$ in., random widths, varying exposures. Varying thicknesses laid haphazard develop maximum textural effect. Also furnished in standard commercial thicknesses, averaging $\frac{3}{16}$ in. and in regular texture up to 2 in. or heavier.

Specify—"Roof to be covered with Sheldon's Olde English Rough Cleft Unfading Arabian Red (state size or sizes, exposures, thicknesses, etc.)"

Sheldon's Olde English Rough Cleft Unfading Arabian Red

Recent Projects Roofed with Sheldon's Slate

A list of many others on request

Project	Location	Architects Specifying
Dwight Morrow Residence	Englewood, N. J.	Delano & Aldrich, New York, N. Y.
Sicard Residence	Larchmont, N. Y.	John Russell Pope, New York, N. Y.
Tuxedo Park Club	Tuxedo, N. Y.	John Russell Pope, New York, N. Y.
East High School	Tampa, Fla.	F. J. Kennard & Son, Tampa, Fla.
Meyers Park Presbyterian Church	Charlotte, N. C.	J. M. McMichael, Charlotte, N. C.
W. G. Hall Residence	Little Rock, Ark.	Thompson, Sanders & Ginocchio
St. Andrew's Church	Portland, Ore.	R. E. Barrett, Portland, Ore.
Stillman Memorial, Colgate University	Hamilton, N. Y.	W. B. Chambers, New York, N. Y.
St. Francis Home for the Aged	Williamsville, N. Y.	Dietel & Wade, Buffalo, N. Y.
Sharpe Residence	Atlanta, Ga.	Cooper & Cooper, Atlanta, Ga.
Science Building, State College	Storrs, Conn.	Perry & Bishop
New Chapel, Cantebury School	New Milford, Conn.	Raphael Hume, New York, N. Y.
Kreagor Barclay Residence	Montreal, P. Q.	H. L. Featherstonhough
Park Club	Williamsville, N. Y.	C. C. Wendehack, New York, N. Y.
Wilchester & Litchfield Apartments	Chicago, Ill.	Sproatt & Ralph
Charles Fisher Boathouse	Grayhaven, Detroit, Mich.	Architectural Dept. of Fisher Body Co.
D. C. Fisher Residence	Detroit, Mich.	R. H. Marr, Detroit, Mich.
S. C. Allyn Residence	Dayton, Ohio	Dwight James Baum, New York, N. Y.
Perkins J. Prewitt Residence	Birmingham, Ala.	Denham, Van Kevren & Denham
St. Paul's College Dormitory	Concord, N. H.	Day & Klauder, Philadelphia, Pa.
Women's Dormitory at Cornell	Ithaca, N. Y.	F. L. Ackerman, New York, N. Y.
Fox Meadow School	Scarsdale, N. Y.	Rossiter & Muller, New York, N. Y.
First National Bank	Amherst, Mass.	Hoggson Brothers, New York, N. Y.
Longview High School	Longview, Wash.	Wm. B. Ittner, St. Louis, Mo.

ESTABLISHED 1869

RISING & NELSON SLATE CO.

Miners, Makers and Shippers of High Grade Roofing Slate

QUARRIES AND MAIN OFFICE
WEST PAWLET, VT.

NEW YORK OFFICE, 101 Park Avenue
BOSTON OFFICE, 46 Cornhill
CHICAGO OFFICE, 2554 West Harrison Street
PHILADELPHIA OFFICE, 112 South 16th Street
DETROIT OFFICE, 2539 Woodward Avenue
LONDON OFFICE, 26 Martin Lane, Cannon Street
ARCHITECTS' SERVICE DEPARTMENT, 101 Park Avenue, NEW YORK, N. Y.

Products

"Tudor Stone" and "Tudor Stone Jr." Roofing Slate.

Commercial Roofing Slate.

"Tudor Stone" Flooring Slate and Garden Flagging.

Tudor Stone Roofs and Flagging

TRADE-MARK

Production

The fact that this company owns and operates numerous quarries in addition to controlling the production of a number of others insures quality and uniformity of result in all slate. This is especially true of architectural slate, which is quarried to order under trained architectural supervision.

Architectural Specialties

"Tudor Stone" Roofing Slate; also the following, which are variations of the *"Tudor Stone"* group: Golden Pheasant, Valenheli, Verde Unique, Yorkshire Gray, Cotswold, *"Tudor Stone, Jr.,"* etc. These are distinct types, not ordinary slate parading under new names, as can readily be seen by comparison.

Commercial Roofing Slate

Sea Green, Unfading Green, Weathering Green, Mottled Green and Purple, Clear Purple, Purple Vein, Rustics, Red, etc., quarried in Vermont.

Genuine Bangor, Albion or Jackson Bangor, Washington Bangor, Franklin, Chapman, Peach Bottom, etc., quarried in Pennsylvania and elsewhere. Monson and Brownville, quarried in Maine. Buckingham, quarried in Virginia.

Flooring Slate and Garden Flagging

Split surface or rubbed surface, trimmed or sawn edges. Irregular shapes, random sizes, rectangular shapes and regular size pieces. In full range of weathering and unfading colors in all thicknesses.

Community Church, East Williston, L. I., N. Y.
George W. Conable, Architect

Samples and Booklet

Samples of any slate desired forwarded on request.

We have booklets and architectural leaflets showing examples of our products. We would be pleased to forward copies of these on request.

Architects' Service Department

The Service Department established in the Architects Building, 101 Park Avenue, New York City, is under trained architectural direction, and is equipped and maintained by this company for the convenience of architects and others who may require information in reference to roof design and construction.

Architects are requested to make use of the facilities offered, either for preliminary work or for the preparation of complete roof layouts and estimates of costs.

This service is rendered without any obligation.

Specifications for "Tudor Stone" Roofing Slate

Preparation—Slating contractor shall examine roof boarding and report to carpenter all defects which would be detrimental to the durability of the finished roof, and shall see that defects are remedied before applying felt.

Carpenter contractor shall furnish and apply a cant strip nailed about 2 in. above the eave line of the slate and shall put water shedding cant strips back of chimneys and up the sides of dormers and where else required. The carpenter contractor shall also build up forming where curved slate valleys are shown and furnish and place all blocking required by roofer.

Roofing contractor shall furnish and apply elastic cement where in his judgment the same is necessary.

Felt—Cover surface to be slated, including cheeks of dormers, with slater's asphalt impregnated roofing felt weighing 30 lbs. to 100 sq. ft. lapped 6 in. at joinings. (See Note 1.)

Where curved slate valleys are shown felt shall be double thickness.

Continued on next page

Slate—All surfaces prepared for slate as above described shall be covered with "Tudor Stone" Roofing Slate, as made by the Rising & Nelson Slate Co., West Pawlet, Vermont.

Thickness, exposure to the weather and character of laying shall be as indicated on roof layout prepared by the Architects' Service Department of the Rising & Nelson Slate Co., under the direction of the architect.

Nails—Nails shall be copper (see Note 4) slater's nails of sufficient length to adequately penetrate the roof boards using not less than 2 to each slate.

Flashing—The sheet metal contractor shall furnish and the slate contractor shall install 16-oz. soft rolled copper built-in flashings as required at closed valleys, chimneys, dormers and other necessary places. Flashing shall extend not less than 4 in. under slate and have not less than 4 in. exposed above the slate on a line at right angle to the roof and shall not be nailed to the vertical surface. Roofing contractor shall insert all aprons required, which will be furnished by sheet metal contractor. Sheet metal contractor shall apply counterflashing and make same secure against leaks.

Open Valleys—All open valleys shall be 16-oz. soft rolled copper (see Note 5), 20 in. wide, nailed at top only. In applying slate, care shall be used that no nails penetrate the sheet metal valleys.

Closed Valleys—All closed valleys to be flashed with 16-oz. copper flashing over each course. Flashing to lap at least 2 in. and to extend 10 in. either side of valley.

Round Valleys—To be carefully fitted and laid with special long slate. No metal used unless specially directed, but care must be taken to preserve continuity of roof color and texture.

Ridges—Ridges and hips shall be of slate laid mitered (or Boston style). If design should so require, ridges and hips should have 16 oz. copper hip and ridge rolls (see Note 6) as shown and detailed.

Guarantee—Contractor shall guarantee to maintain all slate roof surfaces in a water tight condition for a period of 2 years from completion.

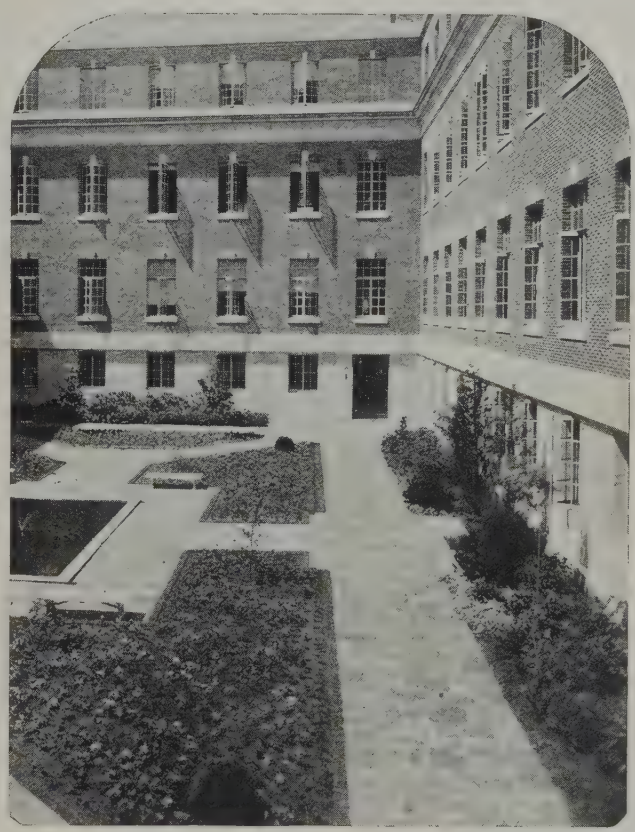
Specification for Plain Hipped Roof with Valleys and Dormers Using Commercial Grade Slate

Preparation, Cement, Felt and *Guarantee* to be specified as described under heading "Tudor Stone" Roofing Slate with such modifications as may be necessary to meet the individual problem.

Slate—All surfaces prepared with felt as above described shall be covered with No. 1 Weathering Green (see Note 2) Roofing Slate, as furnished by the Rising & Nelson Slate Co., West Pawlet, Vermont.

Slate shall be of random widths and 16 in. long (see Note 3); laid with 3-in. head lap so that distance to the weather shall be 6½ in.

Nails (see Note 4), *Valleys, Flashing* and Ridge to be specified as described under heading "Tudor Stone" Roofing Slate.



Courts of Massachusetts Mutual Life Insurance Building, Springfield, Mass.
Olmstead Brothers, Landscape Architects

Specification Notes

Note 1—For best commercial work 30-lb. felt is recommended. For slate not over ¼ in. thick 16-lb. felt may be used.

Note 2—Substitute, if desired, "Tudor Stone Jr.," Weathering Green, Unfading Green, Mottled Green and Purple, Clear Purple, Red or Pennsylvania Slate.

Note 3—Substitute other lengths or uniform widths if desired, but note that commercial slate are made in lengths from 10 to 24 in., always in even inches, and that slate should have 3-in. head lap on second slate.

Note 4—Substitute for less expensive work away from seashore, galvanized iron or copper clad steel nails.

Note 5—Substitute zinc, galvanized iron or tin if desired. Copper is recommended. Curved slate valleys require special attention and when required should be specified to be watertight and of uniform appearance to adjoining slate.

Note 6—Substitute 4-lb. sheet lead or galvanized iron if desired, or specify slated "Boston" hips and ridges or mitered slated hips and ridges. Plumbing specifications should call for 4-lb. sheet lead flashings, 18-in. square, turned up 4 in. around all plumbing pipes, with separate lead cap flashing extended down to the slate and calked into first joint of pipe above the roof.

Specifications for Slate Floors, Terraces and Walks

Slate—The contractor shall furnish and lay all slate for walks, floors and terraces listed below. Slate shall be (here specify color, thickness, surface, size when necessary, shape of pieces, style of edges and width of joints).

On Soil with Grass Joints (Soil or Turf Subbed)—If ground is not well settled, wet and tamp thoroughly. Lay slate directly on soil in (here specify arrangement and pattern). Each piece of slate shall rest on a solid, even bed with the top surface level.

On Soil with Grass Joints (Cinder Subbed)—Mark out location of all walks and terraces to be laid with slate with grass joints and excavate to a depth of 8 to 10 in. Fill excavations with cinders from 6 to 8 in. deep, well rolled and tamped to an even surface. On top of cinder bed place a 2-in. layer of soil and on soil lay slate in (here specify arrangement and pattern). Fill all joints with soil to level of surface of slate and sow grass seed.

On Masonry Slab Laid in Concrete—Place from 1 to 2 in. (depending on final level) of setting mixture (3 parts sand with 1 part of cement). As soon as this setting bed is leveled, sprinkle with pure portland cement to perfect bond between bed and slate and lay slate in (here specify arrangement and pattern.) Thoroughly wet pieces of slate and firmly embed to desired level. Point all joints with concrete mixed 2 parts well-sieved sand and 1 part cement.

Cleaning Slate—(*Note:* Only required for slate floors. with concrete mixture joints). Sponge all slate as set on exposed surface with clean water to remove mortar stains, and, if necessary upon completion, rub down with a solution 3 parts coal oil and 1 part linseed oil. (If light or weak solution of muriatic acid is needed and used for cleaning, care should be taken to wipe only exposed slate surfaces to avoid eating out cement joints.)

Completion—Upon completion, all slate shall be sound, whole and clean; the work shall be left smooth and in every respect a neat example of craftsmanship.

VENDOR SLATE CO.

MAIN OFFICE
EASTON, PA.

ARCHITECTURAL SERVICE AND DISPLAY ROOMS, 101 Park Avenue, NEW YORK, N. Y.

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Products

SLATE:

All varieties Pennsylvania Standard Blue Gray Roofing Slate.

All grades and colors of Vermont Roofing Slate.

Mettowee Stone Architectural Roofing Slate (heavy graduated).

Mettowee Stone Colored Flagging and Flooring.

METTOWEE STONE
TRADE-MARK

A special treatise on correct classification and description of every known slate production in America will also be forwarded upon request.

Facilities

The VENDOR SLATE CO. is the largest shipper of roofing slate in the world. Its large concentration yards, warehouses and private railroad sidings permit unsurpassed uniformity of service and efficiency in assembling all orders of any quantity, variety and thickness.

Architects' Service Department

Service departments located at Easton, Pa., and at 101 Park Avenue, New York, N. Y., are under the direction of trained architects prepared to collaborate with the profession on architectural slate roof design and construction. The benefit of their experience is at your disposal without obligation.

Literature

The only catalogue of its kind and size ever published showing all varieties of roofing slate in natural color reproduction. Detailed specifications, pamphlets of all kinds and colored flagging and flooring catalogues. Send for them.

Condensed Classification

Blue Gray—***No. 1 Genuine Bangor Certificate***—Strong, unfading.

Genuine Bangor Ribbon—Similar to No. 1 grade but contains dark streaks under lap.

Genuine Washington Big Bed—Similar in general to Genuine Bangor but of a deeper bluish cast.

Genuine Albion—Good quality but slightly softer, therefore not quite so permanent in color as above grades (for moderate priced construction).

Green—***Verdelite Unfading Green***—Strong and exceptionally defined in color.

Weathering Green—A deeper shade of green, a portion of which changes to various shades of buff, brown and tan.

Sea Green—Similar to weathering green, but the evolutionary colors are more severe including white and yellow.

Clear Purple—A rich deep subdued shade.

Variegated Green and Purple—Each slate contains opalistic streaks of green and purple.

Mottled Purple and Green—Almost entirely purple with occasional green spots. This term is more generally applied to the finished roof containing a mixture of green and purple slates.

Florentine Red—A very subtle and dignified shade.

Standard Sizes of Roofing in Inches

24x14, 24x12, 22x12, 22x11, 20x12, 20x11, 20x10, 18x12, 18x10, 18x9, 16x12, 16x10, 16x9, 16x8, 14x12, 14x10, 14x9, 14x8, 14x7, 12x12, 12x10, 12x8, 12x7, 12x6.

General Specifications

Preparation of Roof—Before proceeding with the roofing work of any nature, the roofer shall examine all roof surfaces intended for the application of slate, and report for correction any and all defects likely to interfere with the correct execution of his work and guarantee thereof.

The carpenter contractor shall set in place at all eaves a cant strip properly beveled, so that the edge thereof is 1 in. in thickness; the depth of the cant strip to be not less than 2 in.

Paper—Cover all roof surfaces intended for receiving slate with 40-lb. asphalt impregnated roofing felt of approved brand. The felt shall be lapped 4 in. on the rafter and 12 in. where ends are joined. It shall be laid to shed water and be in an undamaged condition when the slate is applied.

All slates shall be laid in a proper weathertight manner with well broken joints and preserving a head lap of at least 3 in. over each second course below in all instances. Unless so designated by the specifications, no severely broken or chipped slates shall be used. Occasional slightly chipped corners, however, will be acceptable.

Nails—Each slate shall be securely fastened with at least 2 copper slaters' nails of sufficient length in every instance to penetrate the roof boarding 1 in. In no case shall nails be driven through flashings, except when applying same.

Cement—Within 1 ft. of dormers, vertical walls, valleys, ridges, hips and similar places, slate shall be laid in an approved brand of elastic cement approximating the general color value of the slate. Within 2 ft. of the eaves where parapet walls require the use of a copper cricket, slate shall be laid in cement as above indicated.

Slate—Cover all properly felted roof surfaces so intended with (insert here grade, color, size, etc.) roofing slate as supplied by the VENDOR SLATE CO., Easton, Pa., with their certificates as to kind and quality. (In the case of specially designed Mettowee Architectural Slate Roofs, it should be mentioned that all slate shall be applied in accordance with special layout prepared and furnished by the Architectural Department of the VENDOR SLATE CO. under supervision of the architect.)

Flashings on dormer cheeks and where the roof meets other vertical surfaces, shall be of sufficient size to lap 4 in. under the next above and extend 8 in. under slate on each side.

Cleaning Up and Guarantee—The contractor shall guarantee his work for a period of at least ..... years from the acceptance thereof, replacing or repairing any broken slates or any leaks in the roof until the end of the guarantee of the roof. Any stains or dirt from any cause whatsoever must be removed from the slate before acceptance of his work will be granted.

Continued on next page

METTOWEE STONE ARCHITECTURAL ROOFS

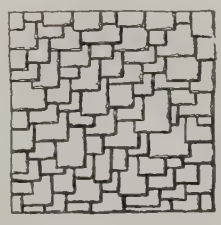
Mettowee Stone Roof Panel No. 36-B (of Bluish Cast)

Composed of an intermixture of 70% standard $\frac{3}{16}$-in. thickness and 30% ¼-in. thickness—a moderately priced architectural roof

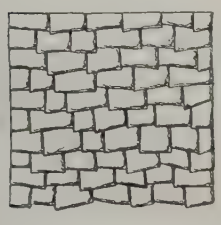
The modified general tone is made so by the inclusion of approximately 30% blue gray slate, particularly Genuine Washington Big Bed, because of its unusual depth of color and variation of surface texture. Equal proportions of permanent and weathering colors are used throughout.

Popular Methods of Application

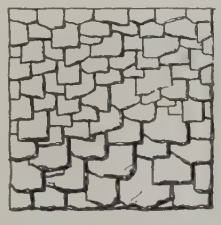
Graduated lengths and thicknesses, random widths



Intermixed lengths, widths and thicknesses with no definite butt line



Irregular butt lines, random widths and thicknesses (of English influence)



Graduated sizes and thicknesses with chipped corners expressing extreme informality

For heavier effects in graduated style the following percentages of thicknesses are suggested:

(A) 20% each 1-in., ¾-in., ½-in., ⅜-in., ¼-in. thicknesses

(B) 20% each ¾-in., ½-in., ⅜-in., ¼-in., $\frac{3}{16}$-in. thicknesses.

(C) 10% 1-in., 15% ¾-in., 20% ½-in., 25% ⅜-in., 30% ¼-in. thickness.

(D) 10% ¾-in., 15% ½-in., 20% ⅜-in., 25% ¼-in., 30% $\frac{3}{16}$-in. thickness.

The loan of your roof plans will enable our Architectural Department to recommend the selection most in harmony with the character of the building and furnish a layout for its application.

Original "Quarry Cleft" Slate (Assorted Texture)

A serviceable roof of modified tone without sacrifice of character

Special Service or Specifications Can Be Furnished from Our Nearest Branch Office

J. W. WILLIAMS SLATE CO.

Producers of Highest Quality Slate Roofs and Slate Specialties

MAIN OFFICE

Drake Building, EASTON, PA.

VERMONT OFFICE, POULTNEY, VT.
ARCHITECTURAL SERVICE DEPARTMENT, 103 Park Avenue, NEW YORK, N. Y.

Products

PENRHYN STONE for roofing, floors, garden walks, coping, etc.

COTSWOLD STONE for roofs and exterior flagging and walks.

VERMONT SLATE of varied colorings, in commercial and architectural thicknesses for artistic roofing.

GENUINE BANGOR BLUE-GRAY ROOFING SLATE from the Bangorvein quarries in Bangor, Pa.

Architectural Roof Design

The Company's organization with over ten years' experience in the layout of roofs for numerous important projects throughout the United States, and its intimate knowledge of the possibilities connected with the slate produced and available in the Vermont and Pennsylvania quarries, is prepared to collaborate with the architectural profession in the preparation of specifications for the artistic roofing of any style of architecture.

A department for this service is maintained at 103 Park Avenue, New York City.

Penrhyn Stone

Penrhyn Stone is the product of a series of quarries operating in the Penrhyn Hills on the border of the State of Vermont.

The wonderful texture and coloring of this material allow harmonious combinations that are adaptable to any type of architecture or period reproduction. The various shades and variegated colorings of purple, gray, green, brown, etc., are so intermingled and weathered that a newly laid roof has all the aged appearance that is characteristic of the roofs on the ancient castles and homes in England.

Penrhyn Stone is produced by skilled craftsmen. It is quarried, split, and trimmed entirely by hand into sizes and thicknesses required by each individual roof, as determined by a study of the architect's plans. Either dark or colorful effects can be produced just as the architect desires or period reproduction demands. The nature of the rock does not admit of being split into commercial thickness and it is, therefore, essentially an architect's slate and especially adaptable to roofs where texture, color, general excellence and integrity of the material itself in addition to the architectural effectiveness, is the paramount object.

Penrhyn Stone Installations

Among the numerous important residences roofed with Penrhyn Stone are the following:

Felix Warburg, White Plains, N. Y., Arnold Brunner, Architect
Roswell Miller, Millbrook, N. Y., Almus P. Evans, Architect
C. H. Veeder, Hartford, Conn., Brooks, Glazier & Adams, Architects
F. R. Huntington, Columbus, Ohio, Alfred Hopkins, Architect
H. Ledyard, Grosse Point, Mich., Alfred Hopkins, Architect
Dr. Berheim, Greenwich, Conn., Frank E. Newman, Architect
Justin B. Ward, Irvington-on-Hudson, Delano & Aldrich, Architects
Geo. Fitzmaurice, Beverly Hills, Calif., Roy Price, Architect
Geo. A. Morrell, Ottumwa, Iowa, Tunsley & McBroom, Architects
J. C. Clark, Bernardsville, N. J., Delano & Aldrich, Architects
Richard Liggett, Litchfield, Conn., Richard Dana Jr., Architect
Allan Mann, Scarsdale, N. Y., Electus Litchfield, Architect
Al. Christie, Beverly Hills, Calif., Leland F. Fuller, Architect
W. R. Lewis, Beverly Hills, Calif., Albert Farr, Architect

Residence of Oscar Hammerstein 2nd, Great Neck, L. I., N. Y.
HUNT & KLINE, Architects, N. Y.

Descriptive Booklets

We issue specifications and illustrated booklets on the use of "Penrhyn Stone" for Architecturally designed graduated roofs, garden walks, interior and exterior floorings and other purposes.

Correspondence is solicited with the Architectural profession during the preliminary stages of any plans where a slate roof is contemplated or will be considered.

Continued on next page

Rough Cleft Architectural Roofs

The growing popularity of the English type of architecture with its diversified effects, in which the slate roof plays a highly important part, has created an entirely new demand in roof architecture. The English cottage in perspective is more than one-half roof and to be an architectural success the roof requires characteristic treatment, and this cannot be accomplished satisfactorily in any material except slate, as variation in color, texture, and thickness is a necessity.

We are producing in Penrhyn Stone an artistic and economical roof in graduated lengths and thicknesses varying from ½ to ¼ in. in an harmonious blend of colors—Rustics, Weathering Greens and Grays, Unfading Greens, Purples, Blacks, etc.—of interesting texture and at a price that is comparable with the cost of the ordinary manufactured roofings.

Rough Cleft Blue-Gray Slate

We are producing a rough textured slate of architectural quality in varying lengths, widths and thicknesses to meet the demand for a dark toned graduated roof.

Penrhyn Stone for Floors, Garden Walks, Garden Seats, Wainscoting, Base, etc.

The wonderful applicability of slate for both interior and exterior effects, with its beautiful and especially effective yet subdued natural colorings, is now fully recognized by the architectural profession.

It has the advantage over other materials in that it can be used with either a rough cleft surface in any degree of roughness desired, or with a rubbed finish similar to a marble tile. The range of colors obtainable is extensive and when carefully selected and blended the result is exceptionally striking and artistic.

The use of slate for terrace and porch floorings in random irregular shapes in mixed colorings is coming more and more into use in America. In Europe, it has been used for centuries—as a reference to illustrations of the floorings and walks of these old structures will testify.

For steps, risers, coping and window sills, slate has many advantages over other materials—it does not absorb moisture, and the colorings can be selected to harmonize with the slate roof.

For stepping stones and garden walks a roughish surface is invariably required by landscape architects, but for terrace and porch floors a comparatively smooth surface (though natural cleft) should be selected so as not to interfere with the free use of the porch furniture.

Where a sub-base of cement is used the thickness of the slabs need not be more than ½ in. but where the Stone is laid in soil a thickness from ¾ to 1 in. is advisable.

The maximum size of the slabs should be determined by the dimensions of the space to be covered—large areas lend themselves to the use of individual slabs of a dimension that could not be successfully used on smaller areas.

Cotswold Stone Roofs

The Cotswold type of English Tudor design with its stone roofs have aroused the enthusiasm of some of our leading architects and reproductions are being designed and specified. To quote a prominent New York architect "the beauty of the Cotswold roofs lie principally in the effect of texture which is brought about by the inequalities of the roof surface; the stone itself is rough on all edges, thick, and laid in courses beautifully graduated in small units." We have made many reproductions using slate instead of stone but we now offer a stone roof of the Cotswold type in interesting tones of Buffs, Rustics, Browns, Grey and Blue in thicknesses of ½ to 1 in. (thicker if desired) and in graduated lengths.

Cotswold Stone Flagging

A natural stone in a variety of subdued colors including Grays, Buffs, Rustics, Browns, Blue, etc.

Cotswold Stone has a very pleasing surface, just rough enough to the foot to prevent slipping when wet which makes it highly desirable for garden walks, steps, curbing for swimming pools and terraces.

Cotswold Stone is supplied in either random sized rectangles or in slabs cut to dimensions as to length and width and in thicknesses from 1 to 3 in.—it is readily cut with a cold chisel to fit any space without breakage.

Suggestions for Installing Garden Walks, Outdoor and Interior Floors

On Soil with Grass Joints (Soil or Turf Sub-bed)—Mark out location of all walks and terraces to be laid with grass joints. If ground is not well settled, wet and tamp thoroughly. Fill any holes or depressions with thoroughly tamped soil, and lay slate directly on soil. Each piece of slate should rest on a solid even bed with the top surface level.

Cinder Sub-bed—Excavate to a depth of 8 to 10 in. Fill excavations with cinders from 6 to 8 in. deep, well rolled and tamped to an even surface. On top of cinder bed place a 2-in. layer of soil and on soil lay slate. Fill all joints with soil to level of surface of slate and sow grass seed.

When Set in Cement—Excavate walks to depth of 6 in., fill in 4 in. with cinder concrete. When this is thoroughly hardened, build up the remaining 2 in. with cement—using a mixture of 3 parts sand and 1 part cement. Grout all joints before cement hardens and point up all joints in color desired.

Stepping Stones—Place stone in desired position on lawn, cut around edge with sharp pointed trowel, lift out sod, remove sufficient earth to permit setting of stone about ½ in. above finished level; tamp well, fill in around edges with earth and sow with seed.

Terrace Floors, Interior Floors, Porch Floors, etc.—Bring rough concrete finish to within 2 in. of desired level for finished floor. Remaining 2 in. shall be built up with cement—3 parts sand 1 part cement. Set each piece of slate separately. Grout all joints before cement hardens and point up all joints.

ESTABLISHED 1901

O'BRIEN BROTHERS SLATE COMPANY, INC.

Quarriers and Manufacturers of Roofing Slate

OFFICE

GRANVILLE, N. Y.

NEW YORK, N. Y., 101 Park Avenue—Telephone, Ashland 3651

Slate Roofing, Flooring and Flagging

The product of our quarries is hard, dense slate rock of a degree of quality and color peculiar to the district. The quarried rock is made into roofing slate, slate flooring and garden flagging in our own shops by experienced craftsmen in strict accordance with approved details and specifications.

All orders are executed under our personal supervision, assuring our clients that the years of our experience as slate makers have gone into the preparing of their material for the roof, floor or flagging.

We are also shippers of Pennsylvania and Virginia slate in both commercial and architectural qualities.

Architects' Service Department

We maintain an Architects' Service Department at 101 Park Avenue, New York, N. Y., for the convenience of architects and engineers. This department is at your service for any needed assistance in the use of O'Brien Brothers Slate.

We will gladly prepare sketches, color schemes, specifications, details, etc., for all types of slate roofs, slate flooring and slate for landscape work.

Samples

Small size samples will be mailed free on request. These samples will give the architect or owner general ideas when working out the color scheme of the building.

A Mixed Thickness, Variegated Color, Graduated Length Slate Roof Particularly Adapted to Residence Work

The Standard Thickness, Unfading Green Slate Makes a Fine Roof When There Are Large Expanses, as on Schools or Churches

Colors Obtainable in O'Brien Brothers Slate

Unfading Green—A guaranteed unfading dark emerald green.

Unfading Mottled Green and Purple—This can be had in such combinations as to produce a predomination of either purple or green.

Unfading Gray—A gray-green slate with irregular shaped dark green splotches. Some slate are a solid gray with no markings.

Rustic Gray—A very desirable colored slate to blend with other colors. Dark streaks run through the slate. Some fade to a brown and beautiful buff color.

Vermont Black—Some are a gray-black, while others are real shiny "Niggerhead Blacks." This slate is unfading and used to the best effect in a heavy roof.

Weathering Green—Commercial sea green makes a very durable watertight roof at the least possible expense. After a few months' exposure on the roof some fade to a brown and buff color while others retain their original gray-green color.

Garden Flagging and Flooring—This material can be furnished in all colors and in random rectangular or random irregular shapes. This material is natural cleft and presents a very beautiful surface.

C. G. BOSTWICK

Manufacturers of Snow Guards for Roofs

69 Bartholomew Avenue
HARTFORD, CONN.

Products

"Campbell" Patented Snow Guards for slate, tile, and other steep roofs.

"Campbell" Patented Snow Guards

The "Campbell" is a positive snow guard that stays put and will not break, bend nor wear out. It is made of pure copper only and will last as long as the building upon which it is installed.

An especially valuable feature of the "Campbell" snow guard is that it can be installed on roofs already laid, without breaking or removing slates.

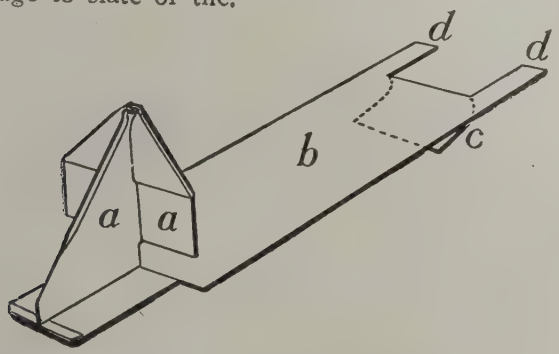
Construction Details

The snow stop or guard head (a) is so designed and constructed that it can not bend or collapse under the weight of the snow or ice.

The broad, flat, thin supporting strap (b) gives a distributed bearing, does not lift the slates and positively will not cause them to break.

The hook end (c) on the supporting strap is broad and will not split nor injure the slates and stays put.

The fingers (d) on the hook end are designed for quick and easy installing on roofs already slated without damage to slate or tile.



Number of Guards to Set, Per Square

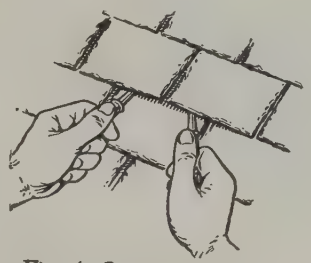
This varies according to the size of the slates, pitch of the roof and special needs.

For graduated, random slate roofs, space the guards from 16 to 24 in. apart horizontally and so spaced up and down as to properly stagger in alternate courses. The following table is worked out by this method:

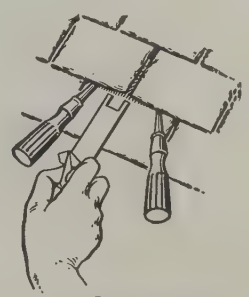
Size of slate, in.	Guards required per square	Where to place guards	
		Horizontally	Perpendicularly
12x6	60	Every 3rd slate	Every 3rd course
12x7	50		
12x8	40	Every 2nd slate	Every 5th course
14x7	45	Every 3rd slate	Every 3rd course
14x8	40		
14x10	35	Every 2nd slate	Every 4th course
16x8	30	Every 3rd slate	Every 3rd course
16x9	60		
16x10	55		
16x12	45		
18x9	50		
18x10	45		
18x12	40	Every 2nd slate	Every 2nd course
20x10	40		
20x12	35		
22x11	35		
22x12	30		
24x12	30		

Directions for Installing

The only tools required are two screwdrivers. Push a screwdriver under the butt of the slate at each side of the joint where the guard is to be installed. Then



First Operation



Second Operation

Finished and in Place

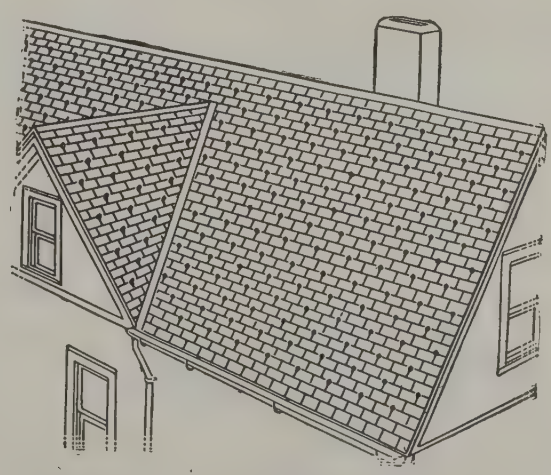
push the guard into place, remove the screwdrivers and continue with the succeeding guards in a like manner.

If the guards are securely hooked on the slates no staging will be required after the first course has been installed.

Start installing at the eaves and work up to the ridge, using the guards as a foothold to work on. However, as a precaution, it is well to have a rope or plank.

Architects' Specification

Install "Campbell" Patented Snow Guards, as manufactured by C. G. Bostwick, Hartford, Conn., spaced not more than 24 in. nor less than 16 in. apart, and so spaced up and down that they will properly stagger in alternate courses.



Spacing of Snow Guards on Typical Roof

CLASON WIRE SNOW GUARD FOR ROOFS

Manufactured Only by
THE M. N. CARTIER & SONS CO.
Cartier Building, 275 Canal Street
PROVIDENCE, R. I.

Product

WIRE SNOW GUARDS for slate, tile, metal and other steep roofs.

Their Purpose

To lessen chances of damage suits against owners of property by increasing both personal and property safety.

There are many buildings so situated that the use of snow guards is essential to personal safety; there are more cases where the use of snow guards could protect the surrounding roofing and sheet metal work against costly damages.

Sliding snow and ice often injure roofings, and puncture or tear away gutters, etc. The use of our snow guards forestalls these dangers, as they hold the ice and snow where they form. They are a cheap and unobtrusive preventive against damage.

Important Notation

We note a growing tendency to permit the installation of three, four, or five courses of snow guards near the roof eaves. The result is that a few guards are compelled to hold not only the weight of snow and ice which they are located to care for, but also to withstand the tremendous tearing force of slides starting from the roof surfaces above.

No guards will withstand such conditions, and their installation in such a manner precludes the *purpose* for which they are used. When specifying our guards please do so according to our table and *insist* upon the roofer following the specification.

Manufacture

We make our guards in our own plant, and are not dependent upon the facilities or services of others.

These guards are manufactured either from pure copper wire or galvanized steel wire, both selected for ductility and stiffness. No copper-covered steel wire is used.

Practicality

Our wire snow guards combine strength, long service, economy and unobstructive design.

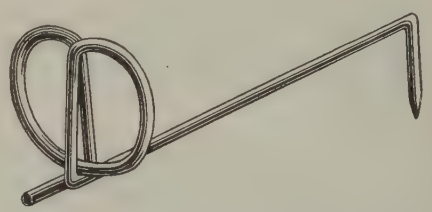
Types of "Clason" Snow Guards

New roofs, 1 and 2-in. points.
Hook and friction for old roofs.
Solder-to-metal-roof.
Special for Spanish tile.
Special for asbestos shingles.

The "Clason"

The "Clason" has been for years the standard guard, and is the strongest guard made.

Note from the illustration that the "butterfly" loops brace and strengthen each other, while the extension brace lends additional strength.



"Clason" Snow Guard for New Roofs

Number Per Square

The following table gives the approximate number of snow guards which may be safely specified for use in each 100 sq. ft. of roof surface:

ROOF PITCH	NUMBER OF GUARDS
One-quarter	50
One-third	75
One-half	125

Towers, and steeper roofs than above indicated, may require special consideration.

How to Specify

Apply to all pitched roofs "Clason" [for old roofs "Clason Special"] Snow Guards, as made by THE M. N. CARTIER & SONS CO., Providence, R. I. The guards to be made from pure copper [galvanized steel] wire. (Here specify the number of guards required per square, dependent upon the pitch of the roof and other special conditions.)

In applying the snow guards, the eaves course of the roofing material shall be laid as usual, but the next course shall be laid with the joints slightly open to receive the shank of the snow guard.

After striking the line for the third course of the roofing material, place the guards in the joints, with the loop just below the lap of the course, and drive the prong into the roof decking; then lay the course, leaving only the loop exposed.

Care must be used to insure having the shank well sunk into the joints, so that the following course of roofing material will lie flat and not bear upon the guard.

(*Note:* The architect or engineer may omit at his discretion the method of application of the guards.)

DAVID LEVOW

"Fitrite" Adjustable Pipe Snow Guards (Malleable Iron or Bronze) and "Fitrite" One-piece Ornamental Leader Straps (Copper or Zinc)

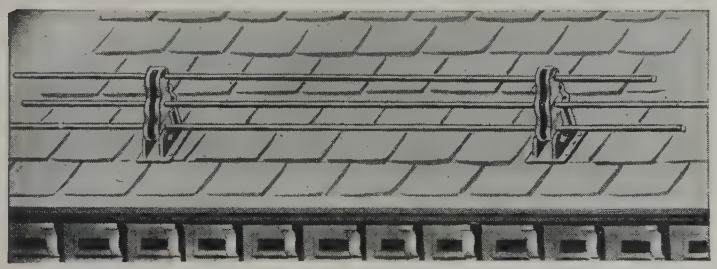
TELEPHONE
CHELSEA 2400

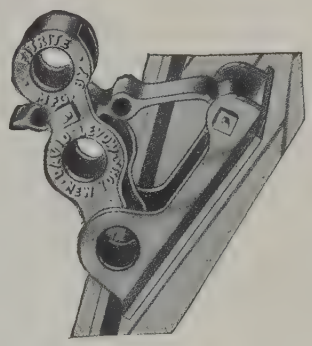
542 West 23rd Street
NEW YORK, N. Y.

For Skylight Gearing and Bronze Strainers, see page A1314

"Fitrite" Adjustable Pipe Snow Guards

Adjustable to four positions. Fits any slate roof of any pitch. To be used with 2 or 3 galvanized iron pipes ¾-in. iron pipe size.





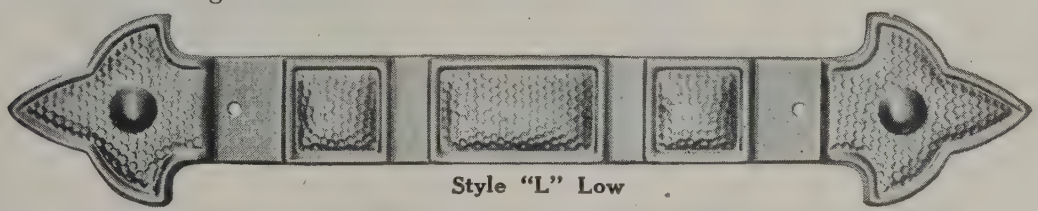
Instructions—Place "Fitrite" Snow Guards along eaves of roof 5 or 6 ft. apart. Plate takes the place of a slate and is fastened with wood screws or nails.

Material—Made in galvanized malleable iron or bronze.

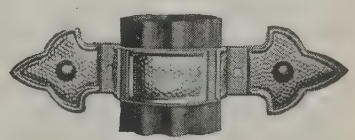
Size of Plates—Made in any size for standard No. 1 slate. Can be made with thicker plates at additional charge. Unless otherwise specified, standard No. 1 plates will be supplied. Also made for Spanish tile and special design shingles.

"Fitrite" One-piece Ornamental Leader Straps

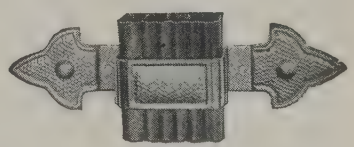
Material—Made in copper for copper leaders, and zinc for zinc or galvanized leaders.



Style "L" Low



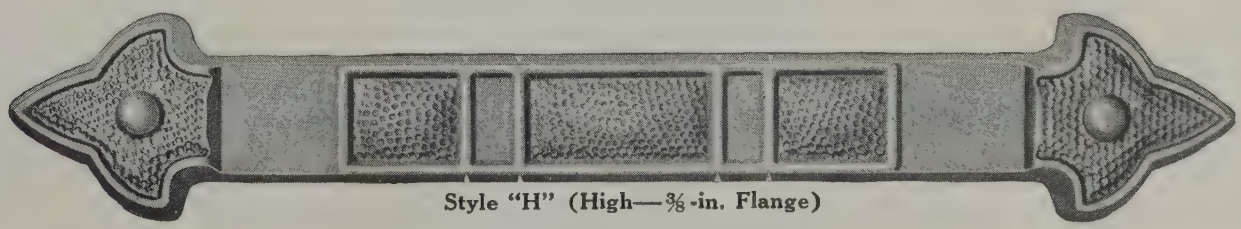
Same Strap Used for Round Leader



Same Strap Used for Square Leader

Style "L" (Low)—Style "L" (Low) made of heavy gauge metal strong enough to hold leader without hooks.

Sizes—
2 in. for 2-in. round or square corrugated pipe (1¾x2¼ in.).
3 in. for 3-in. round or square corrugated pipe (2⅜x3¼ in.).
4 in. for 4-in. round or square corrugated pipe (2¾x4¼ in.).



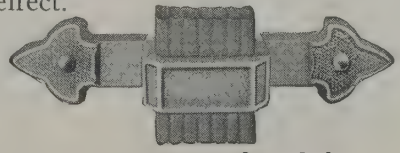
Style "H" (High—⅜-in. Flange)

Style "H" (High—⅜-in. Flange)—Style "H" (High) made in 16-oz. copper or No. 11 gauge zinc. Can be used with or without hooks. When hooks are used, tinsmith slits edge of strap and bends at desired point, allowing for proper distance from leader to wall of building.

Sizes—
2 in. for 2-in. square corrugated pipe (1¾x2¼ in.).
3 in. for 3-in. square corrugated pipe (2⅜x3¼ in.).
4 in. for 4-in. square corrugated pipe (2¾x4¼ in.).

Features—Both styles of strap are shipped flat. They can be bent or formed by hand on the job and require no soldering.

Design and deep stamping produce artistic hand-hammered effect.



For Square Leaders Only

COPPERCLAD SHINGLES

MANUFACTURED BY THE ANACONDA COPPERCLAD COMPANY

GENERAL DISTRIBUTORS

THE FLINTKOTE COMPANY

THE RICHARDSON ROOFING COMPANY
NEW YORK BOSTON CHICAGO

THE CHATFIELD MANUFACTURING CORPORATION
NEW ORLEANS CINCINNATI ATLANTA DALLAS

Products

HEXAGON COPPERCLAD SHINGLES.
STANDARD COPPERCLAD SHINGLES.
THICK BUTT COPPERCLAD SHINGLES.

Also Asphalt Shingles, Roll Roofings and Building Papers, Asphalt Paints, Plastics and Emulsions.

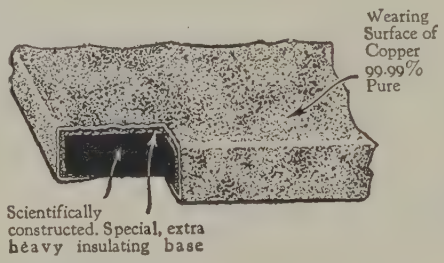
For Asphalt Roofing Products, see page A439; for Thick Butt Shingles, see page A484.

The Reason For Copperclad Shingles

Only a small part of the thickness of 16-oz. sheet copper is necessary for ample protection against wear from the elements. The remaining thickness is required for mechanical strength.

Copperclad shingles present to the elements a sheet of copper several times thicker than the minimum requirements for wear.

The mechanical strength necessary for roofing material is provided by a specially prepared base which not only is less expensive than copper but possesses superior qualities for this purpose.



Asphalt was selected for this base because of its peculiar suitability. In the refining of copper, asphalt has been used for many years because there is no chemical reaction when copper and asphalt are intimately associated. For this reason asphalt is an ideal base for copper roofing.

The insulating qualities of this combination have resulted in an improved type of copper roofing especially adaptable in design to general residential work.

Copper, through the economies effected in Copperclad, is now a moderately priced roofing.

Copperclad is copper to the eye, to the touch and to the weather.

Manufacture

The copper is electrolytically applied by the Anaconda Copperclad Co., Rutherford, N. J., a subsidiary of the Anaconda Sales Company and of THE FLINTKOTE COMPANY.

The special base is made by THE FLINTKOTE COMPANY. The result is a long life shingle of great strength.

Recommended Uses

Copperclad Shingles can be used where the roof pitch exceeds 4 in. to the foot. They are suitable for residences, churches, schools, hospitals and other buildings where permanency, Class A fire protection, waterproofness and beauty are required of a roof.

Reroofing Over Old Shingles

Copperclad can be applied directly over old wooden shingles. Applied in this way or to the roof boards after the wooden shingles have been removed, Copperclad makes a permanent roof of long life and lasting beauty.

Cost

The cost of Copperclad is about one-third to one-half the cost of a sheet copper roof. It is less expensive than a good grade of slate or tile, and only slightly more expensive than the best asphalt or wooden shingles.

Life

Time has proven copper to be one of the best and most enduring of all roofings. Copperclad is copper roofing in its purest and most practical form. Copperclad Shingles are guaranteed for twenty years against defective material or manufacture without reservation of any character whatsoever.

Beauty

Copperclad Shingles are supplied in natural copper color. They will oxidize and color to the natural soft tones so characteristic of other forms of pure copper.

Fire Resistance

Standard Copperclad Shingles carry the Class A label of the Underwriters' Laboratories, Inc. They are the only shingles on the market which do not require a layer of asphalt saturated asbestos felt underneath to receive Underwriters' Class A label.

Application

Copperclad Shingles are applied in overlapping units as shown in illustrations. They lay rapidly. There is no waste from breakage.

Large head copper nails should be used—1-in. length over roof boards, 1½-in. length over old wood shingles.

Nails per square: Hexagonal, 304; Standard and Thick Butt, 360.

Number of units per square: Hexagonal, 76; Standard and Thick Butt, 90.

Weight per square: Hexagonal, 211 lb.; Standard, 234 lb.; Thick Butt, 294 lb.

Use copper nails, flashings and valleys throughout.

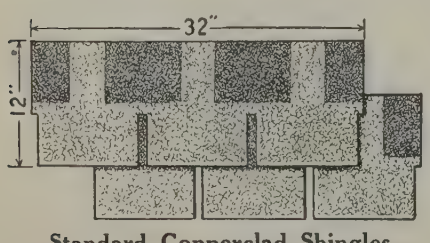
No allowance necessary for expansion or contraction.

Specifications

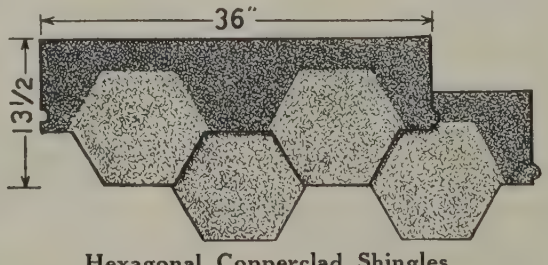
Hexagonal Copperclad Shingles, Standard Copperclad Shingles and Thick Butt Copperclad Shingles are laid in accordance with the instructions contained in bundles.

How Obtainable

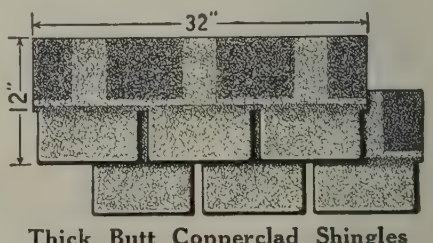
Nine thousand distributors of THE FLINTKOTE COMPANY, The Richardson Roofing Company and The Chatfield Manufacturing Corporation are in a position to furnish Copperclad Shingles. Prices, literature, samples, listed installations and names of local dealers are obtainable from any of the offices of the above companies.



Standard Copperclad Shingles



Hexagonal Copperclad Shingles



Thick Butt Copperclad Shingles

MILWAUKEE CORRUGATING CO.

Metal Building Specialties

MILWAUKEE, WIS.

BRANCH FACTORIES and WAREHOUSES: CHICAGO, ILL.; KANSAS CITY, MO., and LA CROSSE, WIS.

Products

"TITELOCK" SPANISH METAL TILE.

"TITELOCK" AMERICAN METAL TILE.

METAL SHINGLES and "SLATE."

"INVISIBLE JOINT" METAL CEILINGS and WALLS.

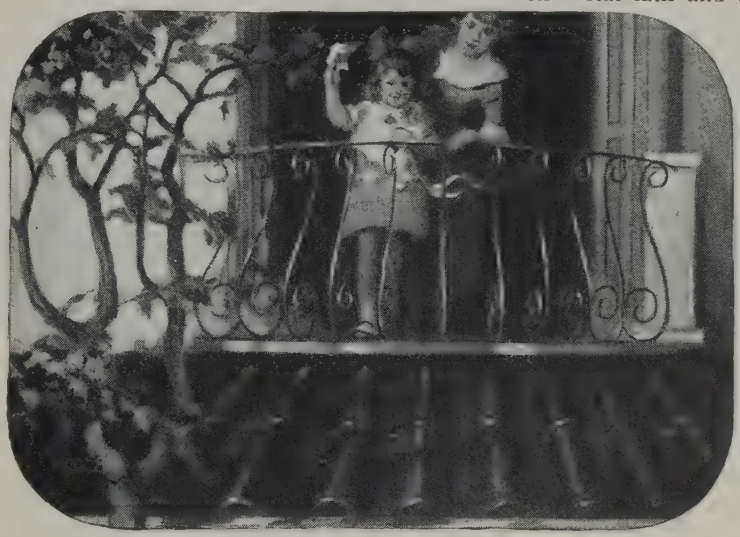
VENTILATORS, SKYLIGHTS.

Also Marquees, Architectural Ornaments, Eaves Trough, Rain Pipe, Furnace Pipe and Fittings, Stove Pipe and Elbows, and other Sheet Metal Products.

For Metal Lath, Corner Beads, etc., see pages B1700-1701.

MILCOR

TRADE-MARK
(Registered)



Catalogues Available

8½x11 in. to fit your files.

No. 20-E—"The Milcor Manual" (96 pages) on metal lath and allied products, standard architectural specifications for fire-safe constructions.

No. 20-D—"Reinforcing Rib Lath—¾-in. Stay-Rib No. 3" (16 pages).

"Modern Modes in Better Plastering" (32 pages).

No. 24-A—"Milcor Architectural Sheet Metal Guide" on roofing and cornices, architectural ornaments, ventilators, etc.

No. 25—Furnace Pipe and Fittings Catalogue (56 pages).

No. 26—"Invisible Joint" Metal Ceiling Catalogue (288 pages).

No. 28—Milcor Sheet Metal Handbook (144 pages).

Spanish Metal Tile
All the charm of the spanish tile made practical in metal. May be painted in any color desired

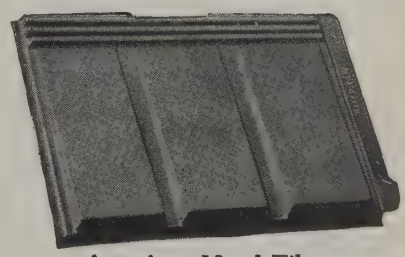
Metal Tile Roofing

Ideal for all types of residences and for the visible portions of roofs of apartment buildings, hotels, churches, theaters, hospitals, schools, libraries and other public buildings, railway stations, garages, filling stations, etc.

Provides a watertight, stormtight, lightningproof, fire-safe roof that is economical, light in weight, very durable and architecturally beautiful.

Available in Anaconda copper, pure zinc, steel, "coppered metal," or rust-resisting Armco Ingot iron.

Ingot Iron



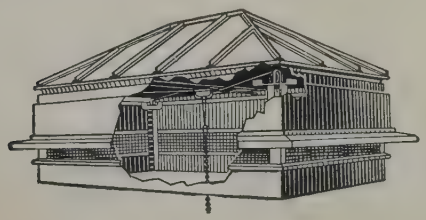
American Metal Tile
A pleasing style, heavily ribbed, to produce desirable shadows. Practical, safe, good looking. Paint any color desired

Ventilators and Skylights

From stationary ventilators of the most simple type, to ball bearing revolving syphon type ventilators (Alpinas) the Milcor line embraces efficient ventilation units for all types of buildings including offices, apartments, residences, etc., up to the larger buildings and industrial plants. Also barn ventilators of special design.

Ventilating skylights and all standard types of skylights (puttyless or puttied) are available in the Milcor line.

Milcor "NuAir" Ventilators possess great exhaust capacity and strength. Designed so as to absolutely prevent downdrafts. Made in standard sizes from 10 to 48 in. Write for specifications.

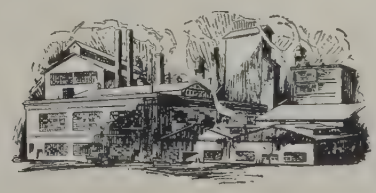


Metal Ceilings and Walls
Milcor "Invisible Joint" metal ceilings and walls need no introduction. 288-page catalogue No. 26 is ready. Write for it. Write for important new Milcor development in ceilings.

Sheet Metal Products for All Types of Buildings

For industrial buildings, office buildings, skyscrapers and all types of homes and other buildings, Milcor Sheet Metal Building Products are available. For interior requirements and for exterior needs these products are designed to give the maximum of service.

Whether it be ordinary flat sheets for air ducts, ventilating systems, cabinets, chutes, etc., or corrugated sheets for roofing or other purposes, or architectural sheet metal cornices, marquises, style roofing, etc., or metal lath and allied products, or rain carrying equipment, or warm air heating equipment, look to Milcor for advice and service.



ALUMINUM COMPANY OF AMERICA

Manufacturers of Aluminum Roofing

PITTSBURGH, PA.

Oakmont (Pa.) Country Club
Aluminum shingles applied over old wood shingles

Products

ALUMINUM SHINGLE ROOFING consisting of Top-Down Aluminum Shingles, Flashings, Hip and Ridge Coverings, Valleys, Gutters, and Down-spouts; together these form a complete, non-corrosive, durable, lightweight roofing job.

For Aluminum and Aluminum Alloys, see page A850; for Aluminum Paint, see page B2034.

Application from Top, Down

Aluminum shingles possess, exclusively, the unique advantage of being laid from the top, down. Start at the ridge pole and finish at the eaves.

Top-Down Aluminum Shingles

Top-Down Aluminum Shingles come in plain and ribbed patterns. They are fabricated from No. 24 B&S. gauge (.0201 in.) aluminum sheets. Their size is 10½x16¾ in., over all. In a completed roof, there is no exposed nailing, and an air space under each row of shingles permits the drying of condensed moisture and gives a desirable insulation.

Colors

Top-Down Aluminum Shingles come in natural aluminum finish, which weathers to a soft, silver-gray tone and in four standard colors—light green, dark green, gray, terra cotta red. Special colors may be had if desired. The paint is sprayed on—a kind of paint made especially for the purpose being used.

Advantages of Aluminum Shingles

Resistance to Corrosion—Aluminum shingles resist the effects of moisture, salt-laden air, sulphur, sulphuric acid fumes, certain organic acids, and other corrosive agents found in the atmosphere.

Light Weight—Top-Down Aluminum Shingles weigh, when applied, approximately 60 lb. per square (100 sq. ft.), which is considerably less than the weight of other roofing materials in general use.

Durability—Top-Down Aluminum Shingles are durable because they resist corrosion. They are durable because thick metal (.0201 in.) is used in fabricating the shingles and the resulting rigidity minimizes possible damage from snow, hail, ice, tree branches, falling bricks, etc. Extreme cold will not make aluminum shingles brittle. They will retain their strength, rigidity, toughness, and ductility in all kinds of weather.

Easily Worked—Top-Down Aluminum Shingles are easily bent and cut without cracking and, once formed, they hold their shape. This speeds up the work and cuts the cost of application.

Pleasing Appearance—The appearance of an aluminum shingle roof is attractive because of the pleasing colors and its pronounced relief. The ⅝-in. butts and heavy vertical ridges give a much desired light-and-shadow texture.

Non-staining—Aluminum forms no colored salts, and, consequently, it will not discolor adjoining materials from drip or splash of watershed.

Weathertight—Weather sealing and expansion and contraction are taken care of in aluminum shingle construction. A roof with a pitch as low as 3 in. to 1 ft. is practicable with aluminum shingles.

How Top-Down Aluminum Shingles Are Laid

Top-Down Aluminum Shingles are laid 8x16 in. to the weather, giving 1½-in. horizontal and ¾-in. vertical interlocking joint connections with complete provision for expansion and contraction, drainage, and water seal against capillary attraction. The height of the butt is in each 8-in. multiple alternately ⅝ and ½ in. This alternating thickness of shingle butts gives a broken butt line to accomplish heavy definite light and shadow lines. 112½ full size 10½x16¾-in. aluminum shingles are required to lay one square (100 sq. ft.), of completed roof surface.

One-third pound of 1-in. aluminum roofing nails is required to lay one square of aluminum shingles on a new roof and one-half pound of 1½-in. aluminum nails to re-roof over a wood shingle roof.

Other Aluminum Roofing Materials

In addition to shingles, aluminum roofing materials are also available in the form of corrugated sheets, standing seam, and other standard forms of roofing.

How to Specify Top-Down Aluminum Shingles

All roof surfaces shall be covered completely with full-size aluminum shingles, three-quarter size starter shingles, eaves-finishing strips, right and left-hand side finish-pieces, valley sheets and valley flashing, ridge cover and ridge flashing, hip cover and counterflashing, around all walls, chimneys, etc., as required to produce a roof of proper mechanical construction in accordance with the manufacturer's standard application instructions, a copy of which will be sent at your request.

Sheathing—All roof sheathing shall be good common boards of equal thickness laid horizontally or diagonally without open joints and securely nailed and properly spaced to insure secure nailing.

Entire roof sheathing shall be covered with 15-lb. asphalt saturated felt, lapped 2 in. and secured with 1-in. aluminum roofing nails.

Note: No felt is required when laying aluminum shingles over wood shingles.

All aluminum shingles and flashing shall be fastened with aluminum nails. Boards of ⅞-in. thickness are required for properly applying hip and ridge covers.

THE AMERICAN BRASS COMPANY

Manufacturers of Sheet, Roll and Strip Copper

GENERAL OFFICES

WATERBURY, CONNECTICUT

MILLS AND FACTORIES

ANSONIA, CONN. TORRINGTON, CONN. WATERBURY, CONN. HASTINGS-ON-HUDSON, N. Y.
BUFFALO, N. Y. DETROIT, MICH. KENOSHA, WIS.

CANADIAN MILL: ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

OFFICES AND AGENCIES

NEW YORK, N. Y., 25 Broadway
NEWARK, N. J., Military Park Building
BOSTON, MASS., Statler Building
PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., Widener Building
PITTSBURGH, PA., Oliver Building
CLEVELAND, OHIO, Union Trust Building
DAYTON, OHIO, Third National Building
CINCINNATI, OHIO, Dixie Terminal Building
CHICAGO, ILL., 111 W. Washington Street
ST. LOUIS, MO., Planters Building
NEW ORLEANS, LA., Hibernia Bank Building
SAN FRANCISCO, CAL., Russ Building

Products

ANACONDA SHEET COPPER, ROLL COPPER and ECONOMY STRIP COPPER.

For Anaconda Extruded Architectural Bronze Mouldings, etc., see pages A852-853; for Anaconda Brass and Copper Pipe and Anaconda Copper Service Tubes, see page C2701.

Quality of Anaconda Sheet Copper

Anaconda Sheet Copper is 99.9% pure, and guaranteed by THE AMERICAN BRASS COMPANY, the world's largest and most experienced manufacturers of copper and brass products. Manufacturing processes, developed during more than a hundred years of practical experience, insure uniform temper and accurate gauge.

Copper in a More Convenient Form

For valleys, flashings, gutters, rain-pipes, gutter linings and similar purposes, THE AMERICAN BRASS COMPANY has developed Economy Strip Copper.

This product is furnished perfectly flat, with edges parallel, in lengths of from 5 to 10 feet, inclusive, widths of 6 to 16 inches, and in 16-ounce weight. Economy Strip Copper is correctly tempered for forming. Its use eliminates the labor cost of flattening, cutting and trimming standard sheets. In addition, because of standardized production in large volume, Economy Strip Copper costs less than standard sheet copper.

Economy Strip Copper Is Trade-marked

As a permanent mark of identification, every length of Economy Strip Copper (Trade-mark Reg. U. S. Pat. Off.) carries the Anaconda trade-mark rolled in the metal. This mark is an assurance of full weight and a guarantee of 99.9% pure copper.

Anaconda Service is Nationwide

Large stocks of Anaconda Copper Sheets, Rolls and Strips at Ansonia, Conn., Buffalo, N. Y., Detroit, Mich. and Kenosha, Wis., enable distributors to meet any unusual requirement. The convenient location of these shipping points means prompt service and a saving in freight.

RECOMMENDED SIZES AND WEIGHTS OF COPPER FOR SHEET METAL WORK

Anaconda Economy Strip Copper should be used for all purposes where the required width does not exceed 16 inches. Where the required width exceeds 16 inches Anaconda Standard Sheet Copper should be used.

Purpose	Designation	Temper	Weight, oz.	Sizes	Number strips packed to crate	Area or length covered
Roofs	Flat seam	Soft	*16	14 x 20-in.	112	180 sq. ft.
				10 x 14-in.		82 sq. ft.
	Standing seam	Soft	*16	20 x 96-in.	25	284 sq. ft.
				30 x 96-in.		448 sq. ft.
	Ribbed seam	Soft	*16	20 x 96-in.	25	284 sq. ft. outside of battens
				30 x 96-in.		448 sq. ft. outside of battens
				6 in. x 6, 8, or 10-ft.	25 or 50	50 lin. ft., 8 sq.ft. for 2 x 3-in. ribs
Flashings and Gutter Linings	Base	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Cap	Soft	*16	10 in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Valley	Soft	*16	18 in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Gutter linings	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Shafts	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Skylight base	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Window heads, etc.	Soft	*16	6 or 8-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.

Note: For flat seam roofs use 4 cleats to each sheet with 2 nails to each cleat.
For standing seam roofs use 9 cleats to each sheet with 2 nails to each cleat.
For ribbed seam roofs use 10 cleats to each sheet with 2 nails to each cleat.
**16-oz. copper meets all ordinary conditions,* but in special cases heavier or lighter weights are sometimes used.

THE AMERICAN ROLLING MILL COMPANY

Makers of ARMCO Ingot Iron

EXECUTIVE OFFICES

MIDDLETOWN, OHIO

DISTRICT OFFICES

NEW YORK, N. Y., 50 Church Street
CHICAGO, ILL., 310 S. Michigan Boulevard
PHILADELPHIA, PA., Franklin Trust Building
DETROIT, MICH., General Motors Building
ST. LOUIS, MO., 1724 Ambassador Building
CINCINNATI, OHIO, Union Trust Building
PITTSBURGH, PA., Oliver Building
SAN FRANCISCO, CAL., Tenth and Bryant Streets
CLEVELAND, OHIO, B. F. Keith Building

Products

ARMCO INGOT IRON SHEETS: ARMCO Ingot Iron black sheets; ARMCO Ingot Iron blue annealed sheets; ARMCO Ingot Iron corrugated sheets; ARMCO Ingot Iron furniture sheets; ARMCO Ingot Iron galvanized sheets; ARMCO Ingot Iron plates; ARMCO Ingot Iron roofing sheets.

ARMCO Ingot Iron formed products, such as down-spouts, elbows, gutters, lath, metal shingles, pipe, are made and distributed by all leading sheet metal fabricators.

Rust Resistance

Among the five salient characteristics of ARMCO Ingot Iron is its pronounced resistance to rust and corrosion. This is the result of its freedom from the impurities that hasten rust. The total impurity content—consisting of carbon, manganese, phosphorus, sulphur, silicon and copper—never exceed *one-sixth of one per cent* in this purest of all irons. Galvanized sheets have a heavy, even coating of high grade zinc, thus assuring added protection.

Cost

Because of the additional refining processes involved in producing ARMCO Ingot Iron it costs slightly more than ordinary irons and steels. Still, when durability, ductility, and dependability are considered, ARMCO Ingot Iron more than compensates for the slight differential in first cost.

Numerous Installations—cornices, marquises, roofing, gutters, down-spouts—are giving anywhere from 50 to 100% longer service than less-pure irons and steels have given under identical conditions. Construction costs are lower, too; for ARMCO Ingot Iron, being pure and consequently soft and workable, forms easily and quickly to the most intricate architectural designs.

Many service records have demonstrated that ARMCO Ingot Iron, galvanized or painted, lasts the life of the building at less than one-quarter the material cost of copper or lead, and one-half the cost of zinc.

RECOMMENDED GAGES FOR DIFFERENT CLASSES OF WORK

Installation	Gage No. for residences	Gage No. for offices and public buildings	Gage No. for factories and warehouses
Roofing	26 to 28	26	18 to 24
Siding			20 to 26
Cornices	24 to 26	22 to 26	22 to 24
Skylights	24 to 26	20 to 26	20 to 26
Ventilators	24 to 26	18 to 24	16 to 24
Heating and ventilating ducts	22 to 26	16 to 26	16 to 26
Eaves troughs	24 to 26	24 to 26	22 to 24
Leaders	24 to 26	24 to 26	22 to 26
Flashing	26 to 28	26	may be lighter than roof
Valleys	24 to 26	24 to 26	same gage as roof
Ridge roll	26 to 28	26	may be lighter than roof
Window frames	22 to 24	22 to 24	22 to 24
Window sash	24	24	24

The heavy gages shown above should be used where unusually severe corrosive conditions are present.

How to Identify Armco Ingot Iron

The ARMCO triangle, stencilled in blue on every sheet, is definite protection against substitution of inferior grades or lighter gages. In each instance the gage is shown at the right of the triangle. All ARMCO Ingot Iron construction should reveal at least a portion of the blue triangle as shown at the left, for it is placed three times diagonally lengthwise on the sheet. If ARMCO Ingot Iron has been specified and the triangle is not in evidence, either inside or outside, it is certain that the specifications have not been followed.

Standard Gages and Sizes

ARMCO *Ingot Iron Galvanized Sheets* are carried in stock in the following sizes: Gages 16, 18, 20, 22, 24, 26 and 28. Widths, 24, 26, 28, 30 and 36 in. Lengths, 96 and 120 in.

ARMCO *Ingot Iron Black Sheets* are carried in stock in even gages from 14 to 26, inclusive, and in the same sizes as galvanized.

ARMCO *Ingot Iron Corrugated Sheets* for roofing and siding purposes are made with 5, 3, 2½, 1¼ and ⅜-in. corrugations. For general building purposes we recommend and carry in stock a 2½-in. corrugated sheet, 26 in. wide (after corrugating) for siding, and 27½ in. wide (after corrugating) for roofing. This size covers 24 in. in the width and allows for a one corrugation lap for siding and a one and one-half corrugation lap for roofing.

These sheets may be had from stock in the following sizes: Gages, 20, 22, 24, 26 and 28. Widths, 26 and 27½ in. Lengths, 60, 72, 84, 96, 108, 120 and 144 in.

All of the above sizes are termed standard sizes because they are carried in stock and used most frequently. All grades of sheets may be had in special sizes when an order is placed for 2000 lbs. or more of a size.

APPROXIMATE THICKNESS AND WEIGHT OF GALVANIZED ARMCO INGOT IRON

Gage No.	Weight per sq. ft., lb.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.	Gage No.	Weight per sq. ft., lb.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.
28	.781	1/64	.0153	21	1.531	11/320	.0337
27	.844	11/640	.0169	20	1.656	3/80	.0368
26	.906	3/160	.0184	18	2.156	1/20	.0490
25	1.031	7/320	.0214	16	2.656	1/16	.0613
24	1.156	1/40	.0245	14	3.281	5/64	.0766
23	1.281	9/320	.0276	12	4.531	7/64	.1072
22	1.406	1/32	.0306	10	5.781	9/64	.1379

Where to Get Armco Ingot Iron

Distributors and "Ingot Iron Shops" in all parts of the United States and Canada supply galvanized sheets and sheet products, and in some instances, black and blue annealed sheets. Names and address of distributors and shops in any given territory supplied on request.

Two Useful Books Every Architect Should Have

"Galvanized Iron for Roofs and Roof Drainage" is a comprehensive work devoted to every-day problems in these important phases of building construction. It is replete with working data, reference data, detail drawings, tables, scales, nomenclature, and other valuable information for architects and engineers. (See specimen drawings on following page.)

"Galvanized Iron for Cornices, Marquises and Skylights" is a companion book to the first. It contains a wealth of detail drawings, suggestions and data pertaining to these types of sheet metal construction. (See specimen drawings on following page.)

Both books were prepared in collaboration with competent firms of architects and engineers and reviewed by The Producers Council.

Copies will be sent free of charge to any practicing architect or engineer on request.

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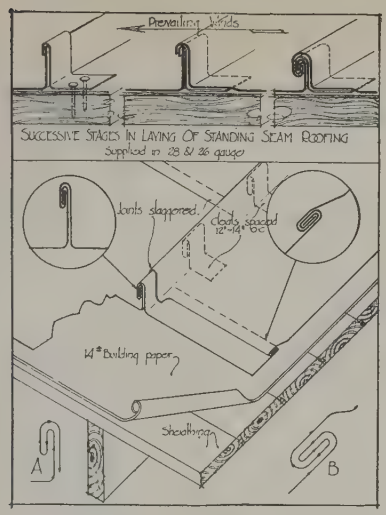
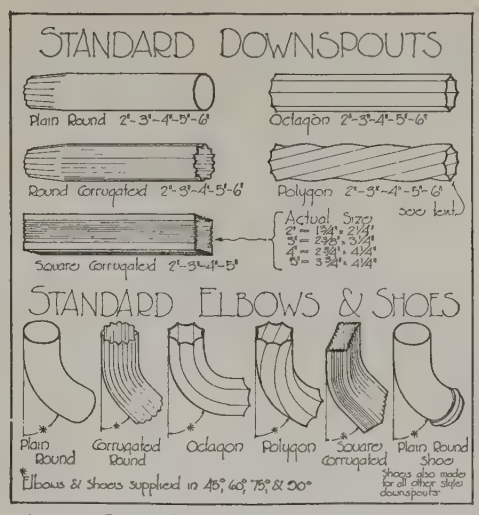
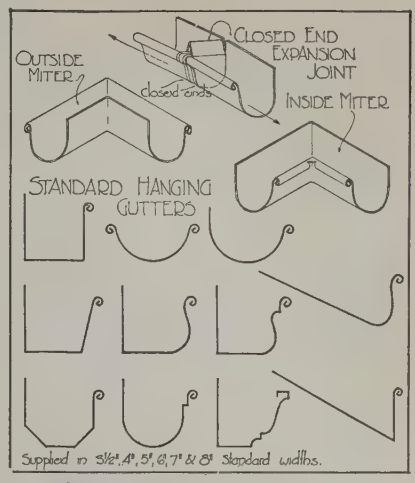


Standing Seam Roofing
Successive stages in laying this effective type of roof for industrial and certain other types of buildings



Armco Ingot Iron Down-spouts, Elbows and Shoes
The variety of available styles that harmonize with practically any type of architecture

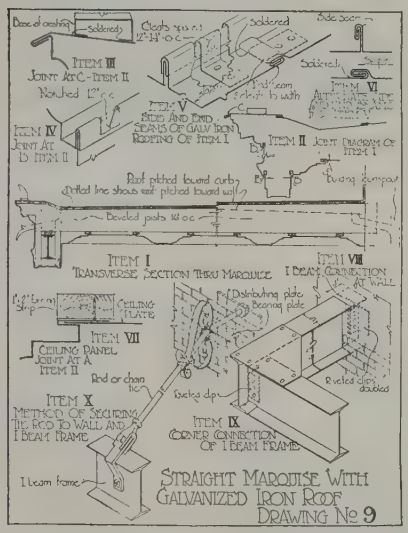


Standard Hanging Gutters
A wide variety of attractive styles are available for draining roof surfaces

Suggested Specifications for Roofs and Roof Drainage Parts

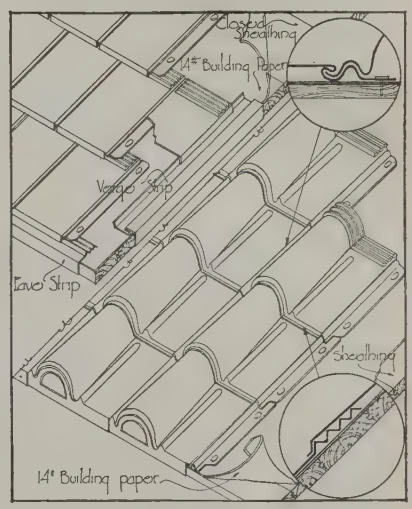
All sheet metal used in construction and erection of this (or these) roof (or roofs) shall be of (a) 26 ga. (b) 24 ga. (c) 22 ga. (d) 20 ga. (e) 18 ga. (f) 16 gage galvanized Armco Ingot Iron.

The various sheet metal parts shall be constructed and applied as indicated in the detailed drawings (or as detailed in "Galvanized Iron for Roofs and Roof Drainage," 1928 edition by The American Rolling Mill Company, Middletown, Ohio).



Left

Straight Marquise with Galvanized Iron Roof
Showing detailed construction throughout



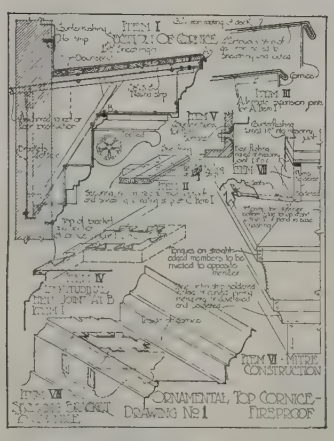
Right

Metal Tile and Metal Shingles
The tight, side-locking feature. Note how the 3 or 4 crimps at the end safeguard against the entrance of water

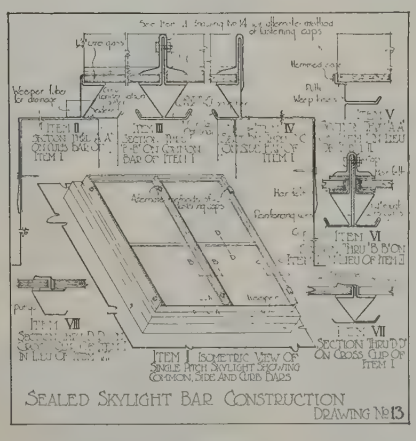
Suggested Specifications for Galvanized Iron Cornice, Marquise, or Skylight

All sheet metal used in construction and erection of this (or these)—(a) cornice—(b) marquise—(c) skylight (or skylights), shall be of (a) 26 ga. (b) 24 ga. (c) 22 gage galvanized Armco Ingot Iron.

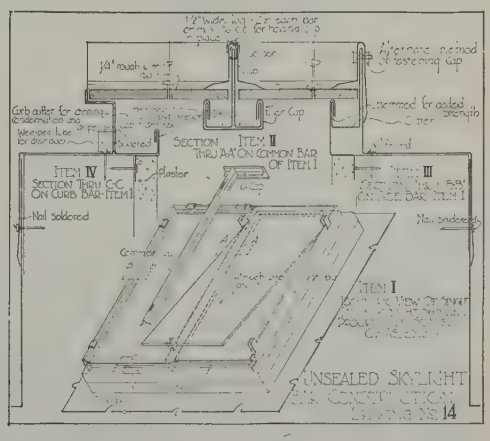
Details of construction and erection shall be done according to detail drawings and all possible applicable parts of section A and (a) section B—(b) section C (c) section D of Specification Suggestions of The American Rolling Mill Company in their handbook "Galvanized Iron for Cornices, Marquees, and Skylights," 1928 edition.



Curved Cornices
Details of constructing and erecting both horizontal and vertical curves, with fireproof and wood supports



Sealed Skylight Bar Construction
The various stages of assembly



Unsealed Skylight Bar Construction
Showing the progressive stages of assembly

APOLLO STEEL COMPANY

Manufacturers of Apolloy Metal Sheets, Roofing and Siding

GENERAL OFFICES

APOLLO, PA.

SALES OFFICES

BOSTON, MASS., Park Square Building
BUFFALO, N. Y., Marine Trust Building
CHICAGO, ILL., 180 No. Michigan Avenue
CLEVELAND, OHIO, 1655 Union Trust Building
CINCINNATI, OHIO, 1020 Union Trust Building
DETROIT, MICH., 2034 Dime Bank Building
LYNCHBURG, VA., 701 Krise Building
NEW ORLEANS, LA., 411 So. Peters Street
ST. LOUIS, MO., 1712 Chestnut Street
NEW YORK, N. Y., 1372, 50 Church Street
PHILADELPHIA, PA., 607 Otis Building
PITTSBURGH, PA., 2218 Oliver Building
SAN FRANCISCO, CAL., Hunter-Dulin Building
SYRACUSE, N. Y., Keith Building

Products

APOLLOY METAL (Copper Content) STEEL.
COMMERCIAL PURE IRON (Copper Content).

Galvanized — Roofing Sheets
One Pass Cold Rolled — 1¼, 2, 2½, 3-in.
Blue Annealed — Corrugated
Single Pickled — 2-V, 3-V, 5-V Crimp
Plain Roll Roofing

APOLLOY METAL COPPER CONTENT

Apolloy Metal, Its Manufacture

The new materials entering into the various stages of fabrication are carefully analyzed in our own laboratory, assuring the use at all times of materials of the proper composition for the ultimate purpose intended.

The fundamental sheet mill operation—hot rolling—is done on the most approved rolling mill machinery under the direction of plant superintendents who give each order their careful and individual attention.

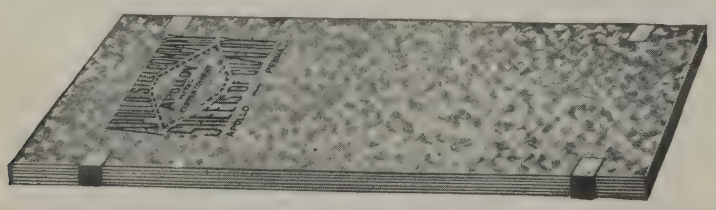
All sheets are rolled from soft ductile steel of special analysis to suit each individual requirement.

Apolloy Metal, Its Uses

Apolloy Copper Content Steel Sheets are manufactured in blue annealed, black and galvanized finishes. This brand has established for us an enviable reputation among our customers who have been using these sheets in the manufacture of their numerous products.

These sheets are especially recommended for exterior work such as roofing, siding, cornices, etc., for underground work such as vaults, culverts, tanks, etc., in fact, wherever the sheets will be exposed to the weather or other corroding agencies.

The extra cost of Apolloy Metal Copper Content Sheets is surprisingly low. Write to our nearest sales office for further particulars.

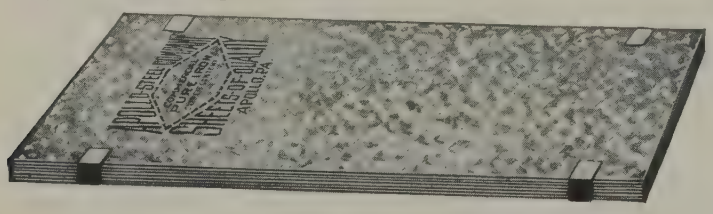


Apolloy Metal Copper Content Sheets

Commercial Pure Iron Copper Content Sheets

It is a known fact that the impurities in metal are the first to be attacked by corrosion. By eliminating impurities in-so-far as possible, it would follow that the resultant metal would have rust-resisting properties of the highest quality.

To supply the demand for this class of material we have specialized in commercial pure iron sheets. These sheets are especially suitable for use as corrugated metal culverts. Copper may be added in proper quantity and this imparts additional rust-resisting properties. The value of this material is attested by the fact that a number of state-highway departments specify iron sheets exclusively.

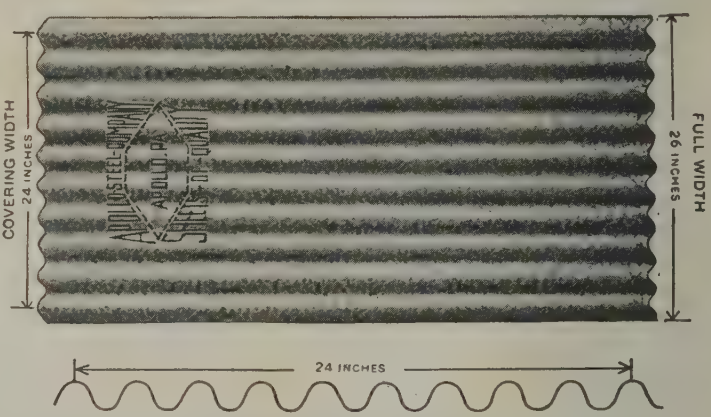


Commercial Pure Iron Copper Content Sheets

Corrugated Steel Sheets

Made of best quality regular and copper content black and galvanized sheets.

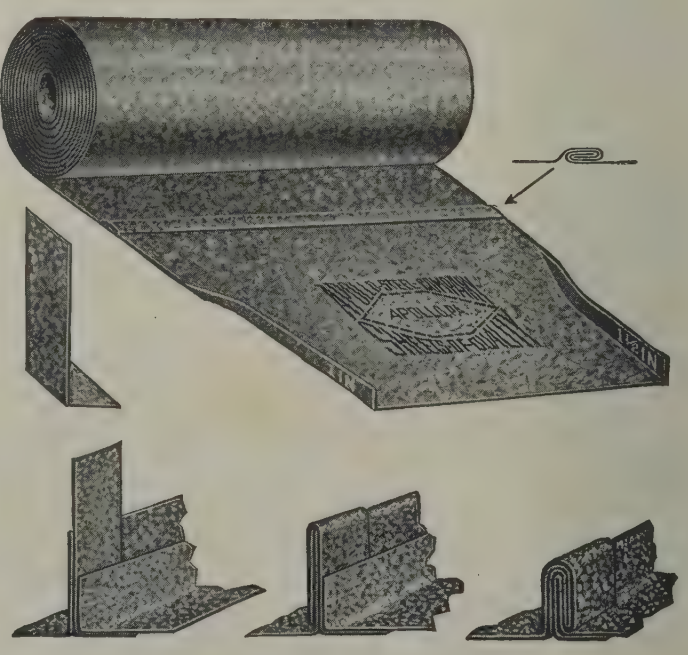
Corrugated sheets are the strongest form of sheet metal and are used for roofing and siding. The corrugations make the sheet more rigid and allow for expansion and contraction, adding strength to the structure to which applied. They are manufactured from flat sheets made in our own plant.



2½-in. Corrugated Steel Sheets

Plain Roll Roofing

Black and galvanized; 28 gauge and lighter. Put up in rolls, of five sheets, full 50 ft., 26½ in. wide; each roll has covering surface of 100 sq. ft.



Plain Roll Roofing

CENTRAL ALLOY STEEL CORPORATION

Manufacturers of Toncan Copper Mo-lyb-den-um Iron Rust and Corrosion Resisting Sheets

MASSILLON, OHIO

REG. U.S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON
TRADE-MARK

Products

TONCAN IRON SHEETS: Black, Blue Annealed, and Galvanized.

TONCAN IRON ROOFING: Roll, V-Crimped, Pressed Standing Seam and Corrugated.

TONCAN IRON SIDING: Corrugated, and Reproductions of Rock Faced Stone, Rock Faced Brick and Lapped Weatherboard.

Also Toncan Iron Corrugated Sheets, straight and curved, for use with concrete work and other special purposes.

Description and Uses

Toncan is a carefully made commercially pure iron alloyed with copper and mo-lyb-den-um to obtain the greatest possible resistance to rust and corrosion. Its long life and easy working qualities are a matter of common experience.

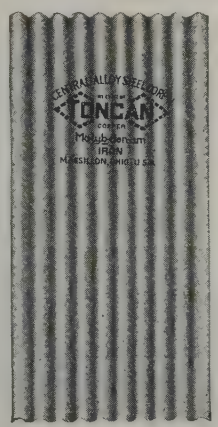
Toncan Iron is widely used for expanded metal lath, eaves trough, conductor pipe, ridge roll, valleys, flashing, cornice, balcony, marquise, window frames, skylights, tanks, ventilation, refrigeration—in fact, for every purpose which demands a durable sheet iron.

Roll Roofing
Painted or galvanized. Excellent for low pitched roofs. Covering width, 24 in. Each roll lays 100 sq. ft. on the building

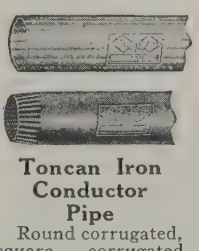
Three V-Crimp Roofing
An attractive form of Toncan roofing, covering width 24 in.; gauges, No. 20 and lighter; also made with 2 and 5 V-form

Expanded Metal Lath

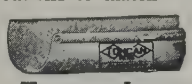
Many architects specify Toncan lath for all lath work as an extra assurance of lasting service. It should always be used for stucco and other exterior or exposed work.



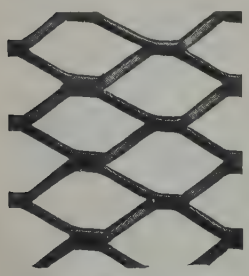
Corrugated Sheets for Roofing and Siding
Gauges No. 10 and lighter; 1¼ and 2½-in. corrugations are standard



Toncan Iron Conductor Pipe
Round corrugated, square corrugated and plain round conductor pipe. Lengths, 8 and 10 ft. All diameters. Elbows, miters and cut-offs to match



Toncan Iron Eaves Trough
Length, 10 ft. All widths; and gauges Nos. 28, 26 and 24



Toncan Expanded Metal Lath
Made in standard weights of 2.2, 2.5, 3.0 and 3.4 lb. per sq. yd. Sheets, 24x96 in., 9 sheets or 16 sq. yd. per bundle

Corrugated Ridge Roll
2½ or 1¼-in. corrugations. Lengths, 27 and 96 in.

Corrugated End Wall Flashing
Flat side on wall, 2 in. Corrugated apron, 4 in. Lengths, 27 and 96 in.

Advantages

In Toncan Iron lies the architect's most satisfactory solution for the sheet metal problem. It enables him to specify a moderate priced sheet metal of unquestionable durability—a durability proved by many years of use in thousands of structures and in every form of severe sheet metal service.

Identification

The trade-mark shown above is stamped in two or three places on every Toncan Iron sheet and die stamped on eaves trough, conductor pipe, elbows, etc.

Sources of Supply

Jobbers and tinners everywhere sell Toncan Iron sheets and products. On request, we will supply names of manufacturers or dealers who can furnish any special Toncan Iron product you may have in mind.

Specification Data

"All sheet metal work shall be of Toncan Copper Mo-lyb-den-um manufactured by the CENTRAL ALLOY STEEL CORPORATION, of Massillon, Ohio," is a safe specification; for Toncan meets all the requirements of modern sheet metal practice.

For trough and pipe, we recommend No. 26 gauge. For gutter, flashing, valleys, etc., No. 24 or, better still, No. 22 gauge. Roofing may be No. 26, 24 or 22 gauge. The heavier gauges should always be used where corrosive conditions are severe as along the sea coast or in a smoky atmosphere. Further information on Toncan Iron will be supplied promptly on request.

References

Thousands of installations in all parts of the country are proving the lasting qualities of Toncan Iron. A few are mentioned below. Ask for others.

Kansas City Star Building, Jarvis Hunt, Architect
Building for Stewart-Warner Speedometer Co., Chicago, Ill., L. G. Hallberg & Co., Architects
Commons Building, New Hampshire College, Prof. E. T. Huddleston, Architect
Aragon Hotel, Jacksonville, Fla., Rutledge Holmes, Architect
Lynchburg National Bank, Lynchburg, Va., Alfred C. Bossom, New York, N. Y., Architect
Grand Central Palace, New York, N. Y., Warren and Wetmore, Architects
Industrial Arts Building, Eastern States Exposition, Springfield, Mass., McClintock & Craig, Architects
Republic National Bank Building, Dallas, Tex., C. D. Hill & Co., Architects
U. S. Chamber of Commerce, Washington, D. C., Cass Gilbert, Architect

California Palace of The Legion of Honor, San Francisco, Cal.
G. A. APPLEGARTH, Architect
30,000 sq. ft. of Toncan Skylight used here

KLEIN & KAVANAGH

INCORPORATED

Masters in Roof Reproduction and Craftsmen in Metal

207-209 East 120th Street, NEW YORK, N. Y.

Products

"Antique Finish" Lead Coated Copper Leader Pipes, Heads, Gutters, Swan Necks, Ornamental Hand Wrought and Cast Lead Work, Antique Roof Reproductions of Slate Stones and Tiles.

Specialized Roofing Service

We design, fabricate, assemble and erect, upholding, with startling fidelity, the infinite standard of right maintained by the old masters.

Our service precludes the misunderstandings that frequently arise when quarry, foundry, mill, roofer and sheet metal contractor each expresses his individual interpretation of the architect's specifications. *For we handle the entire roofing and metal problem from its inception.*

The slates or tiles are quarried or manufactured under our supervision in accordance with a pre-determined scheme, and the colors, texture, sizes, etc. are assembled and checked by our inspectors at their point of origin before shipment is made.

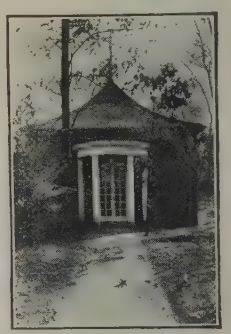
The success of the roof is predetermined by careful study of perspective from vantage points around the building. The color is distributed in accordance with accepted principles of color combination. Varying thicknesses are worked out to gradually decrease in weight from eave to ridge. Thus, the general ensemble has no suggestion of the "violence" which results when roofs are treated in a hit-or-miss, indifferent manner by allowing haphazard courses of color, thicknesses or sizes of slate or tile.

Exceptional Metal Work

Our "Antique Finish" lead-coated copper is made in *our own plant* under a patented process, and is a true reproduction of old cast lead. All of our metal work—lead coated copper, plain copper, lead or bronze—is fabricated, wrought or cast in our own plant to exacting requirements. Flashings and metal work generally are built-in at the building scientifically—with due allowance for contraction and expansion.

Chimneys are flashed through to the flue lining, all flashings built well into or through the walls and concealed from view, if desired, with absolute safety. Standing seam or batten roofs are installed in accordance with our special method (patent applied for) eliminating all soldering of joints, allowing full freedom for movement of the metal and insuring absolute weathertightness.

Roofing and Sheet Metal Specifications



The most comprehensive specification cannot express the interesting nuances, the effectively uneven character of the slates, the subtle refinement of detail that culminate in the truly correct roof on the French, English or Colonial residence.

We could suggest many paragraphs covering points of construction and description of results desired, but we have too often seen exquisite potentialities ruined by unfortunate interpretations of plans and specifications left to competitive bidders. Consequently, may we suggest your discussing and pre-determining in collaboration with our architectural consultants the treatment of your roofing and metal work and then incorporating in your specification the following clause under the heading of "Roofing and Sheet Metal Work":

The general contractor will allow the sum of $..... for all roofing and sheet metal work indicated on the plans and necessary, in the opinion of the architect, to insure the weathertightness of the building. All labor and material required for this work will be furnished by Klein & Kavanagh Inc., and upon completion, they will deliver to the owner their guarantee, bonded if necessary, to make good any of their work which may prove defective within the period of 10 years from the date of completion.

Studio Building, Riverdale, N. Y.
Dwight James Baum, Architect

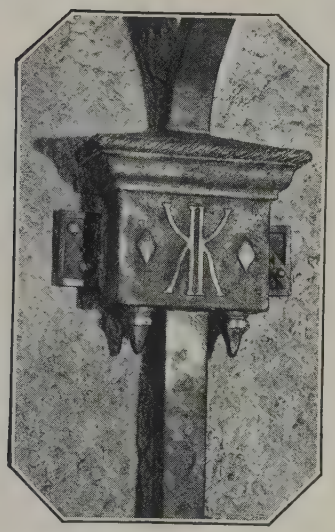
Continued on next page

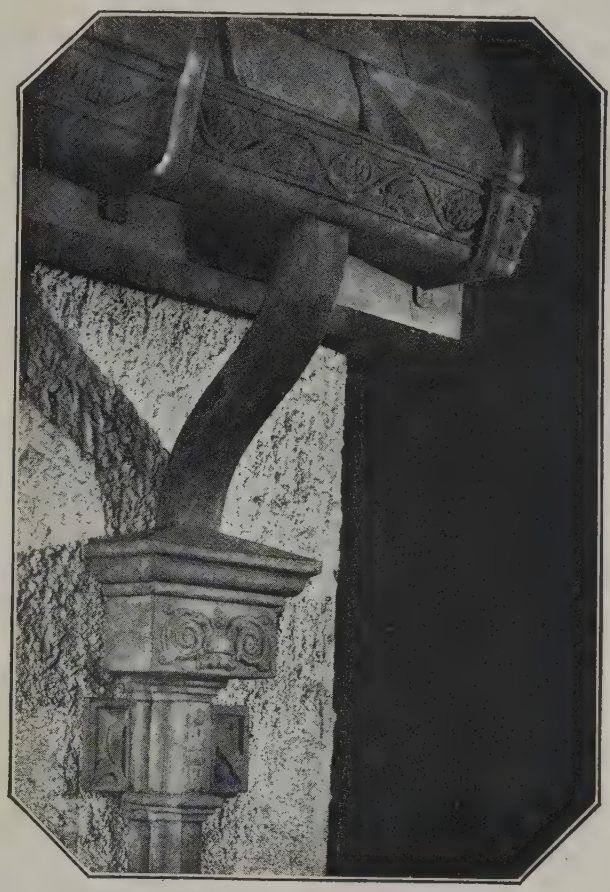
Ornamental Hand Wrought and Cast Lead Work

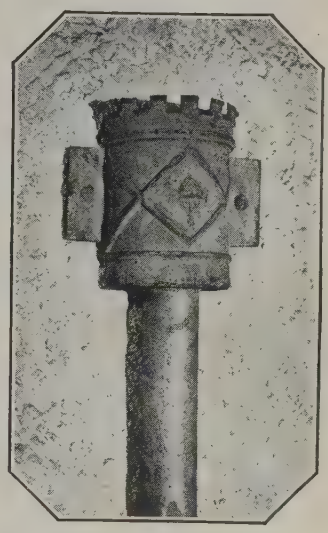
We are specialists in the art of hand wrought and cast lead work. We are not manufacturers but skilled workers in lead, producing not merely decorative objects of this metal but works of real art.

We have no catalogue or stock designs. Each work is original so that the finished product is exactly and artistically suited for the individual purpose required—and not a makeshift selected from some stock design.

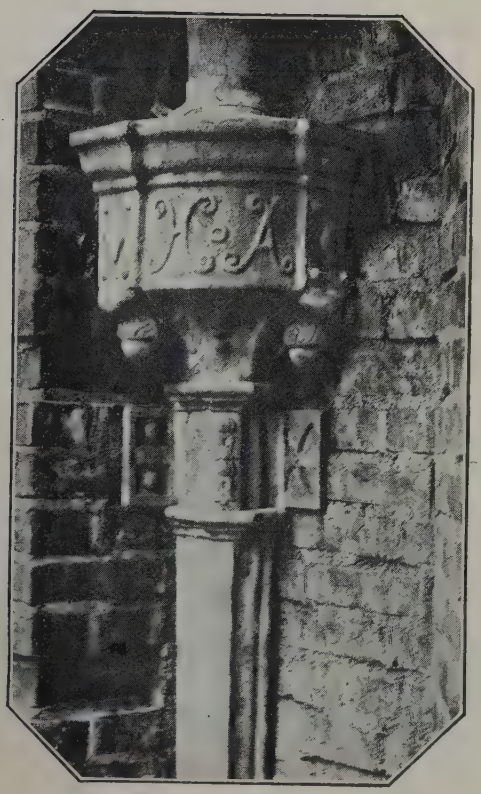
Our works are executed from the designs of the architects or we will be glad to co-operate with the architect and produce designs for work that we are to be awarded.

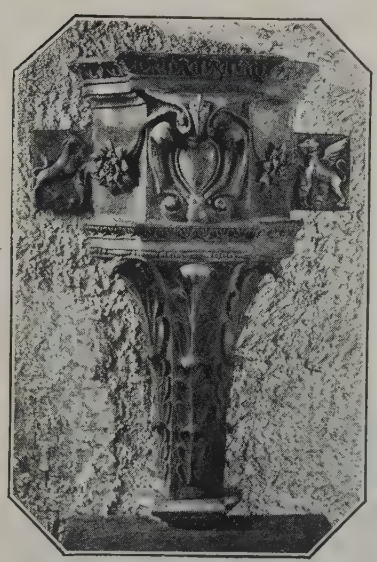


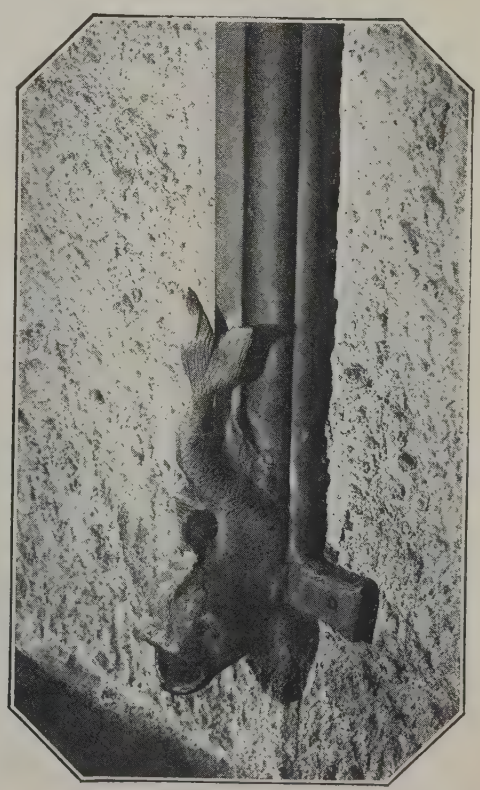




The examples of leadwork shown on this page were executed by KLEIN & KAVANAGH







LYON, CONKLIN & CO. INCORPORATED

Manufacturers of Lyonore Metal Products

BALTIMORE, MD. WASHINGTON, D. C.

Products

"Lyonore Metal" Galvanized Sheets, Conductor Pipe, Eaves Trough, Roofing Terne Plate, etc.

Lyonore Metal an alloy
TRADE-MARK

Lyonore Metal—Corrosion Resistance

A knowledge of the resistance of the alloy Lyonore Metal to chemical influences is of practical importance.

Nearly all articles of metal are exposed to the action of gases contained in the atmosphere; besides nitrogen, there are oxygen, carbonic acid and aqueous vapors, such as steam and fog. In inhabited localities there is nearly always present sulphur, ammonia, etc. These gases together with moisture, rain or snow, readily create a condition that makes a metal exposed to them subject to the influence of electrolysis, the cause of rust, corrosion or disintegration.

Lyonore Metal is an alloy that is electrically balanced, the constituents being of such a nature and proportionately combined as not to be unduly influenced by electrolysis.

Its ability to resist the corrosive action generated by the gases mentioned above proves Lyonore Metal to be the most perfectly balanced alloy that science has been able to compose up to this period.

Several of the constituents used in the composition of Lyonore Metal are of the same substance as the metal that was used by the Egyptians in the joints of the stone work of the Pyramids in Egypt. This metal has resisted corrosion for more than five thousand years.

Other Features—Lyonore Metal is of a finer texture, and more homogeneous than steel or iron. It is pliable, yet tough. Can be worked with less labor and expense and, when formed, holds its shape. Has a tensile strength of 57,000 lb. per sq. in.

Its pliability and toughness make tighter seams possible and its finer texture holds galvanized coating better.

Lyonore Metal Terne Roofing Plates

Lyon Brand, made on Lyonore Metal Base of carefully selected, perfect sheets, carries 40-lb. coating. Coated by the genuine *pure palm oil process,* with pure new tin and new lead, in the proportions of 1 part tin and 2 parts lead, making this a *genuine* terne plate. 1C thickness is generally used for roofing. 1X thickness for valleys and secret gutters.

A Lyonore Metal Roof is lightning-proof when properly grounded.

Lyonore Metal Galvanized Sheets

Adapted for all forms of general sheet metal work.

Corrugated Sheets

Lyonore Metal is furnished in galvanized corrugated sheets in all standard gauges. Standard corrugations are 5/8, 1¼, 2, 2½, 3 and 5 in. Standard lengths are 5, 6, 7, 8, 9, 10 and 12 ft. Covering width is 24 in. Can also be furnished in pressed standing seam, V-crimped, weatherboard siding, beaded ceiling, brick and stone siding, etc.

Lyonore Metal Crimped Sheets for Cornice, Panels, etc.

Made in gauges Nos. 27, 26, 24 and 22. These sheets, crimped $\frac{3}{16}$ in., are especially suitable for cornice. They are stronger, not easily dented, and, when painted, give the appearance of stone.

Standard Specifications for Tin Roofing

For Lyonore Metal Tin Roofing in standing seam, flat seam or ribbed.

All tin roofing on this building shall be Lyonore Metal Base, Lyon Brand 40-lb. coated, 1C thickness for all roofing, and 1X thickness for valleys and gutters, to be done in accordance with the Standard Specifications of National Association Sheet Metal Contractors.

Standard Specifications for Sheet Metal Work

All galvanized sheet metal on this building shall be Lyonore Metal of gauges specified for each class of work.

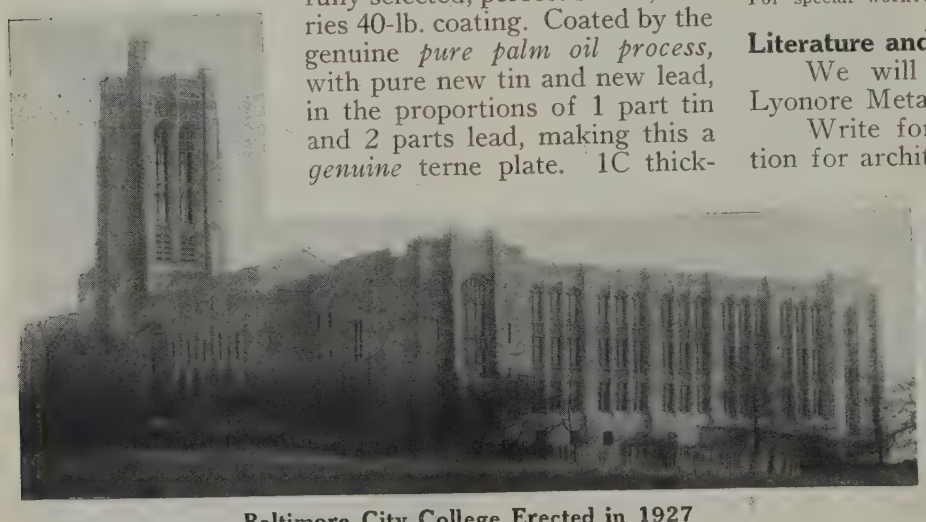
Note: For best results, we recommend that the following gauges be specified for various classes of sheet metal work.

For conductor pipes, hanging gutters and eaves trough	No. 26 gauge
For cornices	No. 24 gauge
For skylights	No. 24 gauge
For gravel strips and flashings	No. 26 gauge
For ventilating ducts and dust conveyors (inside work), specify gauge number according to size of duct as follows:	
16-in. diameter and smaller	No. 26 gauge
18-in. diameter	No. 24 gauge
Larger than 18-in. diameter	No. 22 gauge
For paneling and moulding	No. 24 gauge
For special work	No. 24 gauge

Literature and Samples

We will submit samples of various forms of Lyonore Metal and literature bearing on its use.

Write for File 12c7 containing valuable information for architects and engineers.



Baltimore City College Erected in 1927
Buckler & Fenhagen, Architects
100,000 lb. of Lyonore Metal used for ventilating, etc., in this building.

Charlotte Gas Plant, Charlotte, N. C.
One building was covered with Lyonore Metal 12 years ago and the roof is still good. Ordinary galvanized steel rusted away in a year and a half.

THE NEWPORT ROLLING MILL CO., INC.

Sole Manufacturers of Gohi (Genuine Open Hearth Iron) Rust-resisting Sheets, Roofing, Siding and Accessories

NEWPORT, KY.

Products

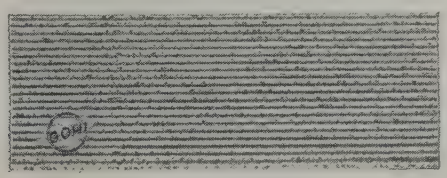
GOHI (GENUINE OPEN HEARTH IRON) includes Black and Galvanized Sheets, Plain or Corrugated; Corrugated Arches; Corrugated Awnings; Corrugated Ridge Rolls; Pressed Standing Seam Roofing; Plain Roll Roofing; Roll and Cap Roofing; Weatherboard Siding; Beaded Ceiling; Beaded Siding; Brick Siding; Rock Face Brick Siding; Rock Face Stone Siding; Metal Shingles; Plain Ridge Roll; Cornices; Louvers; Eaves Trough; Conductor Pipe; Elbows and Shoes; Mitres; Cut-offs; Skylights and Metal Ceilings.

TRADE-MARK

Description

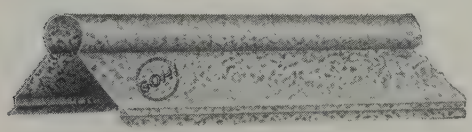
GOHI (Genuine Open Hearth Iron) pure iron copper alloy rust-resisting sheets and formed products will analyze approximately 99.875% pure—considering as impurities the dangerous rust and corrosion agents, namely: carbon, manganese, phosphorus, sulphur, silicon, nitrogen, hydrogen and oxygen.

In addition, GOHI (Genuine Open Hearth Iron) has a copper content of not less than two-tenths (.2) of one per cent (1%) or over three-tenths (.3) of one per cent (1%). This addition of copper to the pure base metal produces a superior lasting and rust-resisting quality product.

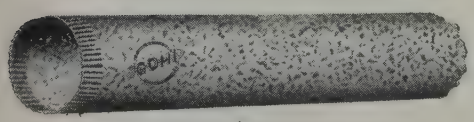


Corrugated Sheet

Roll and Cap Roofing



Ridge Finish



Conductor Pipe

Roof Gutter

Advantages

GOHI (Genuine Open Hearth Iron) is absolutely uniform in quality, being manufactured from the highest grade of selected materials, thus assuring one of the best rust-resisting metals for any and all conditions. GOHI will give longer life and is more durable than re-worked muck bar, charcoal iron, steel, or other iron sheet metal. On account of its superior working qualities, labor costs are reduced and are actually less than in working up steel or other iron sheets. Lasting qualities considered, GOHI is more economical than other sheet metal building materials you can specify.

Sources of Supply

Jobbers, dealers, hardware concerns, etc., everywhere sell GOHI (Genuine Open Hearth Iron) sheets and formed products. On request, we will supply names of distributers who can furnish GOHI in sheets or in the formed products specified above.

Service

GOHI has been produced on a foundation of quality, and knowing it to be as good as human ingenuity can make it, THE NEWPORT ROLLING MILL CO., INC., has directed all efforts to improved service.

We recently had prepared by a firm of architects, a file folder containing a complete analysis and specifications of GOHI (Genuine Open Hearth Iron). This valuable information should be in the hands of every architect specifying quality sheet metal work. It also shows ways and means in which GOHI (Genuine Open Hearth Iron) may be used to advantage in building construction. If you do not have a copy of this folder we will be very glad to forward it to you upon request.

We have also available for your reference, leatherette folders containing sample gauges of GOHI which are mailed free upon request.

Contributing Member
SHEET STEEL
TRADE EXTENSION COMMITTEE

THE NEW JERSEY ZINC COMPANY

ESTABLISHED 1848

Makers of Rolled Zinc for Roofing and Roofing Accessories

PRODUCTS DISTRIBUTED BY

THE NEW JERSEY ZINC SALES COMPANY

160 Front Street	Marquette Building	Oliver Building	Guardian Building	Merchants Exchange Building
NEW YORK, N. Y.	CHICAGO, ILL.	PITTSBURGH, PA.	CLEVELAND, OHIO	SAN FRANCISCO, CAL.

Products

HORSE HEAD ROLLED ZINC.
FLAT SHEET ZINC.
STANDING SEAM HORSE HEAD ZINC ROOFING.
CORRUGATED SHEET ZINC ROOFING and SIDING.
For Paint Pigments, see page B2068.

Uses

For roofing (standing seam, batten or ribbed seam, shingles and corrugated), siding, conductor pipes, eaves troughs, valleys, flashings, and all exposed sheet metal work.

Advantages of Zinc

Durability—Zinc is a metal (not an alloy of other metals) which is extremely resistant to the corrosive action of the elements. It rapidly acquires a very adherent protective coating which will always form whenever any raw zinc is exposed.

Color—This protective coating has a light battleship gray color which will darken with age and approach the color of slate.

No Stain—Zinc sheet metal work can not stain marble, stucco or light colored surfaces.

Cost—The cost of zinc is approximately halfway between that of copper and galvanized steel of equal thickness.

Weight—The weight of zinc per square foot is less than that of copper, lead, galvanized iron, or steel, of an equal thickness.

Painting—Zinc does not require paint as a protection against the elements, but paint can readily be used if other than the natural color of zinc is desired.

Wood Shingles—Since most wood shingles, notably redwood and red cedar, exude acids which are harmful, the use of zinc for sheet metal work is not recommended on buildings covered with this material.

Roofing—Specifications (Condensed)

(1) Shingles—Shall be made from Horse Head Rolled Zinc not less than 0.018 inches thick and laid in accordance with the manufacturer's specifications. Minimum slope 4 inches per foot.

(2) Standing Seam—Use the standard Standing Seam Horse Head Zinc Roofing installed in accordance with the specifications sent with each square of roofing. Minimum slope 2 inches per foot.

(3) Batten or Ribbed Seam—Roofs of this type shall be made from either Horse Head Rolled Zinc (2) or New Jersey Sheet Zinc. The metal used shall be not less than 0.024 inches thick for battens spaced not more than 18 inches on centers. For wider batten spacings, heavier metal shall be used. Minimum slope 3 inches per foot.

Valleys—All valleys shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick and shall be attached to the roof by zinc clips. The nails holding the roofing material must not pass through the valleys.

Note: Horse Head Rolled Zinc is not manufactured wider than 20 inches.

Flashings—All flashings shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick. When used on masonry, concrete, or stucco, they shall be laid on a good grade of waterproof sheathing paper. The reglet for the cap flashing shall be pointed up with elastic roofing cement.

Conductor Pipes and Eaves Troughs—These shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick. The eaves troughs shall be hung on galvanized shank and circle hangers spaced not over 2 feet on centers. Conductor pipes shall be supported by galvanized rack and pin pipe fasteners securely soldered to the pipe.

Corrugated Sheet Zinc Specifications (Condensed)

The New Jersey Corrugated Zinc Sheets have corrugations 2½x⅞ inches deep. These are furnished both for roofing and siding in standard widths and specified lengths.

(1) Roofing Sheets—Corrugated Zinc Roofing Sheets shall be not less than 0.024 inches thick when used over a fully sheathed surface and not less than 0.032 inches thick when used over open purlins not over 48 inches on centers. For wider purlin spacings, heavier gauge sheets shall be used.

(2) Siding Sheets—Corrugated Zinc Siding Sheets shall be not less than 0.024 inches thick.

Write for Detailed Specifications

Further and more detailed specifications on any zinc work will gladly be furnished on request. Our engineering services are always available in connection with the uses of our materials. Please do not hesitate to consult us.

A Zinc Shingle Roof on a Wisconsin Church

Zinc is, in many ways, the most economical metal roofing available

Continued on next page

Fort Jay Y. M. C. A., Governor's Island, New York Harbor
One of the many Y. M. C. A. buildings protected for life by Standing Seam Horse Head Zinc Roofing

Stamford (Conn.) Hospital Roofed with Horse Head Zinc, Batten Seam
As each additional unit of this hospital is erected it is roofed with the same material. The older units have proved the economy of this roofing

A Permanent Industrial Structure in Pennsylvania
Corrugated Sheet Zinc Roofing and Siding insure freedom from repair or replacement. The first cost is the last cost

THE SUPERIOR SHEET STEEL COMPANY

DIVISION OF CONTINENTAL STEEL CORPORATION OF KOKOMO, IND.

Manufacturers of Lead-sealed Roofing, Siding and Other Formed Products

CANTON, OHIO

DISTRICT SALES AGENTS

CHICAGO, ILL., Taubensee & Richards, 111 W. Washington Street
PHILADELPHIA, PA., Park & Williams, Inc., Real Estate Trust Building
NEW YORK, N. Y., Barnard Eberlin, 50 Church Street
DETROIT, MICH., A. A. Griffiths, Dime Bank Building
LOS ANGELES, CAL., C. W. Pike Co., 1213 Pershing Square Building
SAN FRANCISCO, CAL., C. W. Pike Co., 332 Pine Avenue
NEW ORLEANS, LA., J. Wilton Jones Co., Inc.

Products

Lead-sealed, Super-metal, Galvannealed, Black, Galvanized and Long Terne Sheets.

Lead-sealed Roofing: Corrugated and other Roofings.

Lead-sealed Siding: Corrugated and Flat.

Also Lead-sealed Flat Sheets, Eaves Trough, Conductor Pipe and other Formed Products.

Description

Lead-sealed consists of two surfaces of pure lead sealing a core of special analysis, copper content steel. It is manufactured by an exclusive process, which insures against peeling or flaking of the lead surfaces and provides pure lead protection with the light weight and strength of steel.

Both sides of a sheet of Lead-sealed present a smooth, uniform, impermeable surface of pure lead, without break or flaw

The two surfaces of imperishable lead seal a core of special analysis, copper content steel. The lead surfaces are unusually heavy; the base metal *is* sealed

Uses

For industrial structures, sheet metal roofs and siding have many advantages—low material and labor cost, light weight, flexible strength and protection from fire and lightning. It is the special quality of Lead-sealed

that it combines these advantages with the superior resisting qualities of pure lead, which opposes deterioration in all forms.

While many times more rust resisting under like conditions than any coated sheet, the resistance of Lead-sealed to smoke, acid, salt air and gas fumes is incomparably greater. For these reasons, it is most emphatically recommended for chemical plants, gas plants, mills, foundries, seacoast warehouses and dock buildings, railroad shops and depots, and all other industrial structures where conditions such as are here illustrated prevail.

For such applications, Lead-sealed roofing and siding offers the most desirable combination of moderate first cost with extremely long and dependable service.

Characteristics

The manufacturers of Lead-sealed have long been recognized as authorities on high grade coated sheets.

The process by which it is made is exclusive and may be identified, not only by the trade-mark, but by the heavy weight of the lead surfaces and the perfect sealing of the base metal. The sheets are uniformly soft and level and easy to work.

Specification Data

Lead-sealed is made in standard sizes of corrugated roofing and siding, roll and V-crimp roofing, etc., and flat sheets, Nos. 12 to 28 gauge. Methods of application are those of standard sheet metal practice. Lead headed nails are recommended and can be supplied by this company. Any special information will gladly be given on request.

Supply

Lead-sealed may be specified through leading distributors of sheet metal products, or by writing direct to this company or its representatives.

HOYT HARDLEAD PRODUCTS

UNITED LEAD CO.
SUBSIDIARY OF NATIONAL LEAD CO.
111 Broadway
NEW YORK, N. Y.

Products

Hoyt Hardlead Roofing Sheets; Rain Water Pipes; Rain Water Pipe Heads; Pipe Bands; Gutters; Spandrels; Finials; Statuary Garden Ornaments; Ornamental Hoyt Hardlead Work of every description.

For Lead Cames, see page B2183.

Hoyt Hardlead

Hoyt Hardlead has a much greater tensile strength than soft lead, which permits its use in comparatively thin sheets, making it thoroughly practical and adaptable to modern building construction. It can be stamped, formed or cast in any shape desired. When exposed to the atmosphere it takes on a soft gray, non-staining patina that brings out the true value of adjacent materials and gives a balance to these materials that cannot be obtained with other metals. It will lend dignity and character to any structure where permanence and beauty is desired.

It is used for roofing, flashings, cornice coverings and other building purposes where it is practical to use sheet metal.

It is rolled in sheets 24, 30 and 36 in. wide and 96 in. long, weighing 2½, 3, 4, 6 and 8 lb. to the sq. ft.

The proper weight of Hoyt Hardlead Sheets depends upon the purpose for which they are to be used. For roofing, cornice coverings and base flashings generally the 3-lb. sheet is recommended, and for cap flashings and batten roofs where the battens are spaced 24 in. or less on centers the 2½-lb. sheet may be used.

Spandrels

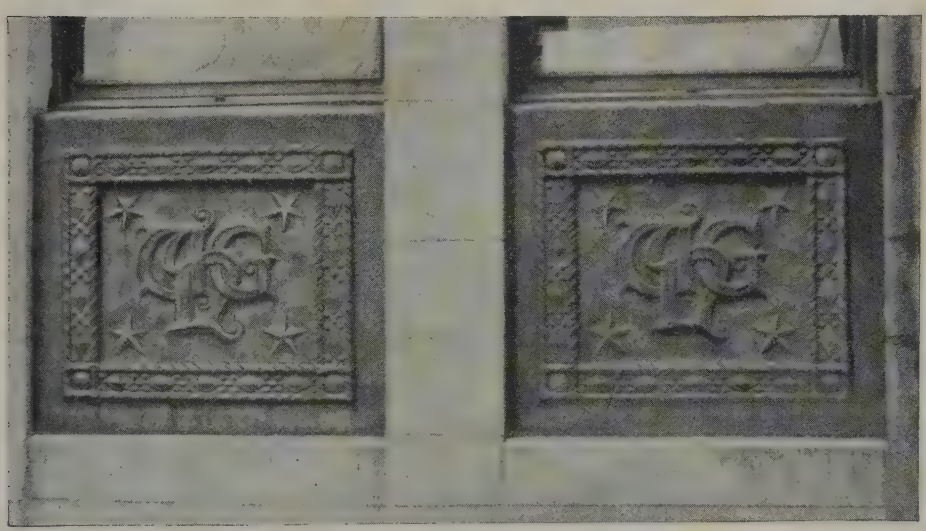
Architecturally and economically there are many advantages in the use of Hoyt Hardlead Spandrels.

It is possible to obtain in Hoyt Hardlead effects that cannot be duplicated in other materals which in contrast present an extreme severity of line. Softness of line and low relief are characteristics of stamped Hoyt Hardlead.

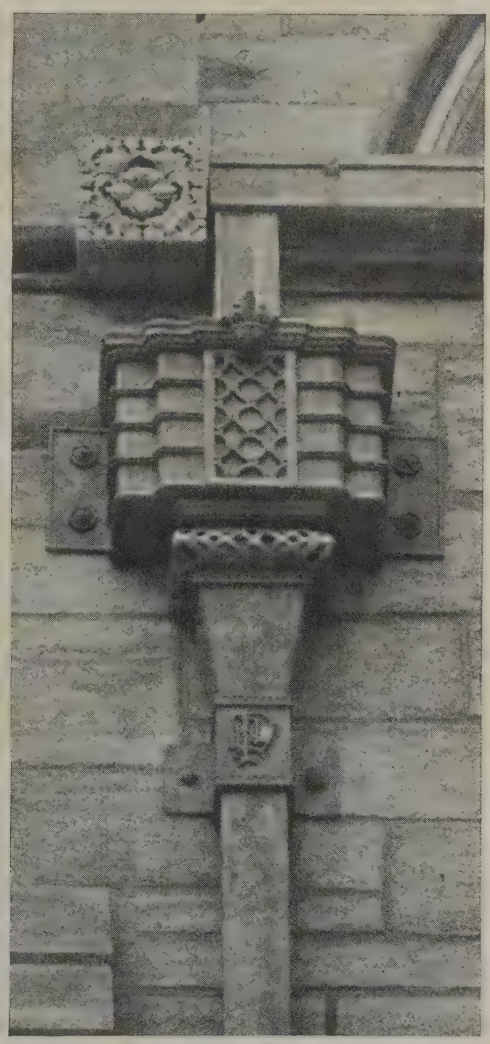
The soft gray color of Hoyt Hardlead is uniform and permanent. Unlike other metals, Hoyt Hardlead Spandrels require no painting nor other maintenance, and do not stain adjacent masonry.

Catalogue

Our catalogue illustrates a complete line of architectural and ornamental lead work. This catalogue will be sent to architects on request.



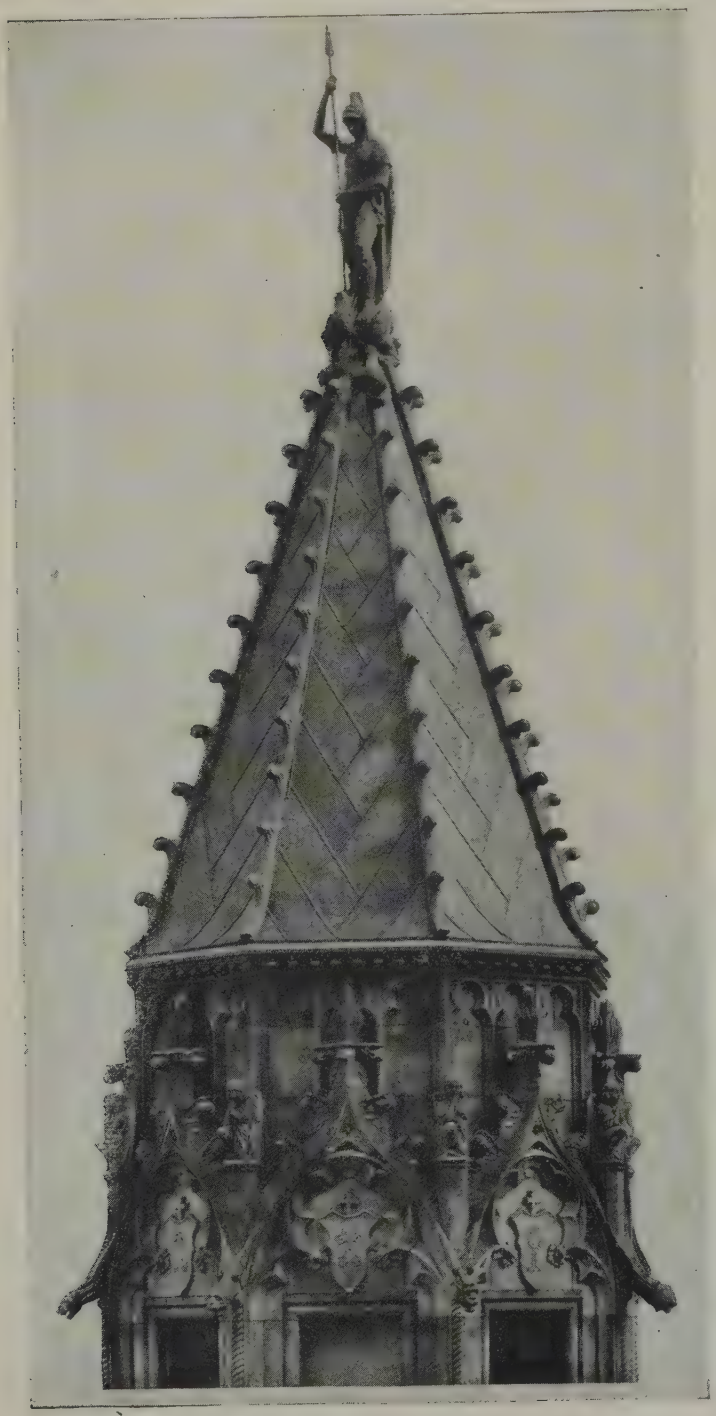
Spandrels—Tribune Tower, Chicago, Ill.
John Mead Howells, and Raymond M. Hood, Chicago, Ill., Architects
Installation of 1200 spandrels, size 33x48 in., stamped from Hoyt's Hardlead sheet 4 lb. to the sq. ft.



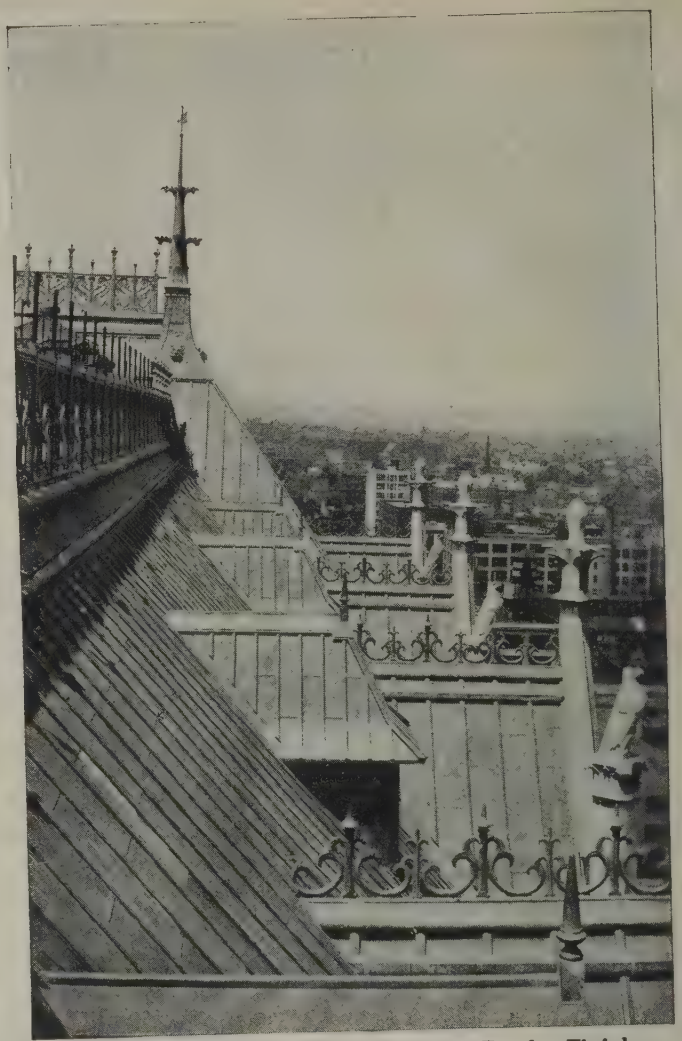
Rain Water Pipe Heads, Pipe, Bands, and Gutter, Princeton University Chapel, Princeton, N. J.
Craw and Ferguson, Architects, Boston, Mass.

Continued on next page

Roof, Vases, Moulding and Facia, Operator's Tower House, Adams Steel Bridge, Chicago, Ill.
CITY OF CHICAGO ENGINEERS, Chicago, Ill.



Statuary and Spire, Quigley Memorial Seminary, Chicago, Ill.
J. W. MCCARTHY, Architect, Chicago, Ill.
GUSTAVE E. STEINBACK, Associate Architect, New York, N. Y.



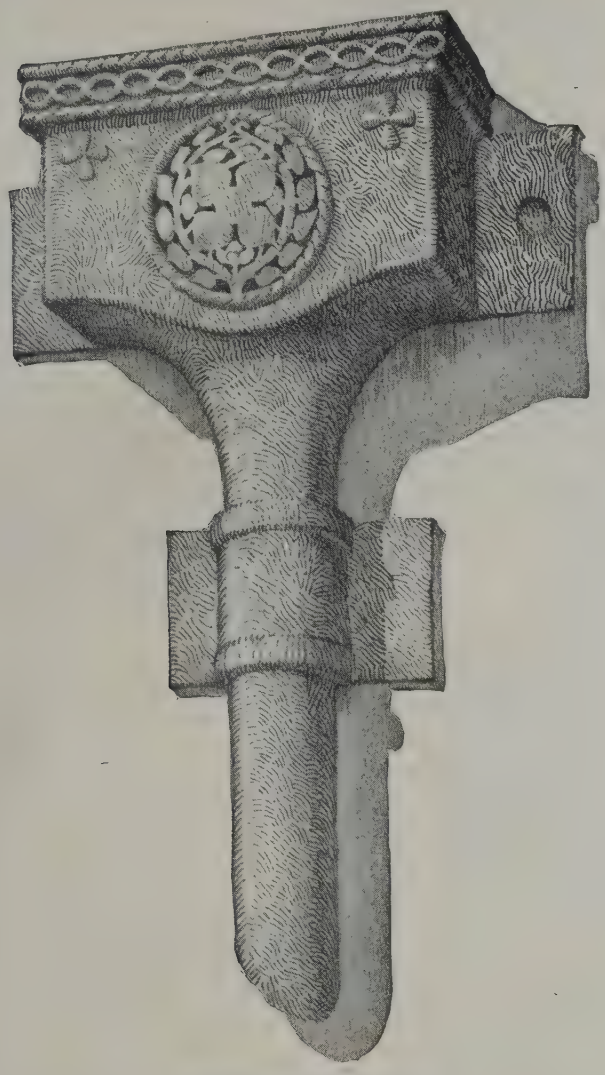
Hoyt Hardlead Mansard Roof, Dormer Roofs, Finials and Crestings, Prudential Life Insurance Co. Building, Newark, N. J.
CASS GILBERT, New York, N. Y., Architect

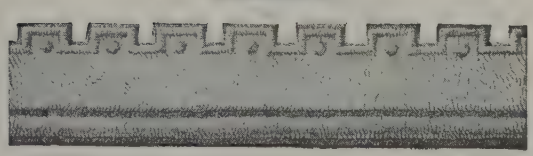
Hoyt Hardlead Rain Water Pipe Heads, Pipe, Bands, Swan Necks, Gutters and Ferrule Plates, Residence of E. W. Marland, Ponca City, Okla.
JOHN DUNCAN FORSYTH, Ponca City, Okla., Architect

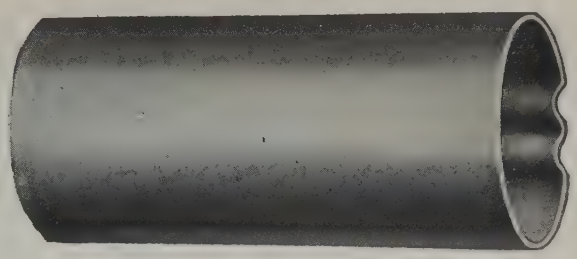
Continued on next page

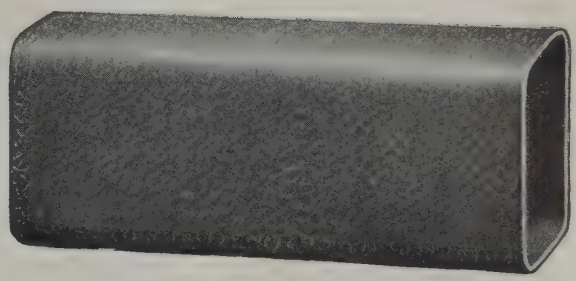
Cast Rain Water Pipe Heads, Rain Water Pipes, Gutters, etc.

A number of designs are carried in stock and we are prepared to execute special designs in accordance with architects' drawings.



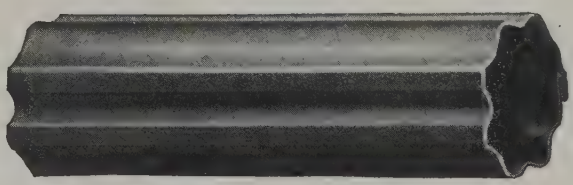






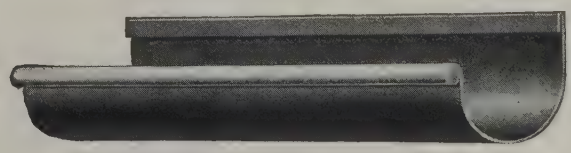
Seamless Rain Water Pipe

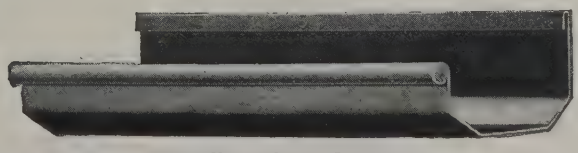
Made from Hoyt Hardlead in the following sizes: 2x3 in., 2½x3½ in., 3x4 in., 3½x5 in., 4½x4½ in., 3 in. round, and 4 in. round. It can be furnished smooth or finished with a hammered or rough cast surface as desired



Rolled Sheet Rain Water Pipe

Made from Hoyt Hardlead rolled sheet in the following sizes: 2x2 in., 3½x3½ in., 2½x3¼ in., 2½x4¼ in., 3 in. and 4 in. octagon and 3 in. and 4 in. round and corrugated





Rolled Sheet Gutter

Made from Hoyt Hardlead rolled sheet with reinforced beaded edge in the following sizes: 3 in., 4 in., 5 in. and 6 in., half round and octagon

REYNOLDS METALS COMPANY

INCORPORATED

Manufacturers of "Tom-cat" Roofing Zinc

GENERAL OFFICES AND FACTORY
LOUISVILLE, KY.

SALES OFFICES

BOSTON, MASS. NEW YORK, N. Y. PHILADELPHIA, PA. BALTIMORE, MD. PITTSBURGH, PA.
DETROIT, MICH. CINCINNATI, OHIO CHICAGO, ILL. MILWAUKEE, WIS. MINNEAPOLIS, MINN.
LOS ANGELES, CALIF. SAN FRANCISCO, CALIF. SEATTLE, WASH.

Product

ROLLS of ROOFING ZINC MATERIAL to be used as a Cap Sheet over asphalt, felt built-up roofs.

Also Zinc-Felt Flashing Material.

Description

This zinc sheet is an inexpensive sheet of metal thick enough to stand walking on, even with hobnails. The zinc is embossed to allow for expansion and contraction and this also makes a rough surface to which asphalt will adhere. The zinc-felt flashing strip is a heavier grade of zinc mounted on 15-lb. roofing felt—weight approximately 38 lb. per 100 sq. ft.

Advantages of the Zinc Protected or Zinc-Felt Built-up Roofs

To make a long story short, our zinc-felt built-up roof is a common asphalt, felt built-up roof covered with a sheet of zinc rolled into the top asphalt as a cap sheet. This, by reflecting the sun's rays, prevents the evaporation of the oils in the asphalts beneath it. With these asphalts thus protected, it is possible to reduce the number of layers of asphalt and felt usually applied and at the same time secure a cheap and everlasting roof. Both zinc and asphalt felts are known roofing materials.

The zinc in itself is waterproof and will not rust. The zinc cap sheet holds the oils in the asphalt and asphalt saturated felts and so increases their waterproofing value indefinitely.

The zinc adds fire protection.

It also adds durability at the flashing where durability is needed.

Sizes

The zinc is shipped in rolls 20½ in. wide and 200 ft. long. One roll will cover 300 sq. ft. of roof surface including 2-in. horizontal laps and 6-in. vertical laps. The zinc-felt flashing material comes in rolls 10 in. wide and 105 ft. long.

Architect's Condensed Specifications

To be included in carpenter's or mason's specifications.

The wood sheathing should be dry, smooth, and free from projections of any kind. All roofs should be graded to drain to gutters and gutters to down-spouts.

Concrete or gypsum decks should be firm, smooth, dry, and free from loose material. The roof deck shall be properly graded to outlets.

Materials—*Felts* to be standard grade asphalt felt weighing 15 lb. to the 100 sq. ft., approved by architect.

Zinc to be REYNOLDS METALS COMPANY rolled and embossed roofing zinc.

Asphalt Cement to be standard grade roofing asphalt as approved by architect.

Counterflashing to be REYNOLDS METALS COMPANY zinc-felt.

Method of Application—(1a) Cover the entire roof with 2 or 3-ply asphalt felt as specified by the architect. Over a wood deck, the first ply of felt should be nailed to the wood deck with 1¼-in. roofing nails over large tin washers. Nails to be staggered not more than 1 ft. apart. If two-ply of felt is used 32 in. wide, same should be lapped 17 in. on the preceding one. If three-ply of felt is used same should be lapped 22 in. on the preceding roll. Mop between all layers of felt with approved asphalt cement approximately 30 lb. to the 100 sq. ft. so that in no case does felt touch felt.

(1b) Over a cement or gypsum deck, the deck should first receive a mopping of approved asphalt primer and the felt be mopped to the deck with hot asphalt instead of being nailed as required in (1a), then proceed as described in (1a).

(2) Begin at the outer and lower edge of the roof, mopping the felt with asphalt cement 30 lb. to the 100 sq. ft. Immediately behind the asphalt mopping roll in the sheets of zinc lapping each sheet 2 in. on the preceding zinc sheet and mopping with asphalt between each lap. At vertical joints, lap zinc on zinc 6 in. Roll the entire roof with a heavy roller behind the laying of the zinc. The zinc shall be applied in lengths not exceeding 22 ft.

(3) All felts and the zinc should be extended up all vertical walls or other vertical surfaces at least 6 in. as a flashing. In addition to this flashing, all vertical walls should be counterflashed as follows:

Lay a strip of REYNOLDS METALS COMPANY zinc-felt 10 in. wide, up the vertical walls 6 in. and lapping down on the roof 4 in. Turn the metal covered side back into the vertical wall 1 in. and wedge and cement into wall. Mop under same with hot asphalt.

Note: Write for complete specifications.

Continued on next page

Left:

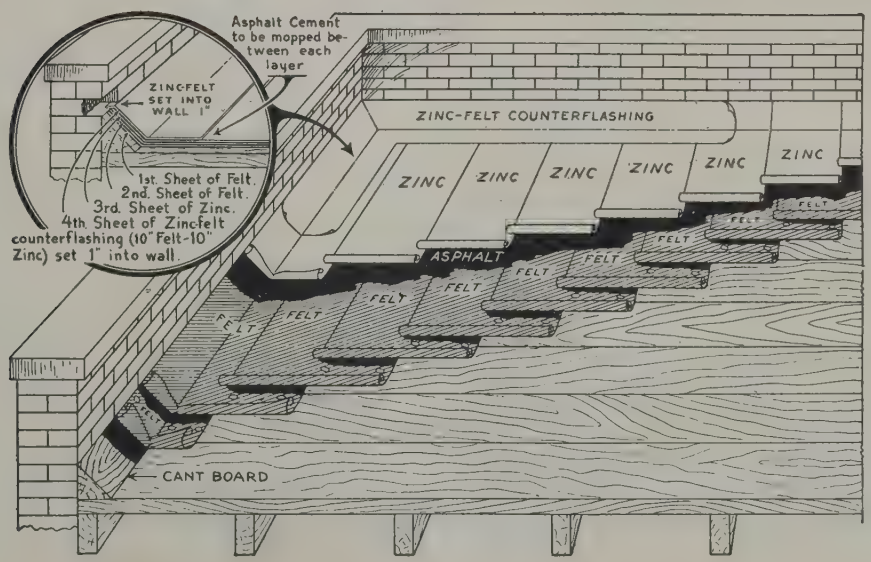
Tomcat Roofing Zinc Being Applied on Industrial Building Roof in Louisville, Ky.

Note the simplicity of the operation and the metal weatherproof surface which insures a long-lived, satisfactory roof

Right:

Store Building Roof in Downtown Section of Louisville After Surfacing with Tomcat Roofing Zinc

Note the complete metal coverage which prevents evaporation and drying out of asphalt-saturated felt underlay



WHEELING METAL & MFG. CO.

Manufacturers of Roofing Material and Accessories

OFFICE AND PLANT

WHEELING, W. VA.

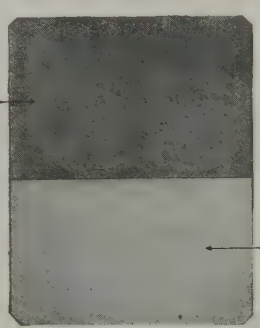
Products

LEADCLAD SHEETS (flat, corrugated and V-crimp), LEADCLAD ROLL ROOFING and STANDING SEAM, LEADCLAD SHINGLES, LEADCLAD SPANISH TILE, LEADCLAD SIDING, METAL CEILINGS, LEADCLAD RIDGE ROLL (plain and corrugated), LEADCLAD CONDUCTOR PIPE and FITTINGS, LEADCLAD EAVES TROUGH and GUTTER, complete line of LEADCLAD ROOFING ACCESSORIES.

Also Apex Heavy Galvanized Roofing Materials.

Leadclad Rust Resistance

Leadclad products are made from copper bearing steel, coated, as the name indicates, with a heavy, tough jacket of everlasting lead. Architects know the lasting properties of lead—its resistance to rust, as shown in famous buildings the world over, such as the Pantheon and St. Peter's at Rome, Windsor Castle and St. Paul's in London, the Paris Opera and many others. The coating of Leadclad is several times heavier than ordinary galvanized. Its great resistance to rust is due to this extra heavy coating of lead.



Leadclad Shingles

Leadclad decorative shingles make a lasting roof for smaller commercial buildings, store fronts or residences. A number of pleasing designs are available—three of these are shown on the opposite page.

Leadclad Spanish Tile

The charm and color of old Spanish Tile is retained in Leadclad Tile with the additional advantages of light weight, economy and permanence. Leadclad Spanish Tile is finding a wide use for the roofs of gasoline stations, store fronts, smaller commercial buildings and any Spanish type of small home construction. Complete accessories make the erection of a Leadclad Spanish Tile roof easy and economical.

Leadclad Cornices and Skylights

Leadclad Sheets are made in convenient sizes for all types of standard skylights, ventilators and cornices. Sizes available on request. The ductility and easy working qualities as well as its permanence make Leadclad desirable for these important uses.

Leadclad Sheets

Leadclad Sheets are made in flat corrugated and crimp styles. Flat sheets are made in standard sizes up to 36 in. wide and 144 in. long in all gauges 18 to 30, inclusive. Corrugated sheets (made with 1¼, 2½ or 3 in. corrugations) are made in gauges 18 to 29, inclusive. Leadclad 2, 3 and 5 V-crimp roofing comes in gauges 24 to 29, inclusive.

Leadclad Roll Roofing and Standing Seam

Leadclad Standing Seam is made 26, 28 and 29 gauges, in 122x26½-in. sheets—5 sheets to a roll (50 lin. ft. The standing seam provides for necessary expansion and contraction making the use of long sheets practical. Roll roofing is made from 14x20-in. or 20x28-in. plates, and cross seams are single locked unless double locked is specified. Particularly recommended for flat seam work.

Leadclad Gutters, Valleys and Conductor Pipe

The Leadclad line of roofing materials is complete in every respect. Conductor pipe is made in plain round, round corrugated and square corrugated styles together with all standard types of fitting. Leadclad gutters, valleys and eaves trough are furnished in all popular styles and standard sizes. On all Leadclad roofs it is recommended that Leadclad nails and washers be used to insure a permanent job.

Standard Specification for Sheet Metal Work

Labor and material for all sheet metal work shall be furnished in accordance with drawings and specifications. All sheets and roofing accessories, including conductor pipe, elbows, gutters, nails and washers, shall be Leadclad as manufactured by the WHEELING METAL & MFG. Co., Wheeling, W. Va., of.....gauge. (See chart below.)

RECOMMENDED GAUGES FOR DIFFERENT CLASSES OF WORK

Use	Recommend Gauge Leadclad			
	For offices, apartments, large commercial buildings	Industrial plants	Residences	
Roofing	24 to 26	18 to 24	26 to 29	Or Leadclad shingles or Leadclad Spanish tile
Skylights	20 to 26		24 to 30	
Flashing	20 to 26	Same or lighter than roof	26 to 29	
Valleys	24 to 26	Same as roof	24 to 28	
Ridge roll	24 to 26	May be same or lighter than roofing	24 to 29	
Cornices	22 to 28		24 to 30	
Siding		18 to 29		
Ventilators	18 to 24	18 to 24	24 to 26	

Leadclad General Catalogue

The Leadclad General Catalogue contains a wealth of information concerning the lasting properties of Leadclad Roofing and Accessories. A copy is available to all architects upon request.

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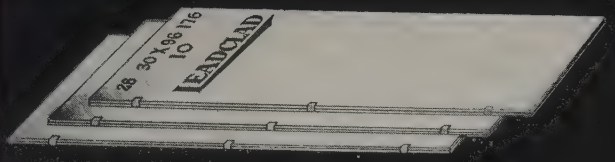
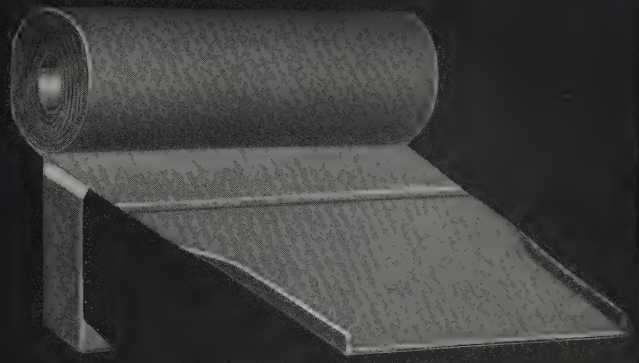
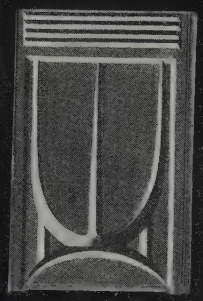


FLAT SHEETS

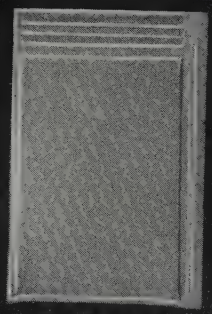


STANDING SEAM ROOFING

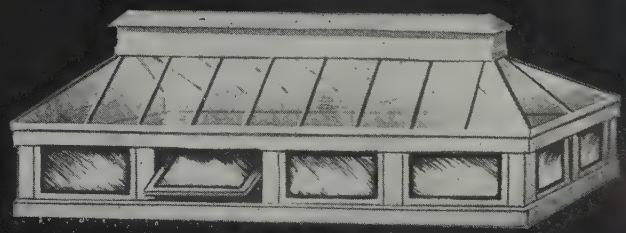
EUREKA SHINGLE



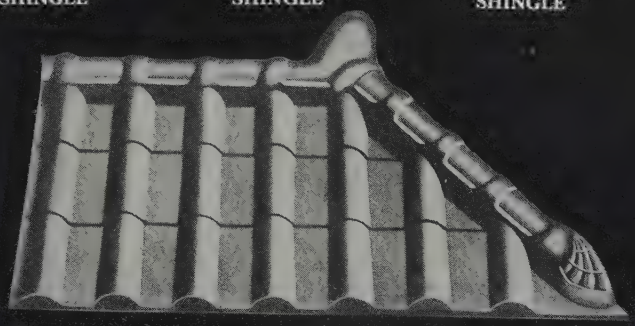
MONARCH SHINGLE



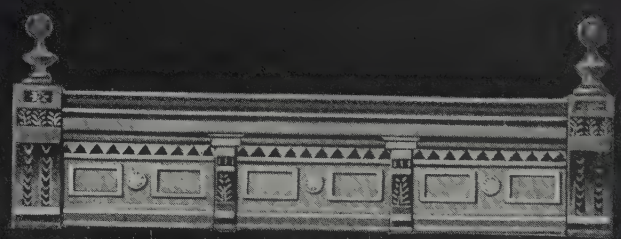
PLAINFIELD SHINGLE



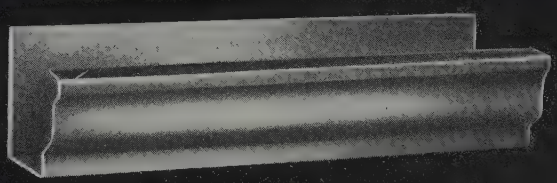
SKYLIGHTS



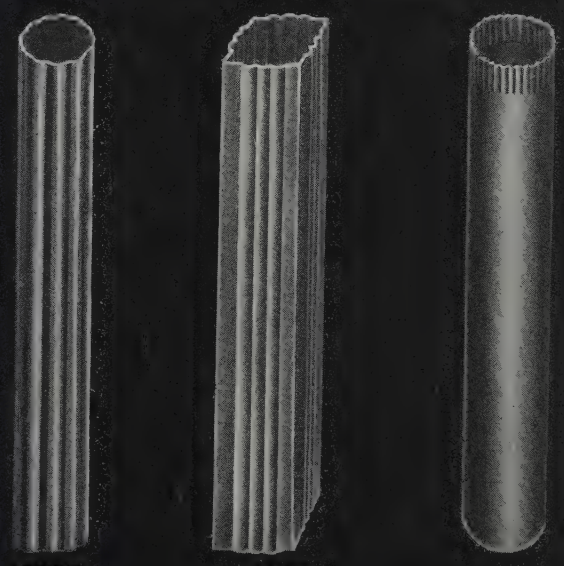
SPANISH TILE



CORNICES



BOX GUTTERS



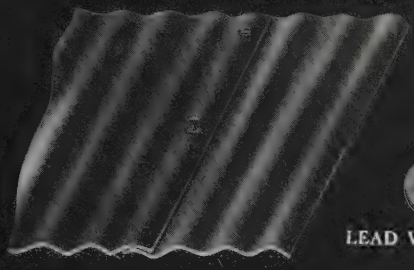
ROUND CORRUGATED

SQUARE CORRUGATED

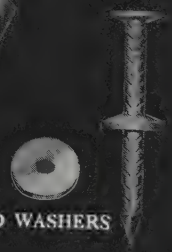
PLAIN ROUND

CONDUCTOR PIPE

CORRUGATED RIDGE ROLL



CORRUGATED ROOFING



LEAD WASHERS

NAILS

THE EDWARDS MANUFACTURING CO.

INCORPORATED 1901

Metal Spanish Tile

CINCINNATI, OHIO

BRANCH OFFICES AND WAREHOUSES

DALLAS, TEX., Corner of Market and Collin Streets

NEW YORK, N. Y., 81-83 Fulton Street

Products

METAL SPANISH TILE.

Also, Edwards Metal Ceilings and Walls, Metal Shingles, "Trustile," "Reo" Cluster Shingles, Metal Culverts, Metal Garages, Portable Steel Buildings, Metal Wall Coverings, Metal Lath, Corrugated Iron Roofing and Siding, Steel Imitation Brick and Stone Siding, Galvanized Iron Cornice, Eaves Trough, Conductor Pipe and "Keyridge" Reinforcement and Lath.

Architects Specifications for Spanish Tile

All pitched roof surfaces shall be covered with Edwards Metal Spanish Tile, manufactured by THE EDWARDS MANUFACTURING CO., Cincinnati, Ohio, to be made from .....

[Insert here, Tin Painted, Tight-cote Galvanized, No. 9 or No. 11 gauge Zinc, 9-oz., 12-oz. or 14-oz. Copper. If painted, specify whether red or green.]

Roof surfaces to be covered with felt or building paper. Tile to be applied straight and true, so all horizontal lines are parallel with the eaves and all vertical lines are at right angles to the eaves. Fixtures shall be .....

[Insert here Regular, Bungalow or Chinese.]

Directions for Applying Edwards Metal Spanish Tile Roofing

Felt—

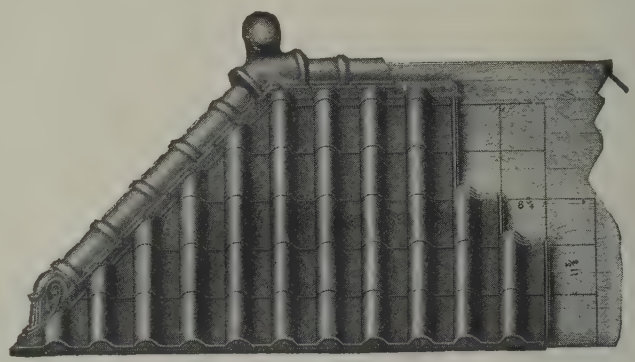
Put on a felt or paper covering on the solid board sheathing. This need not be expensive felt. Ordinary building paper answers the purpose very well. This is done in order to keep out drafts which might draw moisture through, and also to act as a deadening agent.

Line Roof—

Take a chalk line and line roof horizontally, parallel with the eaves at 11⅝-in. distances, with the exception of the first row for eave tile where the distance depends on the pitch of the roof. To determine this, lay an eave tile No. 369 on the roof with the closed end pushed up against the eave, and measure the actual distance. Then line roof vertically, at right angles with the eaves, distances of 8¾ in.

Eave and Field Tile—

Lay the eave tile course first. Commence at the left. The nailing flange is covered up by locking the next tile in place. See that the chalk lines are followed.



Method of Applying Tile and Fixtures

Then lay the field tile in the same manner, working from left to right, following the chalk lines. In lapping the course below, see that the bottom of the upper course is up against the lower storm ribs of the lower course.

Hip and Ridge—

Put 2x4-in. or 2x6-in. strips on edge on all hips and ridges. When working against a hip or ridge, cut the tile to butt against the strips. When tile is applied, nail hip and ridge flashings against the side of strips, keeping them straight and at the same height. Then place the hip and ridge finish by resting it on the outer edges of hip and ridge flashings, and fasten by turning the cleats over the lower flange of the finish.

Finials and Hip Starters—

These are put on in the same manner as the hip and ridge finish and held in place by cleats.

Valley—

The long valley sheets, No. 381, are nailed down before applying tile. In finishing a course at a valley, use a left valley tile and in starting a course at a valley, use a right valley tile. Cut the flat surface of the valley tile, so that the edge will run parallel with the lock or fold in the valley, and will overlap it about ½ in.; then bend, or fold the valley tile into the lock in the valley. Be careful that the closed ends are kept in a straight line. Note different lengths of valley tile. This is to avoid waste. Use long or short tile as distance varies going up the valley.

Various Flashings and Fixtures

We manufacture many fixtures to take care of different and special conditions. They are easy to apply and blend perfectly into the balance of the roof, so that the complete roof is a compact unit.

GLASIRON ROOFING TILE

MANUFACTURED BY

GLASIRON PRODUCTS COMPANY

DETROIT TELEPHONE
LAFAYETTE 6278

Scotten Avenue at Michigan
DETROIT, MICH.

Glasiron Roofing Tile

Three nationally known trademarks represent the materials composing Glasiron Roofing Tile. The base, armco ingot iron, and the two coats of pemco glass fused together at 1600° F., produce a roofing tile extremely durable and of *permanent beauty*. Its exceptional merits are readily recognized. You may rightly consider Glasiron as a gold bond investment which will not depreciate in value. During the entire life of a building it will remain in perfect condition without one cent of maintenance and its color and beauty are permanent.

Each tile has a slightly rounded crown 1⅝ in. high in the center, covering space 10.4 in. wide and 9.8 in. high—the main ridge covering 8 in. of roof surface. The roof completed shows heavy shadow lines giving it striking individuality and distinctiveness which can be accentuated by blending the endless number of single colors which are available. Unlimited color choice of single colors or blends of two colors in each tile may be secured in three different surface textures, Glazed, Dull and Sand.

Glasiron ROOFING TILE

ARMCO Ingot Iron

PEMCO

Advantages of Glasiron Tile

(1) Unusual durability.
(2) No yearly maintenance.
(3) Non-fading colors.
(4) Unlimited color choice.
(5) Easy and quick application.
(6) Adaptable any construction.
(7) One-sixth weight of clay tile.
(8) Low understructure cost.
(9) Cool summer—warm winter.
(10) Waterproof and noiseless.
(11) Architectural beauty.
(12) Adaptable over old roofing.
(13) Fireproof—lower insurance.

Notice to Architects

When Glasiron Roofing Tile is specified, actual roof dimensions of all roof surfaces to be covered with tile, should be shown on blue prints as fully as possible. After receipt of architect's blue prints, manufacturer will draw up a roof sketch showing all cuts and roof dimensions. Upon receipt of this sketch, architect is to make any necessary corrections, O.K. the sketch in space provided for same, and return to manufacturer. Four copies will then be forwarded to architect, one copy to be given to general contractor, carpenter contractor and roofing contractor. Manufacturer will then make all cuts according to dimensions shown on roof sketch. Cuts made by manufacturer in this manner before coating is applied, preclude any possibility of yearly roof maintenance.

Sun Oil Service Station, Philadelphia

Architects' Specifications

Roofing and Sheet Metal Work—*Instructions*—Manufacturer will make all cuts for valleys, hips and flashings, dormers and all other irregular sections of roof according to manufacturer's "Roof Sketch." All major cutting shall be done by manufacturer on the raw tile before coating is applied.

All roof surfaces must be constructed strictly according to the dimensions shown on "Roof Sketch" and roofing contractor shall report to general contractor any variation in roof surfaces from these dimensions. Roof corrections must then be made before tile is applied.

Application—All roofing is to be laid strictly in accordance with the GLASIRON PRODUCTS COMPANY'S latest Method of Laying Instructions. Architects' instructions herein contained, supersede those of manufacturer.

Roofing—The main, porch, dormer and all other roof surfaces so indicated on the drawings shall be covered with Glasiron Roofing Tile of ..... color ..... finish as manufactured by the GLASIRON PRODUCTS COMPANY, Scotten Avenue, at Michigan, Detroit.

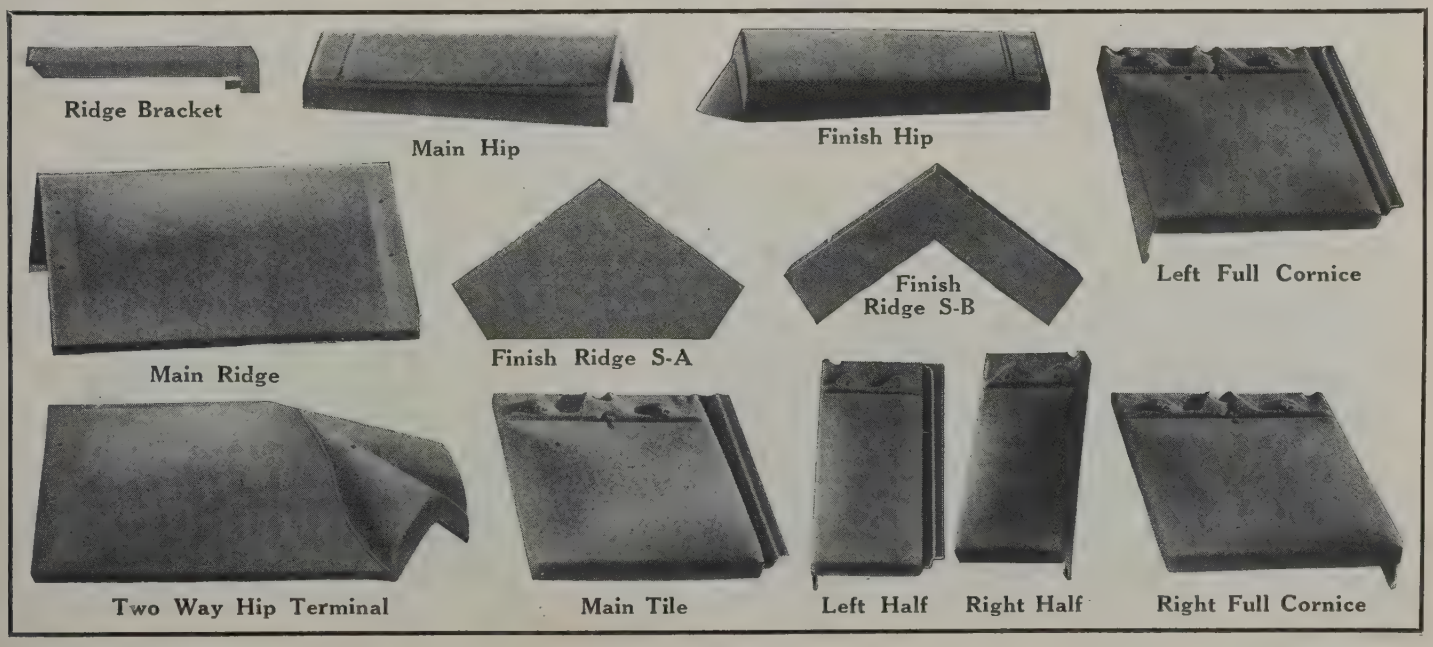
Roofing Felt—All roof surfaces shall be covered with 30-lb. asphalt felt (one thickness, each horizontal layer to be lapped toward the eaves) or in accordance with manufacturers' method of laying specifications (double thickness).

Nails—Deniston "led-hed" copper nails 1¾ in. or longer, two nails to each tile are to be used in fastening. 3-in. or longer copper nails with lead washers are to be used in fastening each ridge bracket and hip according to manufacturer's instructions.

Flashings—(Galvanized armco ingot iron, 24 gauge) or (.. oz. Copper) is to be used for making a 5-in. drip at eaves in accordange with manufacturer's specifications. Same material is to be used for making a base and cap flashing course against all parapet and party walls, roof posts, porch roofs where they connect with the walls, chimneys, saddles, etc. Roofing felt shall be laid 5 in. or more up the side underneath flashing.

Roof Boarding—(Or sheathing) shall be ⅞ in. thick and not more than 8 in. wide, tongued and grooved, surfaced one side and free from waves, shakes, loose or large knots.

Cutting—If it is necessary for roofer to cut any tiles to secure proper fitting, all cut edges or openings shall be thoroughly filled and covered with a high grade roofing cement and painted to conform closely with the color of tile used.



ESTABLISHED 1856

JACOB RINGLE & SON, INC.

Contractors for General Roofing and Sheet Metal Work
Manufacturers and Installers of Our Special Jumbo Copper Tile Roofing

466-472 Grand Street, JERSEY CITY, N. J.

JUMBO COPPER SPANISH TILE

In quick changing temperatures nothing stands, as a permanent roof covering, quite so well as copper—especially copper tile—where they are securely fastened to the decking, and ample provisions made for expansion and contraction.

Jumbo Copper Tile are made of special annealed soft copper, equal in weight to 16-oz. copper.

They are classified as Standard Copper Tile, Lead Coated Copper Tile, and Dwarf and Oversize Copper Tile.

Standard Copper Tile

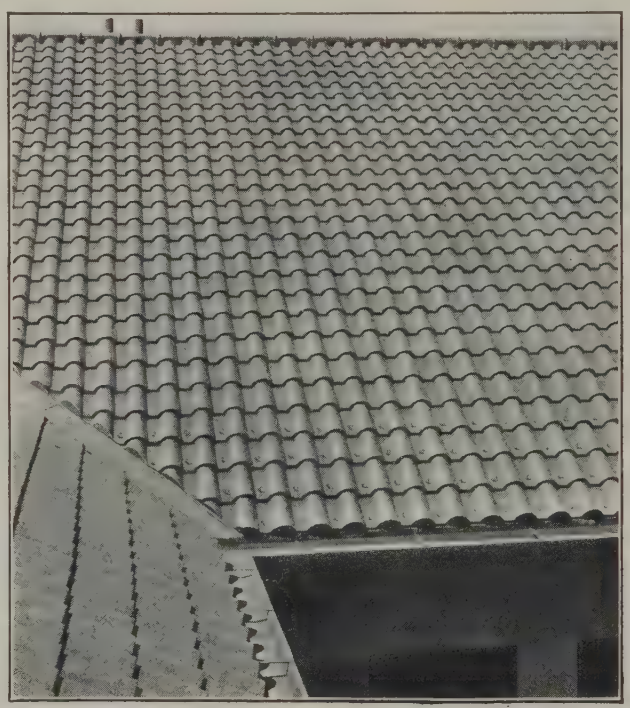
Standard Copper Tile are plain, 16x12 in. with heavy butts, interlocking at sides, top and bottom. Formed with rolled tapered section. Each tile is independent of the other with ample provision for expansion and contraction.

Lead Coated Copper Tile

Lead Coated Copper Tile are made exactly the same as the Standard Tile in form and size but in addition are treated with a heavy rough coating of lead on exposed side only.

With the use of Lead Coated Copper Tile the massive, heavy lead effect is secured without the necessity of providing additional framing which would be required to support a genuine lead tile roof.

The lead coating has no detriment effect on the copper nor does it add to its life.



Standard Jumbo Copper Spanish Tile Roof, Municipal Building, Brooklyn, N. Y.
McKenzie, Voorhees & Walker, Architects
45,000 sq. ft.—installed in 1926

Dwarf and Oversize Copper Tile

Dwarf and Oversize Copper Tile are used to create our "Anteekcraft Tile" roof.

A complete roof is laid of our Standard Copper Tile after which Dwarf and Oversize tiles of various shapes and sizes are applied at random over the Standard Tile and soldered securely in place. There is no limit to the artistic effects that may be obtained.

Comparative Weight, Cost and Maintenance

Jumbo Copper Tile weighs 200 lb. per square and standard clay tile approximately 1500 lb. per square.

Jumbo Copper Tile is no more expensive than standard clay tile in that it does not require extra heavy or special framing to support its weight.

Jumbo Copper Tile does not break, loosen and fall, and its maintenance cost is small.

Coloring of Copper Tile—Not Coated with Lead

(1) Nature is the best artist in the coloring of copper where the permanent Verde Antique finish is desired.

After the copper has been installed the entire surface should be cleaned and given a coating of pure linseed oil, weather and time will accomplish the rest.

Locations usually determine the length of time needed by nature to produce the desired effect.

After cleaning and coating the tile with linseed oil,

Mayfair Apartments, Park Avenue and 57th Street, New York, N. Y.
Charles A. Rich, Architect
15,000 sq. ft.—installed in 1905

Continued on next page.

a dull bronze effect is obtained for a short period of time, they then gradually darken and begin to take on the finish that will eventually be the pleasing light green or Verde Antique. This finish is permanent when created by nature and does not have to be renewed. Neither does it craze nor crack, affecting the body of the tile underneath.

(2) Artificial finishes are not permanent, and usually wash off during the first heavy rain, or a quick change in temperature.

Construction of the Various Jumbo Copper Tile Units

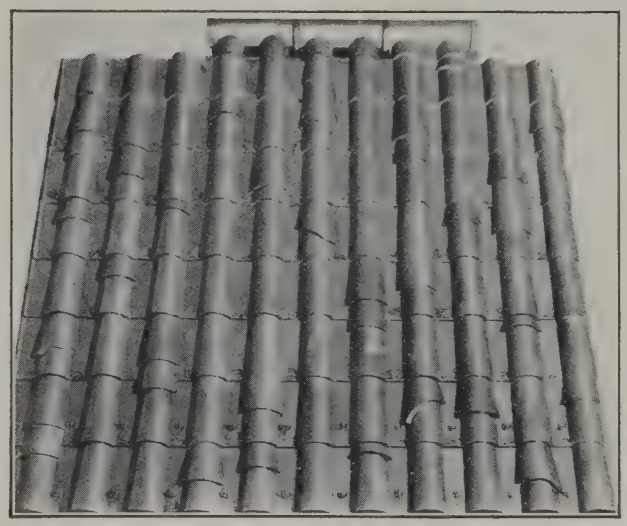
Ridge Units—Are made in split sections consisting of two pieces with rolled sides, extension apron for covering the top field tiles, round side laps, and an excess allowance at the top for standing seam or lock joint.

Standard size of the completed ridge unit in place—20½ in. long, 6 in. high and an average width over all of approximately 20 in.

Hip Units—Are made complete and ready to apply, formed with tapered roll, lap at bottom with 1 in. butt, shoulder at top and flanged at sides for soldering to the field tile. They are large and give a heavy massive effect.

Standard sizes of the completed hip unit in place—17 in. long, 9¼ in. wide, with a center height at butt of 7½ in.

Field Units—Are made complete and ready to apply, formed with a combination of flat valley surface and tapered roll, lap at bottom with 1 in. butt, shoulder at top and turned over flanges at sides for lock seams or joints.



"Anteekcraft" Jumbo Copper Spanish Roof Tile
Light, strong and durable

Standard size of a field unit in place—14½ in. long, 10¾ in. wide, with a center height at butt of 3½ in.

Eave, Sunken Gutter and Valley Construction

The open butts of all field and hip tiles at eaves and top edge of sunken gutters are closed with copper closures soldered in place at the job.

Valley tiles are cut on the job and the open butts are closed with copper closures soldered in place. Standard valley linings are easily applied.

Gutters

All types of gutters such as hanging, moulded, sunken, cornice and parapet wall linings can be easily applied to Jumbo Copper Tile roofing.

Finials and Terminals

Special finials and terminals will be executed in strict accordance with architects designs and arranged to fit our Jumbo Copper Tile roofing.

Snow Guards

Copper wire snow guards placed in valley between rolls of all field tile at the two or three bottom rows at all eaves, form a natural and permanent barrier against sliding snow or slush.

Cast brass stanchions with flange for pipe guards can be easily installed, replacing a whole, or part of a copper tile.

Suggested Specification for Jumbo Copper Spanish Tile Roof

(1) The Contractor shall provide and install over all sloping roof surfaces Jumbo (Lead Coated) Copper Tile as manufactured by Jacob Ringle & Son, 466-472 Grand Street, Jersey City, N. J., in strict accordance with the following specification:

(2) **General**—The Contractor shall examine all surfaces to be covered with (lead coated) copper tile and shall see that all crickets are properly constructed, all surfaces properly graded and in proper condition to receive the copper tile.

(3) **Felt Base**—The Contractor shall provide and lay, over the entire roof surfaces, a single layer of 40-lb. asphaltum felt, extending over all ridges, hips, valleys and under all flashings, etc., securely nailed with tin disc washers and large headed roofing nails in an approved manner.

(4) **Copper Work**—All field tiles, hips, ridges, finials, valleys, flashings, etc., shall be 16 oz. special annealed soft copper (lead coated).

The field tile, hips, ridges and finials shall be formed to secure the true Spanish effect.

(5) ***Field Tile***—Each field tile shall be approximately 16x12 in. overall formed with rolled tapered section, 3½ in. wide valley, 15 in. exposure to the weather, 3½ in. high at center of butt, 1 in. butt with top, bottom and side locks. Each tile to hold down four adjoining tiles.

Each tile shall be securely nailed to nailing base with large head copper nails, two at the top of each tile, and fastened at the side with a copper cleat securely locked and nailed to the base.

(6) ***Hip Tile***—Each hip tile shall be approximately 20½x12 in. overall, formed with rolled tapered section, 17 in. exposure to the weather, 7½ in. high at center of butt, 1 in. butt, shoulder at top and flanged at sides for soldering to the field tile.

(7) ***Ridge Tile***—Each completed ridge tile shall be made in two sections, each section shall be approximately 22½x14 in. overall, formed with rolled section having an interlocking bead at the ends of roll, an apron with two rolled sections to lap and fit over two field tile.

The two sections shall be fastened together at top edge of ridge roll with a standing seam (or lock joint) thoroughly soldered.

(8) ***Finials and Terminals***—All finials and terminals shall be made in strict accordance with the detail drawing and shall be neatly fitted and soldered to all ridges, hips, etc.

(9) ***Finish at Eaves and Valleys***—All butts of field tile at all eaves and valleys shall be closed with (lead coated) copper closures thoroughly soldered.

Note: If sunken gutters are to be used, the words "sunken gutters" should be included in the heading and paragraph above.

Note: The design of the building and the type of roof will govern the balance of the specification. The following headings will suggest the various paragraphs to be added to the above specification to make it complete for a particular job.

Flashings and Linings for Valleys, Dormers, Chimneys, Pipes, Walls, Parapets, Cornices, Cornice Gutters, etc.

Sunken Gutters, Hanging Gutters, Down Spouts, Leaders, Leader Boxes, etc.

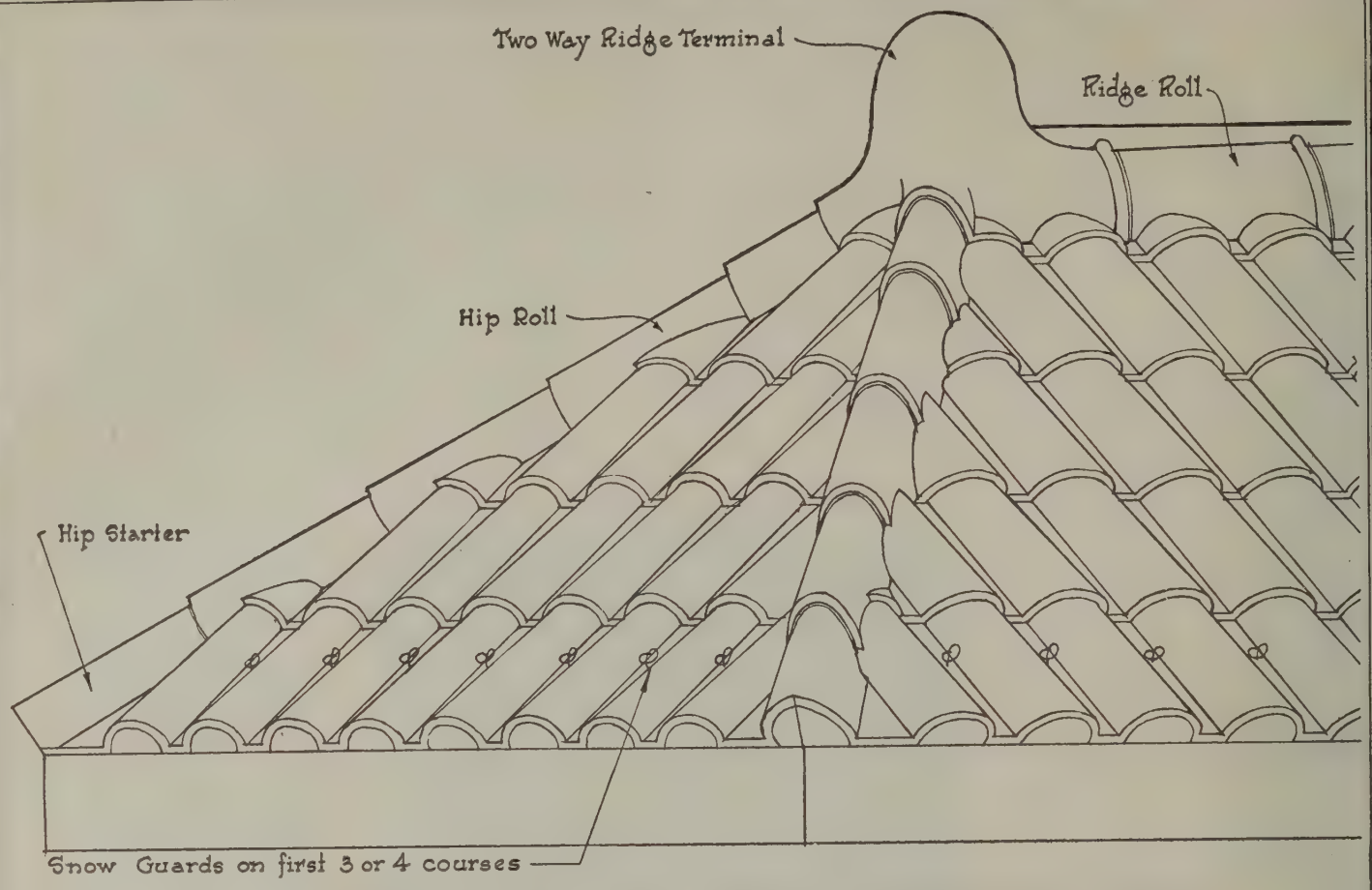
Note: The above specification with the addition of the various suggested clauses required to fit a particular job, makes it a complete specification for our Standard Plain (or Lead Coated) Copper Spanish Tile Roof. If our "Anteekcraft" roof is desired insert the following clause in the specification immediately after paragraph 9.

(10) ***Dwarf and Oversize Copper Tiles***—About 10% of total field tile area shall be covered with dwarf and oversize tiles of odd shapes and sizes scattered throughout the roof area to break up the regular straight line effect. No effort shall be made to place them in regular order.

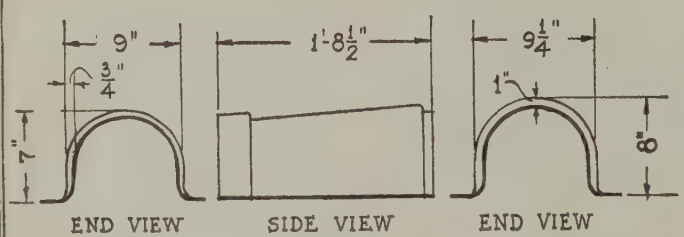
Note: When the roof is of plain copper (not lead coated) the following paragraph shall be inserted at the end of the specification.

Cleaning and Finish—After all the copper has been installed the entire surface of all exposed copper work shall be cleaned and given a thorough coating of pure linseed oil and then allowed to weather naturally. *No artificial coloring or acids shall be employed.*

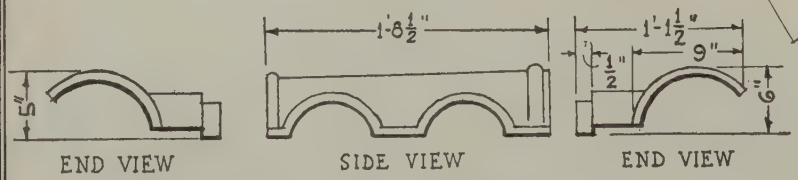
Continued on next page



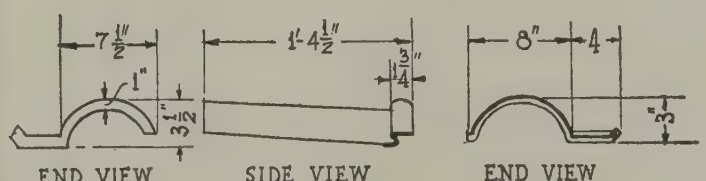
PERSPECTIVE VIEW SHOWING JUMBO COPPER SPANISH TILE ROOFING
Applied on any good nailing surface



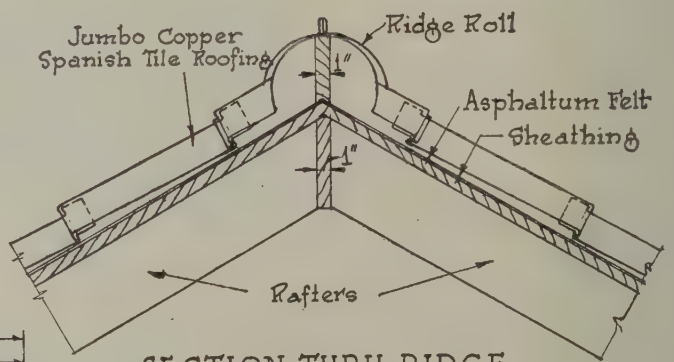
DETAIL OF HIP ROLL



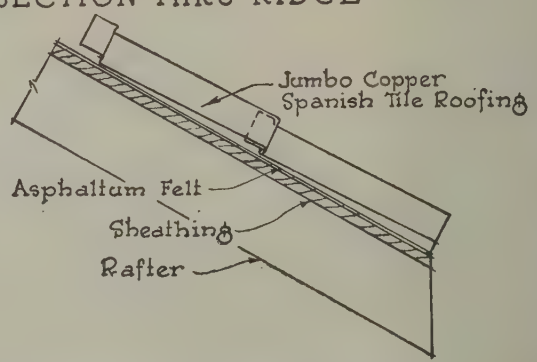
DETAIL OF RIDGE ROLL



DETAIL OF ROOF TILE



SECTION THRU RIDGE



SECTION THRU EAVES

DRAWN BY SWEETS CATALOGUE SERVICE	TYPICAL DETAILS OF JUMBO COPPER SPANISH TILE ROOFING	SCALE 3/4" EQUALS 1'-0" DATE JULY 28	DRWG 1

WHEELING CORRUGATING COMPANY

WHEELING, W. VA.

WAREHOUSES

NEW YORK, N. Y.	CHICAGO, ILL.	ST. LOUIS, MO.	CHATTANOOGA, TENN.	DES MOINES, IOWA
PHILADELPHIA, PA.	MINNEAPOLIS, MINN.	KANSAS CITY, MO.	RICHMOND, VA.	COLUMBUS, OHIO

Products

SPANISH METAL TILE and FITTINGS.
STEEL CEILINGS.
HAND DIPPED ROOFING TERNES.
HAND DIPPED ZINC COATED CONDUCTOR PIPE.
HAND DIPPED ZINC COATED ELBOWS and SHOES.
EXTRA HEAVY COATED EAVESTROUGH and FITTINGS.
For Arch Lath, see page B1706.

TRADE-MARK

Full stocks of Wheeling Spanish Metal Tile and Fixtures are carried in a Wheeling warehouse near you. Equally significant is the fact that Wheeling supplies the materials for a complete Spanish Metal Tile Roof—one specification—one uniform high quality.

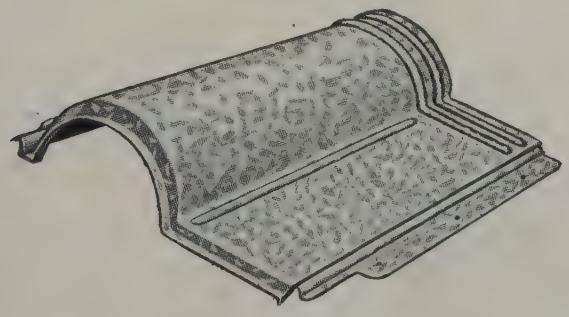
Spanish Metal Tile and Fittings

Due to its rare charm and beauty, the Wheeling Spanish Tile Roof is especially suitable for homes, churches, school buildings, garages and similar structures.

Laying Spanish Metal Tile Roof

Wheeling Spanish Tile and Fixtures are fabricated from COP-R-LOY, the copper alloyed steel. After forming, they are hand dipped in pure molten zinc to thoroughly protect the seams, edges and surfaces.

For a roof of enduring beauty at low cost, specify a Wheeling Spanish Metal Tile Roof. Easy and economical to erect. Rustproof, lightning proof and leakproof. Lowers insurance rates.



Spanish Metal Tile

Wheeling Hand Dipped Zinc Coated Conductor Pipe

Formed from heavy gauge COP-R-LOY, the copper alloyed steel. Hand dipped after forming, in pure molten zinc. The hand dipping process embeds surfaces, edges and seams within a thick, impenetrable, weatherproof, rustproof coating to an extent never before possible in a conductor having the rigid strength of steel.

Wheeling Hand Dipped Elbows

For use with Wheeling Hand Dipped Zinc Coated Conductor Pipe. They are made by the same process and of the same materials.

Specify: "Wheeling Hand Dipped Elbows."

Wheeling Extra Heavy Coated Eavestrough

This is made for use with Wheeling Hand Dipped Conductor to enable the construction of permanently economical roof drainage systems. Manufactured of COP-R-LOY, the copper alloyed steel, with an extra heavy coating of pure zinc.

Specify: "Wheeling Extra Heavy Coated Eavestrough."

Wheeling Steel Ceilings

Wheeling Steel Ceilings continue to be the standard fire-safe ceilings of the country and are manufactured in an extensive range of designs appropriate for every type of room.

They are made with re-pressed beads and die-cut nailholes, which insure perfect alignment and dustproof joints. Wheeling Steel Ceilings are fireproof, sanitary and dustproof. They are carried in stock for prompt shipment at every Wheeling warehouse. For your convenience a large catalogue of designs will be supplied upon request.

Wheeling Hand Dipped Roofing Plates

The base of these roofing plates is COP-R-LOY, the copper alloyed steel and the coating is of pure tin and lead applied by the Wheeling hand dipping process, assuring a heavy and long-wearing protective coating.

Each plate is stamped with the Wheeling trademark, weight of base and coating.

To insure long lasting, fireproof roofing, specify: "Wheeling Terne Plates" which are obtainable with coating weights from 8 to 47 lb. per box.

HAWTHORNE ROOFING TILE

MANUFACTURED BY

HAWTHORNE ROOFING TILE CO.

Builders Building, 228 North La Salle Street

CHICAGO, ILL.

HAWTHORNE PACIFIC TILE CO.
3326 San Fernando Road, Los Angeles, Cal.
HAWTHORNE ROOFING TILE CO. OF MICHIGAN
19030 Woodward Avenue, Detroit, Mich.

HAWTHORNE ROOFING TILE CO. OF NEW YORK
507 Fifth Avenue, New York, N. Y.
CONCRETE ART TILE COMPANY
1375 Andrews Avenue, Lakewood, Ohio

Hawthorne Roofing Tile—A National Product

Hawthorne

HAWTHORNE Roofing Tile has been developed as a result of years of experience and study of the use of concrete as a roofing material. The originators of this company began with the manufacture of concrete slabs by hand-process, which was later discarded and automatic power driven equipment developed to produce a perfect and uniform tile with a permanently imbedded color coat.

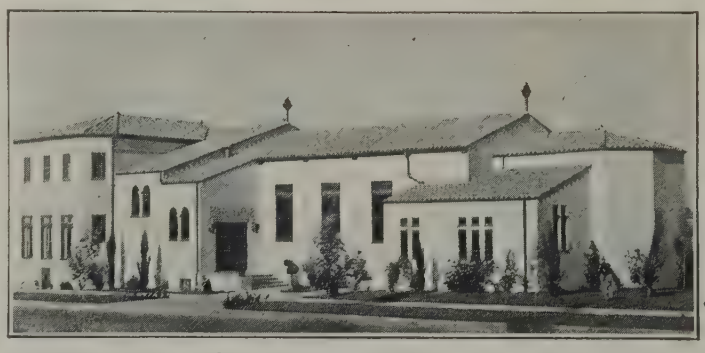
When the HAWTHORNE ROOFING TILE CO. entered the field with this new type of tile, it began to attract the attention of progressive Builders and Architects. Because of the cheapness with which the machines could turn out the slabs it became possible for tile to be used where formerly the price had prohibited it. Today HAWTHORNE Tile is the popular permanent roofing material. There are now ten factories in operation in the United States. This recognition has come only as a result of its following superior qualities:

(1) Permanence—Concrete is known as one of the most lasting of building materials. HAWTHORNE Tile is made from a rich mixture of cement with a fine grade of sand. The curing process, developed after a long period of close observation, prevents the disintegration customary on the surface of ordinary coarse concrete construction. In other words HAWTHORNE Tile is composed of a concrete mixture so cured that it will never wear out. The tile passes all practical strength tests. Once placed on the roof it will not break under normal conditions.

William F. Higginbotham Public School, Detroit, Mich.
N. CHESTER SORENSON & Co., Architects

(2) Economy—The fact that the tile is practically indestructible eliminates the necessity of repeated repairs. Therefore, although the first cost may be somewhat higher than the cheap forms of semi-permanent roofing materials, this first cost is more than saved during the first ten years of the life of the building. Another saving is effected in that the method of laying the tile provides an insulating air space which saves in roof construction and fuel bills.

(3) Utility—HAWTHORNE Tile is absolutely fireproof. Spectacular tests made at our plant have proven that the tile will not burn although the rest of the building may be destroyed. There is absolutely no danger from flying embers.



Messiah Evangelical Lutheran Church, Los Angeles, Cal.
RUDOLPH MEIER, Architect

HAWTHORNE Tile is waterproof. The chemical action which takes place in the rich mixture of concrete when the cement comes in contact with water, renders the tile more waterproof than any competitive type of roofing material. We have on file in our office laboratory tests showing that HAWTHORNE Tile has less absorption than similar types of competitive tile on the market. When the tile is laid according to our specifications, a roof is provided which will keep out driving rain or snow. The fact that our roofing is applied all through the United States proves that it stands up under any sort of climate.

Residence, Kenilworth, Great Neck, L. I., N. Y.
GEORGE BARNES, Architect

(4) Beauty—The growing use of color places a demand on building materials which is not always easy to meet. Beautiful color effects may be produced which are not permanent and attempts to produce a permanent color limit the range to dull effects. After years of intensive experimental work, we have developed a process whereby we impregnate a permanent color surface on our tile. It is now produced in the following fourteen colors:

Dark red	Standard green	Dark Green
Bright red	Pea green	Orange
	Tan	Blue
	Chocolate	Velvet Blue
	Natural gray	Yellow
	Velvet gray	Purple

HAWTHORNE Tile is now made in the following styles:

French, Spanish, English Shingle (Chicago only) and Mission (California only).

It is now possible for the particular architect or builder with an eye to the combined effect of beautiful materials, to select a roof having all the requirements of usage and at the same time becoming a part of a distinctive and pleasing architectural scheme.

Continued on next page

The Method of Laying Hawthorne Roofs

The tiles are laid without the use of nails, and are so designed that they interlock securely in place. They will not become dislodged by wind or vibration. The use of nails in other materials causes cracking at the time of application, and later, due to the shifting of the roof structure.

In those rare cases where an occasional tile may become broken it may easily be replaced by lifting the adjoining tiles and sliding the new one in place.

Edgebrook Country Club, Chicago, Ill.
HALL, LAWRENCE & RATCLIFF, INC., Architects

Hawthorne Tile Used from Coast to Coast

The geographical location of HAWTHORNE Tile plants ensures quick delivery of all orders, large or small, with minimum of transportation expense, to all parts of the country.

Suggested Specification Clauses for Use of Architects Specifying Hawthorne Roofing Tile

All sloping roofs shall be covered with Red (or other color) French [Spanish] HAWTHORNE Roofing Tile of shade approved by the architect and finished with HAWTHORNE special tile at ridges, hips and gables (and eaves in Spanish tile). Specials to be nailed with copper nails. All to be laid in accordance with the Standard Practice of the HAWTHORNE ROOFING TILE CO.

Before laying the tile, roof sheathing is to be covered with an approved slater's asphalted felt weighing not less than 30 lb. per square, securely nailed with flat headed nails, lapped not less than 3 in. at intersections, and doubled at valleys, hips and ridges. All flashings to be installed before tile is laid, and all stucco work, pointing or other finish on dormers and other vertical surfaces that rise above roof to be completed before tile laying is started.

Standard Practice of Hawthorne Roofing Tile Co. for Laying Hawthorne Tile Roofs

Roof framing should be of sufficient strength to support roof tiling. Weight of tile as laid on roof is not more than 8½ lb. per sq. ft. In residence construction 2x6-in. rafters, 20-in. centers are sufficient to support HAWTHORNE Tile on ordinary spans; but, in cases where 2x4-in. rafters are used, it is recommended that collar beams be used to stiffen the roof. It is important that valleys and headers should be of ample size and securely framed together. Rafters should be covered with close sheathing.

As total thickness above roof sheathing to under side of the tile is about 1¼ in., it is necessary to place gable rake boards so they project about 1¼ in. above roof boarding to receive the gable tile, as shown on detail drawings. Total width of this board may be 4, 6 or 8 in., to suit design of roof.

First Baptist Church, Pittsburgh, Pa.

The best method of finishing eaves for French tile is to place a tilting fillet 2 in. high under the first roof board. The lowest tile will then lay right on the roof boarding and set snugly in the gutter. A more common practice is to lay sheathing just as for other roofs; the roofer then sets his lowest furring strip on edge in order to give proper tilt to the tile. This results in the tile showing a little higher above the edge of the gutter. This is not objectionable. In the case of Spanish tile no tilt is required, as eave closer furnished with the tile finishes edge.

Felt—Over the sheathing roofer will lay slater's asphalted felt weighing at least 30 lb. per 100 sq. ft. Felt should be lapped 3 in. or more at intersections and doubled at valleys, hips and ridges, securely nailed down with flat headed nails. Where moulding gutters are used felt should be brought up over back edge of the gutter.

Sheet Metal Work—Before laying any tile, all sheet metal work for flashings, gutters, valleys, etc., should be installed.

Flashings of 16-oz. copper should be used. Roofers often use galvanized iron flashings and valleys, but this is not recommended, as the life of sheet iron flashings is short.

Weeper and Hanger Strips—When all flashings and felt have been laid the weeper strips are placed. They are laid at right angles to the eaves, about 2 ft. apart over the entire roof. Ordinary plasterer's lath are suitable for this purpose. They should be securely nailed to the roof boarding with ⅞-in. shingle nails.

Over weeper strips horizontal 1x2-in. battens or hanger strips are placed. They are placed parallel to the eaves and securely nailed through weepers to the sheathing using 6d wire nails.

Hanger strips must be accurately and evenly spaced in order that lines of the tile may be regular. Before laying strips, roof from eaves to ridge should be measured to determine spacing of hanger strips. Tile are usually laid 12 in. to the weather, but if distance from ridge to eave is not an even number of feet, it will be necessary to slightly increase or decrease spacing of the hanger strips from 12 in. on centers.

It is important that the lines of hanger strips should be absolutely horizontal and that spacing from eave to ridge should be uniform. Roofer usually measures the distance and marks out the lines in chalk before placing these strips.

On all hips and ridges a 1x4-in. strip is set vertically and securely nailed to the sheathing below. Ridge and hip tile are nailed to these, so that their weight does not bear on the roof tile.

In some cases where pitch of roof is very flat or very steep, a 1x4-in. strip is not sufficient to keep ridge and hip tile clear of the tile below or it may bring it too high. In this case, width of strip shall be slightly increased or decreased in order that the hip and ridge tile may set close to the surface of the field tile and yet allow its weight to be carried on the strip.

Tile Laying—Tile are laid in horizontal rows starting at lower left-hand corner; lugs of the tile hook over the hanger strips. Each succeeding tile interlocks with the preceding tile. Upper rows of tile overlap the row immediately below by not less than 2½ in. Gable starters and finishers are used on all gable rakes. If length of roof is not an even multiple of 8 in., the last tile nearest the gable finisher may be cut to fit and gable finisher bedded with cement mortar on to it.

Tile should be neatly and carefully cut to fit hips and valleys. Tile on either side of valleys should be cut so that they show straight parallel lines. Rough and unsightly edges should not be permitted. Edges should be 6 in. apart at all points except in the case of very long slopes (30 ft. or more), in which case width at eaves should be slightly increased and gradually tapered to 6 in. at top.

Hip and ridge tile should be nailed to the 1x4-in. strip and bedded and pointed up with colored cement mortar, using the same color as that used in the manufacture of tile. With Spanish tile, ridge closers and eave closers are used to finish tile at ridges and eaves; pointing at ridges is unnecessary.

Note: The above practice does not apply to the installation of Mission tile as manufactured by the Los Angeles plant. The office of the Los Angeles plant will be pleased to furnish architects with complete details and specifications for laying this tile.

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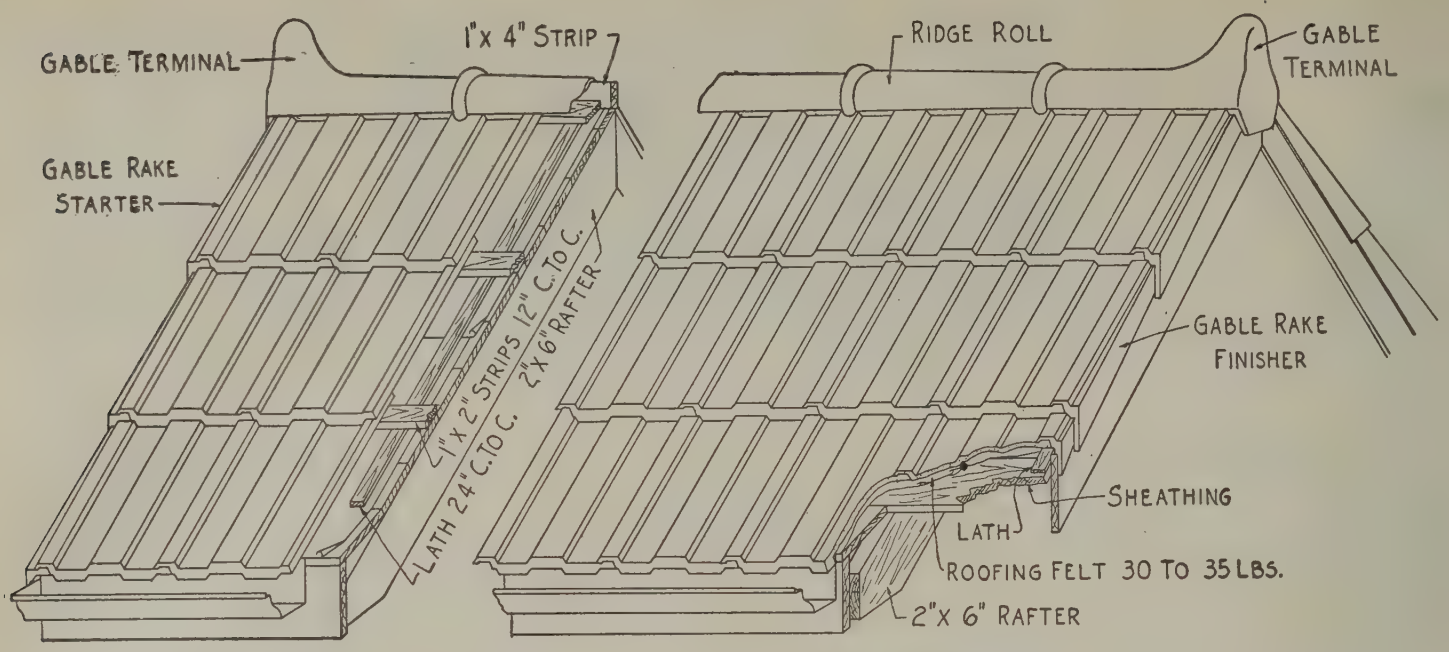
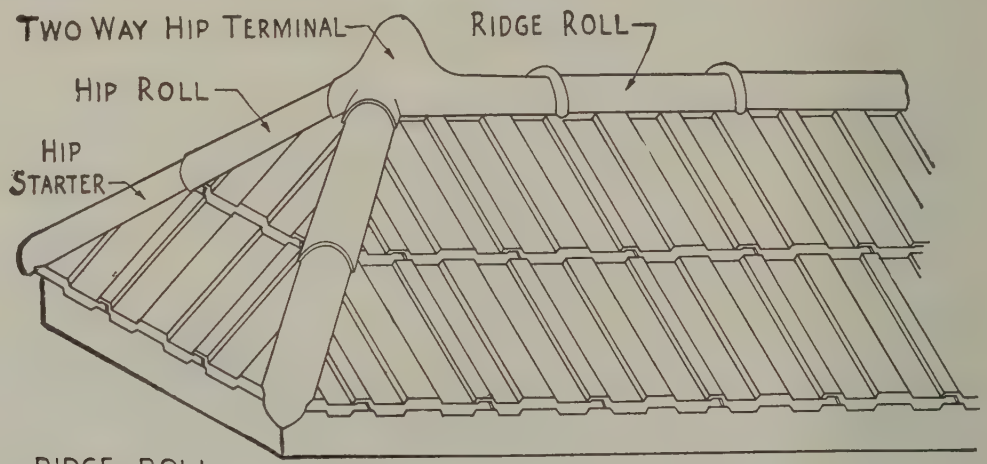
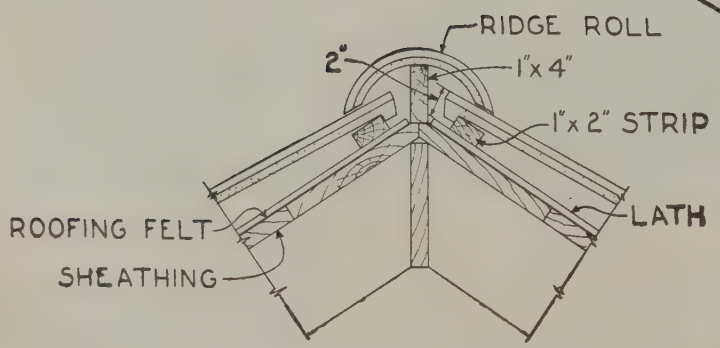
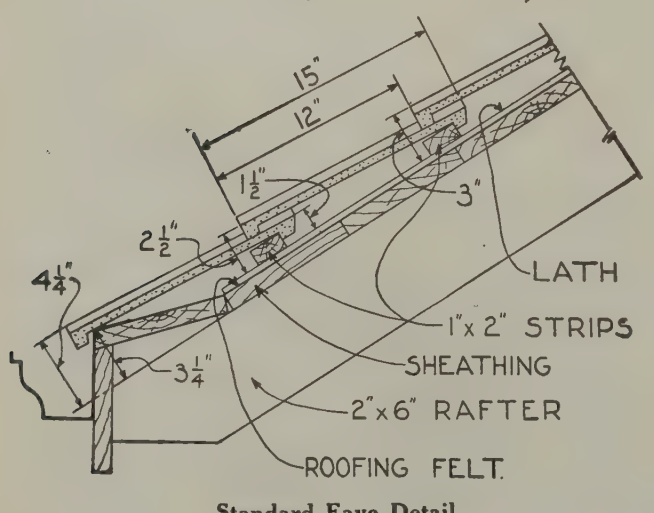


Lock Joint of Hawthorne French Tile

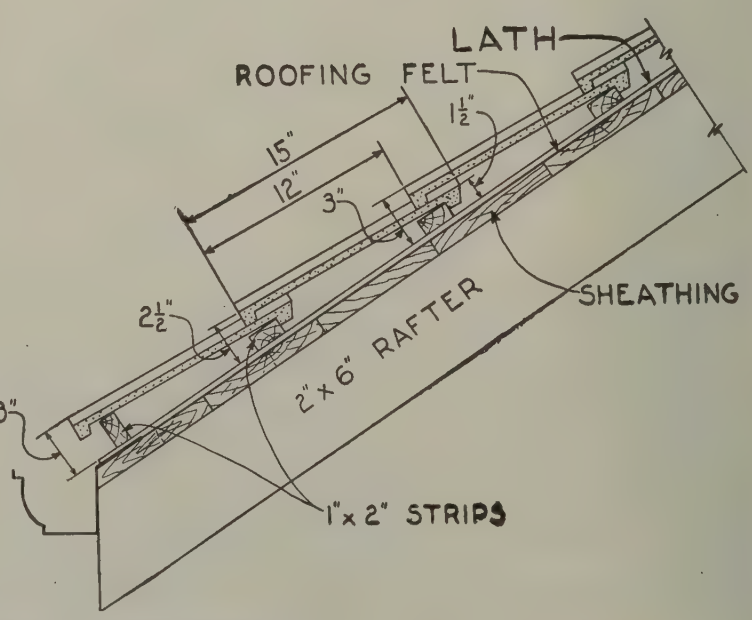


Hawthorne Special Tile for gable rake starters and finishers, ridge and hip rolls and terminals, illustrated on second page following.





Standard Eave Detail



Details of Hawthorne French Roofing Tile

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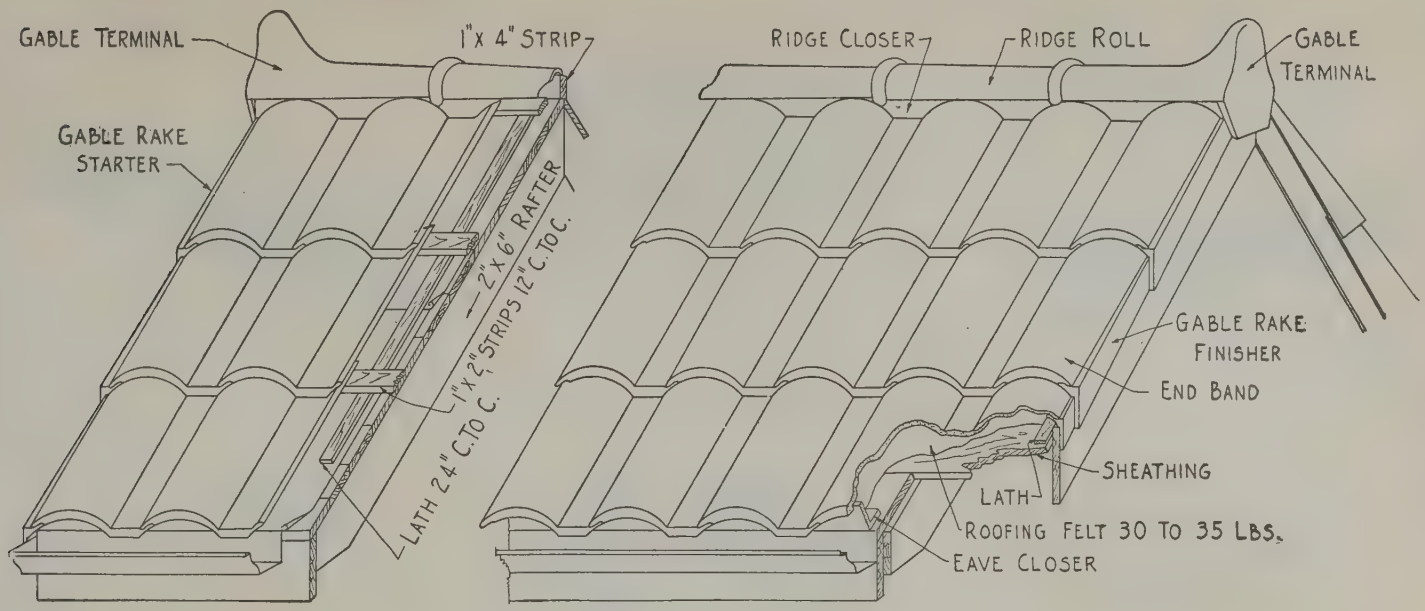
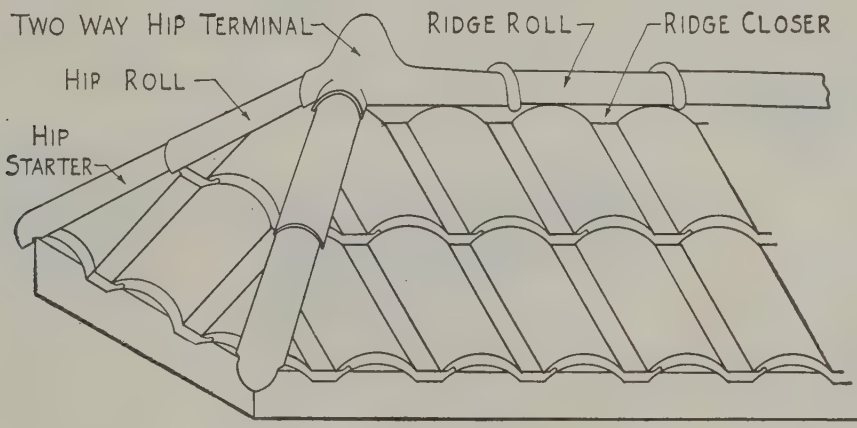
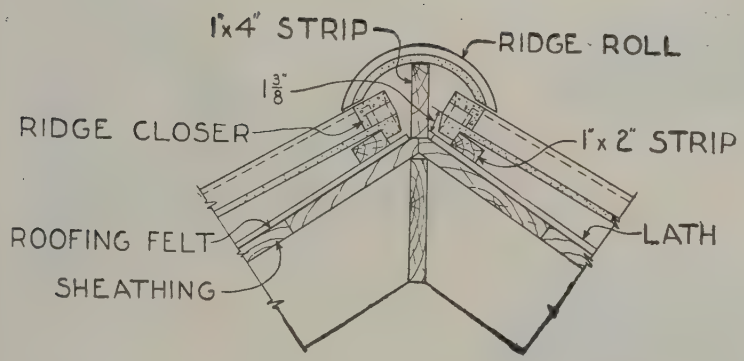
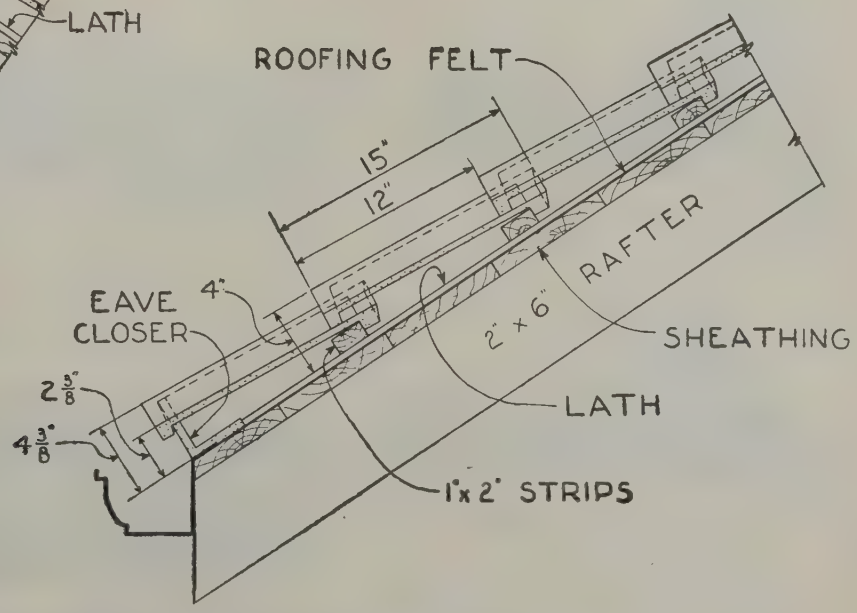






Hawthorne Special Tile for gable rake starters and finishers, ridge and hip rolls, terminals, and ridge and eave closers, illustrated on following page.

Lock Joint of Hawthorne Spanish Tile



Details of Hawthorne Spanish Roofing Tile

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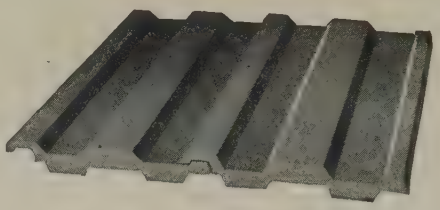
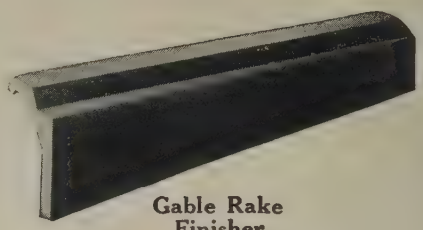
Hawthorne French Tile



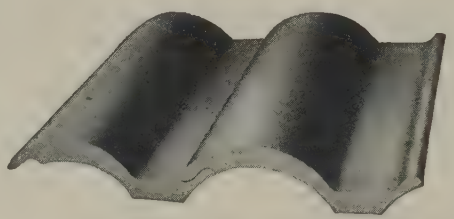
Size, 9¼x15 in. Exposure, 8x12 in.
Weight per square, 825 lb.
150 tile per square

Gable Rake Starter

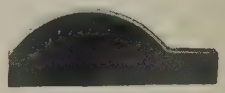


Gable Rake Finisher

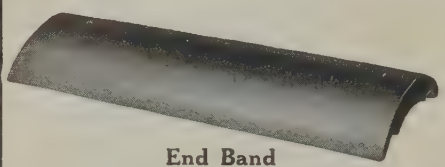
Hawthorne Spanish Tile



Size, 9¼x15 in. Exposure, 8x12 in.
Weight per square, 825 lb.
150 tile per square

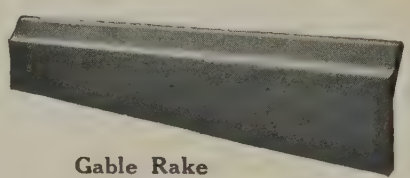


Eave Closer



End Band

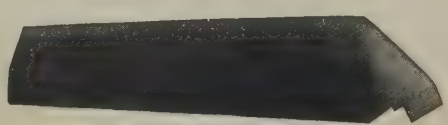
Ridge Closer



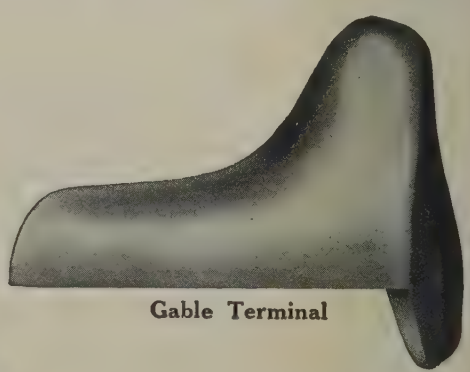
Gable Rake Starter

Gable Rake Finisher

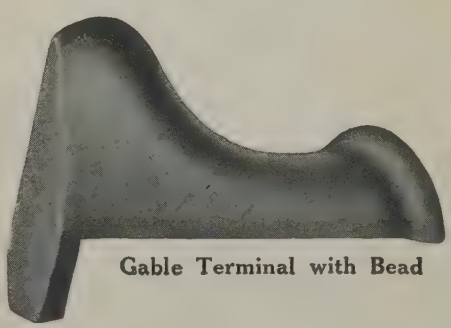
Hawthorne Ridge and Hip Tile



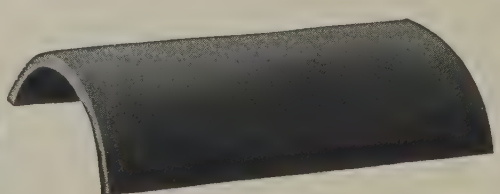
Hip Starter



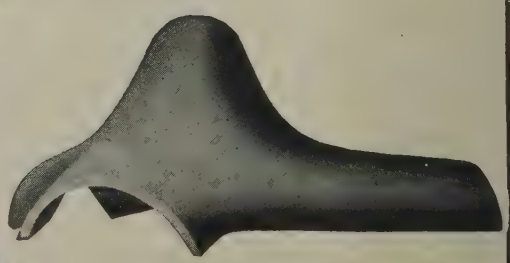
Gable Terminal



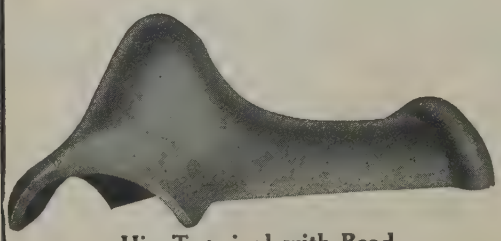
Gable Terminal with Bead



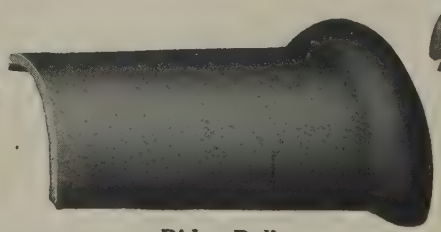
Hip Roll
Can also be used for Ridge



Hip Terminal



Hip Terminal with Bead



Ridge Roll
Can also be used for Hip

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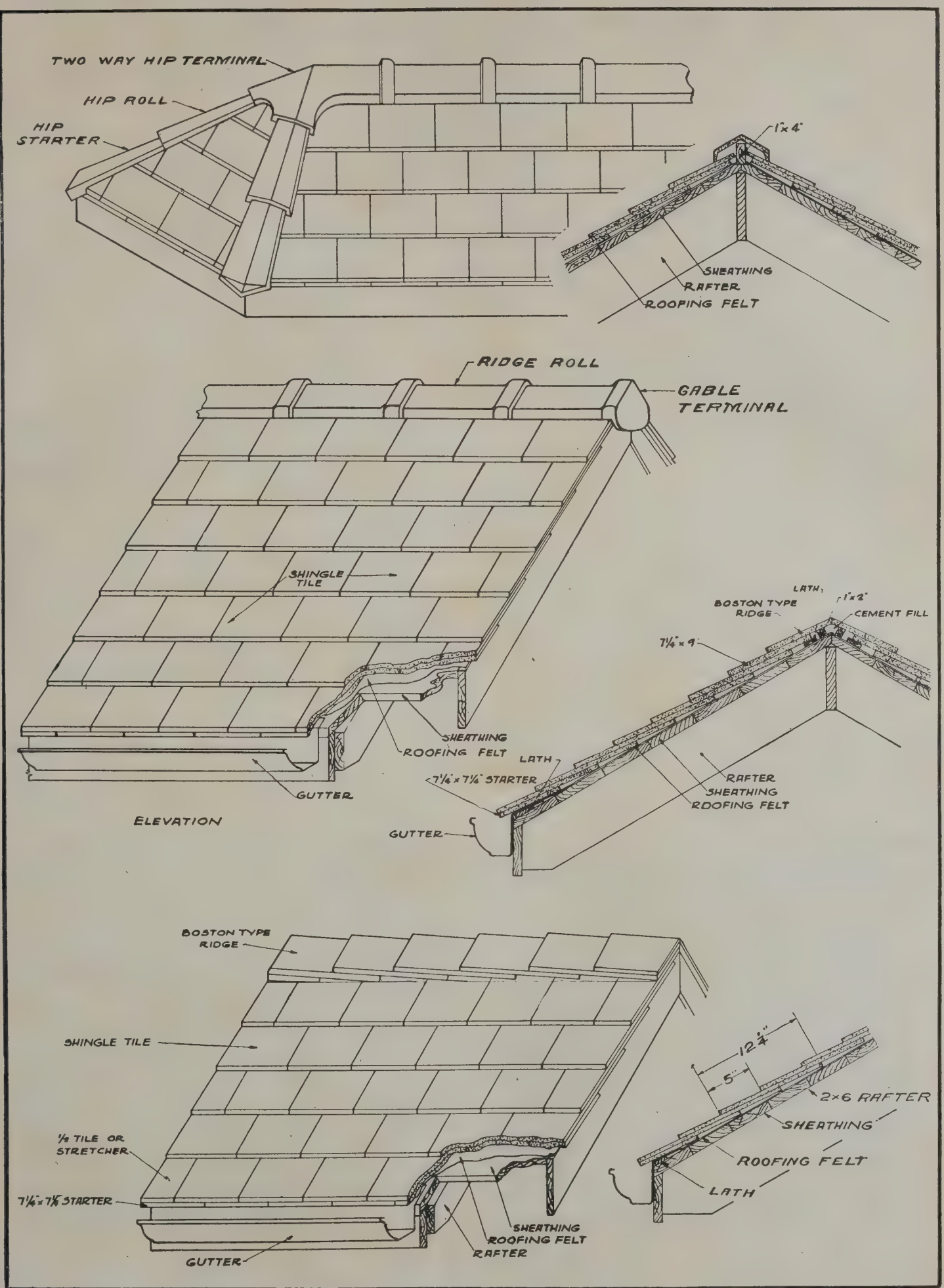

Details of Hawthorne Shingle Roofing Tile

B. MIFFLIN HOOD BRICK COMPANY

Manufacturers of Roof and Floor Tiles, Face and Chemical Brick

DAISY, TENN.

TELEPHONE or TELEGRAPH, Main 5457 Chattanooga, Tenn.

BRANCH SALES OFFICES

ATLANTA, GA., 686 Greenwood Avenue, N. E.
CHARLOTTE, N. C., 1206 S. Boulevard
CHATTANOOGA, TENN., P. O. Daisy, Tenn.
GREENVILLE, S. C., P. O. Box 86
GREENSBORO, N. C., P. O. Box 550
MEMPHIS, TENN., 928 Dermon Bldg.
MIAMI, FLA., P. O. Box 1626, Riverside Station
NEW ORLEANS, LA., 406 Maritime Building
NEW YORK, N. Y., Room 626, 101 Park Avenue
PHILADELPHIA, PA. Hood Tile Co., DeLong Building
RALEIGH, N. C.
TAMPA, FLA., 215 S. Rome Avenue

Represented by Leading Roofers, Tile and Brick Dealers in Principal Cities

Products

Flat Shingle Roof Tile; True Mission Roof Tile; Tapered Mission Roof Tile.

Also manufacturers of Brick of standard colors, shapes and textures. Fireplaces, Steps, Briquettes, Landscape Tile, Garden and Terrace Tile, Heavy Traffic Tile, Non-slip Ramps, Brick and Stucco Inserts, Chemical Stoneware, Cylindrical Spiral Rings.

For Floor Tile, see page B1878.

Roofing Tile

This has increased in use about 400 per cent since the Hood Company began reproducing old European effects in America and emancipating the architect from painted sheet metal effects.

All Europe, even the frigid parts, have shown a preference for natural clay roofing tiles over hard harsh shale and glazed roofing tiles. Their beauty is derived from the aging of the clay tile roofs. In Europe practically all roofing tiles are porous which allows them to enhance their beauty by naturally growing moss and lichen.

The Hood Company has specialized in reproducing authentic European roof tiles, yet, at the same time, make commercial American tiles of shale in natural, fireflashed and artificial green and blue colors.

Textures—Smooth, matt, rugg, sanded, engobe. Vegetating and non-vegetating.

Shingle Tiles

"Old Europe"—Sanded, aged, mellow surface. Vegetating; will grow moss. Reproduced from tiles brought back from Europe.

"Rugby"—Matt, aged. Variety of sizes and thicknesses.

"Yorkshire"—Engobed, subdued reds, aged browns. Capable of wide variation.

"Sussex"—Smooth flat shingle in full range of fireflashed colors.

"Devonshire"—Rugg, fireflashed tans, reds, browns, bronzes and bluish purples.

"Normandy"—Smooth or sanded. Cool subdued clay colors. Vegetating, reproducing roof effects in Northern Europe.

"Dresden"—Rugg, full range, fireflashed, flat rib, light weight interlocking.

Curved Tiles

"Riviera"—Smooth or rugg. Full range mingled flashes resembling autumn foliage.

"Habana"—Smooth, sanded or engobe; will grow moss; straight barrel with body of clay. Colors like old hand-made Cuban tiles.

"Aztec"—Smooth, sanded or engobe, 15 in. tapered with clay body, pastel shadings, vegetating.

"Lombardy"—Smooth, sanded or engobe, 18-in. tapered. True Italian. Range of cool pastel colors. Vegetating.

"Tuscany"—Smooth, sanded or engobe, 18-in. flat Roman pans. Reproduced from tiles brought back from Italy and will grow lichen.

American "S" (Erroneously called Spanish "S")—Pan and roll in one piece. Colors from red through fireflashed.

Specials or Fittings—Necessary authentic fittings furnished with each type. See chart below for size, texture, exposure, weight, etc. Complete data sheets cheerfully furnished on all upon request.

DATA CHART—ROOF TILE

Name	Type	Body	Size, in.	Texture	Exposure to weather, in.	Pieces per square	Weight per square, lb.
"Old Europe"	Latin Nordic	Clay and Shale	7x12 7x15	Sanded	4½ 6	475 360	1750 1750
"Rugby"	Latin Nordic	Clay and Shale	Varied	Matt	Random	Varied	2500
"Yorkshire"	Nordic	Clay and Shale	6x15	Engobe	6	415	1700
"Sussex"	Nordic	Clay and Shale	6x15	Smooth	6	415	1700
"Devonshire"	Nordic	Clay and Shale	6x15	Rugg	6	415	1700
"Normandy"	Latin Nordic	Clay and Shale	6x15	Smooth Sanded	6	415	1700
"Dresden"	American Teutonic	Clay and Shale	8x13	ugg	10	215	1100
"Riviera"	Latin	Clay and Shale	8x15	Smooth Rugg	11	230	1400
"Habana"	Latin	Clay and Shale	8x15	Smooth Sanded Engobe	11	230	1400
"Aztec"	Latin	Clay and Shale	7½x15	Smooth Sanded Engobe	12	250	1250
"Lombardy"	Italian	Clay and Shale	7x18	Smooth Sanded Engobe	15	225	1350
"Tuscany"	Italian pans	Clay and Shale	12x18	Smooth Sanded Engobe	15	85 pans used with 18-in tapered or S. B. covers	
American "S"	American	Clay and Shale	10x13	Smooth	10½	180	900

"IMPERIAL" ROOFING TILES

Made by

LUDOWICI-CELADON COMPANY

GENERAL OFFICES
104 South Michigan Avenue
CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 565 Fifth Avenue
WASHINGTON, D. C., 738 15th Street, N. W.
PHILADELPHIA, PA., 1315 Walnut Street
PITTSBURGH, PA., 355 Fifth Avenue
CLEVELAND, OHIO, 1836 Euclid Avenue
CINCINNATI, OHIO, 622 Broadway
ST. LOUIS, MO., 317 North 11th Street
KANSAS CITY, MO., 1004 Baltimore Street

FACTORIES

NEW LEXINGTON, OHIO — COFFEYVILLE, KANSAS — PERU, KANSAS

Product

"Imperial" Shale Roofing Tiles.

Description

We manufacture vitreous shale roofing tiles in all standard shapes.

Four regular stock patterns are shown on the page following, in addition to which the "Imperial" Roman, the "Imperial" Greek, the "Imperial" Slab Shingle, the "Imperial" English and other special shapes are manufactured. These are produced in a natural red color or in glazes of almost any color.

Specifications

All pitched roofs shall be covered with "Imperial" (insert name of pattern) tiles made by the Ludowici-Celadon Company with stock fitting suitable for each pattern. The tiles as specified above must be hard burned of ..... color, and in accordance with samples deposited in the office of the architects.

Before the roofer is sent for, the owner or general contractor should construct roofs in strict accordance with plans, sheath the roofs *tight*, have all chimneys and walls above roof line completed, have all vent lines put through roofs, furnish all strips of required width used under hip rolls, furnish any strips that may be used under tile at eaves, and have all scaffolding ready for roofer's use. The metal contractor should have all gutters in place on the roof (gutters, whether box, hanging or secret), to extend over the roof sheathing and run under the felt and tile at least 8 inches and should also have in place all valley metal, the width of which must be not less than 24 inches with both edges turned up ¼ inch, the entire length of the valley. The valley metal to be fastened with clips and never nailed or punctured in any manner. The valley metal must be laid over one layer of felt running lengthwise the entire distance of the valley. The metal contractor must have in readiness all flashing metal used alongside and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after arrival of the tile roofer and in accordance with the requirements of the tile.

After the roofs have thus been prepared to receive the felt and tile, the tile roofer shall cover the sheathing of the roofs with one thickness of asphalt roofing felt weighing not less than 30 pounds to the square, laying same with a 2½-inch lap and securing in place with capped nails. The felt should be laid parallel with the eaves and lapped over all valley metal about 4 inches and laid under all valley metal about 6 inches.

The roof having thus been prepared, the tile layer is to fasten tile with copper nails. The roofer shall see that the tiles are well locked together and lay smoothly, and no attempt shall be made to stretch the courses.

The tiles must be laid so that the vertical lines are parallel with each other and at right angles to the eaves. The tiles that verge along the hips should be cut close against the hip board, and a watertight joint made by cementing cut hip joint to hip board with elastic cement. Each piece of hip roll shall then be nailed to the hip board, and the hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with the pointing material.

Residence of E. P. Sedgwick, Highland Park, Ill.
R. E. Pingrey, Chicago, Ill., Architect
Roofed with "Imperial" Straight Barrel Mission Tiles
in a mixture of Reds, Browns,
Purples and Buffs

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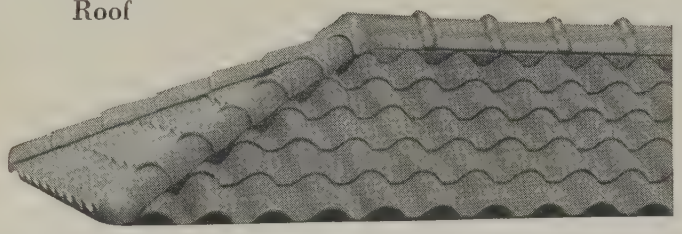
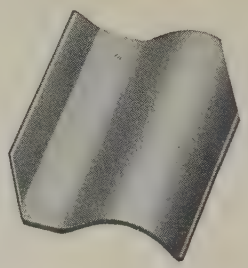
"IMPERIAL" Spanish Roof

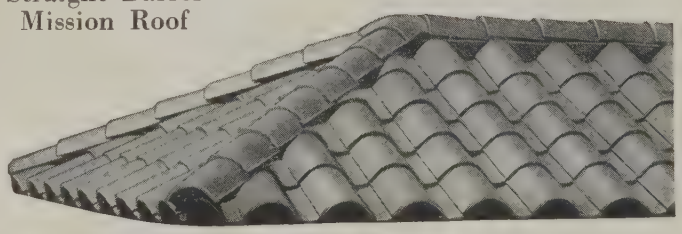


With 102 Hip Roll, 152 Hip Starters, 206 Ridge and Plain Terminal

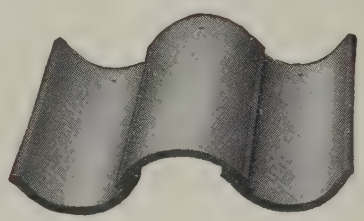


Length	13¼ inches
Width	9¾ inches
Average exposure	8¼x10¼ inches
Average pieces per square	171
Actual weight per square	950 pounds
Shipping weight per square, with fittings	1050 pounds

"IMPERIAL" Straight Barrel Mission Roof

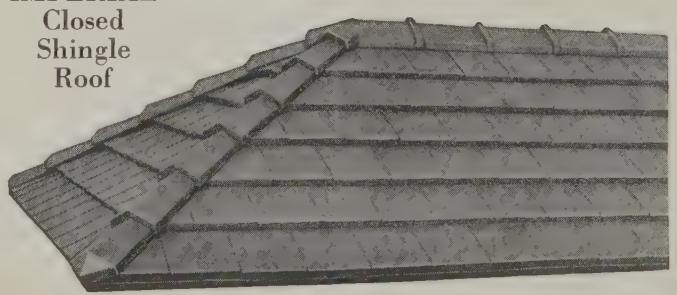


With Cover Tile Used for Hip and Ridge Treatment. Plain Terminal



Average exposure in length	11¼ inches
Width, center to center of covers	11½ inches
Average pieces per square	224
Actual weight per square	1280 pounds
Shipping weight per square, with fittings	1380 pounds

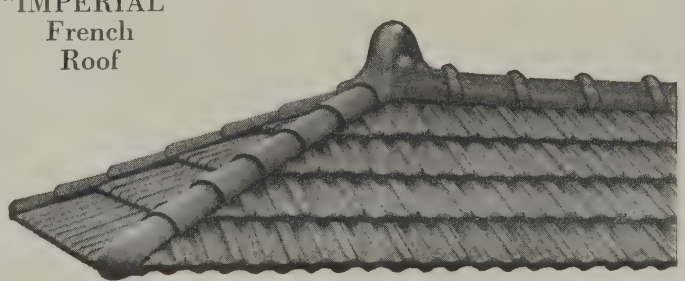
"IMPERIAL" Closed Shingle Roof



With 118 Hip Roll, 168 Hip Starters, 211 Ridge and Plain Terminal

Length	11 inches
Width	8¾ inches
Average exposure	8x8 inches
Average pieces per square	225
Actual weight per square	900 pounds
Shipping weight per square, with fittings	1000 pounds

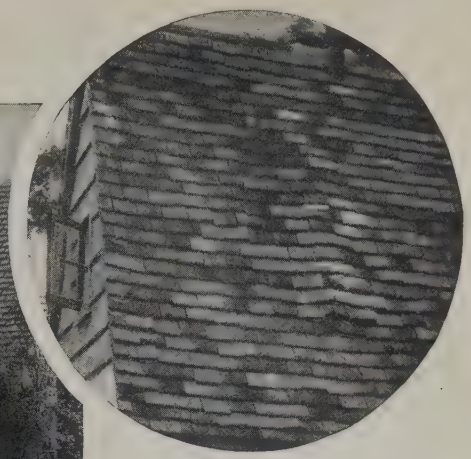
"IMPERIAL" French Roof



With 102 Hip Roll, 152 Hip Starters, 206 Ridge and 405 Terminal

Length	16¼ inches
Width	9 inches
Average exposure	8⅛x13⅜ inches
Average pieces per square	133
Actual weight per square	925 pounds
Shipping weight per square, with fittings	1025 pounds

Continued on next page



Above: A Close-up of the Same Roof. Showing Its Pleasing Irregularity

An English-Type House, Roofed with "Imperial" Brittany Shingle Tiles in Dull Reds and Sage Browns

The Brittany Shingle tile illustrated above is one of several types of special shingles made in various colors and textures. With our genuine Hand-Made and Old English shingles, and stock machine-made patterns, we have shingle tiles varying in size from 6x12x⅜ in. to as large as 8x16 x1 in.; furnished in textures and colors to suit requirements

Specifications for Brittany Shingle Tile

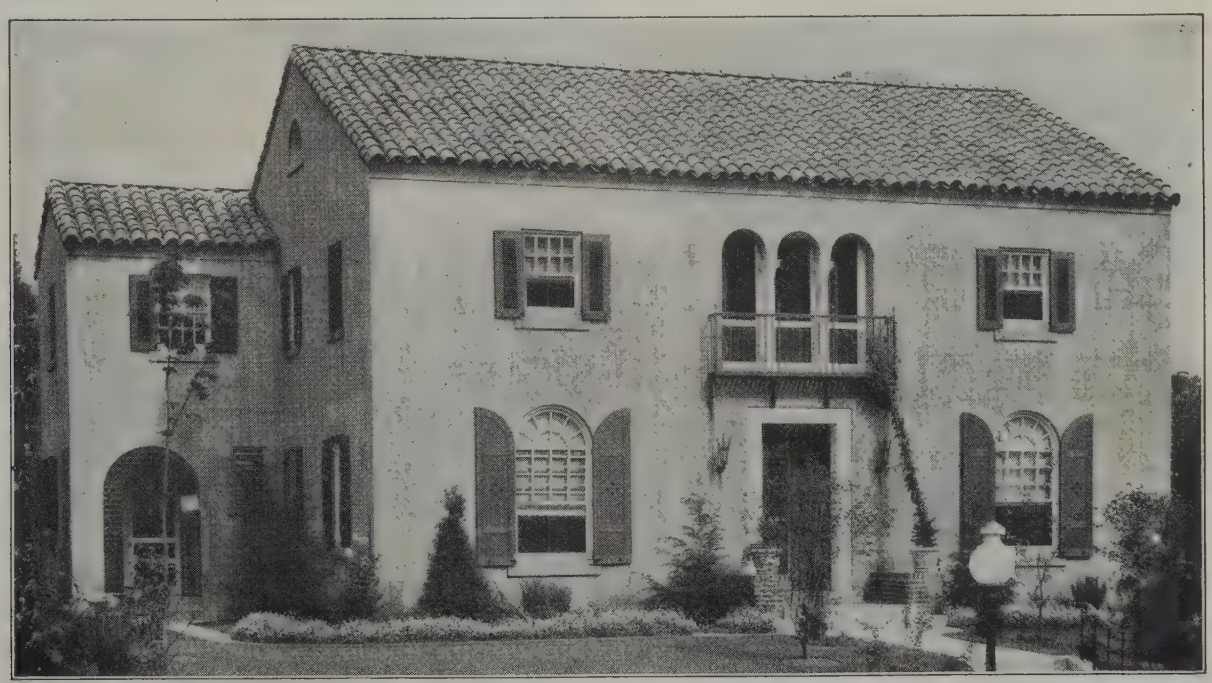
Cover all pitched roofs with "Imperial" Brittany Shingle Tile 6x12x⅝ in., as manufactured by the Ludowici-Celadon Company, in colors as selected by the architect, including appropriate fittings such as ridge, hip, terminals, etc. Hip and valley tile to be cut to the correct pitch in the green before burning and provided with nailholes for proper fastening.

Tile to be laid with some irregularity in exposure to eliminate straight horizontal lines, but not more than 5-in. exposure nor less than 4½-in., in order to insure proper head lap.

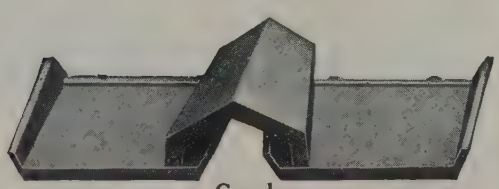
Before tile are laid, cover sheathing with best quality asphaltum felt weighing not less than 30 lb. per square (40 lb. on low pitches), laid parallel to eave and ridge and lapped 2½ in.

Apply on hips and ridges 1-in. wood stringers of proper height to carry hip and ridge and use ¾x1-in. cant strips at eaves.

Fasten tile with 1¾-in. copper nails, 2 to each tile. Where tile joins hip stringer, cement cut hip tile to hip board with a good quality elastic cement. Nail hip roll with 2-in. copper nails and ridge with 2½-in. nails.



A Residence Covered with "Imperial" Large Tapered Mission, Ancient Hand-Made



Greek

Roman

INCORPORATED 1902

MOUND CITY ROOFING TILE COMPANY

3301 Morganford Road
ST. LOUIS, MO.

Mound City Roofing Tile Is Made of Finest Grade of Shale

Our shale is of the finest grade, making a roofing tile of superior quality and color, burned a solid red throughout at a temperature of 2000 degrees Fahrenheit. Our machinery is the most modern and our plant the most up-to-date in the country.

Colors

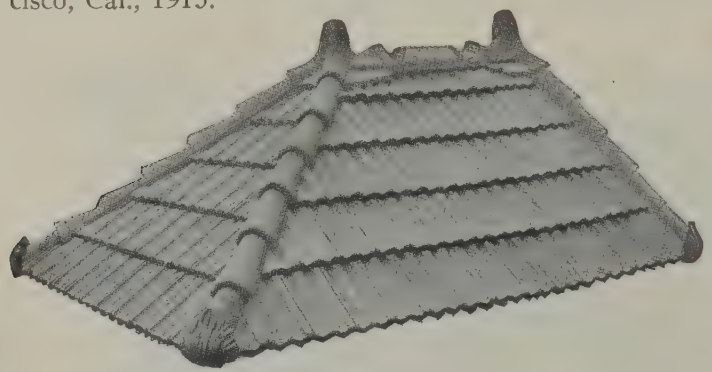
Our tile is made regularly in the various shades of red, also in dull and full green, and brown glazes. Our red tile is called Vitreous Face tile. This class of tile is preferred by a great many architects for several reasons; namely, being vitrified on the exposed surface it will not absorb any moisture from the outside and prevents the possibility of dripping caused through condensation at certain seasons of the year; it will not gather soot and dirt, but remains clean.

We also produce sage, oak, burgundy and sumac shades, which can be assembled with the red, producing the beautiful autumn foliage roofs so much in vogue at the present time. We are equipped to make any shape and color of tile or trimming the architect desires.

Awards

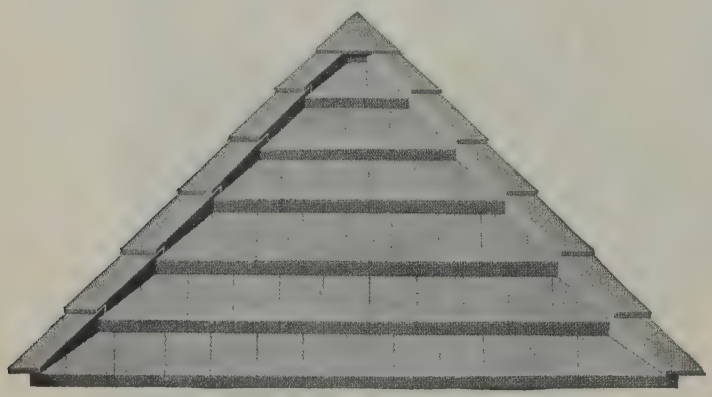
Highest Award, Gold Medal, World's Fair, St. Louis, Mo., 1904.

Gold Medal, Panama-Pacific Exposition, San Francisco, Cal., 1915.



"A" Interlocking Tile

With No. H-5 hip and H-5 hip-starter, No. R-5 ridge and No. T-3, 2-way terminal.
Size of tile, 9x15½ in.
Shipping weight, including trimmings, 1000 lb. per square



Closed Panama Tile

With No. H-8 hip and H-8 plain hip-starter, No. R-6 ridge and No. T-2, 2-way terminal.
Size of tile, 8½x13¾ in.
Shipping weight, including trimmings, 1250 lb. per square

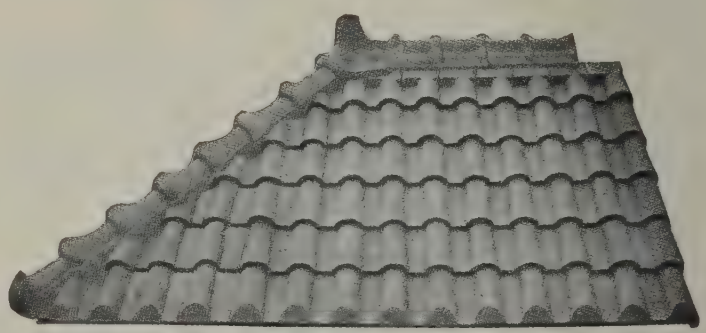
General Specifications

Cover all pitch roofs with one layer of asphalt felt weighing not less than thirty pounds per square. Same to be laid parallel with the eaves, each layer lapped at least three inches and nailed with capped or large-headed nails. The felt shall lap the valley metal at least six inches and on upright walls it shall lap under the tile at least four inches.

The metal contractor shall then place all valley metal, same to be held in place with clips fastened to the metal. The metal shall be bent over 1 by 2 strips running parallel on each side of the valley and must not be punctured in any manner. All eave strips and strips for hips and ridge shall be on hand ready for the roofer.

Cover all roofs so prepared with Mound City hard burned red (or green) ..... pattern tile with trimmings as designated by the manufacturer. All tile to be fastened with copper nails.

No attempt shall be made to stretch the courses. The tile shall be so laid that the vertical lines are parallel with each other and at right angles to the eaves. The tile that verge along the hip shall be cut close to the hip board and a water tight job made by cementing the cut tile to the hip board with elastic cement. The joints of the hips and ridge should be cemented, but the interior space of the hips and ridge must not be filled with the pointing material. After roofer has completed his work he shall remove all broken and damaged tile.



"C" Spanish Tile

With No. H-3 hip and H-3 ornamental hip-starter, No. R-1 ridge and No. T-3, 2-way terminal.
Size of tile, 12½x9½ in.
Shipping weight, including trimmings, 1100 lb. per square

Mission Tile

Size of tile, 15½x7¾ in.
Gauge, 9½x12 in.
Shipping weight, including trimmings, 1400 lb. per square

MURRAY TILE COMPANY

INCORPORATED

Manufacturers of Roofing Tile

CLOVERPORT, KENTUCKY

NEW YORK OFFICE AND STOCK: 656 West 35th Street CHICAGO OFFICE AND STOCK: 1205 South Clark Street

Products

ROOFING TILE, Flat Shingle and Spanish Type.

For Quarry Tile, see pages B1880-1881.

Murray Roofing Tile

Murray Roofing Tile are made from an extremely hard burning shale, impervious to moisture, not effected by the most extreme weather conditions. Roofs of Murray tile after more than twenty years of service, free from roof troubles and repair costs, are today apparently as good as the day applied.

Flat Shingle Tile—*Smooth Red*—Murray reds are distinctively Murray's, a light red, bright and attractive.

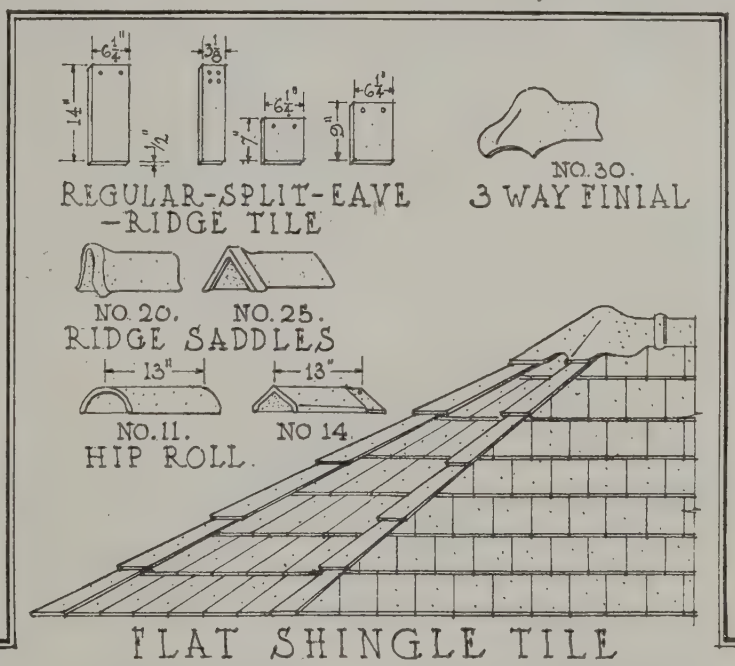
Murray Fireflashed—Wide range of autumn colors, smooth surface, bright red body with intermingling of tan, green and purple. Colors are burned in and are permanent, not surface colors.

Murray Rough Velvet—Machine-scored surface, a full range of colors from bright red to dark brown fireflashed, many showing tints of purple and green. The extremely wide color range of this tile offers many opportunities for artistic roofs without loss of permanent roof satisfaction from standpoint of service.

Spanish Type—In plain bright red and full fireflashed range.

Murray Autumn Blend—Distinctively Murray's, a blending of reds and browns, the reds running from light to dark, the browns from seal to chocolate, machine-scored and flame-flashed at high temperatures, producing a pleasing blend with tints of purple, green and tan.

Trimmings—Hips, hip starters, ridges, finials, rakes, eave enclosures and all necessary trimmings made in various styles to fit different designs of tile, including tile cut before burning for hips and valleys.



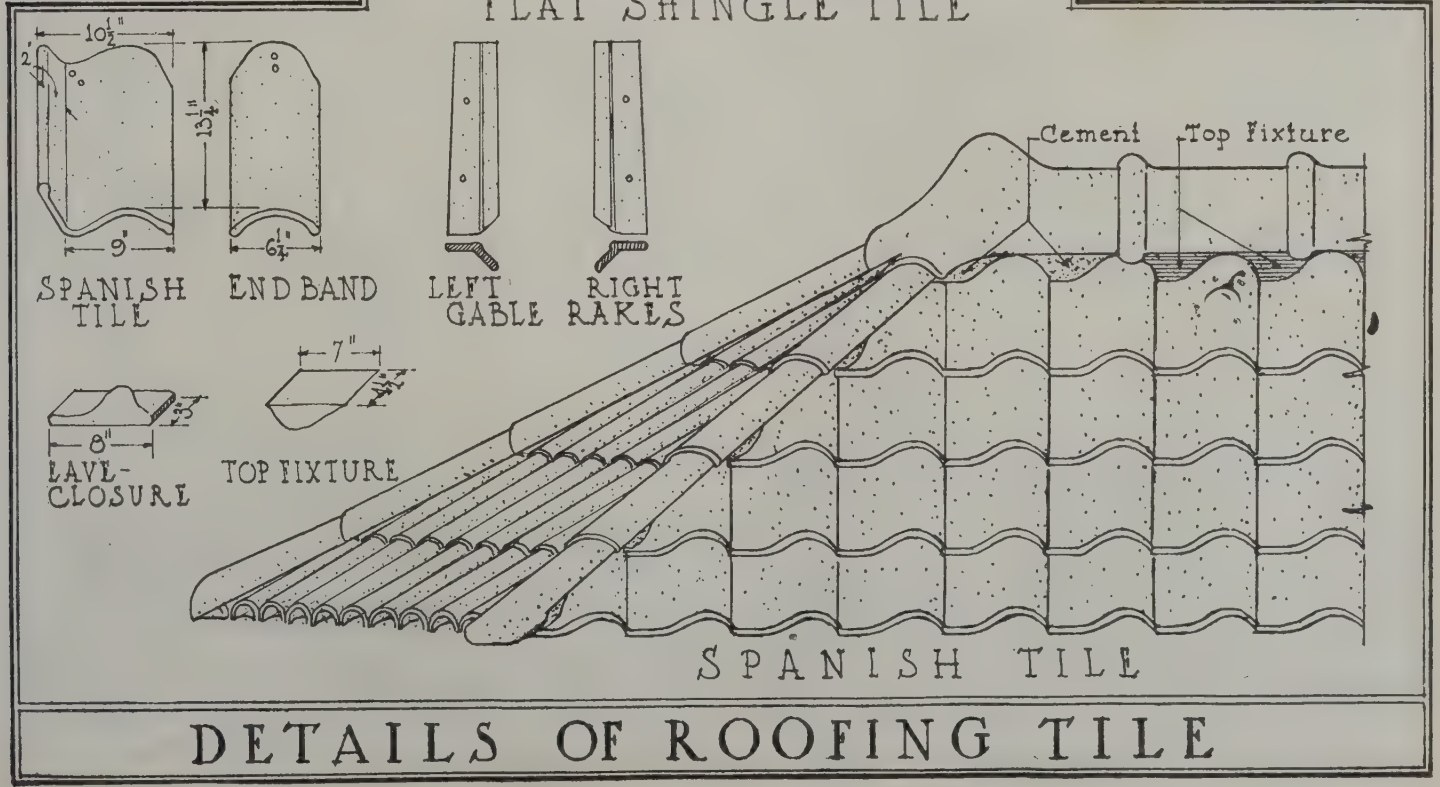
Sizes and Weights

Shingle Type, Smooth Red, Fireflashed Rough Velvet—

Length, 14 in.
Width, 6¼ in.
Average exposure, 5¾ in.
Pieces per square, 400
Weight per square, 1200 lb.

Spanish Type—

Length, 13¾ in.
Width, 9¾ in.
Average exposure, 8¼x10¼ in.
Pieces per square, 171.
Weight per square, 950 lb.



DETAILS OF ROOFING TILE

WILLIAM L. BARRELL CO. OF N. Y., INC.

Cotton Duck—Converted Fabrics

40 Worth Street, NEW YORK, N. Y.

BRANCHES

BOSTON, MASS., 52 Chauncy Street
CHICAGO, ILL., 323 South Franklin Street
KANSAS CITY, MO., 219 West 8th Street
LOS ANGELES, CALIF., 122 East 7th Street
PHILADELPHIA, PA., 1005 Market Street
SAN FRANCISCO, CALIF., 225 Bush Street

Product

CON-SER-TEX, a canvas covering for roofs and floors.

CON-SER-TEX CANVAS ROOFING
TRADE-MARK

Con-Ser-Tex Canvas Roofing and Floor Covering

Con-Ser-Tex is a specially woven cotton fabric, scientifically treated by a chemical process making it waterproof and, in addition, preserving the fibre from the ravages of dry rot, mildew germs and the elements. No oil or paraffin is used in our chemical process. The effectiveness of the process is proved by the great endurance of the similarly bitumen soaked mummy cloths of the ancient Egyptians. The canvas is so impregnated that paint will not come in direct contact with the cotton fibre, thus preventing the detrimental oxidizing action of the oils in paint.

Both sides of the canvas are finished with a "tooth" to which paint readily adheres.

Cotton duck, while desirable for many reasons as a roofing and floor covering, has not been entirely satisfactory because the cloth split, buckled and rotted in a short time. Investigation revealed this condition as being due to mildew, occasioned by the exposure of the duck to the elements owing to the checking of the paint —also the burning of the cotton fibre by the oils in paint.

An Ideal Covering for Roofs and Floors

Con-Ser-Tex being a specially woven, chemically treated, tough cotton duck meets the exacting requirements of an ideal covering for roofs and floors of porches, sleeping balconies, of residences, schools, hospitals, sanitariums, etc.; for floors of kitchens, laundries, garages; also used for the lining of wood gutters, valleys and hips, and flashings. Recommended for roof gardens or where the roof is often used as a recreation and dancing floor.

Con-Ser-Tex is so woven that there is absolutely no tendency to curl, as is the case with ordinary cotton fabrics. It lies flat permanently, will never split, not even under severe vibration or strain. It is comfortable under foot and may be turned up to form a sanitary, vermin and waterproof base, integral with the floor.

Con-Ser-Tex is soundproof, non-heat-radiating and is a non-conductor of heat and cold.

Durability Proved Through Service

Con-Ser-Tex is more durable than ordinary wood shingles or tin, and nearly as durable as copper. The durability of Con-Ser-Tex has been proved by the many years of service it has rendered to the largest transportation companies, which have used it exclusively for passenger car roofing.

Con-Ser-Tex has found wide use in every climate and for every class of service with complete satisfaction.

A Lower Grade of Lumber May Be Used

In the construction of exterior and semi-exterior wood floors* it has been customary to use clear pine owing to its durable nature. Con-Ser-Tex will permit the use of a lower grade of lumber, as it protects the lumber from the action of the elements, and a surface so covered will have greater life than would an unprotected clear pine surface.

Easily and Quickly Laid—Conserves Labor

Con-Ser-Tex is easily and quickly laid, consequently it effects great savings in time and labor. *See methods of laying and flashing on plate of details opposite.*

How to Lay Con-Ser-Tex

Dress the surface by eliminating rough places and sharp edges, after which apply a heavy coating of white lead thinned in linseed oil as a bedding (see Note). Over this bedding (while still wet) lay the Con-Ser-Tex, slightly stretching it so as to insure a close adhesion to the surface, taking care to arrange laps so as to permit free drainage.

If Con-Ser-Tex is to be laid in parallel courses with the building, the strips start from the outer or lower edge of the surface to be covered. Con-Ser-Tex should be turned up or flashed 4 to 6 in. at walls to insure a watertight result.

While Con-Ser-Tex is stretched, fasten with galvanized or copper tacks 4 in. apart on edge to be lapped, and then apply the next strip, allowing a lap of not less than 1½ in., fasten with tacks ¾ in. apart.

*All wood surfaces to be covered with Con-Ser-Tex must be tongued and grooved stock. Shiplapped stock should not be used under any condition.

Centenary M. E. Church, South, Chattanooga, Tenn.
Con-Ser-Tex is giving satisfactory service on the large roof garden floor

Club House, Empire City Race Track, Mt. Vernon, N. Y.
Con-Ser-Tex is giving service on the porch floor and roof

Continued on next page

After Con-Ser-Tex is laid and set, apply a light coat of good quality lead and oil paint, and a heavy second coat of best grade Deck paint after the first is thoroughly dry.

Note: If desired, we can furnish a special bedding paint which has greater adhesive qualities than ordinary white lead and oil.

Grades of Con-Ser-Tex

Grade E—A light weight grade, suitable for roofing small porches and for floors where traffic is light.

Grade G—A medium weight grade, suitable for larger porch floors and roofs on residences and public buildings.

Grade I—The heaviest grade, used principally for public buildings and all places where severe conditions exist.

Reasonable in Cost

The first cost of Con-Ser-Tex is reasonable and its upkeep practically nil, requiring painting only as often as the rest of the building.

LIST PRICE OF CON-SER-TEX PER LINEAL YARD

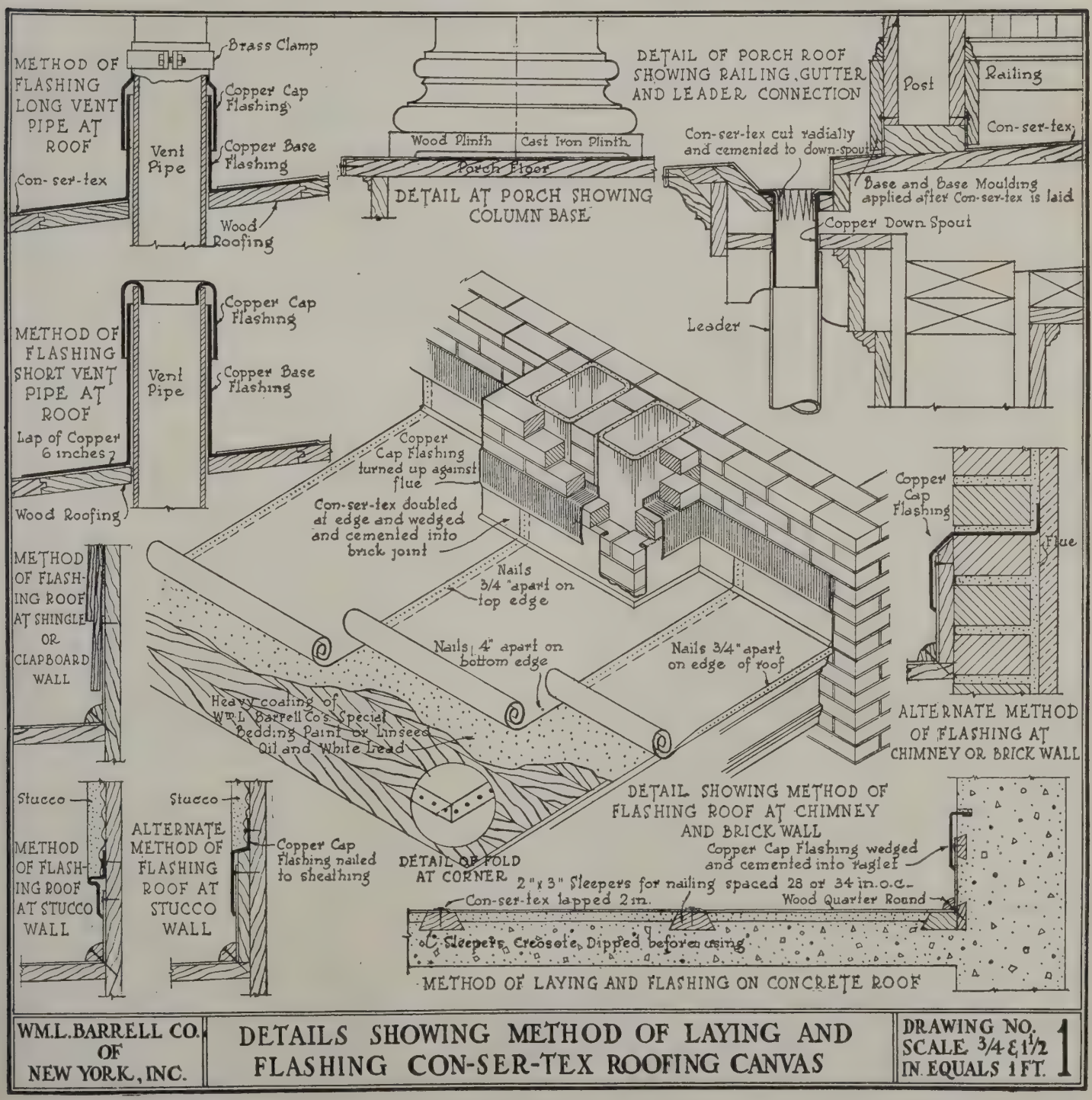
Width, in.	Grade E	Grade G	Grade I
30	$1.17	$1.38	$1.47
36	1.39	1.60	1.78

Discounts furnished on request. The above widths carried in stock. Other widths processed to order.

Consult Us Regarding Economical Laying

On receipt of dimensions of the surface to be covered, we will submit an estimate of cost, also a diagram showing the most economical method of laying Con-Ser-Tex, eliminating to the greatest possible extent all waste in cutting.

There is no charge for this service.



THE BARRETT COMPANY

Flashings for Brick and Concrete Walls

40 Rector Street
NEW YORK, N. Y.

For Branch Offices, see page A436

Products

FLASHING BLOCK for Brick Walls (Patented), FLASHING FORM for Concrete Walls (Patented), PLASTIC ELASTIGUM for Flashings.

For Roofing, see pages A436-438; for Roof Leader and Roof Vent Connections, see page C2769. For detailed description and specifications, see Volume III, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

Essential Features of Barrett Flashings

Barrett Flashings, which are the result of nearly three-quarters of a century of successful roofing experience, embody all of the following essential features: (1) They provide amply for expansion and contraction. (2) Their elasticity takes care of settlement or shrinkage. (3) All joints are watertight under every weather condition. (4) They will not pull away from either roof or wall. (5) They are practical and easy to install. (6) They are adaptable to every complex wall construction. (7) They are durable and require no maintenance or repair. (8) They eliminate division of responsibility between contractors. (9) Their cost is moderate.

Barrett Flashing Blocks and Flashing for Brick Walls

These blocks provide a permanent, upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing. This cap, being an integral part of wall, is as permanent as the wall itself, and can not become detached.

The flashing material is installed over one unbroken plane, eliminating the buckling, tearing, pocketing, and special wear which so frequently occur where flashings are set in at right or acute angles. The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

For detailed specifications see Volume III, Architects' and Engineers' Built-up Roofing Reference Series.

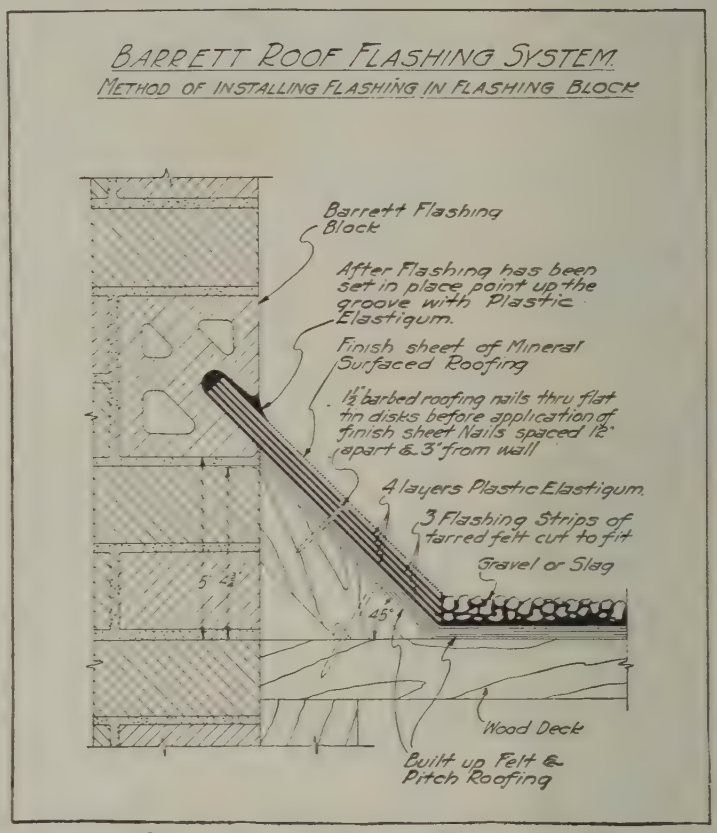


Diagram Showing Barrett Flashing Blocks and Flashing for Brick Walls

Barrett Flashing Form and Flashing for Concrete Walls

This flashing form is identical in principle with the flashing blocks described above. The metal flashing form, shown at right, provides a permanent, upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing. This cap, being an integral part of wall, is as permanent as the wall itself, and can not become detached.

The metal flashing form is not intended to be permanent, its only function being to shape or create the flashing groove. It is left in the wall merely as a matter of convenience.

The flashing material is installed over one unbroken plane, eliminating the buckling, tearing, pocketing, and special wear, which so frequently occur where flashings are set in at right or acute angles. The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

For detailed specifications see Volume III, Architects' and Engineers' Built-Up Roofing Reference Series.

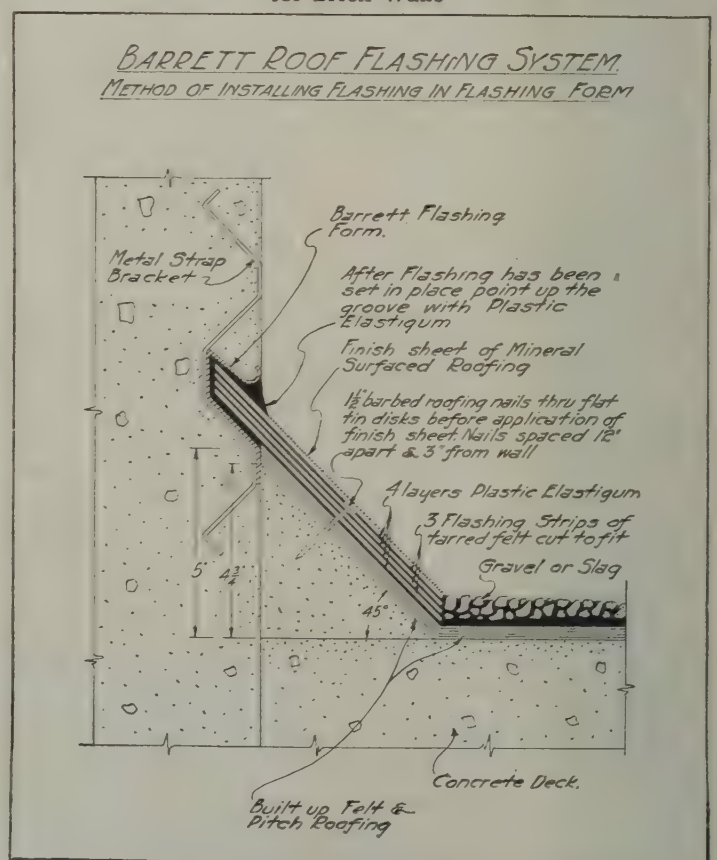


Diagram Showing Barrett Flashing Form and Flashing for Concrete Walls

THE CHENEY COMPANY

Manufacturers of Interlocking Wall Flashing

317 Grove Street, MELROSE, MASS.

Cheney Interlocking Wall Flashing

Does not break the bond. Prevents efflorescence.

A through copper flashing for masonry walls that makes a perfect bond in every direction when built into the mortar bed between two courses of masonry. Cheney Interlocking Wall Flashing is keyed both ways, the keyed edges hooking together to make a continuous waterproof flashing and a perfect mechanical bond clear across a solid brick wall.

A *positive stop* for all seepage troubles at the following points:

Parapet walls	Lintels
Cornices	Set-back bases
Sills	Spandrels

No Lost Time—Mason carries wall up to point where flashing is required, sets flashing in mortar and proceeds—no sheet metal trades are involved in placing same, as it is interlocking and absolutely eliminates all soldering and fitting.

Economical—In cost and application. Made of copper and is not affected by moisture, lime, or cement. Keys are formed on a regular machine and are absolutely uniform. Special pieces are furnished for all corners.

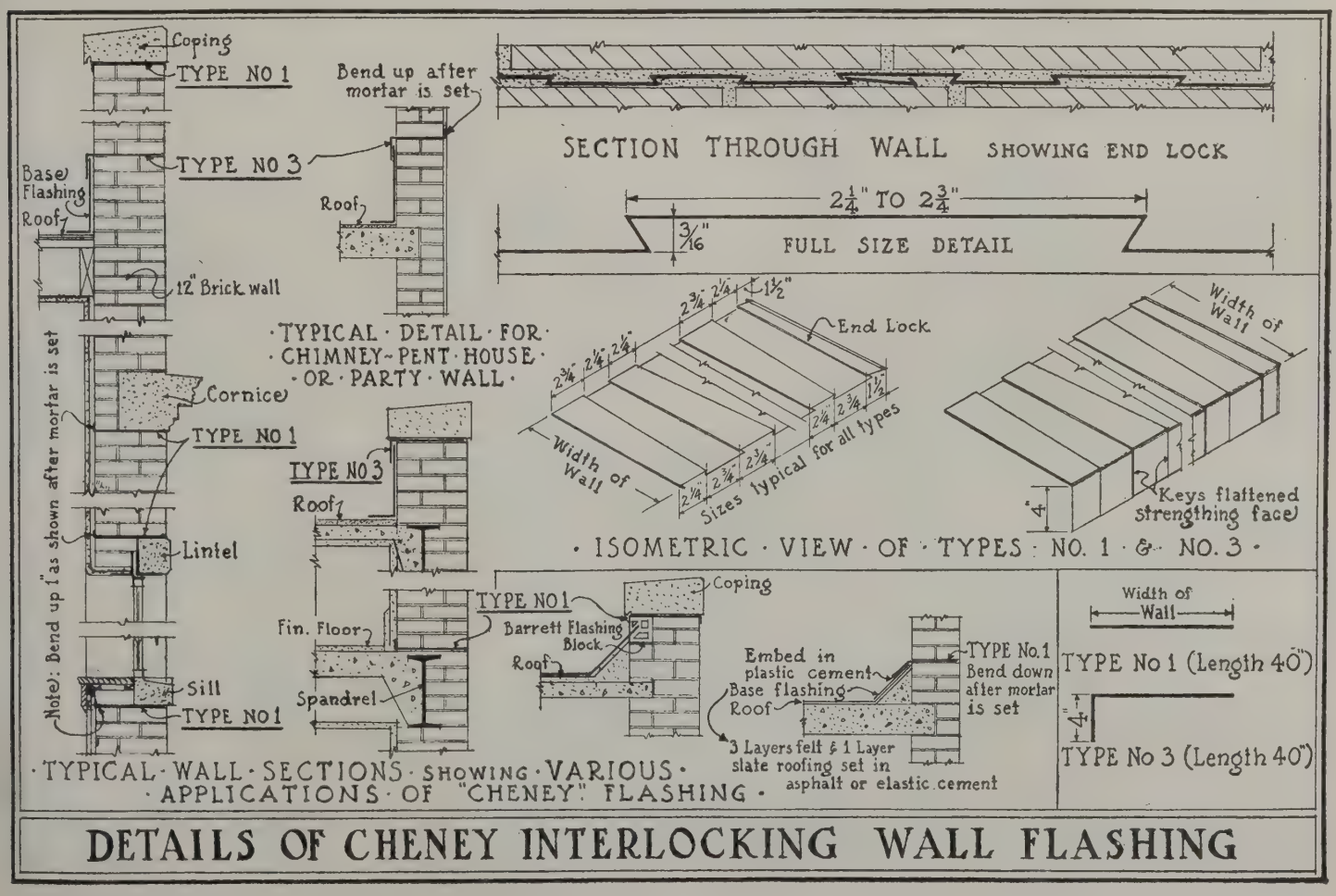
Standard Sizes and Types—All strips are 40 in. long and weigh about 1 pound per sq. ft.; all widths from 4 to 36 in.; special strips of any design on order.

Type 1—For use above the roof line under copings and over Barrett Flashing Blocks. Also for use below the roof line under cornices and sills and over lintels, by extending beyond inside face of wall 1 in. or more and bending up after mortar is set so that water collecting on the flashing can not run into the building.

Type 3—For use above the roof line as a combined through wall flashing and 4-in. counterflashing all ready for roofer to install base flashing. Also for use in penthouse, chimney, skylight and party walls by extending beyond inside face of wall 1 in. or more and bending up after mortar is set so that water collecting on flashing can not run into the building. Can also be bent down ½ in. or more on outside face under coping stones. The flattening of the keys of the 4-in. counterflashing materially strengthens this face so that it can be lifted and bent down again so as to hug the wall smoothly.

Specification

Flashing (For Masonry Specifications)—Cheney Interlocking Wall Flashing shall be used for all through-wall flashings, as shown on plans, and shall be furnished and placed in wall by Mason Contractor. Flashing shall be set with mortar below and on top of flashing, so that a mechanical bond is obtained. (The Cheney Company, 317 Grove Street, Melrose. Mass.)



DETAILS OF CHENEY INTERLOCKING WALL FLASHING

COPPER ROOFINGS AND FLASHINGS

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway, NEW YORK, N. Y.

MIDWESTERN OFFICE
Landreth Building
ST. LOUIS, MO.

CANADIAN OFFICE
67 Yonge Street
TORONTO, ONT.

PACIFIC COAST OFFICE
Architects Building
LOS ANGELES, CAL.

Special Consulting Service

The scientific knowledge and practical experience of our Research and Building Service Departments are at your disposal at all times.

We will be glad to consult with you on any problems pertaining to the uses and applications of Copper, Brass and Bronze.

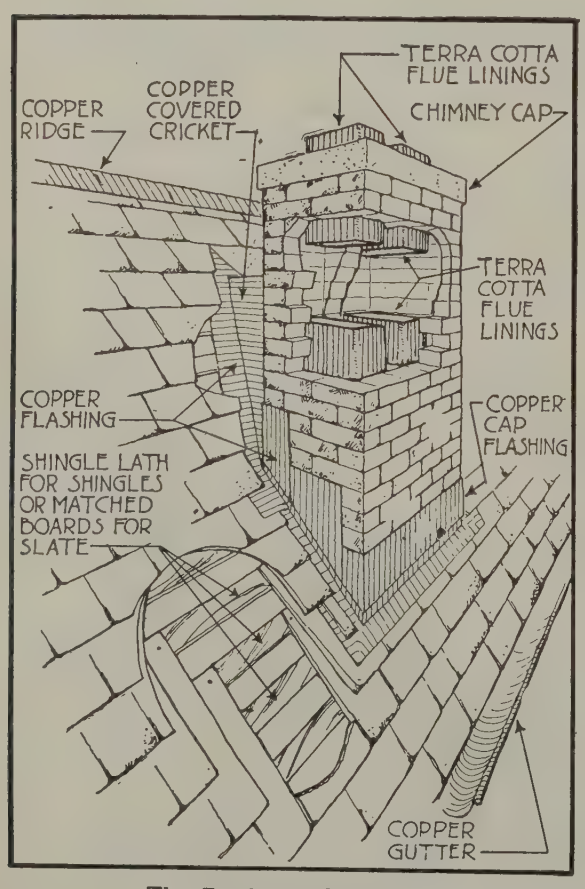
Our service covers constructive information about flashings and roofings, preparation of details, preparation of specifications, personal consultation with architects and contractors, and complete technical and scientific information about the physical and chemical properties of Copper, including its coloring. Architects are invited to use this service freely for technical advice on all uses of Sheet Copper—for cornices, eaves troughs, flashings, gutters, leaders, skylights, ventilators, and sheet, shingle or Spanish tile roofing.

Literature

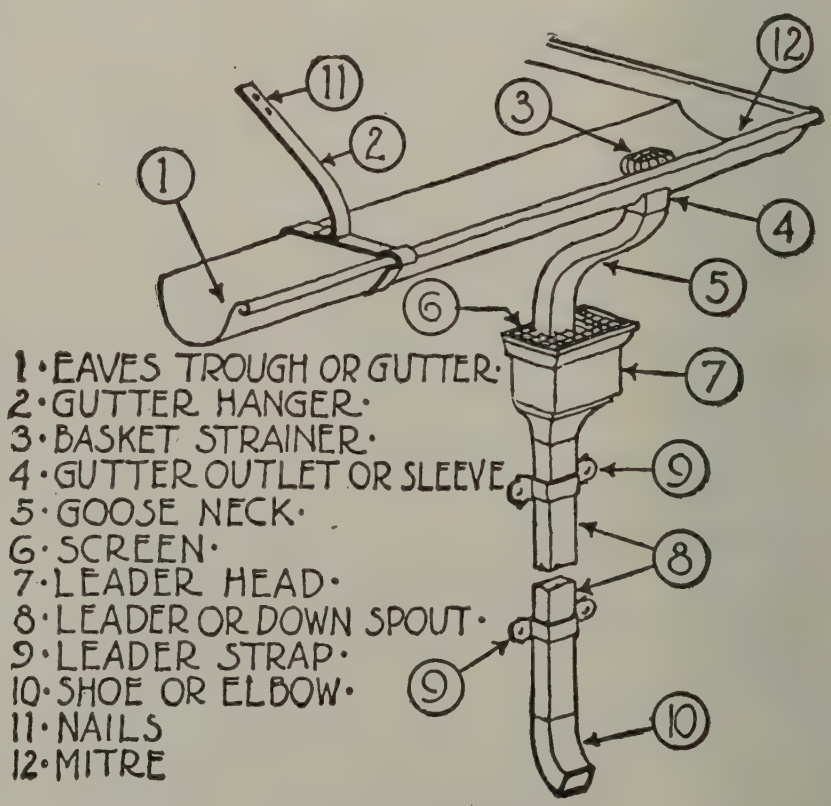
"Copper Roofings—A Manual"—Drawings, specifications and miscellaneous data on laying sheet-copper roofs. 8½x11 in., 29 pages. Sent on request.

"Copper Flashings—A Handbook"—Drawings, specifications and miscellaneous data on flashings of all kinds. 8½x11 in., 66 pages. Sent on request.

"Unfrequent Flashings"—A series of sheets of unusual and little-used flashings—published from time to time—8½x11 in. Sent on request.



The Roof and Chimney



Gutter and Leader Detail

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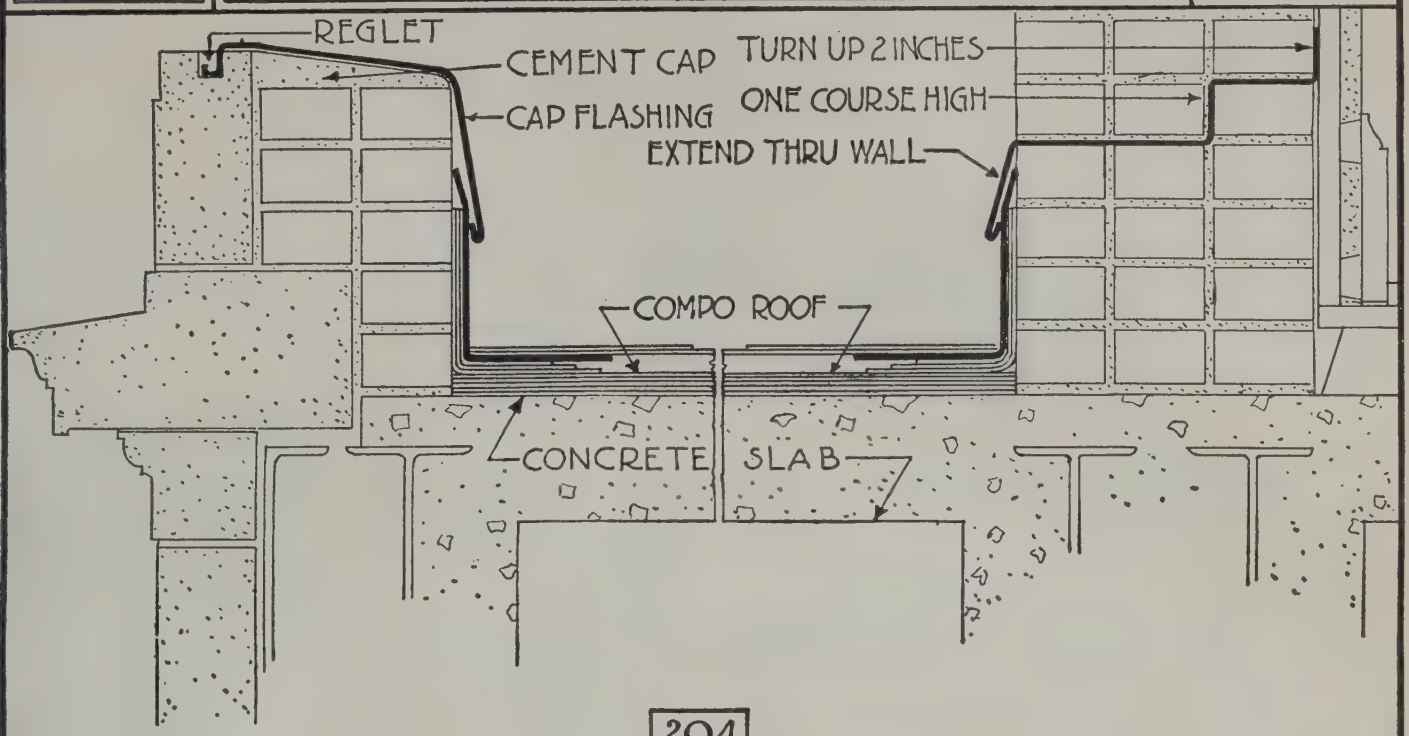
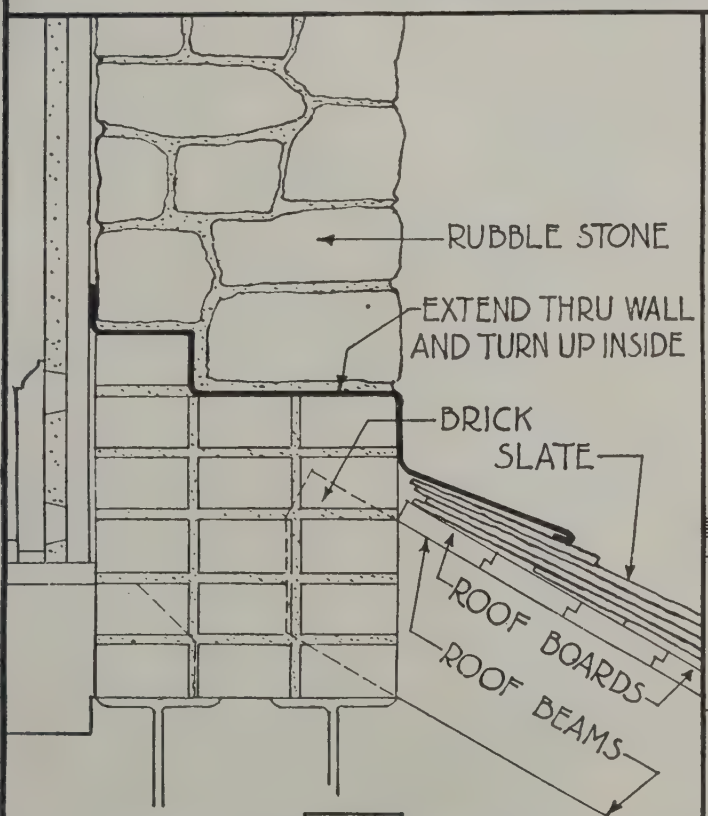
SERIES C

UNFREQUENT FLASHINGS
SET BACKS
SCALE - AN INCH AND A HALF EQUALS ONE FOOT

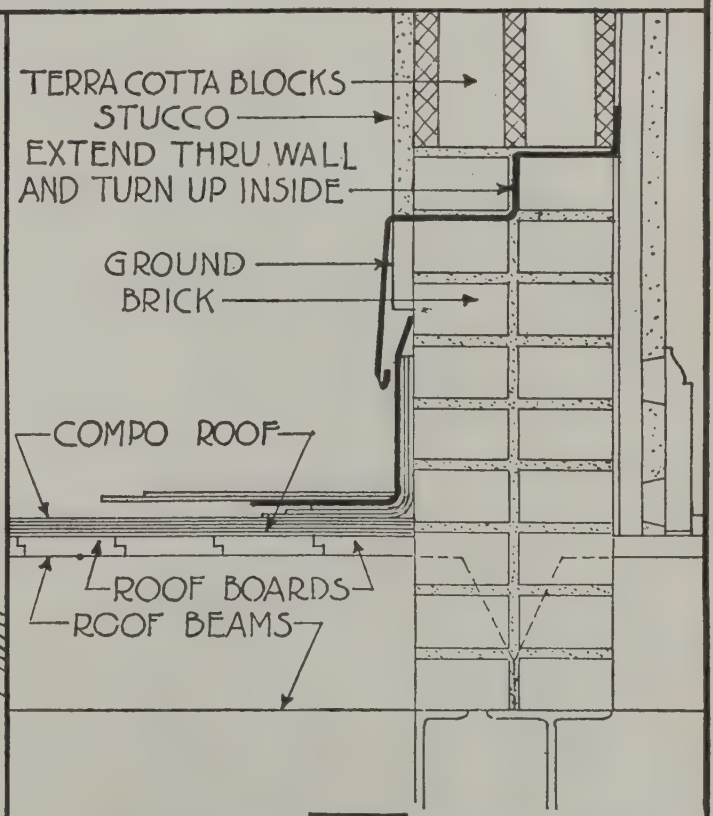
NUMBER TWO



204
SET BACK IN FIREPROOF CONSTRUCTION



205
RUBBLE WALL-SLATE ROOF



206
HOLLOW TILE WALL-FLAT ROOF

COPPER & BRASS RESEARCH ASSOCIATION
25 BROADWAY NEW YORK

COUNTER-FLASHING RECEIVER CO.

Manufacturers of Permanent Leakproof Flashings

712 Park Street, MILWAUKEE, WIS.

AGENTS IN ALL PRINCIPAL CITIES

Product

SCHNEIDER COUNTER-FLASHING RECEIVER, a permanently built-in, leakproof metal raglet for masonry parapets and walls. Receives and securely holds, without calking, the standing flat-roof counter-flashing. Fully protected by patent.

Materials

16 ounce, cold rolled copper. 26 gauge galvanized Armco iron. Furnished in 8-ft. lengths.

Adaptability

Adapted to all classes of buildings with flat or slight pitch composition roofs such as those of industrial and commercial buildings, hotels, apartments, schools, etc.

Advantages

Furnished and installed by mason. Flashing receiver is furnished and built in by the masonry or general contractor with little labor cost as the masonry work of parapets and walls progresses.

Permanence—Made up of non-corrosive metals, it lasts as long as the masonry walls. Permits the removal and replacing of counter-flashing without injury to the receiver.

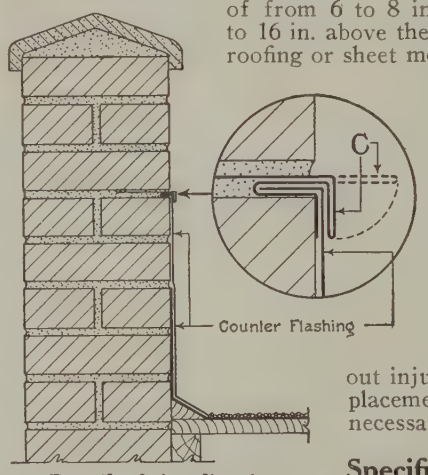
Leakproof—Most roof leaks occur at or about the flashing against parapets and walls. The counter-flashing when set with its top flange inserted in a cut out mortar joint secured with flashing hooks and calking cement is far from permanent and is the vital point where leakage occurs.

The turn-up at the back of the Counter-flashing Receiver body, not only securely anchors the receiver in the masonry mortar joint, but it permanently prevents wind driven rain or the water from melting banked snow from passing over the receiver body, and penetrating through the mortar joint to the interior of the wall to appear on the walls and ceilings beneath with resultant costly damage.

This positive and permanent assurance against leaks at this most vital point is a prime reason for the inclusion of the receiver on all buildings where counter-flashing is required.

Easily and Quickly Installed—Furnished in convenient lengths of 8 ft., the Counter-flashing Receiver is easily handled and quickly installed by the mason without special tools or skill in metal working.

Reduces Labor Costs—Eliminates the usual labor costs of roofing and sheet metal contractor in cutting out the mortar joint to receive the counter-flashing flange and the initial cost of flashing hooks and calking cement, and the labor of installation.



Detail of Application

Application

The Schneider Counter-flashing Receiver is furnished and set by the mason in the masonry mortar joint. The body of the receiver (A) is set level in the wall with the guide flange (E) pressed close against the vertical masonry face. Splice plates with turn-up at back edge, are furnished to fit snugly into the splicing plate groove (F) to firmly join abutting ends in perfect alignment. Corners and re-entrant angles are easily made without intricate fitting or special tools. On roofs with considerable pitch the receiver is installed in steps maintaining a minimum of from 6 to 8 in. and a maximum of 12 to 16 in. above the roof surface. After the roofing or sheet metal contractor has set the counter-flashing with its top flange inserted in the counter-flashing groove (D), he bends down the projecting flange (C) securely locking the counter-flashing in place, yet allowing for its normal and natural expansion and contraction. The locking flange (C) is easily lifted and re-bent to its customary position without injury when removal and replacement of counter-flashing is necessary in reroofing.

Specification

Include in Masonry Specifications—The Mason Contractor shall furnish and build into all parapet and similar walls where counter-flashing is required [copper] [galvanized armco iron] Schneider Counter-flashing Receiver as manufactured by the COUNTER-FLASHING RECEIVER Co., Milwaukee, Wis.

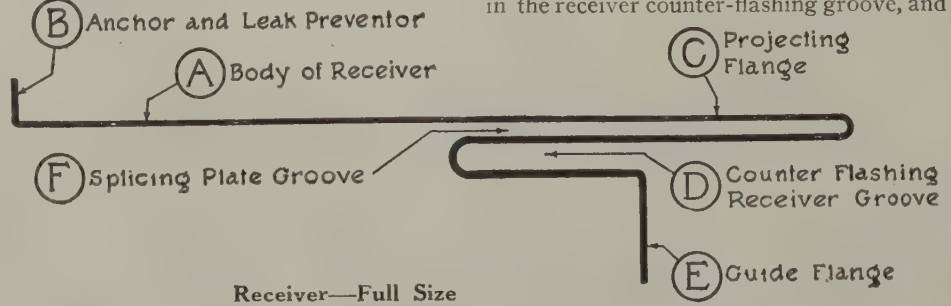
The Counter-flashing Receiver shall be set in the masonry mortar joint in accordance with the manufacturer's details. Butting end joints shall be secured in perfect alignment with splice plates, furnished by the receiver manufacturer, and all corners and re-entrant angles shall be lapped and joined as shown.

The receiver shall be set in a mortar joint approximately 9 in. at its lowest point from the roof level. Where steps are required by changing roof level, these shall occur at points where the maximum height above the roof surface is approximately from 12 to 16 in.

Include in Roofing and Sheet Metals Specification—[Copper] [galvanized armco iron] Schneider Counter-flashing Receiver is furnished and built in by the Mason Contractor (see page ... of specifications and details). This contractor shall insert the top flange of his [copper] [galvanized armco iron] counter-flashing in the receiver counter-flashing groove, and bend the projecting receiver flange over the counter-flashing top.

Note: No counter-flashing hooks or calking cement are required.

Note: To prevent electrolysis, the receiver and counter-flashing must always be of the same metal, i.e. copper receiver—copper counter-flashing; galvanized armco iron receiver—galvanized armco iron counterflashing.



Receiver—Full Size

THE FIGGE COMPANY

Manufacturers of the Patented Figge Roof Flashing

1110 West Adams Street

CHICAGO, ILL.

Product

FIGGE PATENTED ROOF FLASHING for all types of built-up roofings.

Figge Roof Flashing

Figge roof flashing is manufactured for the one purpose of permanently protecting the vital point in built-up roof construction.

Architects recognize that 95% of roof leaks develop in and around the flashing.

Figge flashing is furnished complete in two weights —two-ply and three-ply—the material is woven fabric thoroughly saturated with bituminous compound. The life of the Figge flashing is equal to the best built-up roof constructions. There are no nails to rust, no wood to rot, no crevices for water seepage. It forms a solid, permanent waterseal between the wall and the roof. Figge flashing presents perfect flexibility working perfectly into corners and uneven mortar courses.

How to Specify

Figge flashing requires a raggle which is formed by raking out the mortar joint between brick. This raggle should be 1½ in. deep and at whatever height desired. It can be taken care of in mason specification where it is raked out before it sets or can be taken care of by the roofer. Wherever concrete is used a raggle can be provided by a wood strip nailed on to the form. Under roofing specifications have subheading:

Roof Flashing—The roof flashing shall be Figge Flashing applied according to manufacturers' directions.

Specify either Two-ply, Three-ply, Standard or Extra Heavy and the width. Specify either 6, 8, 10 or 12 in.

The flashing should extend out on the roof from 1 to 2 in., to reinforce angle between roof and wall so that if necessary to flash up on the wall 6 in., specify 8 in. wide flashing. If necessary to flash up on the wall 8 in. specify 10-in. wide, etc.

How Packed

Figge flashing is packed in specially designed cartons of tough and durable fiber board which assures flashing arriving on the job in perfect condition. Each carton is labeled properly with type and size clearly shown, bound with heavy steel strapping. Direction sheet in each package.

Package contains 100 lin. ft.

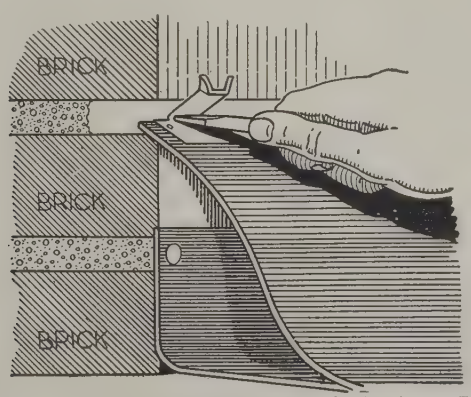


Fig. 1—Provide raggle 1½ in. deep at required height. Place flashing so that corrugation in device is in center of raggle. Place screwdriver or flat piece of metal at corrugation in securing device and push into raggle

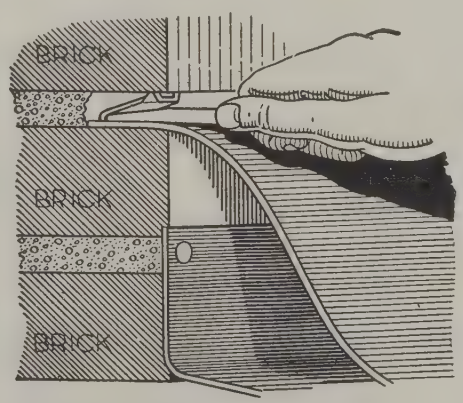


Fig. 2—When securing device in place press down so that it takes on position shown in Fig. 2

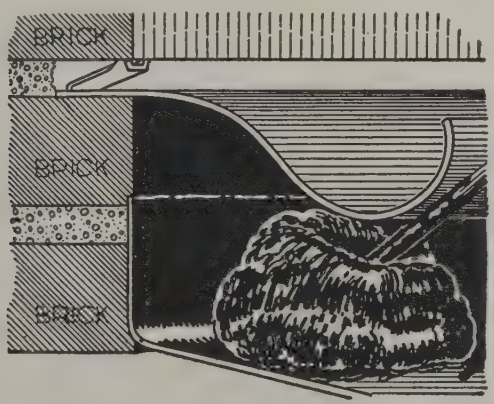


Fig. 3—Cement flashing to wall and turned-up portion of roof cover ing. Care should be taken here to prevent wrinkles

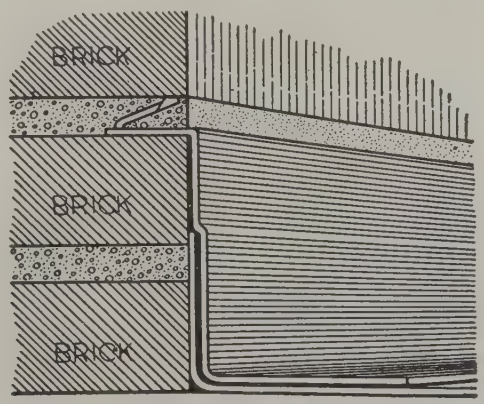


Fig. 4—Point up raggle with a rich mixture of portland cement mortar, or asphalt roof cement. In using asphalt roof cement stiffen with portland cement to form a mastic consistency. Then apply a coating of bituminous cement over entire exterior of flashing

ESTATE OF J. G. HETZEL

CABLE ADDRESS
"HETZEL, NEWARK"

Manufacturers of Roofing Cements and Paints

67 Maine Street, NEWARK, N. J.

Products

HETZEL'S ELASTIC ROOF CEMENT for all roofs, glass skylights, coping stones, etc.

HETZEL'S INSULATION CEMENT.

HETZEL'S PLASTIC ROOF COMPOUND and FIBROUS KOTING.

HETZEL'S ELASTIC CALKING COMPOUND.

HETZEL'S PIPE JOINT COMPOUND.

HETZEL'S DAMP RESISTING PAINT for brick walls.

Also Hetzel's Asphalt Paints; Hetzel's "Rub-on" Roofing Paint; Hetzel's Enamel Paint for boiler fronts and steam pipes; Hetzel's Acidproof Paint for metal work, ammonia tanks and gas tanks; Hetzel's Structural Paint for exposed surfaces.

TRADE-MARK

Hetzel's Elastic Roof Cement

Hetzel's elastic roof cement, in use throughout the United States and Europe for many years, is especially valuable for covering and repairing all holes, cracked joints, breaks, or leaks in roofs of all kinds. Used also for pointing around chimneys, skylights, and dormer windows; for repairing coping stones, gutters, wood and stone work which require to be made watertight; for laying and bedding slate and tile roofs.

Asphalt shingles laid in Hetzel's cement will not curl, nor can snow or rain blow under them.

Colors: brown, gray, black, white, green and red. It is also made to order to suit every purpose, and is the only slaters', tinners' and tile roofers' cement.

Hetzel's elastic roof cement is equally well adapted for use on slate, tin, asbestos, glass, wood and metal roofs; is permanent; does not run or loosen from joints or cracks, and is not affected by any extreme of temperature or climatic changes. It does not harden, but preserves its complete elasticity even when exposed to extreme heat, cold, dryness or humidity.

Hetzel's Insulation Cement

For applying Celotex or insulating material.

Applied cold, requires no heating. Eliminates kettles and consequent dirt and soot. Superior to pitch or asphalt for this purpose.

Hetzel's Plastic Roof Compound and Fibrous Koting (Liquid)

Specially prepared compounds for repairing and painting old wood, tin, iron or felt roofing; for repairing leaky chimneys; for waterproofing walls below and above grade, etc.

Hetzel's Elastic Calking Compound

For pointing window frames, hothouses, steel sashes, crevices, cracks in masonry, etc. Remains elastic indefinitely. Will not crack or dry up. Far superior to lead or oakum. Does not contain asphalt or coal tar. Can be painted over with any color. Also made in special consistency for use in guns.

Colors: white, gray, green, black and red.

Pipe Joint Compound (Red, Gray and White)

For joints of gas, steam, water, and air pipes. Will not harden, and prevents joints from rusting. Makes absolutely tight joints which can be disconnected at any time without injury to fittings.

Hetzel's Damp Resisting Paint

A compound black paint for dampproofing foundations and walls above and below grade. When applied to inner side of exterior walls, forms a good dampproof surface for direct application of plaster, rendering plaster stainproof, and saving cost of furring and lathing.

Specifications Hetzel's Elastic Roof Cement

All nailholes and joints between the slates shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J., in such quantities as to hold the slates in position should they break, or the nails rust away. (Fig. 1.)

The joints of all tiles shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. To prevent leaking, the hip and ridge rolls shall be sealed in a like manner. (Fig. 2.)

All cap flashings shall be carefully pointed up with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. (Fig. 3.)

The joints of all copings shall be set and sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. (Fig. 4.)

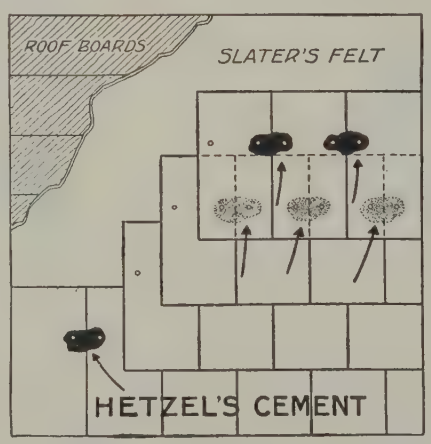


Fig. 1. For Slate Roofs

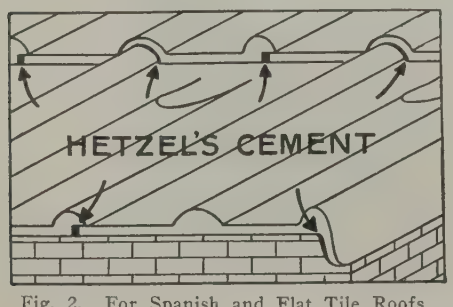


Fig. 2. For Spanish and Flat Tile Roofs

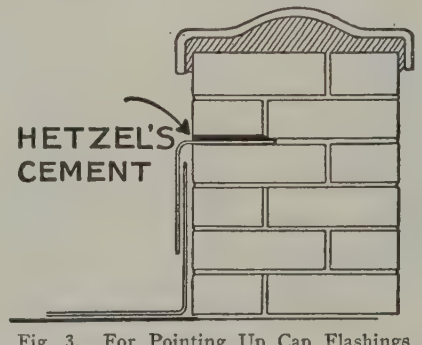


Fig. 3. For Pointing Up Cap Flashings

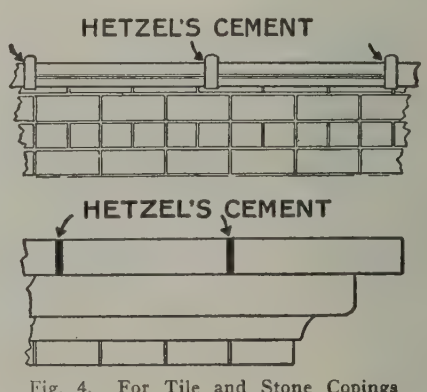


Fig. 4. For Tile and Stone Copings

Applications of Hetzel's Elastic Roof Cement

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street

CHICAGO, ILL.

Products

WALL COPING; FLASHING BLOCK; WALL APRONS.

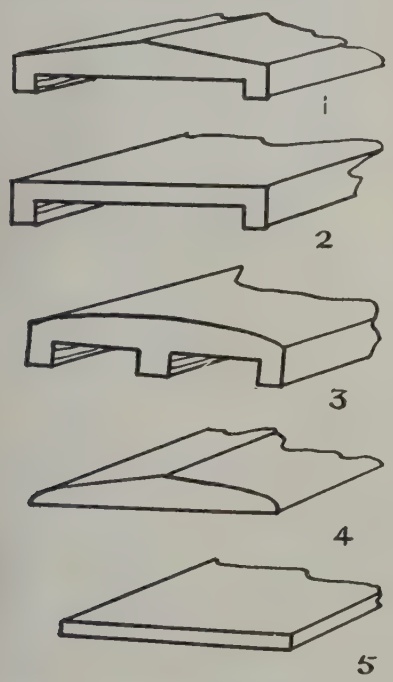
For Expansion Joints, see page A131.

For Ridge Strips, Asbestos Cement or Slate Roofing, Saturated Felt, Roofing Asphalt and Roof Coating, see page A455.

For Insulation, Roof Cement, Asphalt Paint and Industrial Flooring, see page B1996.

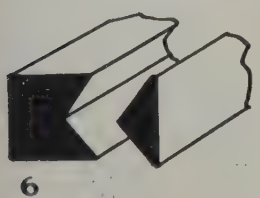
For Sewer Liners, Caulking Belts, Sewer Pipe Compound and Bitupack, see page C2737.

Servicised Wall Copings



These are highly resilient, absorb shock and are free from breakage. They comprise a bituminous and linear fiber mixture with a mineral content. They are prepared in various shapes and sizes, and are particularly adapted for waterproofing walls more effectively than brittle substances. The joint can be more effectively sealed and consequently guarantee a better waterproof seal over the wall. Different types of coping are shown and numbers should be utilized in writing, giving wall thickness so that proper widths can be determined.

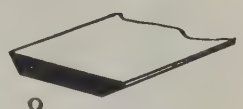
Servicised Raggle Block

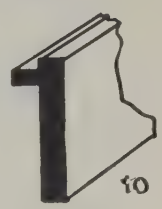


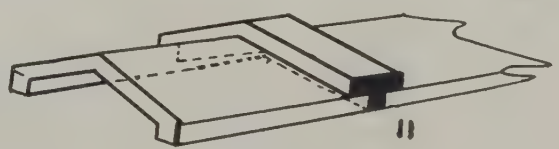
This is a block adapted to fit into the wall, it is prepared from bituminous material, felt fiber and mineral matter. It is especially designed to completely enclose the roofing joined with the wall, and inasmuch as the material from which the raggle block is prepared has the same ratio of expansion and contraction as the roofing, a better joint can be affected and maintained over a period of time. The use of Servicised Raggle Block guarantees an absolutely watertight wall connection.

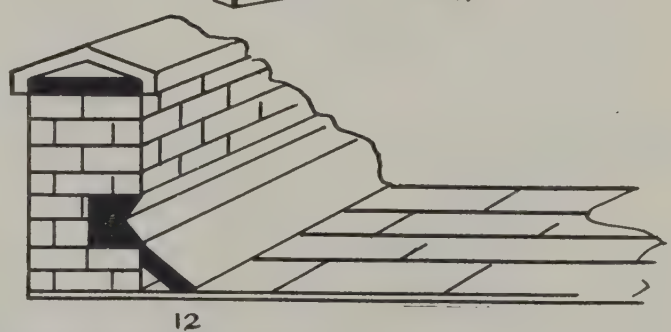
Servicised Coping Slabs

These are prepared to underlie the coping, or are adapted to underlie vitrified coping where the asphalt composition coping is not utilized. It forms an exceedingly waterproof separation between the coping stones and the wall proper, and can be fabricated with depending projections on the sides so that the top of the wall is capped with a waterproof sheet. Where it is made in channel or cap form the larger size coping stone would have to be employed to make allowance for at least ½ to 1-in. thickness on either side of the wall for the overhang.









Servicised Wall Aprons

These are designed to be suspended from the coping stone to the flashing block for the purpose of preventing moisture penetrating the wall structure above the roof.

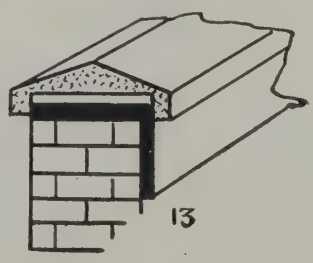


Illustration of Raggle Block, Cant Strip, Wall Coping and Coping Slabs in Place before Placing Roofing

BERGER BROTHERS COMPANY

Gutter Hangers and Conductor Pipe Fasteners

229-237 Arch Street, PHILADELPHIA, PA.

Products

GUTTER HANGERS and CONDUCTOR PIPE FASTENERS, of malleable iron, wrought iron, solid cast bronze and copper channel.

Also a general line of Sheet Metal Workers' Requirements; "Shurlock" Conductor Pipe and "E-Z" Fit Eaves Trough; "Quaker City" line of Mitres, Ends, Caps and Outlets.

Exclusive manufacturers of Octagon and Polygon Conductor Pipe.

TRADE -B B- MARK

Our registered trade-mark appears on all products manufactured by us. This mark represents dependability, durability and strength and protects the purchaser against inferior imitations.

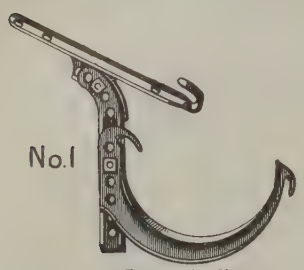
When specifying, full protection is assured by insisting that our trade-mark appear on every piece.

How Furnished—Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), solid cast bronze and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks.

Free samples on request.

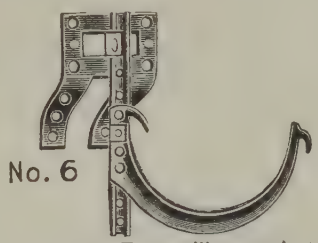
The Mark of Quality Which Protects the Purchaser

We are the originators, designers and manufacturers of the best grade of gutter hangers and conductor pipe fasteners on the market.

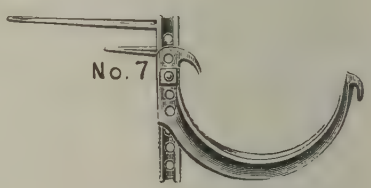


No. 1. Clamped direct to metal roof, requiring only one bolt through the iron. Especially suitable for awnings and corrugated roofs

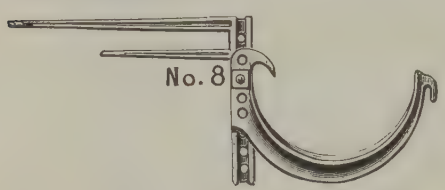
No. 5. Will span over various shaped mouldings and is easily bent larger or smaller before nailing to eave



No. 6. For nailing against O. G. mouldings. The two stays are made to fit in the cove and can be bent to suit variation

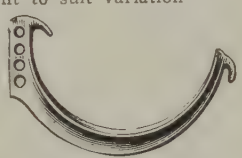


No. 7. For driving from 3 to 4 in. square in cornice. Lower prong forms a brace for the upper and makes it strong and firm



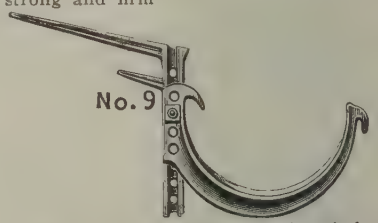
No. 8. For driving from 3 to 6 in. square in cornice. Intended for eaves where shingles project over the cornice

Penn Gutter Circle
For double bead gutters. Sizes, 3½, 4, 4½, 5, 6, 7 and 8 in.



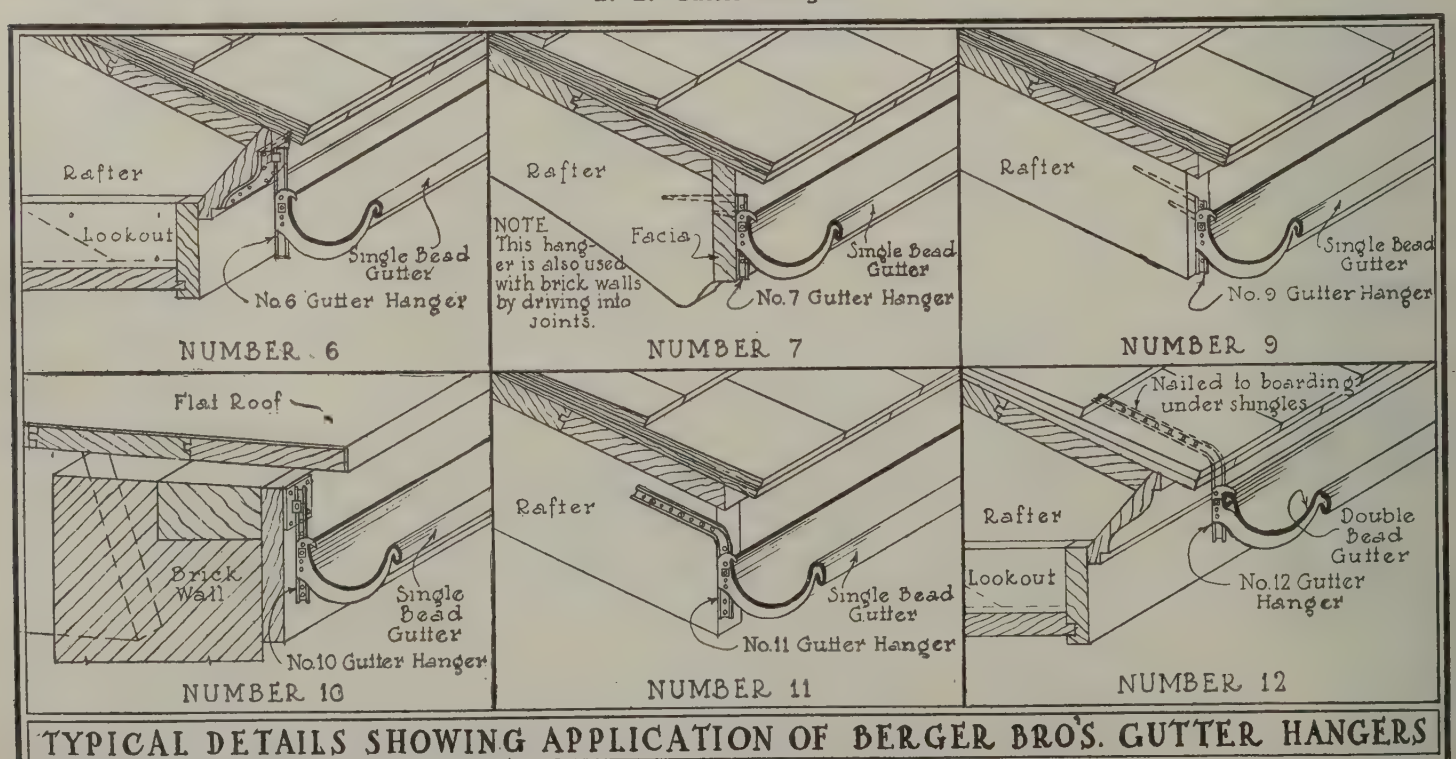
Gem Gutter Circle
For single bead gutters. Sizes, 3½, 3¾, 4, 4½, 5, 6, 7 and 8 in.

Circles are applicable to any B. B. hanger



No. 9. For driving with the pitch of the roof. Suitable for narrow moulded cornice

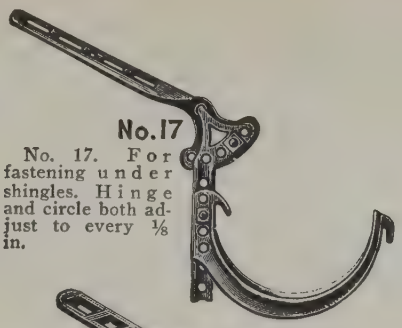
B. B. Gutter Hangers



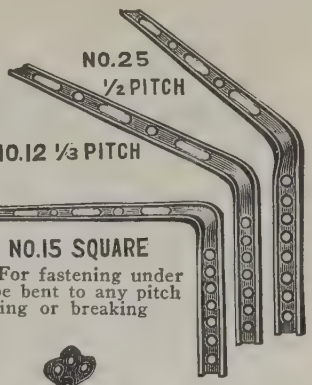
TYPICAL DETAILS SHOWING APPLICATION OF BERGER BRO'S. GUTTER HANGERS

Continued on next page

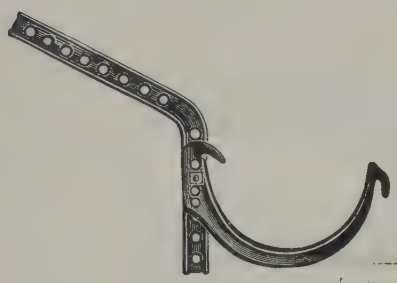
No. 10. For nailing against square box cornice



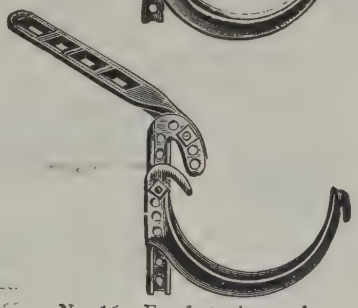
No. 17. For fastening under shingles. Hinge and circle both adjust to every ⅛ in.



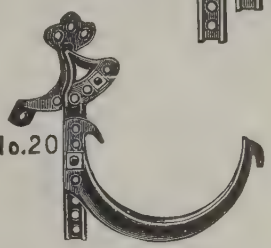
Nos. 12, 15 and 25. For fastening under shingles or slate. Can be bent to any pitch of roof without weakening or breaking



No. 11. For nailing to the side of exposed rafters



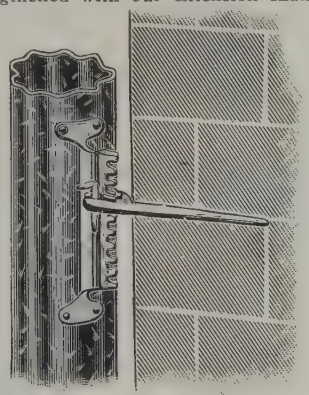
No. 16. For fastening under shingles

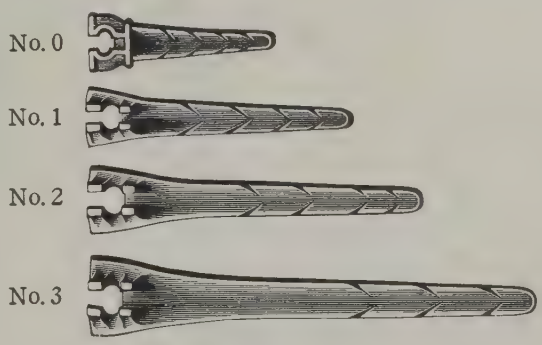


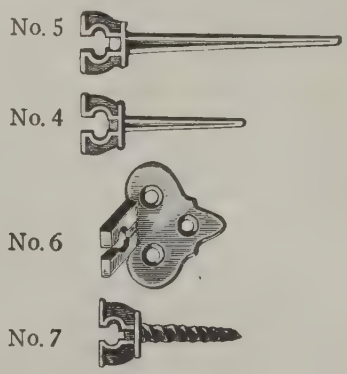
No. 20. For nailing or screwing to various shaped mouldings at any angle desired. Hinged for any pitch of roof

B. B. Gutter Hangers

Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), solid cast bronze and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks. Free samples on request



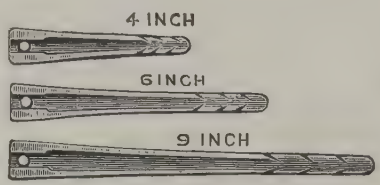


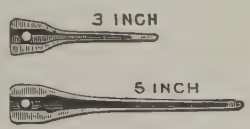


Pipe Fasteners

For fastening all kinds of conductor pipes at any distance from the wall. Used in any position and allow enough variation to let pipe slip together until tight in the joints. Needs no close measuring on wall to find a joint for the drive

No. 0. For brick, 3 in. No. 1. For brick or stone, 4½ in. No. 2. For stone, 6 in. No. 3. For stone, 9 in. No. 4. For wood, 3 in. No. 5. For wood, 5 in. No. 6. To nail on wood. No. 7. To screw in wood.



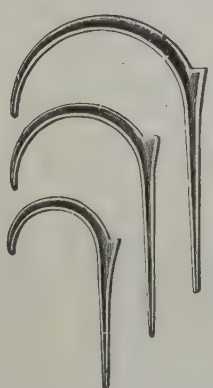


Clasp Pipe Hooks

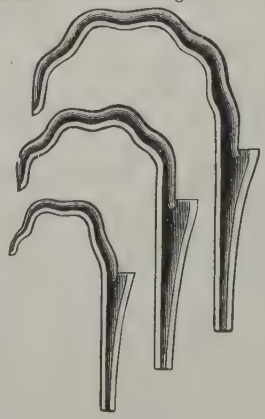
For fastening conductor pipe to wood, brick or stone at any distance from the wall. Length drives: 3 and 5 in. for wood; 4, 6 and 9 in. for brick and stone

Round Corrugated Hinged Pipe Hook
With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.

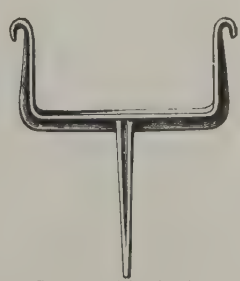
Plain Round Hinged Pipe Hook
With brick drive in 2, 3, and 4 in., and wood drive in 2, 3 and 4-in. sizes.



Plain Sickle Pipe Hooks
With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.



Corrugated Sickle Pipe Hooks
With wood and brick drive. Sizes, 2, 3 and 4 in.



Square Wired Pipe Hook
With wood and brick drive. Sizes, 3, 4, 5 and 6 in.

Round Wired Pipe Hook
With wood drive. Sizes, 3 and 4 in.

B. B. Conductor Pipe Fasteners and Hooks

Made of tinned malleable iron and of solid cast bronze

CHASE BRASS & COPPER CO.

INCORPORATED

Copper Roofing Materials, Drawn Brass Door Saddles and Sill Mouldings

WATERBURY, CONN.

NEW YORK, N. Y., 80 Lafayette Street

BOSTON MASS., 411 "D" Street
ROCHESTER, N. Y., 119 East Main Street
NEWARK, N. J., 361 Halsey Street
PHILADELPHIA, PA., 46 North 6th Street
BALTIMORE, MD., 307 E. Lombard Street
PITTSBURGH, PA., Union Trust Building
CINCINNATI, OHIO, 222 Post Square
CLEVELAND, OHIO, 5005 Superior Avenue
DETROIT, MICH., 2798 E. Grand Boulevard
CHICAGO, ILL., 1300 W. Harrison Street
ST. LOUIS, MO., 314 North 2nd Street
NEW ORLEANS, LA., 429 Camp Street
DALLAS, TEX., American Exchange Bank Building
LOS ANGELES, CAL., 2463 East 8th Street
SAN FRANCISCO, CAL., 680 Second Street

Products

CHASE TRADE-MARK

COPPER LEADERS, ELBOWS, SHOES, STRAPS, STRAINERS, HEADS.

COPPER GUTTERS: MITERS, END PIECES, CAPS, OUTLETS and HANGERS.

SHEET COPPER; ROOFING NAILS; COPPER SHINGLES; COPPER SPANISH TILE.

DRAWN BRASS DOOR SADDLES and SILL MOULDING.

Also, Snow Guards; Copper Ridge Caps, Rolls, Valleys and Flashings; Brass and Bronze Railings; Grilles; Ornamental Wire Work.

For Bronze and Copper Screen Cloth, see page B1561; for Alpha Brass Pipe, see page C2704.

Chase Star Brand Copper Leaders

Only 16 oz. pure copper will give the satisfactory long life and permanently trim, neat appearance that rightfully should be and is expected of copper leaders and gutters.

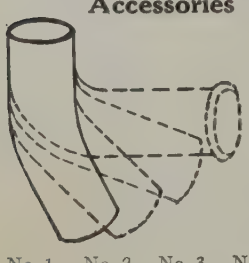
Every length of Chase leader and gutter is clearly embossed with our name and the net weight of hard rolled, roofing temper pure sheet copper from which it is made. Our name and brand mark on a length of copper leader or gutter is positive assurance of full net weight, standard quality material. All Chase copper products are unconditionally guaranteed.

In order to meet requirements of the building trades for prompt service we carry on hand in our warehouses, ready for *immediate* shipment an extensive stock of copper leaders comprising the following sizes and kinds.

Copper leader	Weight of copper, oz.	Lengths, ft.	Diameter, in.
Plain round	16	10	2, 3, 4, and 5
Corrugated round	16	10	2, 3, 4, 5 and 6
*Corrugated square	16	10	2, 3, 4, and 5

*From long custom this type of leader is termed "square," whereas it is in reality rectangular in shape. Sizes carried in our stock as noted above are standard. Actual measurement of 2-in. "square" corrugated leader is 1¾x2¼ in.; 3 in.=2⅜x3¼ in.; 4 in.=2¾x4¼ in.; 5 in.=3¾x5 in.

Chase Copper Leader and Gutter Fittings and Accessories

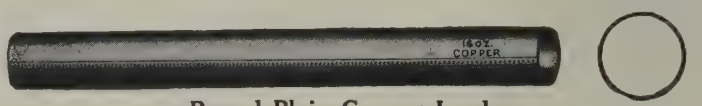


No. 1 45° | No. 2 60° | No. 3 75° | No. 4 90° Shoe

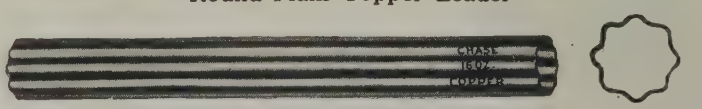
Types of Leader Elbows

Elbows, shoes, miters, end pieces, caps and outlets are also carried in our warehouse stock in sizes and patterns to correspond with foregoing stock items of leader and gutter.

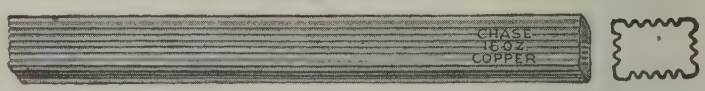
Leader elbows are ordinarily designated by "number" and diameter. "Number" indicates degree of angle (see accompanying sketch).



Round Plain Copper Leader

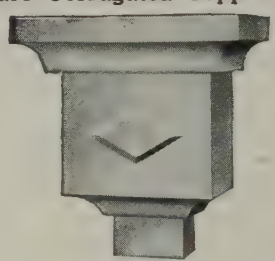


Round Corrugated Copper Leader



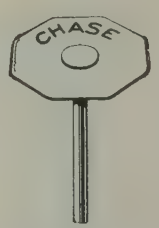
Square Corrugated Copper Leader

Brick Drive Tinned Iron Leader Hook



Diamond Pattern Copper Leader Head

Also made in fleur-de-lis pattern. All sizes



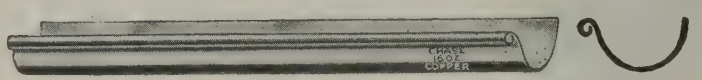
Copper Storm Nail for Asbestos Shingles

Round Corrugated Shoe

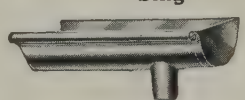
Style "B" Locktite Copper Leader Strap

Also available for round leaders

Square Corrugated Elbow



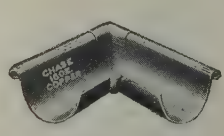
Single Bead Lap Joint Copper Gutter



Gutter End Piece with Cap and Outlet

Copper Wire Leader Strainer

Also made for round leader



Outside Corner Copper Gutter Miter

Copper Wire Nail

Copper Shingle

Cut Copper Nail

Copper Spanish Tile

Continued on next page

Chase Copper Gutter

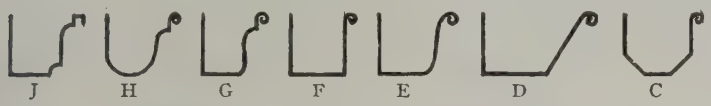
Single bead, lap joint half round. Stock sizes: 16-oz. copper, 10-ft. lengths, 4, 5, and 6-in. diam.

Double bead, half round gutter, also double or single bead, *slip* joint types can be furnished promptly to special order.

While it is possible for a skilled metal worker to make satisfactory quality copper gutter, this practice leaves the architect without positive means of knowing that full weight, 16-oz. copper has been installed on a residence, in accordance with specifications.

Like our Chase Copper Leader we advocate the use of *factory made* material and for purposes of quick identification and as our positive guarantee of full weight standard quality, every length of genuine Chase copper gutter is indelibly die stamped with our name and the full net weight of copper from which it is made.

To meet special requirements a variety of "OG" and other types of copper gutters can be made to order promptly. The following suggested patterns give some idea of our facilities in this direction.



Styles of Special Copper Gutters

End or contour views showing some types of "OG" and special patterns of copper gutters that can be made promptly to special order (not drawn to scale). These designs may be varied in any particular to conform with architects' plans and can be made in any size desired

Chase Sheet Copper

Has a reputation with the roofing and sheet metal working trades as a dependable, uniformly satisfactory product.

Every step in the production of Chase sheet copper from mine to ingot and from ingot to the rolled sheet is carried out in full accordance with present day standards and improved methods.

Chase sheet copper is as near 100% pure as any sheet copper can be made.

By writing Chase Copper into specifications you will have the satisfaction of knowing that you are providing for material with a thoroughly tried and proved reputation for quality.

Chase "Old English" Lead Coated Copper

For roofs, valleys, flashings, leaders, gutters and other outside metal trim on country houses or public buildings where "English" style of architecture is a feature.

Can be furnished in any required size. Coated on one or both sides, as desired.

The cost is only a fraction of that of hard sheet lead or cast lead fittings. It is much lighter than pure lead and therefore easier to handle and support. It will not dent and damage as easily as pure lead. It can be worked into innumerable designs and patterns that would be impossible of attainment with cast lead.

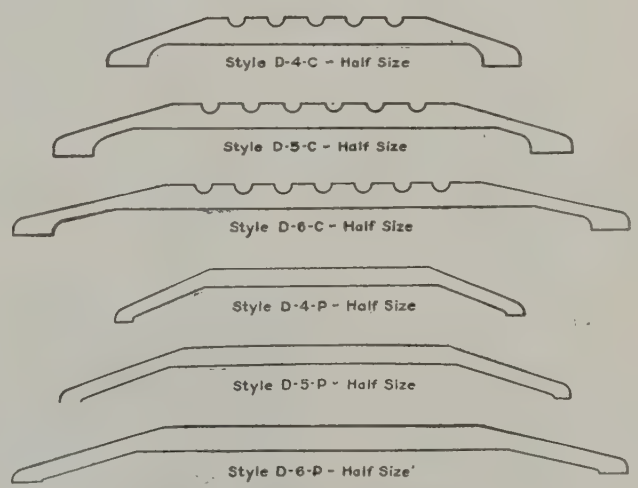
Chase Drawn Brass Door Saddles

Ready to ship from warehouse stock in two types, *plain* and *corrugated;* and in three widths, *four, five* and *six-inch* (see drawings of cross sections opposite).

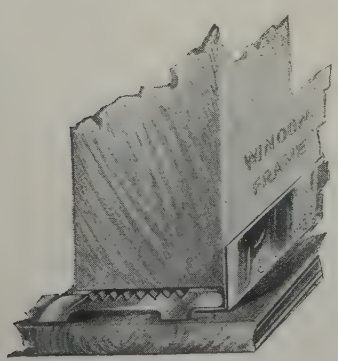
Drawn brass saddles should not be confused with *cast* brass equipment, which is much softer and less durable than drawn metal for this purpose.

Iron door saddles will rust and are unsightly; marble and stone wear away quickly, also chip and crack easily; while wood is wholly unsuitable for use where there is any great amount of traffic. Drawn brass saddles are ideal for both interior and exterior use.

Furnished ready cut to specific lengths or in random mill lengths up to *twelve feet.* Notched end cuts will be made without charge provided they can be made on a circular bench saw. Any odd width up to *six inches* can be furnished from mill where quantity required is sufficient to warrant special manufacture.

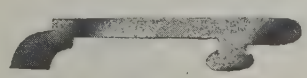


Drawn Brass Door Saddles



Showing Method of Installing Chase Drawn Brass Sill Mounting
(Not drawn to scale)

S-1-F
Cross section, actual size



S-2-V
Cross section, actual size

S-3-P
Cross section, actual size

Chase Drawn Brass Weatherproof Sill Moulding

Every wood frame casement window and outside French door should have a strip of non-rustable weatherproof moulding installed on the sill.

We specialize in brass moulding for this purpose and have tools for the manufacture of a variety of types, three of which are illustrated here.

Combination brass door saddles and weatherproof sill mouldings are in great favor for suburban residences and we can furnish practically any type or size to special order provided the quantities required are large enough to warrant special manufacture.

Samples and further details regarding standard types and sizes gladly furnished upon request.

LOUIS ABT & COMPANY

Manufacturers of the Abt Double Ventilating Skylight

2651-2653 Roosevelt Road
CHICAGO, ILL.

Product

The Abt Double Ventilating Skylight, Manually Chain Operated, or Electric Power with or without Automatic Thermostatic Control.

Adaptation

An essential in the design of garages, foundries, factories, laundries, etc., in the elimination of smoke, steam and gases in conjunction with natural controlled air change necessary for efficient working conditions.

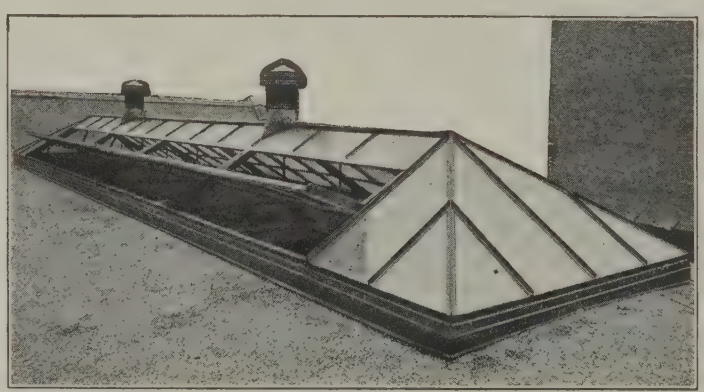
Description

The Abt Double Ventilating Skylights provide both *intake* and *exhaust* opening for complete, *controlled* natural ventilation readily adapted to specific industrial and building requirements. An analysis of the patented construction discloses the highest type of efficiency value possible—capable of practically twice the ventilation or open area provided by other skylights of the same size.

Structurally the design assures the utmost in permanent strength and rigidity without excessive weight. Due to the design of the axle balanced ventilating sash, continuous runs of 100 ft. or more are operated with the least possible effort. The construction of the weathering members at the operating units is watertight under all conditions.

Designs and Sizes

The construction is adapted to any design such as gable end, hip, gambrel roof or sawtooth. Made in standard widths 6, 8, 10, 12 and 14 ft. and from 8 ft. to any required length. Special widths at additional cost.



Model "B"
Also made in gable type

Types

Model B—Has a glass ridge. Made with either gable end (where the ventilating sash may run the full length if desired) or hipped (where the ventilating sash may run the length of the ridge).

Model C—Has a metal ridge with gable end. The ventilating sash sections alternate with fixed skylight sections.

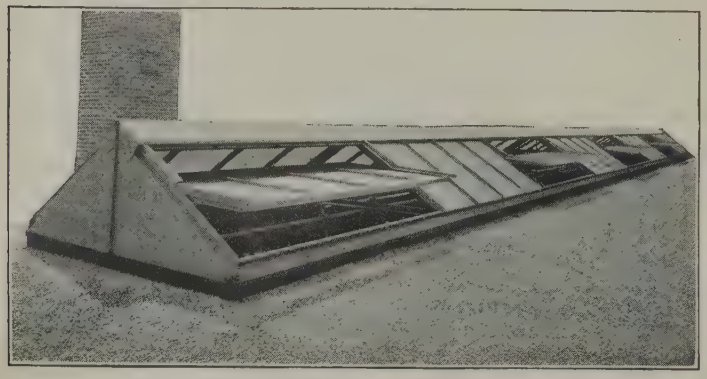
Model D—Gable end gambrel roof type with the ridge slope glazed. Made with alternate panels of ventilating sash and fixed glass or with ventilating sash running the full length.

Operators

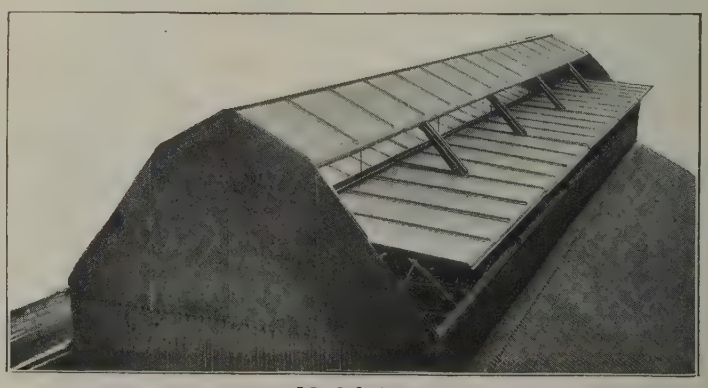
Manual Operation—Chain operated wheel or rod operated gear direct connected to a pipe shaft operating racks and pinions. Continuous runs of 100 ft. or more of ventilating sash are operated from a single power unit with the greatest ease and speed—runs are completely opened or closed in less than a minute.

Electric Power—Motor driven through friction drive direct connected to pipe shaft operating racks and pinions with minimum current consumption. Completely equipped with special remote control panel—ventilating sash may be started and stopped at will from any position. Opposite sides of skylight may be operated simultaneously or independently. Automatically stops at full open and full closed without strain on operating device.

Automatic Thermostatic Control—Applied in conjunction with electric power. Is entirely automatic but can be controlled to suit conditions from remote control panel as above described. Arranged to operate one or both sides of skylight and to stop and start at will.



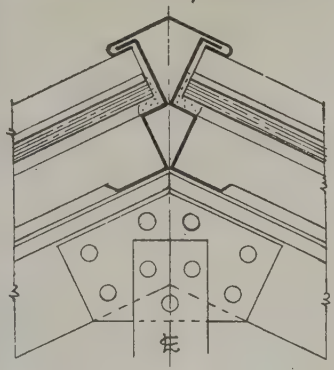
Model "C"



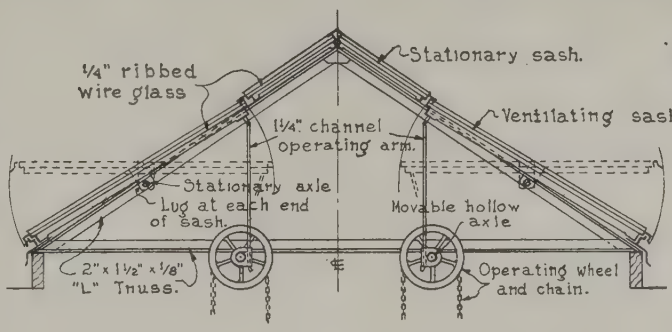
Model "D"

Continued on next page

~ Operated by Hand, Electric or Thermostatic Control ~

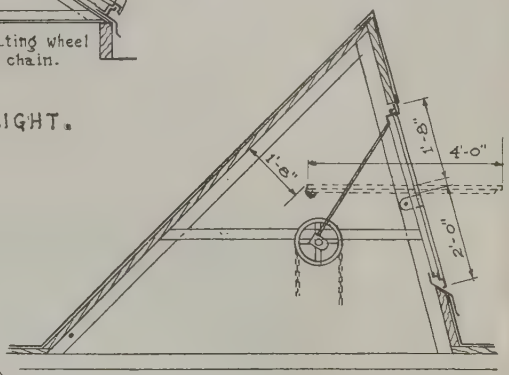


RIDGE SECTION OF MODEL "D"
SCALE 3" = 1'-0".

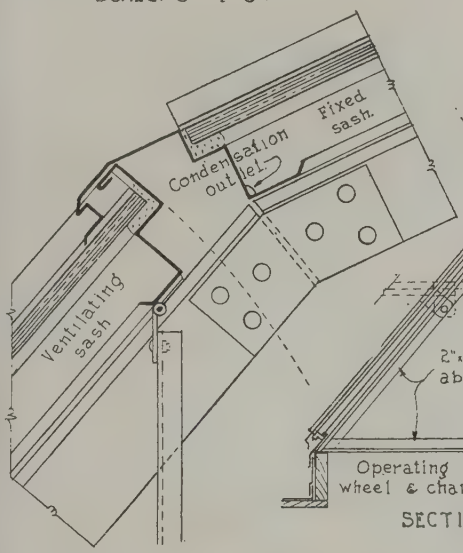


SECTION THROUGH MODEL "B" SKYLIGHT.
SCALE 3/8" = 1'-0".

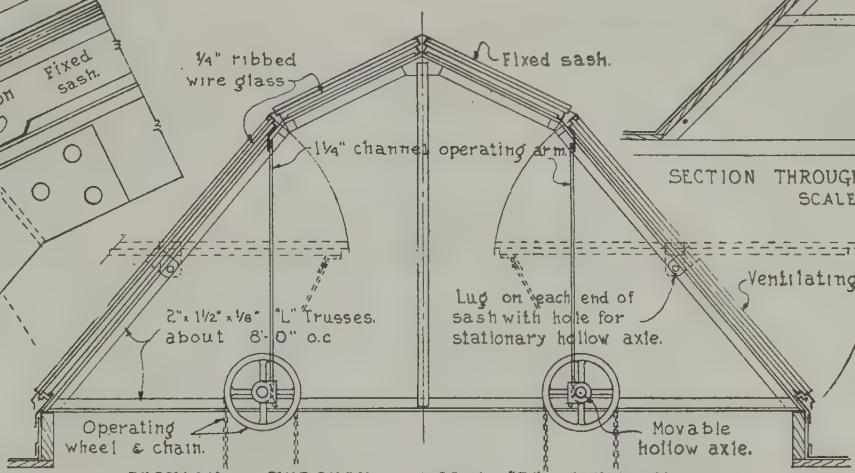
SECTION THROUGH BAR.
SCALE 3" = 1'-0".
NOTE:- Used on all models.



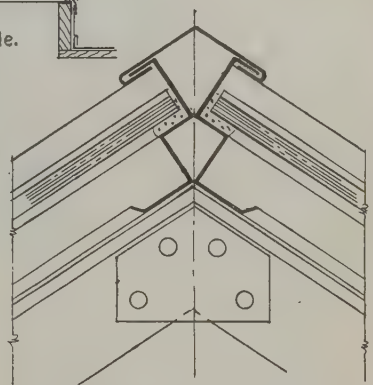
SECTION THROUGH SAW-TOOTH SKYLIGHT.
SCALE ¼" = 1'-0".



SECTION AT HEAD OF VENTILATING SASH OF MODEL "D".
SCALE 3" = 1'-0".

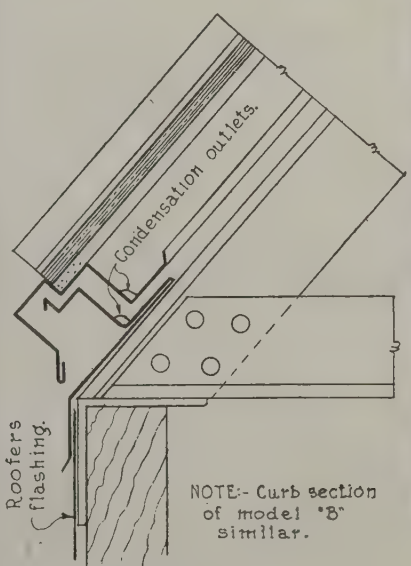


SECTION THROUGH MODEL "D" SKYLIGHT.
SCALE 3/8" = 1'-0".



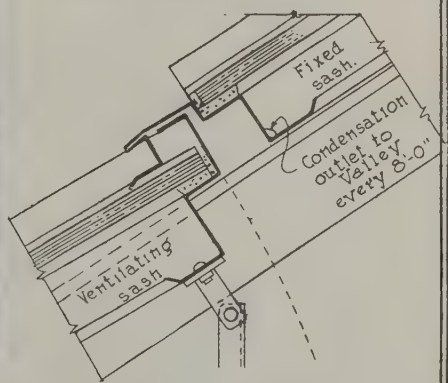
RIDGE SECTION OF MODEL "B"
SCALE 3" = 1'-0"

MODEL "D" SKYLIGHT ASSURES MAXIMUM LIGHT AND VENTILATION.



NOTE:- Curb section of model "B" similar.

CURB SECTION OF MODEL "D"
SCALE 3" = 1'-0"



SECTION AT HEAD OF VENTILATING SASH OF MODEL "B"
SCALE 3" = 1'-0"

LOUIS ABT & COMPANY.	DETAILS OF ABT DOUBLE VENTILATING SKYLIGHTS MODEL "B" MODEL "D" & SAWTOOTH.	DRAWING NO. 1 SCALE:- ¼" 3/8" & 3" = 1'-0".

AMERICAN SKYLIGHT COMPANY

American Ventilating Skylights and "Steelead" Skylights

2617-2625 Fletcher Street

CHICAGO, ILL.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

West of the Rocky Mountains, "Steelead" Skylights are Manufactured and Installed by NORTHWEST LEAD COMPANY, SEATTLE, WASH.

AMERICAN VENTILATING SKYLIGHTS

Type "F" American Ridge Ventilating Skylights

This advanced construction meets every demand of the architect. It gives a full measure of daylight and provides perfectly controlled ventilation as well.

Because of this double value, these skylights are ideal installations for public garages, laundries, shops, foundries, gymnasiums, schools, public auditoriums, etc.

Type "F" ventilating skylights have movable or ventilating sash at the ridge with fixed sections below. Either or both sides of the ventilating units may be opened. The ventilating units are built from 4 to 28 ft. in length and 30 in. wide. The width of the ventilating unit is fixed and does not vary with the width of the skylight. Only one operator is required for every 28 ft. of type "F" ventilation.

The operator may be equipped with detachable pole with crank handle or an endless chain, as preferred, or it can be fitted with electric drive if desired, so that by simply pressing an ordinary light switch in the wall, the skylight will open. A ¼ hp. motor will easily operate one ventilating section.

Type "F" skylights are glazed with ¼-in. wire glass, ribbed or rough and are made of No. 18 galvanized copper bearing metal. They are carried in stock in standard sizes 4, 6, 8, 10 and 12 ft. wide, these dimensions being out to out of curbs, length as desired. They can be made up to practically any width and many installations have been made of skylights as wide as 30 ft. Type "F" skylights can also be made of copper, aluminum, or leadclad metal, at slight additional cost.

Competent erection crews maintained in the larger cities insure prompt service and careful supervision of installations anywhere in the United States.

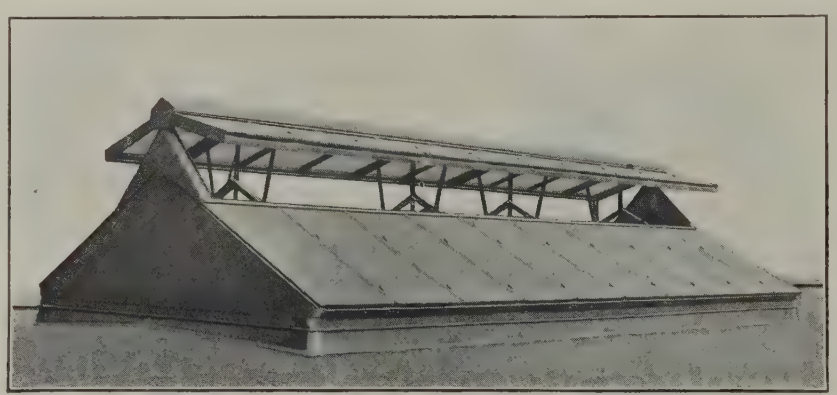
Type "F" skylights are shipped to the job partially assembled so that very little additional labor will complete the erection. All units are bolted together; no soldering is necessary and complete erection instructions and layout drawings are provided when the skylights are to be erected by local sheet metal men or contractors.

The detail below clearly illustrates the method of operation. The steel trusses are always provided as part of the skylight. The design of the truss varies with the width of the skylight; they are always spaced not greater than 6 ft. on centers. A curb flashing is provided which extends down 4 in. below top of curb.

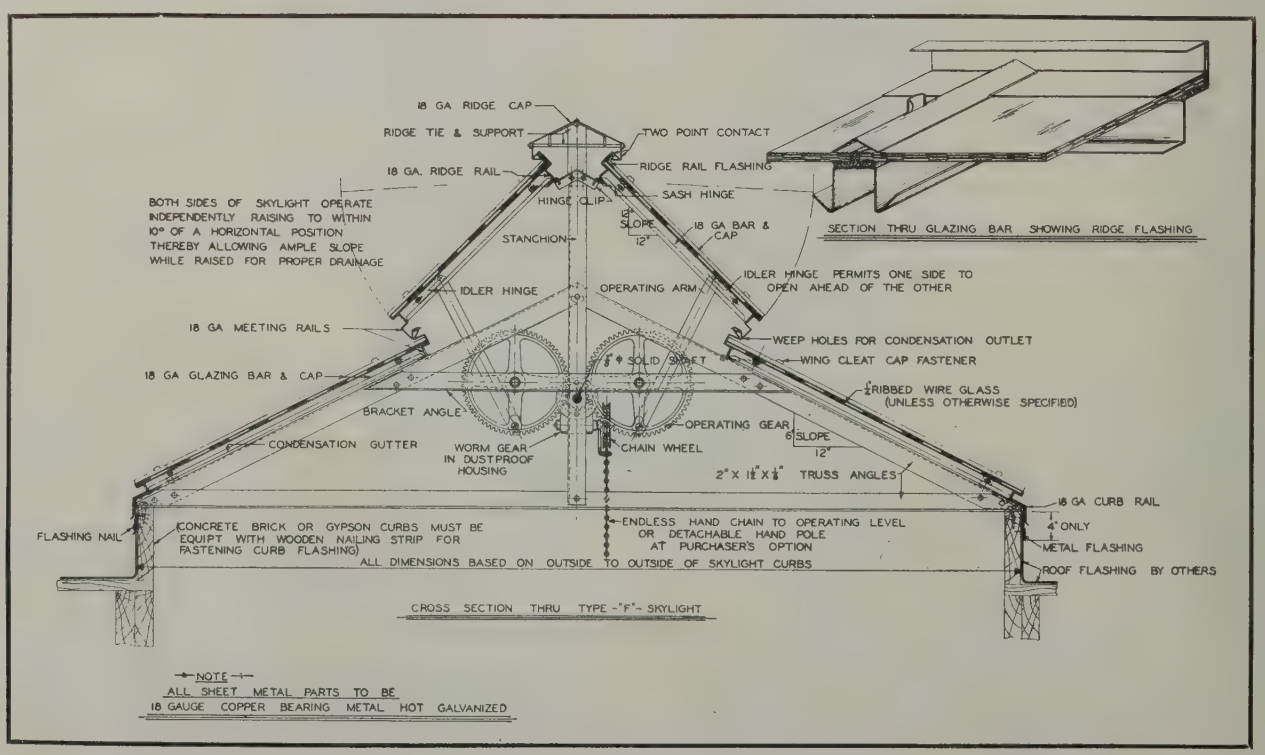
Specifications—Skylights shown on plans shall be Type "F" Ridge Ventilating, as made by the AMERICAN SKYLIGHT COMPANY, Chicago, Illinois. They shall be composed of stationary and hinged sections, the length of hinged sections to be as indicated on plans.

All sheet metal parts to be formed of No. 18 gauge galvanized copper bearing rust resisting metal, pressed into shape and fitted together without the use of solder. The sash shall be supported on steel trusses not more than 6 ft. on centers. The skylights shall be glazed with ¼-in. ribbed or rough wire glass, set in putty. The skylights shall be operated by means of a detachable pole with crank handle [endless chain].

All metal parts shall have one shop coat of special prepared paint.



Type "F" Skylight, Showing Ventilating Features



Details of Type "F" Skylight Showing All Important Features of Construction

Continued on next page

Type "J" Skylight

Fills the need for maximum ventilation without sacrificing daylight. Provides great exhaust capacity with perfect control and maximum light area.

Complete sash can be raised from ridge to curb. Either or both sides may be raised at will. By opening side away from the wind, air will be drawn out of building; opening side towards the wind will force fresh air into building. Both sides open will ventilate building. If both sides are closed it is absolutely weathertight.

Standard width sizes are carried in stock at all times so that prompt shipments can be made. Skylights 4, 6, 8, 10 and 12 ft. wide are standard, these dimensions being out to out of curbs.

Type J Construction—*Sash*—The sash is made of 18 gauge galvanized copper bearing, rust resisting metal. Glazing bar is shaped to provide deep condensation gutters. Upper and lower rails make weathertight connections. Sash is hinged at the top and may be raised to a position 10 degrees below horizontal, allowing ample slope for drainage.

Trusses—Trusses are spaced not greater than 6 ft. apart. They are made of 2x1½x⅛-in. steel angles with riveted connections. Center member of truss supports ridge.

Ridge—Ridge is constructed of 18 gauge galvanized copper bearing, rust resisting metal. Extends the full length of skylight, overlapping gable ends. Ridge is securely bolted to the center member of each truss.

The Gable Ends—Gable ends are made of 18 gauge galvanized copper bearing, rust resisting metal. They are well reinforced by steel angles.

Curb Flashing—Flashing extends 4 in. below top of curb. It is made of 24 gauge galvanized copper bearing, rust resisting metal.

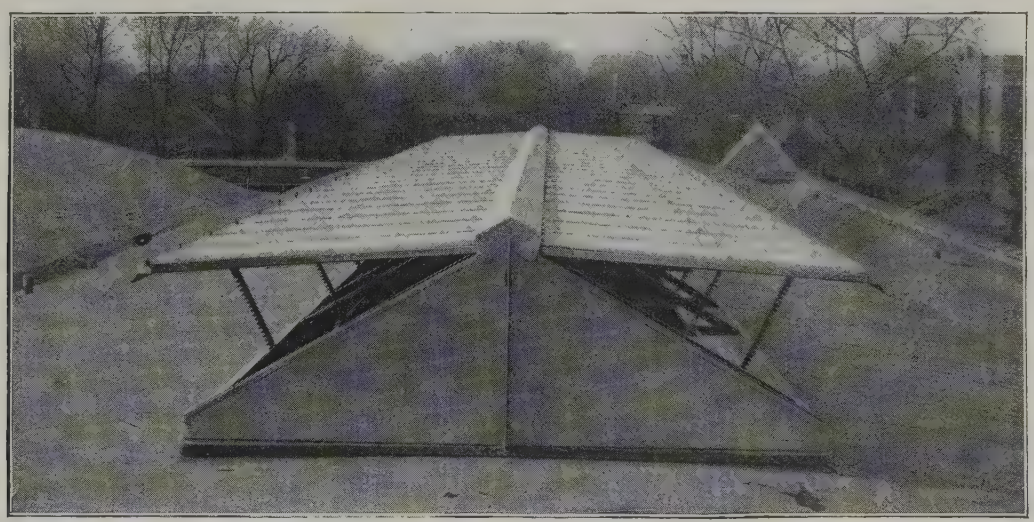
Manual Operators—Operators are controlled by a pole with crank handle or an endless chain as preferred. Where impractical to operate skylight from a point directly beneath, simple connections can be supplied at slight additional cost for remote control.

Motor Operators—Motor driven units can be used equipped with limit switches.

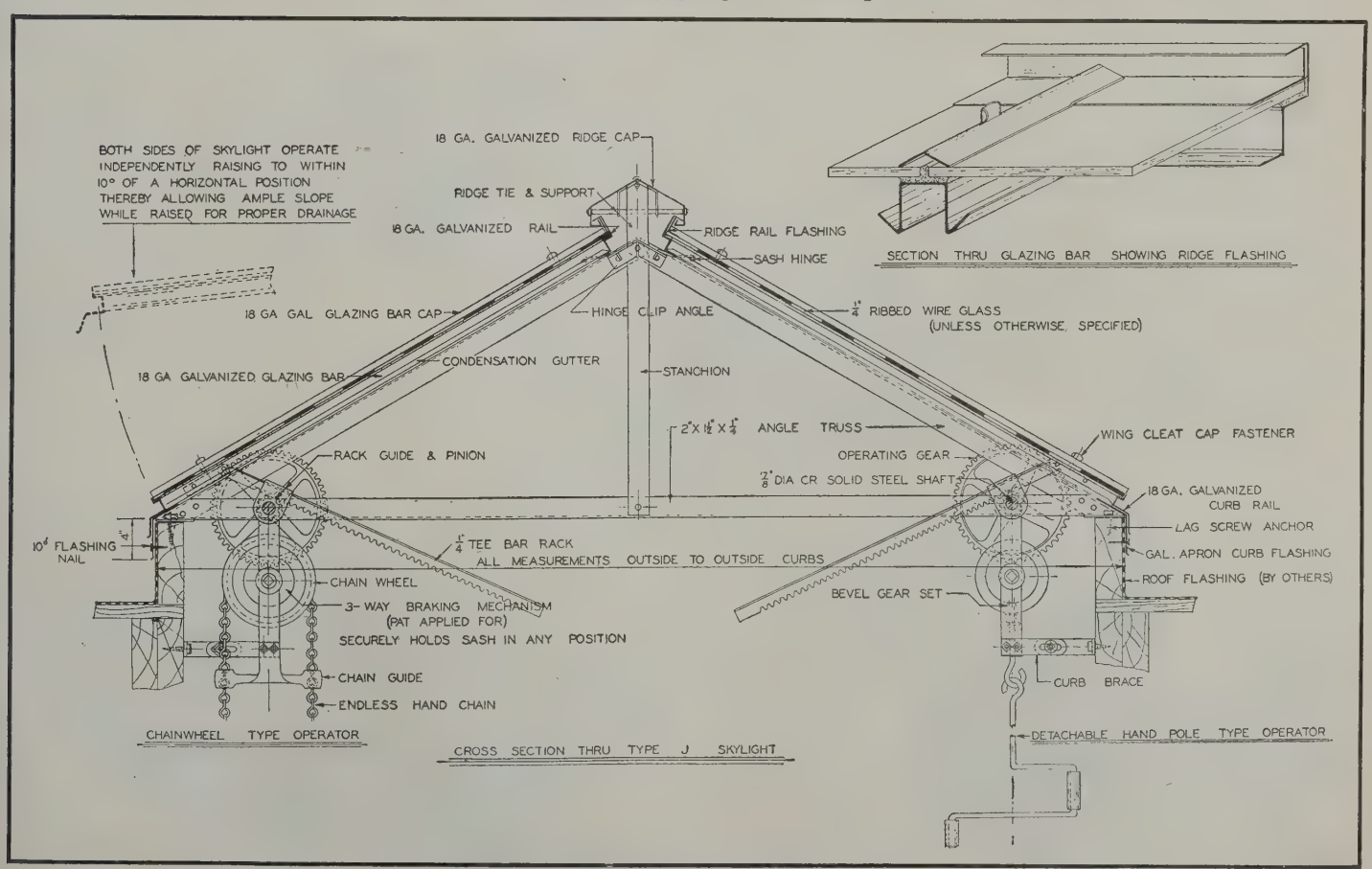
Glass—¼-in ribbed or rough wire glass supplied with all orders. Best grade linseed oil putty is furnished. After glass is set, flashing caps are secured to glazing bars to protect putty.

Paint—All metal parts are given one coat of special prepared paint at the factory.

Specifications—*Full Vent Type "J"*—Skylights shown on plans shall be of the type known as Full Ventilating, as made by the American Skylight Company. They shall be composed of sections on each side that are hinged at the ridge and raised from the curb. These shall be operated by a hand chain mechanism or detachable pole with crank handle from below; each side separately. They shall be made of No. 18 gauge galvanized copper bearing metal painted on shop coat of special prepared paint. Glazing shall be ¼-in. (ribbed or rough) wired glass.



End View of Type "J" Skylight, 8 Ft. Wide, on a Public Garage
Illustrates the perfect daylighting and ventilating features



Details of Type "J" Skylight Showing All Important Features of Construction

Continued on next page

"STEELEAD" SKYLIGHTS

West of the Rocky Mountains these skylights are manufactured and installed by Northwest Lead Company, *Seattle, Washington*

"Steelead" Skylight Features

Put through every possible trial by engineers and architects—tested by time in hundreds of installations—"Steelead" has proven itself to be above all the perfect skylight. It is adapted to all types of construction, in all kinds of locations.

"Steelead" Skylights can be built in any style—lean-to, single pitch, hip, gable, or sawtooth. Any style ventilator can be installed with "Steelead" as well or better than with most sheet metal constructions. Whatever the type of installation, there is a "Steelead" construction to meet it.

Strength—The 1½-in. steel T-bar core in the standard "Steelead" bar is sufficient structurally for a 7-ft. clear span. This permits the construction of double pitch skylights up to 12 ft. in span (out to out of curbs) without the use of purlins.

A heavier "Steelead" bar is carried in stock with a steel T-bar core 2x2x¼ in.—3.56 lb. The 2-in. "Steelead" bar is sufficient structurally for a 9-ft. clear span. This permits the construction of double pitch skylights up to 16 ft. out to out of curbs, without the use of purlins using the 2-in. "Steelead" bar.

Permanence—The lead sheath is everlasting. Will not rust, rot or corrode. Needs no paint, packing, or putty.

For railroad use in depots, train sheds, freight houses, with their great assault of smoke, gases and vibration; for factories with the attacks of fumes, steam and vibration; for institutions where upkeep is an item and permanence a need; for public buildings where dependability is paramount—"Steelead" has proven itself without an equal. And its cost is no greater than copper sheet metal constructions.

"Steelead" Bar—The patented "Steelead" bar is the basis of the "Steelead" skylight, and the secret of its superiority. This combines the strength of steel with the permanence of lead.

On a standard 1½x1½x$\frac{3}{16}$-in. steel T-bar is moulded a seamless sheath of pure lead, our special patented design for skylight construction. After being cut to the proper length, both ends of the bar are sealed with lead.

An ideal glass rest is provided by forming a heavy ridge at the heel of the bar. The glass actually rests on a thin knife edge of lead, formed on top of the ridge. Due to the thin edge and the ductility of lead, this knife edge under the weight of the glass, conforms to any unevenness in the glass, prevents undue strain at any point and makes an absolutely tight joint.

There is also formed between the glass rest and the stem of the bar a drip gutter that catches any possible leakage.

Condensation gutters are provided and are opened with a wood tool just before the glass is set.

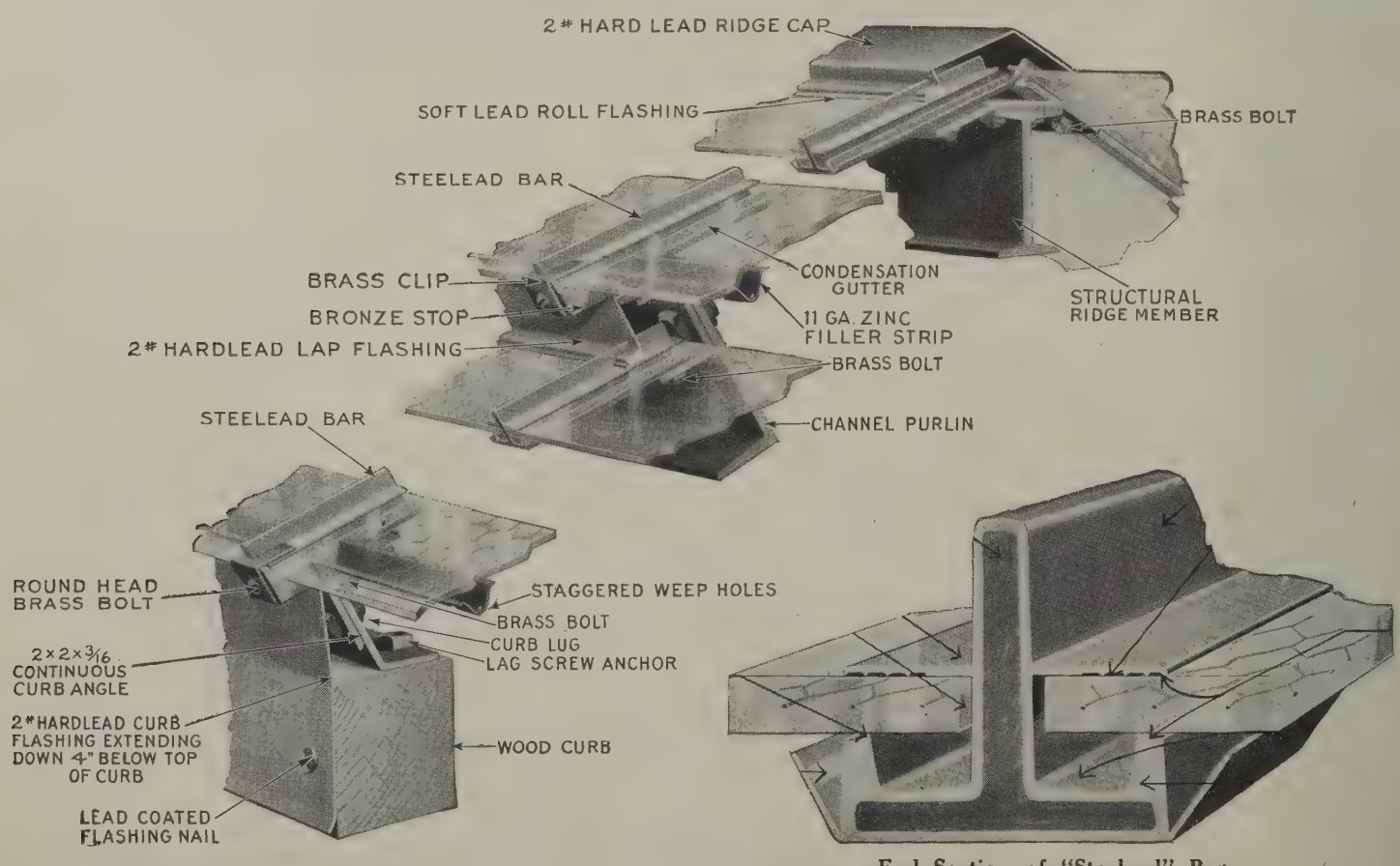
On the web of the "Steelead" bar are moulded, integral with the lead sheath, lead glazing wings. After the glass is placed on the lead seat, the glazing wing is pressed down on top of the glass. The undersides of these glazing wings are longitudinally ribbed so that when pressed onto the glass they conform to the unevenness and make a series of air seals that are dusttight, watertight and windtight. These wings will withstand severe air pressure from below, yet they can easily be raised to replace a broken glass.

Thus the glass rests on lead and is held in place by lead without using putty or packing. It is tight, yet free to expand and contract—an ideal condition for skylight glass.

"Steelead" Design—Where the skylights are not considered as part of the structural design of the building, necessary structural trusses for the skylights are designed and constructed at our factory. Where the skylight supports are considered as part of the structural steel supporting the building, "Steelead" can readily be adapted to meet these conditions.

Where two or more runs of glass are required along the slope of a skylight the upper run is lapped over the lower run, a method much better than the butt joint construction for the reason that any condensation is carried out at the lower end of each run and does not need to travel underneath the skylight until it reaches the curb. Some sheet metal authorities advise against using sheet metal puttyless constructions with hipped skylights, because of difficulty in making a weathertight job. We have experienced no difficulty in producing a perfectly weathertight, hipped "Steelead" Skylight; in fact, the majority of our installations have been of this construction.

In a "Steelead" Skylight only glass and lead are exposed to the elements, with the exception of a cast bronze bar stop, which holds the lower end of each "Steelead" bar. Therefore, "Steelead" Skylights should last as long as the building.



End Section of "Steelead" Bar

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Specifications

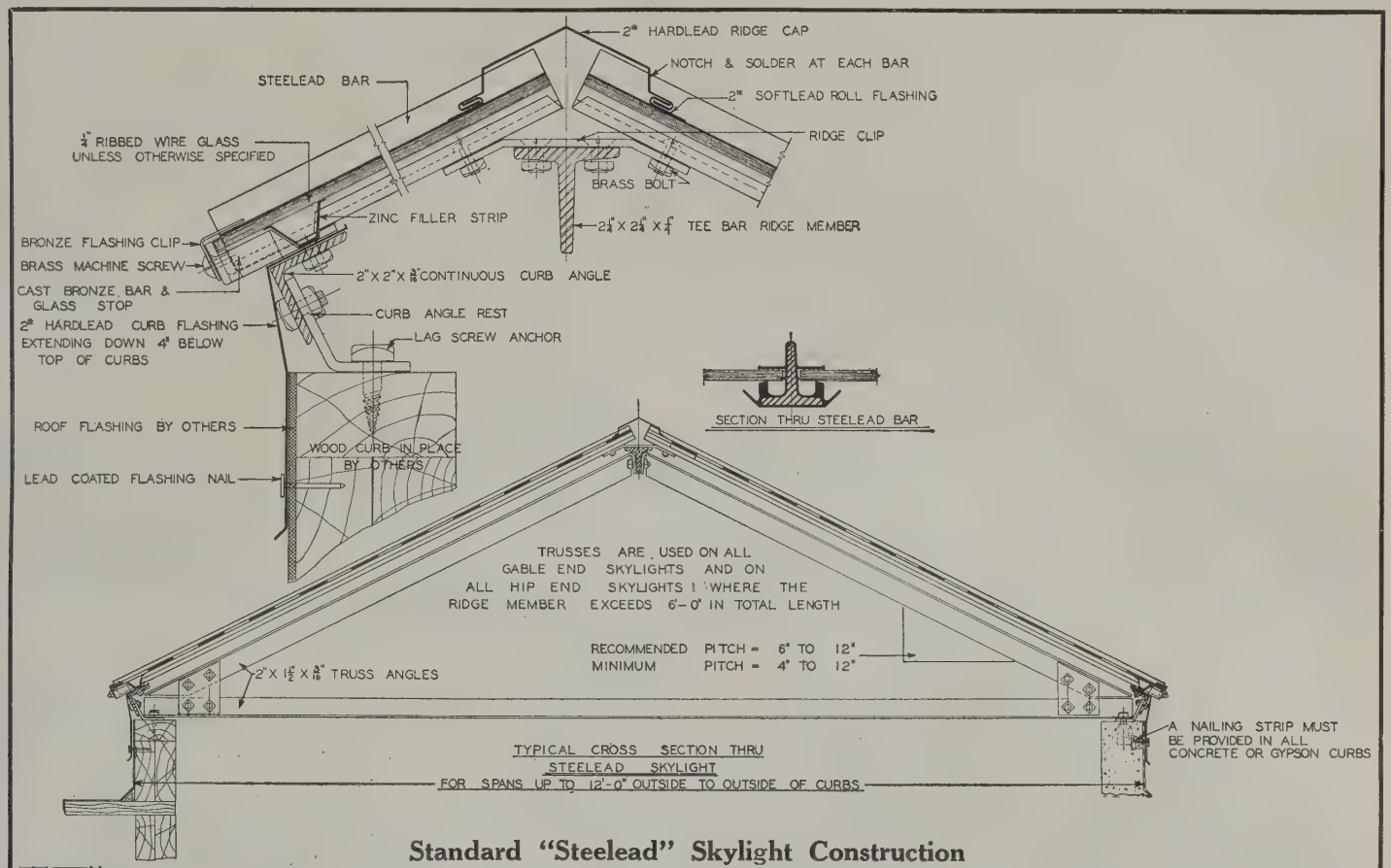
All skylights shown on the plans shall be constructed of "Steelead," as manufactured by the American Skylight Company, and in accordance with detailed drawings submitted by them and approved by the architects, engineers, or purchasers.

Glass supporting Steelead bars shall have a maximum deflection of not more than 1/30 in. per lineal foot of span, under normal loadings. The steel bar shall be hermetically sealed in a seamless lead sheath, fully capable of resisting attacks by fumes, gases, etc.

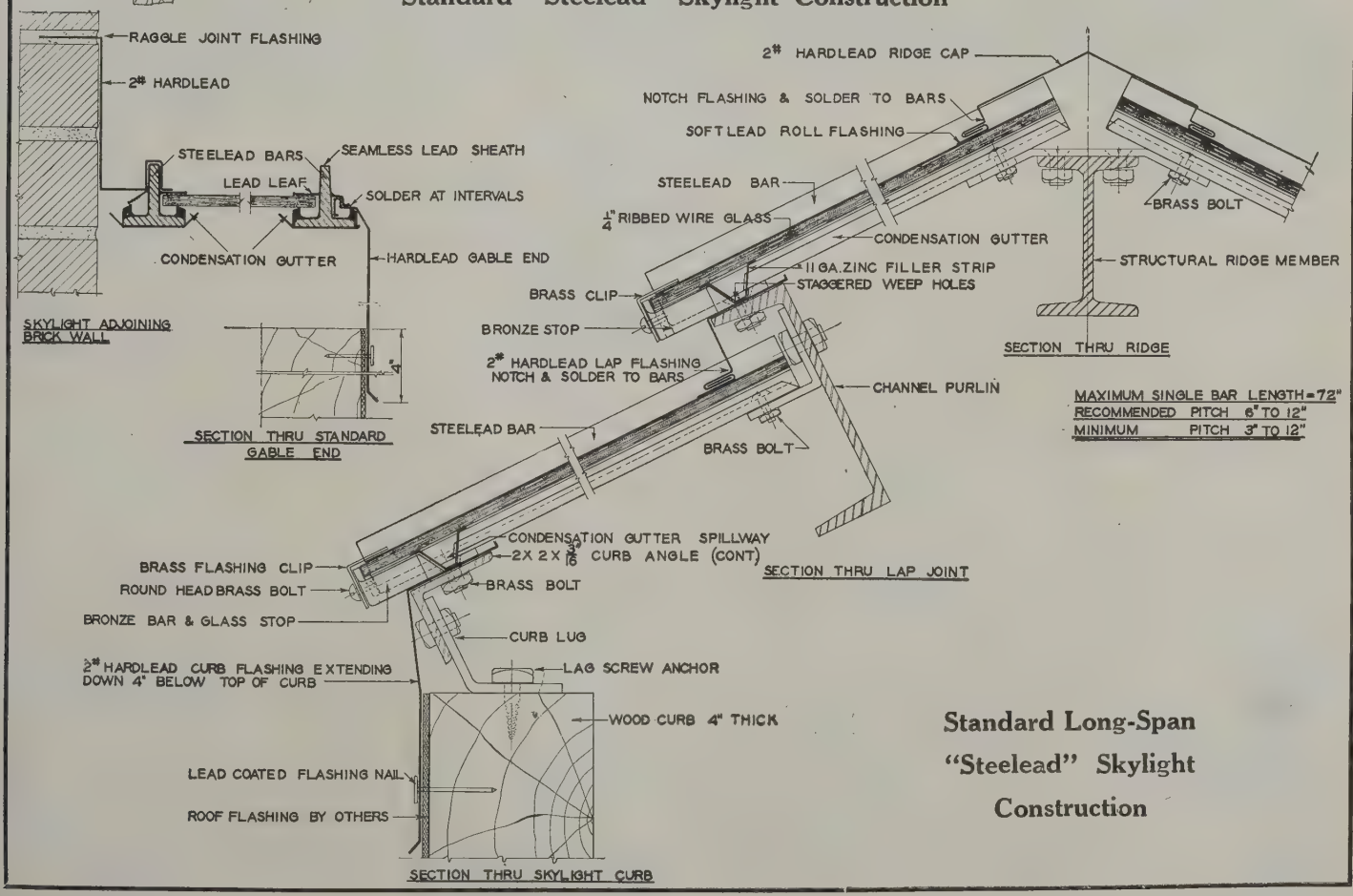
The glass shall be (state thickness, make and kind). This glass shall have a bearing on a lead cushion, and be left free to expand, without coming into contact with bolts or other rigid substances. The glass shall be held securely in place by the lead wings on the bar, making a weathertight joint without the use of putty or packing. Ample provision shall be made for carrying away all condensation which may be delivered from the underside of the glass.

Skylight work shall be free of leaks and glass shall be left clean and without cracks.

All flashings pertaining to the skylights shall be hard lead weighing not less than 2 lb. per sq. ft.



Standard "Steelead" Skylight Construction



Standard Long-Span "Steelead" Skylight Construction

BLASKI MANUFACTURING CO.

Exclusive Skylight Manufacturers

4132-4138 Belmont Avenue, CHICAGO, ILL.

BRANCHES IN PRINCIPAL CITIES

Products

BLASKI LEAKPROOF *Puttyless* VENTILATING SKYLIGHTS.
BLASKI LEAKPROOF *Putty* VENTILATING SKYLIGHTS.

Special Features

Blaski skylights are entirely self-supported by steel trusses, and do not require any special preparatory construction except the curbs. They are built completely of *No. 18 gauge* galvanized *copper bearing* iron, machine fabricated throughout. All parts are bolted, riveted, or interlocked. An absolutely *solderless* construction which will last a lifetime.

The quality of the die and machine made parts is of a uniform high standard; every piece being an exact duplicate of the original part which was designed and made by experts.

Blaski detachable rod operators eliminate the hanging chain nuisance. All steel (patented self-locking spur gear for highest possible efficiency) mechanisms running in bronze bushings throughout. Will open or close the sash with less than one-third the effort and time required to manipulate other devices.

In the *puttyless* type a perfect puttyless glazing system provides for quick and easy removal of all glass for cleaning and painting of the skylights. This feature saves considerable time and money and insures a better job of painting.

Types

Both the *puttyless* and *putty* constructions are made in three standard types, "B," "C," and "D" as illustrated on page A571.

Standard widths for type "B" are 4 ft., 6 ft., 8 ft., 10 ft., and 12 ft.

Standard widths for type "C" are 13 ft. 4 in., 15 ft. 4 in., 17 ft. 4 in., and 19 ft. 4 in.

Standard heights for type "D" are 4 ft. 4 in., 5 ft. 6 in., 6 ft. 8 in.

These standard widths and heights are carried in stock in any lengths, ready for erection.

Really Good Skylights

Types "B," "C" and "D" skylights, we believe are the outstanding examples of really good skylight construction. Every detail incorporated in these skylights is the result of long study and experimentation by experts and then proven under all conditions by years of actual service. The rugged construction, neat proportioning of all parts and the really fine workmanship, all tend to inspire confidence in their performance.

Blaski Skylights for All Uses

Types "B" and "C" skylights, in their variety of sizes and possible lengths of ventilating sections, can be placed at strategic points so as to light and ventilate the entire building chiefly through the roof. The increased efficiency and saving of electric light soon pays for the installation. The general trend when Blaski skylights have been tried is increased use, and many architects literally flood the building with Blaski skylights and ventilation. We also receive a large number of orders direct from owners who add to the quantity of Blaski skylights originally installed to cover additional requirements.

Blaski Puttyless Ventilating Skylight

Same construction also furnished with conventional pully glazing (putty type)

Quick Delivery

An average of over 100,000 sq. ft. of skylights are stocked for immediate shipment. The actual installation requires only a few simple assembling operations, which any handy man can quickly accomplish with only ordinary tools. This advantage is particularly desirable when skylights are ordered to be erected by mechanics already on the job.

Installation Crews and Factory Branches

Our erection crews are thoroughly experienced, and are available for service in any part of the country.

Factory branches located in principal cities. These branches carry complete stocks and replicas of our factory service equipment, and thus can provide service equal that of the parent organization. Your inquiry will be referred at once to the nearest branch.

Prices, Inquiries, etc.

Requests for quotations should designate whether *puttyless* or *putty* type is wanted, as there is a difference in cost. State number of skylights, their sizes and length of each skylight to be ventilated.

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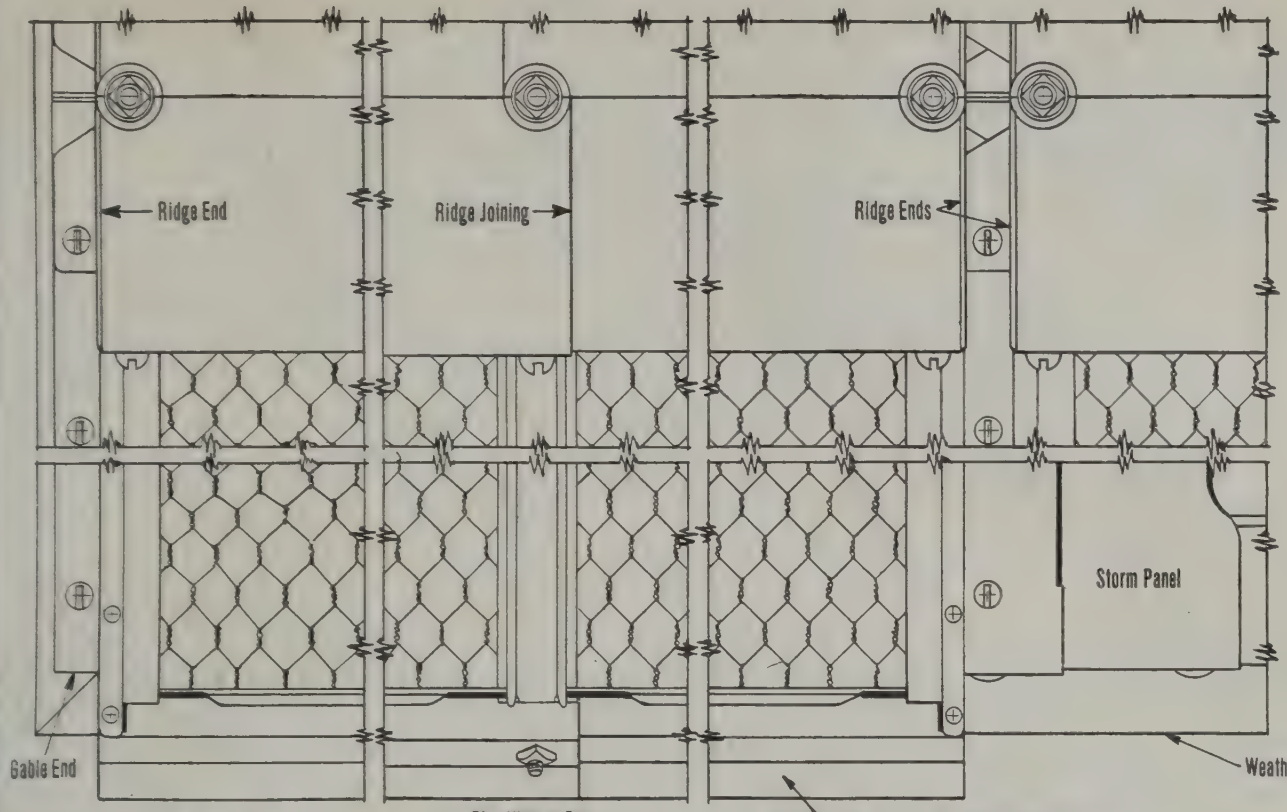
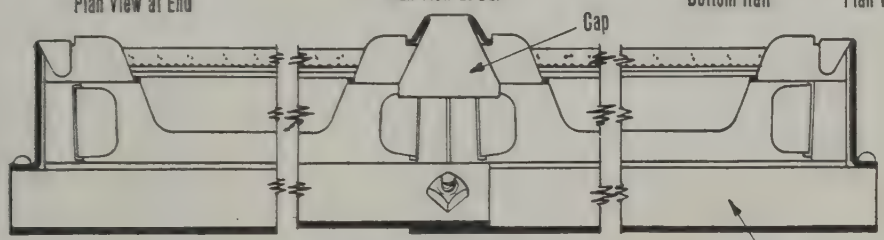
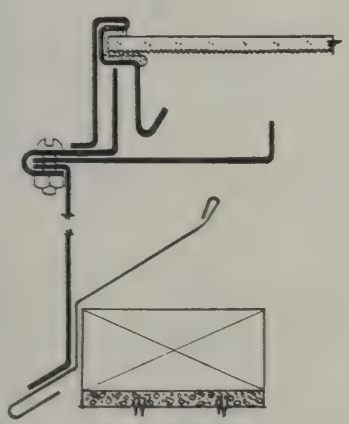


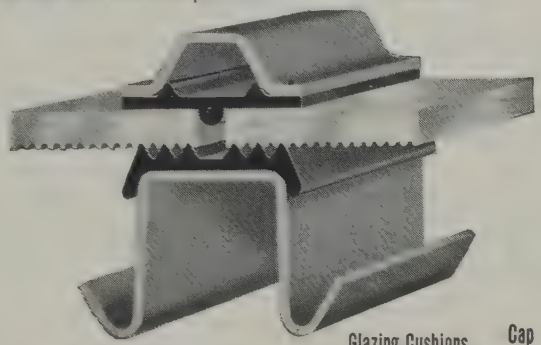


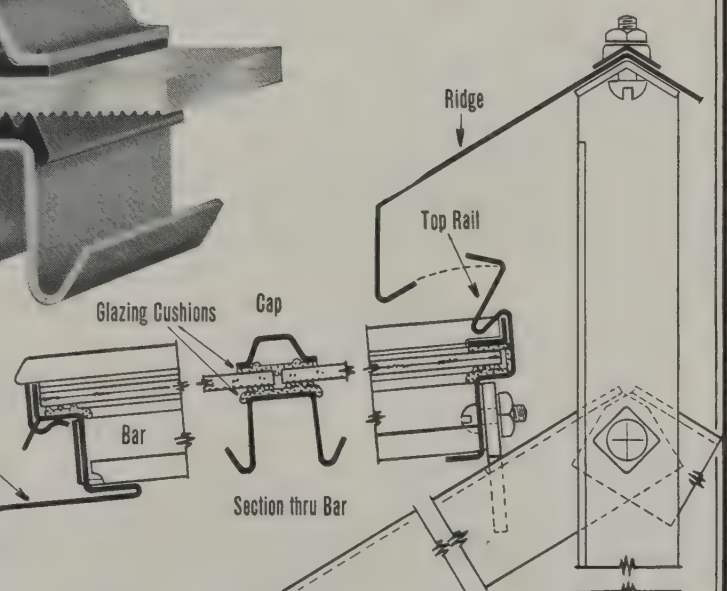
DETAILS OF TYPE "B"

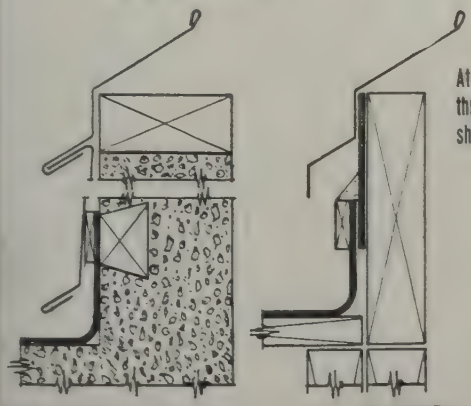
Ventilating or stationary skylight construction. Operating mechanism is shown in illustration on preceding page. Stocked to fit curbs 4-0, 6-0, 8-0 and 10-0 wide and any length.

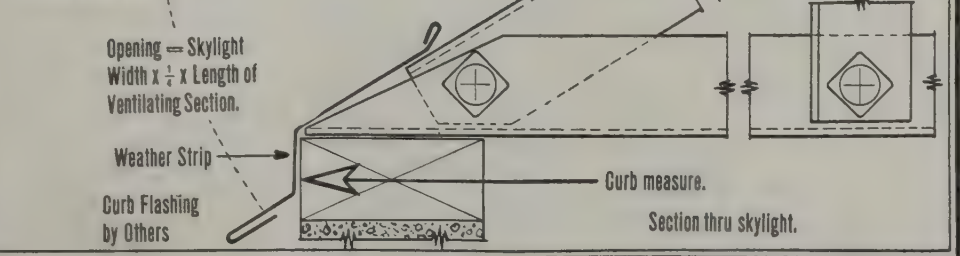
SCALE 3" = 1'-0"











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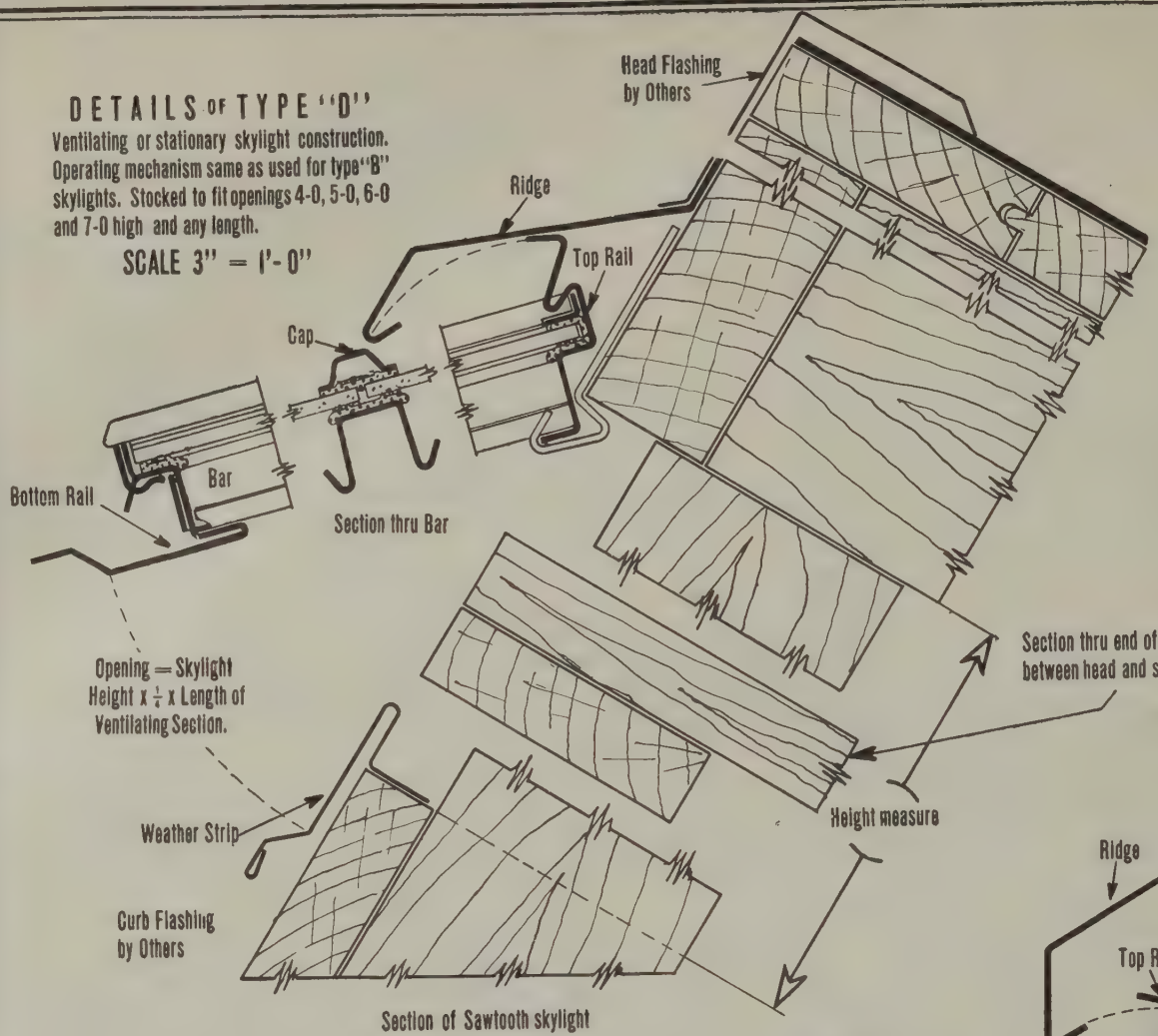
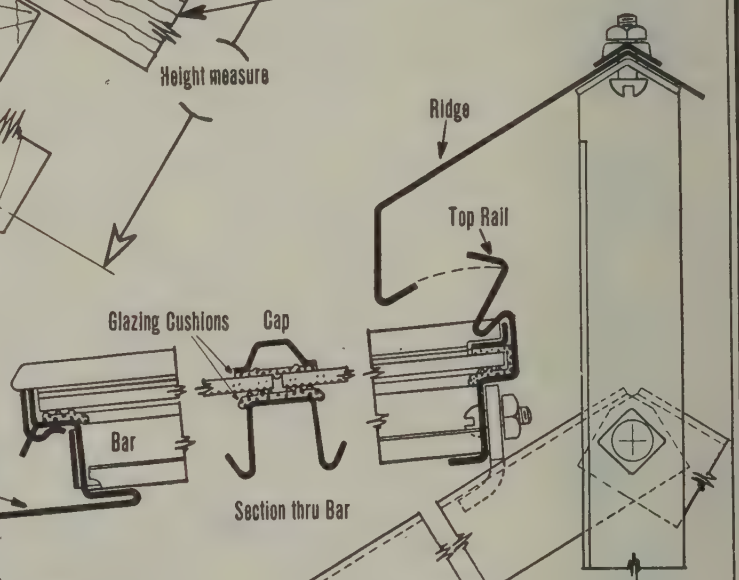
DETAILS OF TYPE "D"

Ventilating or stationary skylight construction. Operating mechanism same as used for type "B" skylights. Stocked to fit openings 4-0, 5-0, 6-0 and 7-0 high and any length.

SCALE 3" = 1'-0"



Section of Sawtooth skylight



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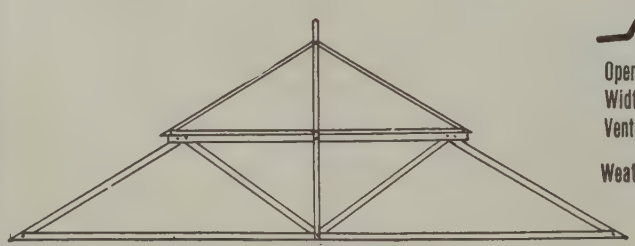
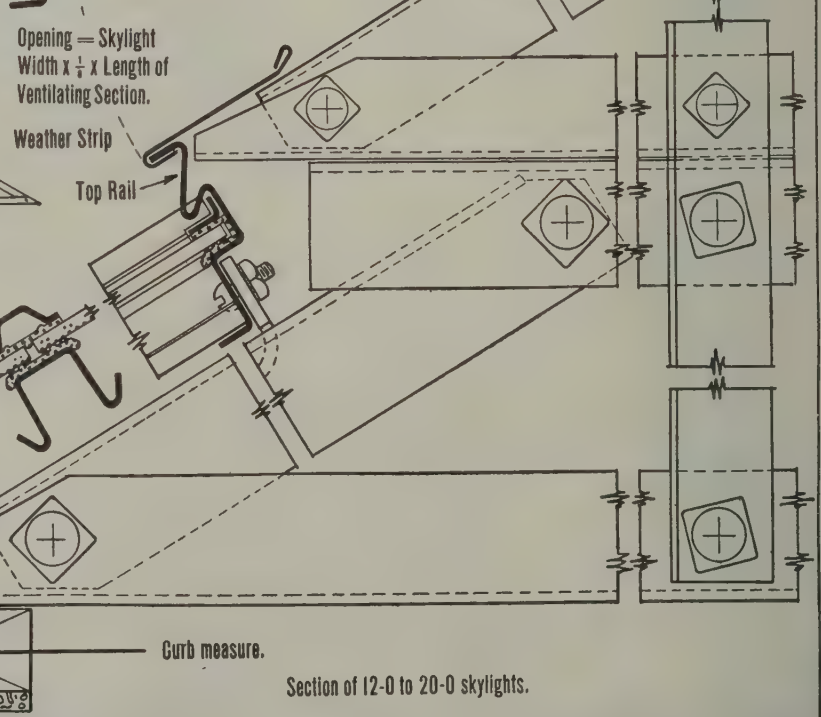


Diagram of truss



Section of 12-0 to 20-0 skylights.

DETAILS OF TYPE "C"

Ventilating or stationary skylight construction. Upper and lower sections of skylight can be arranged to ventilate. Operating mechanism same as used on type "B" skylights. Stocked for curb widths 12-0, 14-0, 16-0, 18-0 and 20-0 wide and any length.

Continued on next page

Construction Details

Fabrication—Complete fabrication of all parts direct from raw materials is done in plants owned by the Blaski Manufacturing Co., under the strictest supervision and inspection. This, we believe, is the strongest guarantee of quality in any specification.

Supporting Structure—All steel trusses built from angles from 2x1½x⅛ in. to 2½x2x¼ in. depending on size of skylight, but never spaced more than 67 in. apart.

Glass Bearing Members and Closures—These parts are all die and machine fabricated from 18 gauge galvanized copper-bearing iron. The galvanized coating is not injured, as is very likely with handwork. Assembly of the various parts is by bolting, lug and slot interlocking, or riveting, but never soldering. Thus each joint is of a predetermined strength.

Glass and Puttyless Glazing—The ¼-in. thick ribbed wire glass set in Blaski moulded glazing cushions is perfectly protected against expansion, contraction and flexure of skylight or glass. The cushions take up all twist and shock—as we frequently demonstrate by lifting one corner of an open sash without breakage of glass.

Putty Glazing—In the *Putty* type, we employ the conventional method of glazing, using a high grade glazing cement.

Operating Mechanism—All-steel rack and pinion type with all setscrews of permanent self-seating type. Shafting journaled in brass bushings which prevent rusting in. Operation by light detachable handle with friction clutch that positively prevents accidental or willful injury to operating mechanism. This operating mechanism requires only one-third the manual power as compared to the cast iron worm gear type, and does away with the ordinary troublesome chain nuisance.

Hardware and Miscellaneous—Like the operating mechanism, all hardware is pressed steel and designed especially for the purpose required. A flexible 24 gauge galvanized iron weatherstrip is used between the curb and lower rails. This is the only place where metal lighter than 18 gauge is used.

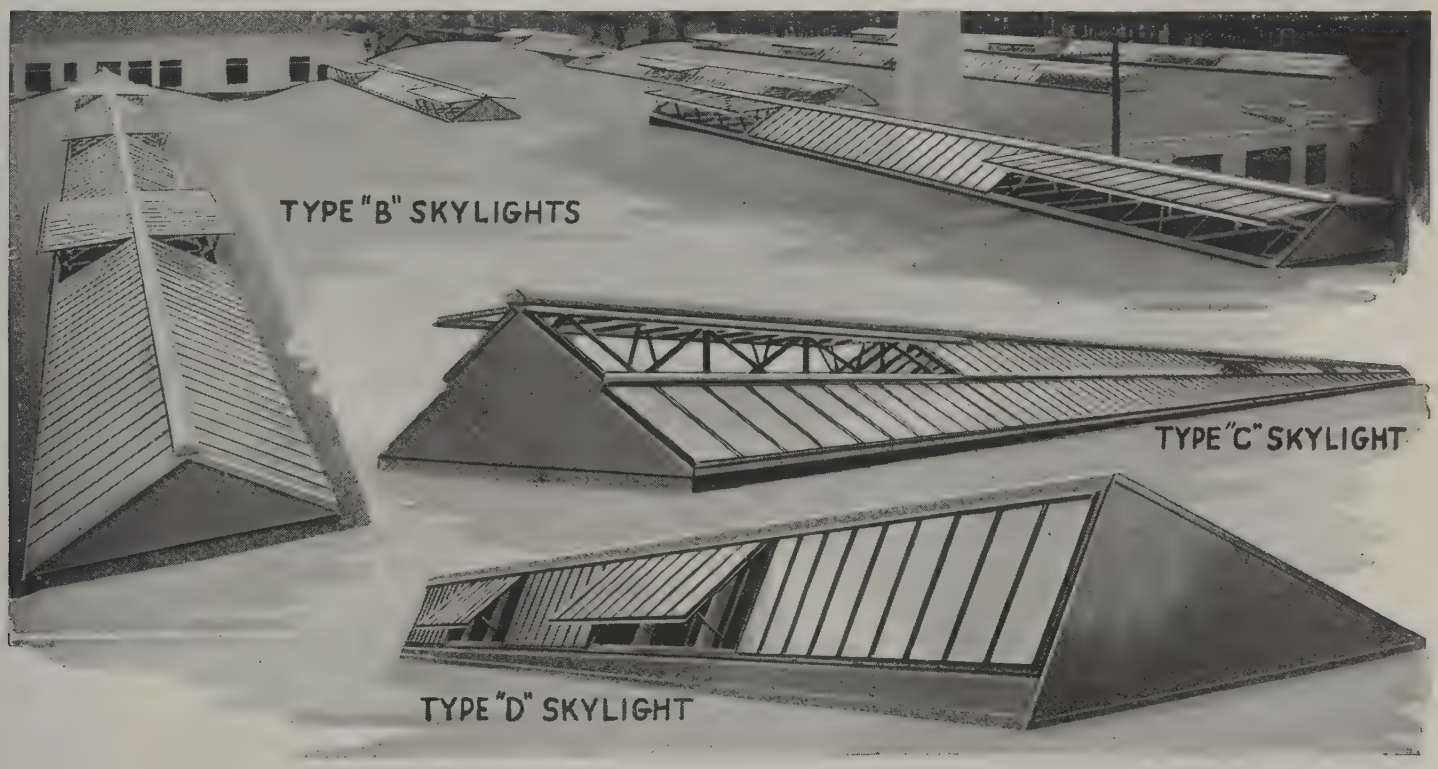
Painting—Trusses receive a shop coat of red mineral paint before assembly. Operators and mechanism receive one shop coat of black paint. Galvanized iron parts are not painted unless painting is specified.

Flashings—Our composition flashing 9 in. wide is regularly furnished with all skylights. Other kinds of flashing can be installed on special order or can be included in the specifications of other contractors.

Special Metals—For general use the metals specified above will prove satisfactory, as the careful fabrication and high quality of metals give the skylight an expected life of from 50 to 75 years. For abnormal conditions skylights of a variety of metals can be made to stand up under any kind of requirements.

Recommended Architects' Specifications

Skylights to be of the (state whether *Puttyless* or *Putty*) ventilating type as manufactured by the Blaski Manufacturing Co., 4132-4138 Belmont Avenue, Chicago, Ill. The size of skylights and lengths of ventilating sections to be in accordance with sizes shown in plans.



General Information

Curbs and Flashings—Curbs for Type "B" skylights should be 4, 6, 8, 10, or 12 ft. wide and any length. For Type "C" the curbs should be 13 ft. 4 in., 15 ft. 4 in., 17 ft. 4 in., or 19 ft. 4 in. wide and any length. Measurements in both cases are outside measure. Measures for opening in sawtooth framing are from head to sill and inside between ends. Variation of ¼ in. over or under is the maximum allowance for all skylight curbs or openings. A typical wood and concrete curb is shown in section on detail of Type "B" skylight, and typical sawtooth framing on detail of Type "D" skylight. Any other style of curb can be built, however, as the only requisites for Blaski skylights are continuous fastening grounds or wood plate on the top of the curb, and continuous nailing strip about 6 in. above the roof line for fastening of roofing and flashing. Type "D" skylight framing can also be of any style with provisions for fastening of skylight and flashings. The details on the two preceding pages are drawn to a 3-in. scale. Necessary dimensions can be scaled directly from them.

The height of curbs or sills above the roof line depends on circumstances. A high curb must be metal flashed. Low curbs, such as possible on rounded truss roof construction, can be finished with our composition flashing as shown by typical curb sections on detail of Type "B." This type of flashing has been used by us very successfully for over six years and effects considerable economies both in first cost and later re-roofing. The joint being roofing to a similar material is very tight and is much better than joints made to brick walls. The joint is also protected by the large overhang of the galvanized weatherstrip.

Skylight Sizes and Lighting Efficiency—A general statement can be made, that about 15% to 25% of the floor area should be the area of skylights, and this percentage can vary with the nature of the work performed in the building. Large skylights in preference to smaller sizes are recommended. As an example: a room 40x80 ft. 20% lighted requires a 10x64 ft. skylight. The same amount of money spent for, say four smaller skylights, would probably buy only 10% to 15% of the floor area in skylights on account of the greater cost of small skylights, extra curb framing, etc.

Length of Ventilating Sections—The maximum length of ventilating sections for 4, 6, 8, 10, and 12-ft. wide skylights are 40, 35, 30, 25, and 20 ft., respectively; for 13 ft. 4 in., 15 ft. 4 in., 17. ft. 4 in., and 19 ft. 4 in. are 40, 35, 30, and 25 ft., respectively.

Any combination of ventilating and stationary sections is possible, but all skylights are recommended to be full ventilating, especially when the length of skylight is less than the possible length of ventilating section.

THE G. DROUVÉ COMPANY

Manufacturers of Puttyless Skylights and Sash Operators

TELEPHONE
NOBLE 1950
CABLE
Western Union Code

(Post Office Address)
BRIDGEPORT, CONN.

FACTORY
FAIRFIELD

REPRESENTATIVES
PITTSBURGH, PA., E. K. Geyser, 921 Fulton Building
NASHVILLE, TENN., George W. Ruth Co., 41 Arcade
DALLAS, TEX., Universal Building Products Co., 502 Slaughter Building
ATLANTA, GA., Applewhite & Lawler Co.

Products

"ANTI-PLUVIUS" PUTTYLESS SKYLIGHT, trade-marked and patented.

"ANTI-PLUVIUS" (NON-CORROSIVE) PUTTYLESS SKYLIGHT, trade-marked and patented.

"DROU-VE-LITE" GLASS STRUCTURE, patented.

"DROU-VE-LITE" (NON-CORROSIVE) GLASS STRUCTURE, patented.

"STRAIGHT-PUSH" SASH OPERATOR, tension type.

"DROUVÉ LOVELL" SASH OPERATOR, tension type.

WORM and GEAR SASH OPERATOR, torsion type.

Also manufacturers of "Drou-Ve-Lite" Sawtooth Continuous Ventilating Skylight and the "Drouvé" Double Gutter Ventilators.

A MODERN SKYLIGHT SERVICE FOR EVERY NEED

Manufacturing and Shipping Facilities—Our plant is a modern one-story factory building containing 40,000 sq. ft. of floor space completely equipped with the most modern sheet metal working machinery known to the trade.

This entire plant, one of the largest of its kind in the country, is devoted exclusively to the manufacture of "Anti-Pluvius" Puttyless Skylights, Drou-Ve-Lite Glass Structures, Drou-Ve-Lite Sawtooth Continuous Ventilating Skylights and various types of sash operating devices.

With a siding of the New York, New Haven and Hartford Railroad at our plant we are enabled to make prompt shipments to any part of the country.

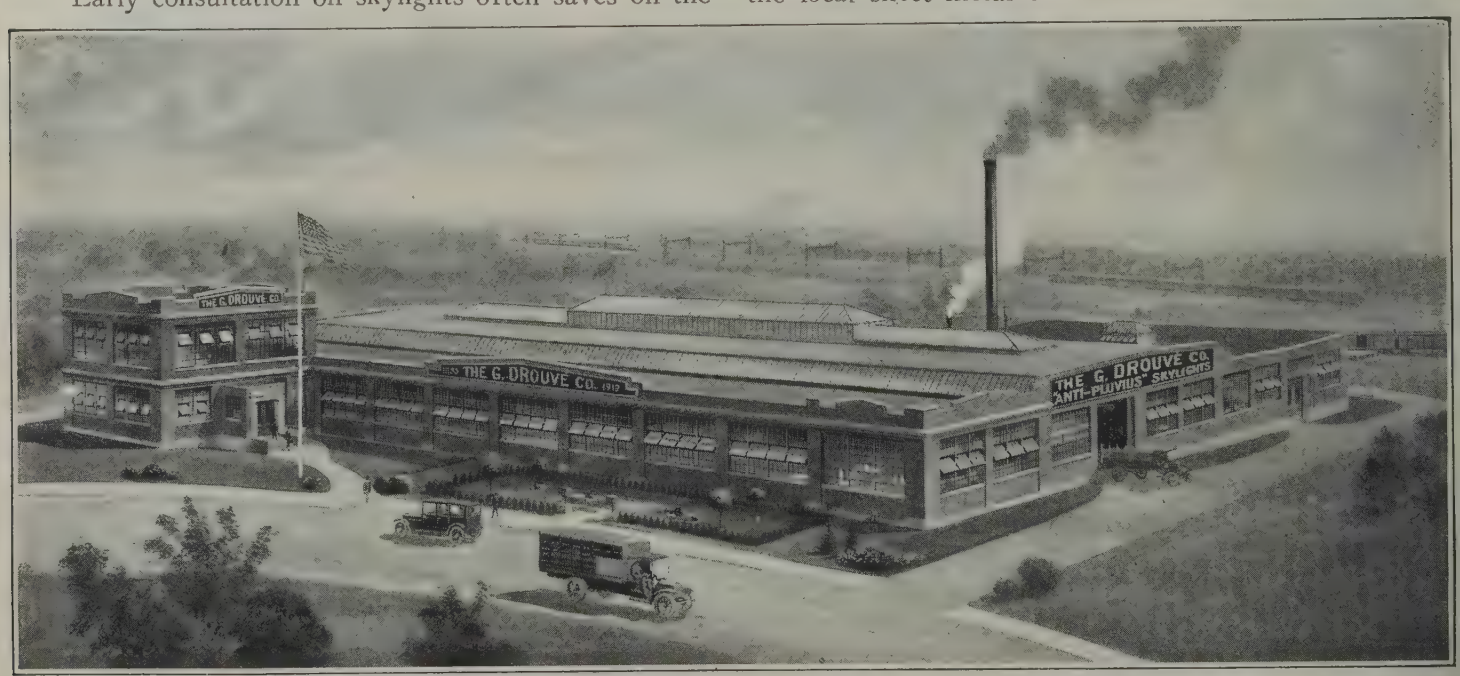
Planning and Consulting Service—An experience of over 40 years in solving skylight problems enables us to offer you practical solutions for your most intricate problems of skylight construction. Our engineering staff is ready to co-operate with you by means of a personal call or by preparing suggestions for use with the architectural drawings, without obligation to you.

Early consultation on skylights often saves on the cost of the building. Frequently it is possible to save considerably by the omission of part of the steel framing of a roof with the use of the Drou-Ve-Lite structural type of skylight which is designed especially for long spans and does not require structural reinforcing. At other times, for ordinary conditions, the "Anti-Pluvius" offers a better solution. Sometimes both are used on the same job depending on conditions. For these reasons we are always glad to go over the work under consideration and offer advice as to the type best suited to the work, without charge or obligation on the part of the architect.

Erecting Service—No matter how good a skylight is, if it is not carefully and properly put together there is always the chance that it will leak. This makes the owner dissatisfied with the work of the architect, the builder and the skylight manufacturer.

In order to insure proper and careful erection we maintain a force thoroughly skilled in erecting our skylights. They can be sent to any part of the country as required from our main office or nearest representative.

If required we will ship skylights for erection by the local sheet metal contractor.



Forty Thousand Square Feet of Floor Space Devoted Exclusively to the Manufacture of:

The "Anti-Pluvius" Puttyless Skylight. The "Drou-Ve-Lite" Glass Structure. The "Drou-Ve-Lite" Continuous Ventilating Skylight. The Drouvé "Improved Lovell" Sash Operators. The Drouvé "Straight Push" Sash Operators. The Drouvé Worm and Gear Sash Operators

Continued on next page

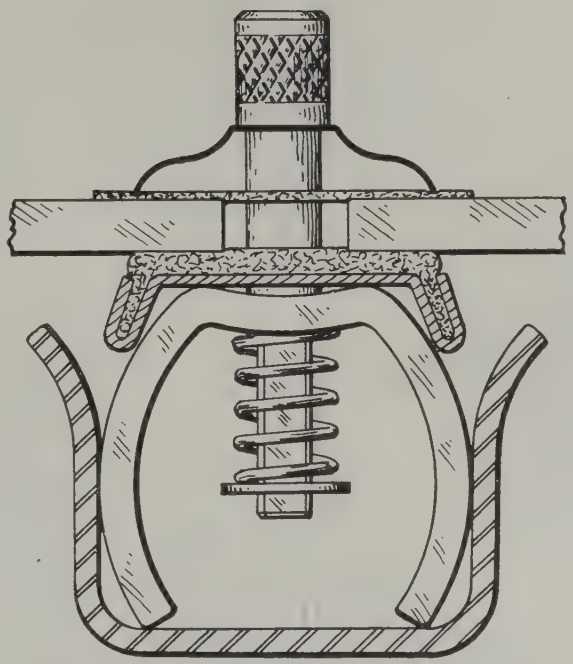
"ANTI-PLUVIUS" PUTTYLESS SKYLIGHTS FOR ORDINARY SPANS

For Long Span or Structural Skylights, see third page following

A Perfect Puttyless Skylight

"Anti-Pluvius" is one of the original puttyless skylights. Years of practical experience with skylights under all kinds of atmospheric conditions has enabled us to produce a puttyless construction which will give satisfactory service anywhere.

Sweating Eliminated—The sweating of the main supporting bars, which is so prevalent, naturally, in skylights has been very successfully eliminated by the simple method of isolating the glass and its bearing from the main supporting bars and permitting free circulation of air between the main supporting bars and the glass. Thus there is not condensation to drip into the room and cause corrosion of the bars.



Full Size Section Showing "Anti-Pluvius" Construction

Supporting Bars and Condensation Cutters Combined—By reason of the fact that the main supporting bars in our "Anti-Pluvius" skylight are U-shaped channels, they are utilized as condensation gutters as well as to give ample support for the skylight structure. This gives an exceptionally large condensation gutter due to the depth of these channels without cutting down excessively on the glass area which, in skylights, is always desired in the maximum. The over-all width of the channels at their widest point is only 2¼ in.

Breakage of Glass Is Reduced—By phosphor bronze tension springs which allow for expansion, contraction and vibration.

Other Special Features—

(1) Safety walk-bridges where the span exceeds 6 ft. from ridge to eaves when specified.

(2) Overhang construction at curbs permitting the successful discharge of condensation outside the building.

(3) Unusually high grade materials (see specifications, page A574) well balanced and perfectly fitted in their respective places in the structure.

Advantages of "Anti-Pluvius" Puttyless Skylights

"Anti-Pluvius" skylights of both regular and non-corrosive constructions possess the following advantages:

(1) Strength to satisfy the most exacting requirements (see material specifications on Plate No. .....).

(2) Positive watertightness.

(3) No sweating of main supporting bars.

(4) Every light of glass independent of every other light. The lights do not come in contact with each other nor do they come in contact with any metal.

(5) Glass rests on pure non-rotting cattle hair felt.

(6) Glass breakage reduced to a minimum.

(7) Frames are flexible and ample allowances are made for expansion and contraction, vibration and wind pressures.

(8) Adaptable to all types of roof construction.

"Anti-Pluvius" (Non-corrosive) Puttyless Skylights

This skylight in design and construction is identical with our "Anti-Pluvius," the difference being only in the metals used. These are of non-corrosive materials (not a protective process). This construction is guaranteed absolutely against any form of deterioration for an indefinite length of time. The cost of this construction is surprisingly low considering the fact that it is a skylight entirely free from any maintenance expense. This construction is ideal for use on powerhouses, chemical plants, railroad shops, foundries, etc., as it will stand up under the conditions existing in such buildings.

Sash Operators

If the design of the skylight is such that operators are required we will also furnish the proper type to suit the conditions. We make three types of operators: "Straight Push," "Improved Lovell Dreadnought" and Worm and Gear. All are of extra heavy construction designed to stand up under hard usage and unexpected conditions.

A Few Buildings in Which "Anti-Pluvius" Puttyless Skylights Have Been Used

E. Ingraham Company, Bristol, Conn.
Times Building, Brooklyn, N. Y.
Cannon Mills, Kannapolis, N. C.
Bethlehem Steel Company, Bethlehem, Pa.
General Baking Company, New Haven, Conn.
Duquesne Light Company, Pittsburgh, Pa.
Ford Motor Company, Memphis, Tenn.
Billings & Spencer Co., Hartford, Conn.
National Folding Box Co., New Haven, Conn.
Quinnipiac Club, New Haven, Conn.
U. S. Post Office, Casper, Wyo.
Public Bath House, Yonkers, N. Y.
Telephone Building, Baltimore, Md.
Telephone Building, New Haven, Conn.
Franklin & Marshall College, Lancaster, Pa.
Hudson School, Hudson, Mass.
School for Colored Youth, Bordentown, N. J.
The Smart School, Wabash, Ind.
Washington School, Royal Oak, Mich.
Franklin Savings Bank, New York, N. Y.
Peoples Bank, Laconia, N. H.
First National Bank, Milton, Pa.
Meriden Savings Bank, Meriden, Conn.
First National Bank, Blairsville, Pa.

Continued on next page

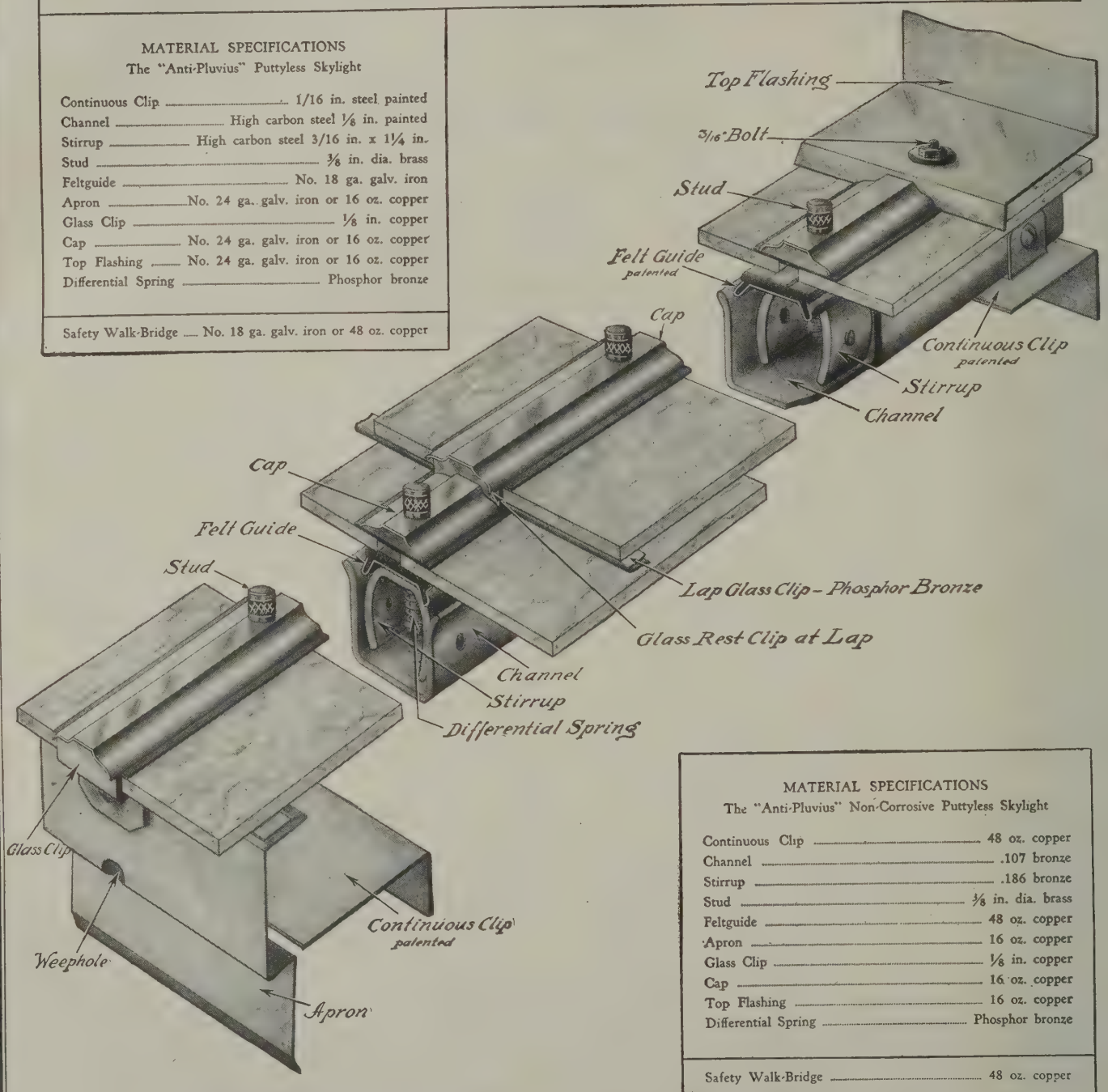
Specifications Covering the "Anti-Pluvius" Puttyless Skylight

Skylights shall be of the "Anti-Pluvius" puttyless construction as manufactured by The G. Drouve Company, Bridgeport, Conn., having all metal parts which are exposed to the weather of { copper. / galvanized iron. Skylight ribs or main supporting channels to be U-shaped and of high carbon steel painted one good shop coat of metallic paint. Glass to be ..... and to be laid on pure non-rotting cattle hair felt cushions. The cushions shall be confined and supported by continuous metal guides so constructed, that the underside of the glass, when installed, will not come in contact with any materials, other than the felt. The glass rest shall be raised above channels sufficiently so that there will be a free circulation of air between the glass and the channels. Skylight studs and caps to be so constructed, as to allow for expansion, contraction and vibration, by the use of phosphor bronze springs.

(OPTIONAL)
SAFETY WALK-BRIDGES. Safety walk-bridges shall be supplied above each channel and supported from the channel for use in cleaning and maintaining skylights.

MATERIAL SPECIFICATIONS
The "Anti-Pluvius" Puttyless Skylight

Continuous Clip	1/16 in. steel painted
Channel	High carbon steel ⅛ in. painted
Stirrup	High carbon steel 3/16 in. x 1¼ in.
Stud	⅜ in. dia. brass
Feltguide	No. 18 ga. galv. iron
Apron	No. 24 ga. galv. iron or 16 oz. copper
Glass Clip	⅛ in. copper
Cap	No. 24 ga. galv. iron or 16 oz. copper
Top Flashing	No. 24 ga. galv. iron or 16 oz. copper
Differential Spring	Phosphor bronze
Safety Walk-Bridge	No. 18 ga. galv. iron or 48 oz. copper



MATERIAL SPECIFICATIONS
The "Anti-Pluvius" Non-Corrosive Puttyless Skylight

Continuous Clip	48 oz. copper
Channel	.107 bronze
Stirrup	.186 bronze
Stud	⅜ in. dia. brass
Feltguide	48 oz. copper
Apron	16 oz. copper
Glass Clip	⅛ in. copper
Cap	16 oz. copper
Top Flashing	16 oz. copper
Differential Spring	Phosphor bronze
Safety Walk-Bridge	48 oz. copper

Specifications Covering the "Anti-Pluvius" NON-CORROSIVE Puttyless Skylight

Skylights shall be of the "Anti-Pluvius" NON-CORROSIVE puttyless construction as manufactured by The G. Drouve Company, Bridgeport, Conn., having all metal parts which are exposed to the interior of the building of bronze and all metal parts which are exposed to the weather of copper. Glass to be ..... and to be laid on pure non-rotting cattle hair felt cushion. The cushions shall be confined and supported by continuous metal guides so constructed that the underside of the glass, when installed, will not come in contact with any materials other than the felt. The glass rest shall be raised above the channels sufficiently so that there will be a free circulation of air between the glass and the channels. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration, by the use of phosphor bronze springs.

(OPTIONAL)
SAFETY WALK-BRIDGES. Safety walk-bridges shall be supplied above each channel and supported from the channel for use in cleaning and maintaining skylights.

THE G. DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • ANTI-PLUVIUS • SKYLIGHT

MANUFACTURED UNDER
DROUVÉ PATENT NO. 892034.
HAWES PATENT NO. 1513809.
HAWES PATENT NO. 1513810.

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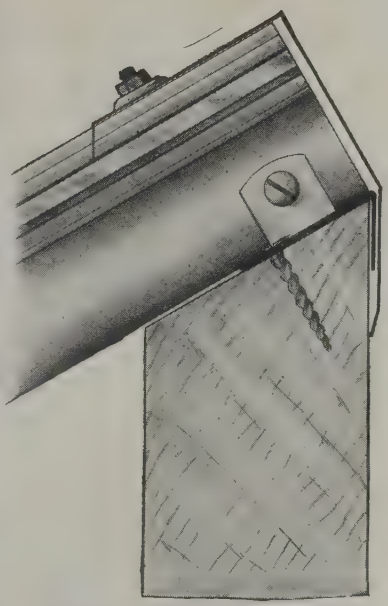
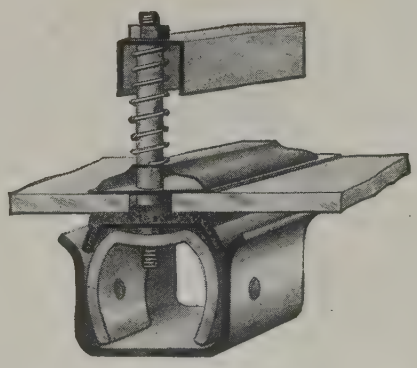


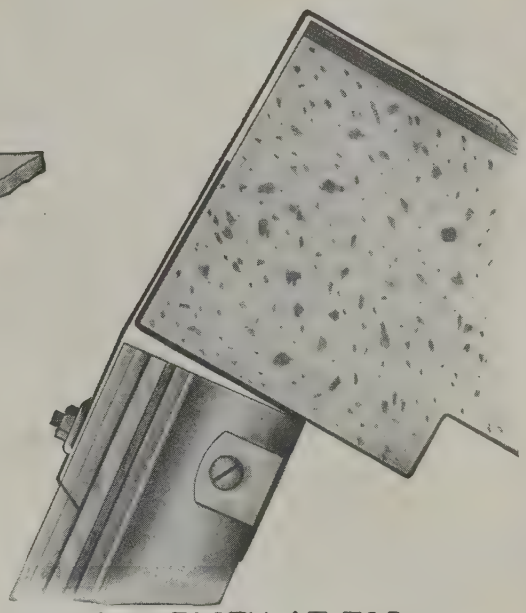
SINGLE PITCH AT TOP



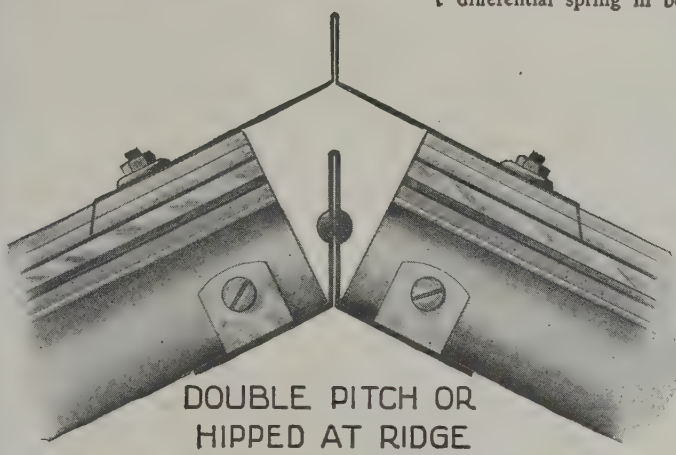
On skylights, the span of which exceeds six feet from ridge to eave, the Walk-Bridge permits one to stand or walk on the skylights to clean it without injury to the glass or other parts of the structure.

On skylights, the span of which does not exceed six feet from ridge to eave, the Walk-Bridge is unnecessary and therefore not recommended.

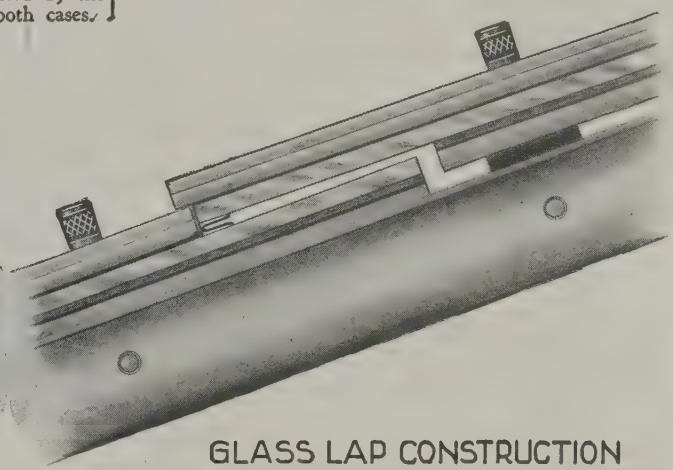
{The difference in expansion between glass and metal is adjusted by the differential spring in both cases.}



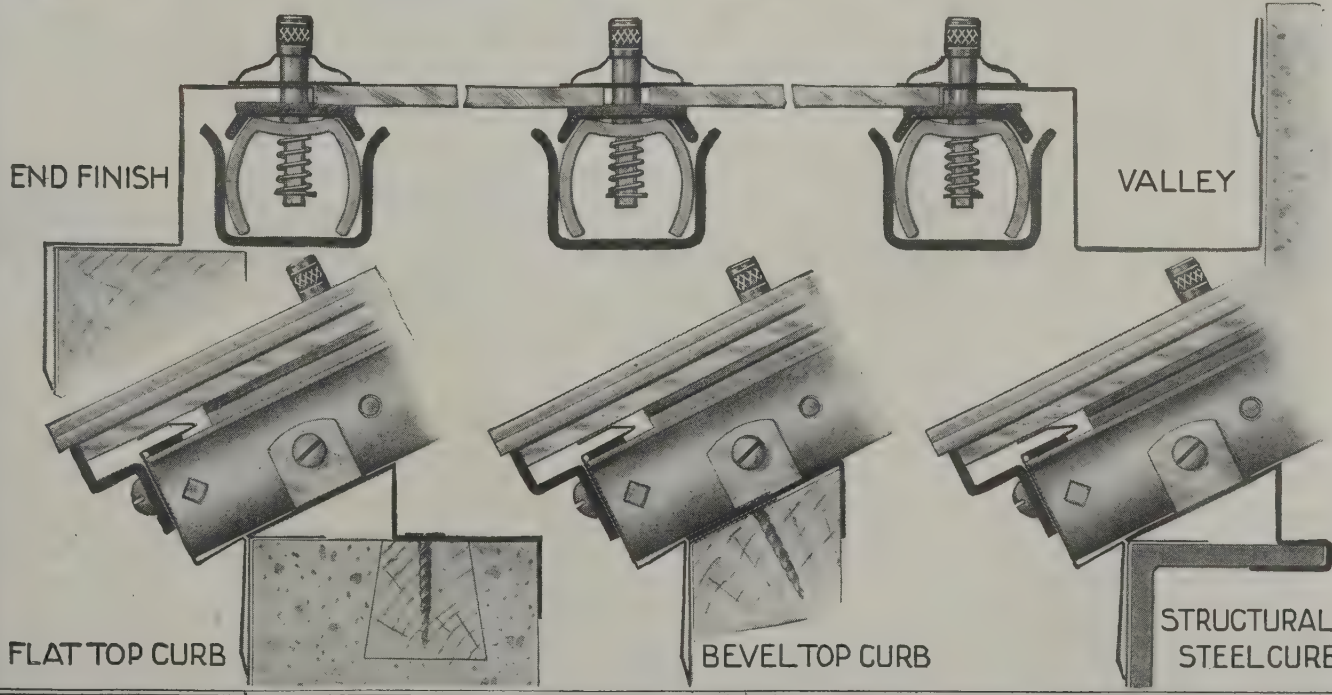
SAWTOOTH AT TOP



DOUBLE PITCH OR HIPPED AT RIDGE



GLASS LAP CONSTRUCTION



THE G·DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • ANTI-PLUVIUS • SKYLIGHT

MANUFACTURED UNDER
DROUVÉ PATENT NO. 892034.
HAWES PATENT NO. 1313809
HAWES PATENT NO. 1313810.

Continued on next page

"DROU-VE-LITE" PUTTYLESS GLASS STRUCTURES FOR LONG SPAN CONSTRUCTION

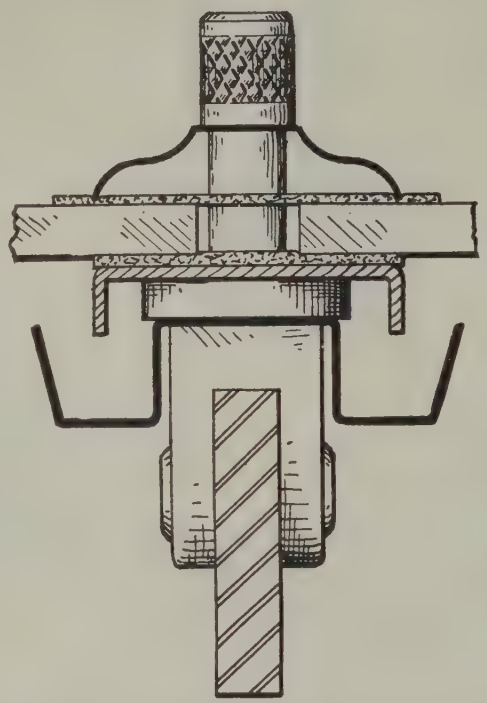
Self-supporting Puttyless Skylight Construction

In late years there has been a tendency to eliminate, as much as possible, structural steel work for the support of the skylight itself. A skylight which is self-supporting, regardless of length of span, effects a considerable saving when exceptionally wide skylights are desired, because it requires no steel work for its support other than that which is part of the skylight itself. Another feature of the self-supporting skylight is the freedom from unsightly steel trusses, etc. in the skylight well opening and the consequent elimination of shadows and obstruction of light.

Structure Is a Unit—A study of the construction details on page A577 will show how this structure is assembled into a unit. Every part of the structure from ridge bar to curb functions in harmony. The interlocking sections prevent, beyond any question of a doubt, sagging at the ridge and in consequence spreading at the curbs. The rafter bars are $\frac{5}{16}$ in. thick by a depth suitable for the span without any intermediate supports whatsoever. Intermediate rafter bar spacers are employed at certain points between ridge and eave, usually directly under glass laps, thereby holding the rafter bars absolutely parallel and in perfect alignment from the ridge to eave. The rigidity of this structure when assembled is amazing.

Sweating Eliminated—As in the "Anti-Pluvius" skylight, sweating of the main supporting bars is eliminated by isolating the glass and its rest from the bars and so permitting free circulation of air between the glass and bars. As the bars are always dry there is no condensation to drip into the room. A chief cause of corrosion is thus removed and the life of the bars indefinitely prolonged. The bars can be painted on all sides without removing the glass.

Condensation Gutters—Are of ample size to take care of all condensation. The over-all width of the gutters, which is the widest point of light obstruction, is 2⅛ in.



Full Size Section Showing "Drou-Ve-Lite" Construction

Advantages of "Drou-Ve-Lite" Glass Structures

Drou-Ve-Lite Glass Structures of both regular and non-corrosive construction possess many advantages.

(1) Construction is entirely suitable for use over very small openings as well as exceptionally long spans, because the rafter bars are furnished proportionately to the size of the skylight.

(2) Easily adaptable to all types of roof construction.

(3) Positive watertightness.

(4) Sweating of rafter bars is eliminated.

(5) Each light of glass is independent of every other light. The lights do not come in contact with each other or with any metal.

(6) Glass rests on asphaltic felt bedding.

(7) Glass breakage is reduced to a minimum.

(8) Admit maximum daylight and cast minimum shadows.

(9) Structure is an absolutely rigid unit.

"Drou-Ve-Lite" (Non-corrosive) Glass Structures

This skylight in design and construction is identical with our Drou-Ve-Lite, the difference being only in the metals used. These are of non-corrosive materials (not a protective process). This construction is guaranteed absolutely against any form of deterioration for an indefinite length of time. The cost of this construction is surprisingly low considering the fact that it is a skylight entirely free from any maintenance expense. This construction is ideal for use on powerhouses, chemical plants, railroad shops, foundries, etc., as it will stand up indefinitely under the conditions existing in such buildings.

Sash Operators

If operators are required we can furnish the proper type to suit the conditions. We make three types of operators: "Straight Push," "Improved Lovell Dreadnought," and Worm and Gear, each unsurpassed in its class.

A Few Buildings In Which "Drou-Ve-Lite" Glass Structures Have Been Used

Standard Oil Company, Whiting, Ind.
Rice Printing Plant, Mamaroneck, N. Y.
Chase Metal Works, Waterbury, Conn.
Consolidated Gas Company, New York, N. Y.
Victor Talking Machine Co., Camden, N. J.
Consolidated Gas Company, Baltimore, Md.
Ford Motor Company, Norfolk, Va. and St. Paul, Minn.
The U. S. Aluminum Company, Fairfield, Conn.
U. S. Post Office, Cohoes, N. Y.
Indoor Tennis Court, Huntington, L. I., N. Y.
American Museum of Natural History, New York, N. Y.
Memorial Hospital, Niagara Falls, N. Y.
Peabody Museum, Yale University, New Haven, Conn.
High School, North Plainfield, N. H.
Cleveland Avenue School, Niagara Falls, N. Y.
Charter Oak School, Hartford, Conn.
Roosevelt School, Yonkers, N. Y.
Hawthorne Junior High School, Yonkers, N. Y.
Melbourne State Bank, Melbourne, Fla.
Peoples National Bank, Fairmont, W. Va.
Citizens Title & Trust Co., Uniontown, Pa.
First National Bank, Perth Amboy, N. J.
Raritan Trust Co., Perth Amboy, N. J.

Continued on next page

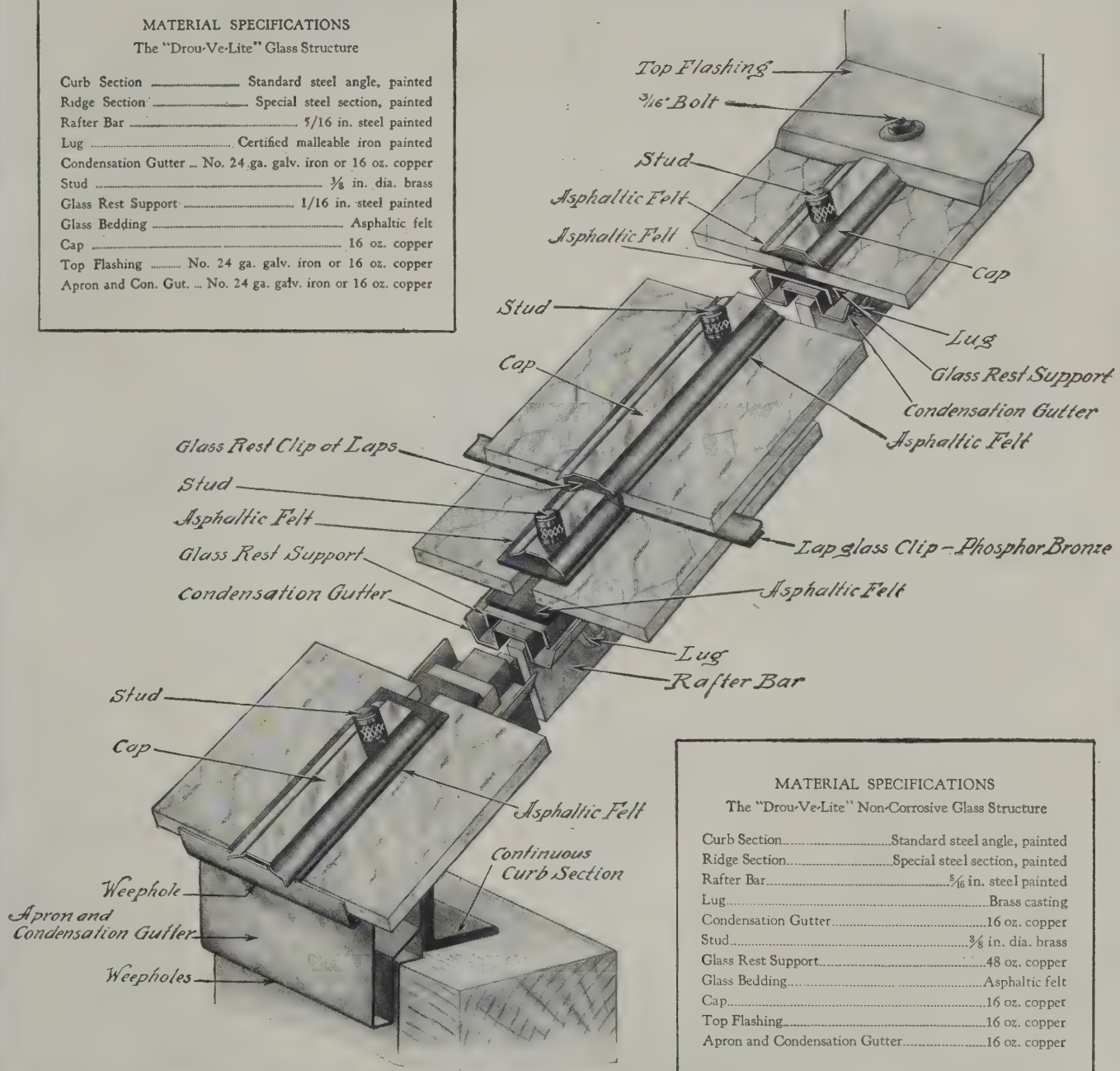
Specifications Covering the "Drou-Ve-Lite" Glass Structure

Skylights shall be of the "Drou-Ve-Lite" puttyless construction as manufactured by The G. Drouve Company, Bridgeport, Conn., having all metal parts which are exposed to the weather of { copper. / galvanized iron. } Rafter bars to be 5/16" thick by required depth to suit span and painted one good shop coat paint. Glass to be . . . . . and to be laid on asphaltic felt bedding, the bedding to be continuous and so constructed that the glass, when installed, will not come in contact with any metal. The glass rest shall be raised above rafter bars so that there will be a free circulation of air between the glass and these bars. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration by the use of resilient washers.

Skylights shall be self supporting without the use of any structural steel other than that steel which is part of the skylight itself.

MATERIAL SPECIFICATIONS
The "Drou-Ve-Lite" Glass Structure

Curb Section	Standard steel angle, painted
Ridge Section	Special steel section, painted
Rafter Bar	5/16 in. steel painted
Lug	Certified malleable iron painted
Condensation Gutter	No. 24 ga. galv. iron or 16 oz. copper
Stud	⅜ in. dia. brass
Glass Rest Support	1/16 in. steel painted
Glass Bedding	Asphaltic felt
Cap	16 oz. copper
Top Flashing	No. 24 ga. galv. iron or 16 oz. copper
Apron and Con. Gut.	No. 24 ga. galv. iron or 16 oz. copper



MATERIAL SPECIFICATIONS
The "Drou-Ve-Lite" Non-Corrosive Glass Structure

Curb Section	Standard steel angle, painted
Ridge Section	Special steel section, painted
Rafter Bar	5/16 in. steel painted
Lug	Brass casting
Condensation Gutter	16 oz. copper
Stud	⅜ in. dia. brass
Glass Rest Support	48 oz. copper
Glass Bedding	Asphaltic felt
Cap	16 oz. copper
Top Flashing	16 oz. copper
Apron and Condensation Gutter	16 oz. copper

Specifications Covering the "Drou-Ve-Lite" NON-CORROSIVE Glass Structure

Skylights shall be of the "Drou-Ve-Lite" NON-CORROSIVE puttyless construction as manufactured by The G. Drouve Company, Bridgeport, Conn., having all metal parts which are exposed to the interior of the building of brass with the exception of rafter bars, curb and ridge sections, which are to be of steel painted and all metal parts which are exposed to the weather of copper. Glass to be . . . . . and to be laid on asphaltic felt bedding, the bedding to be continuous and so constructed that the glass, when installed, will not come in contact with any metal. The glass rest shall be raised above rafter bars so that there will be a free circulation of air between the glass and these bars. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration by the use of resilient washers.

Skylights shall be self supporting without the use of any structural steel other than that steel which is part of the skylight itself.

THE G·DROUVÉ CO. BRIDGEPORT, CONN.

CONSTRUCTION DETAILS OF THE PUTTYLESS • DROU-VE-LITE • GLASS STRUCTURE

MANUFACTURED UNDER HAWES PATENT NO. 1632330

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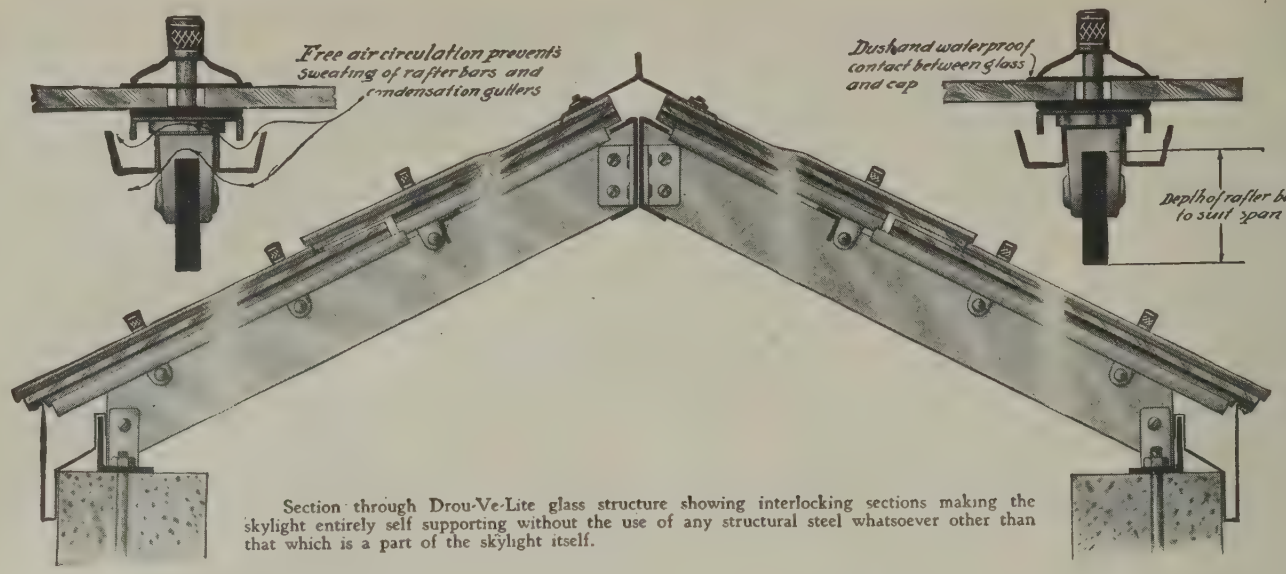
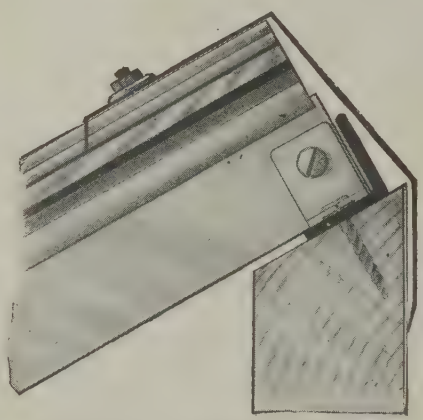
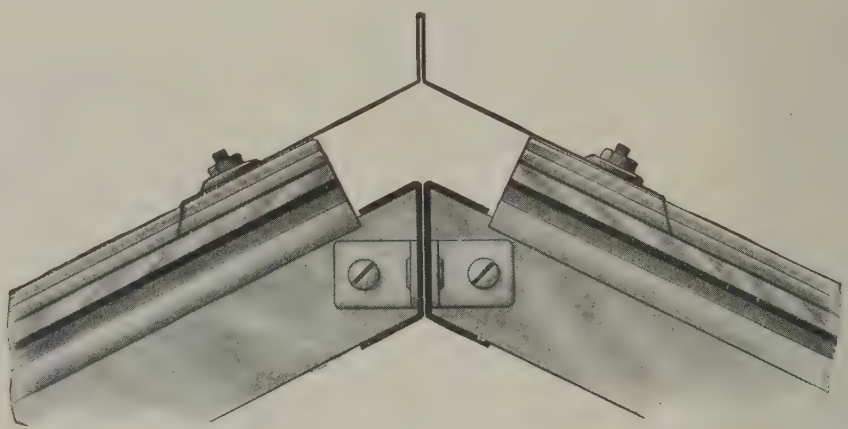


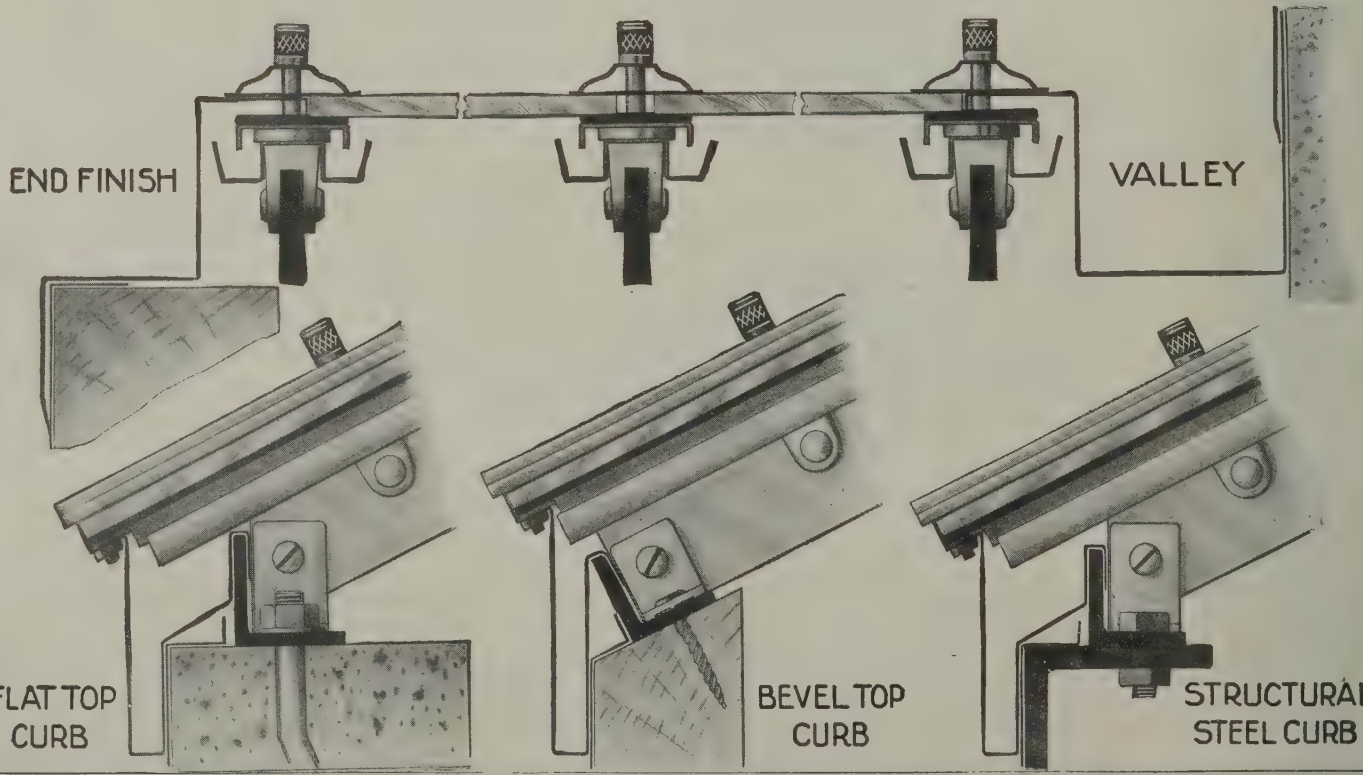
Section through Drou-Ve-Lite glass structure showing interlocking sections making the skylight entirely self supporting without the use of any structural steel whatsoever other than that which is a part of the skylight itself.



SINGLE PITCH AT TOP



DOUBLE PITCH OR HIPPED AT RIDGE



THE G·DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • DROU-VE-LITE • GLASS STRUCTURE

MANUFACTURED UNDER HAWES PATENT NO. 1632330

GENERAL SHEET METAL WORKS

Manufacturers of Skylights and Pressed Steel Sash Operators

BRIDGEPORT, CONN.

Cibulas Puttyless Skylights

Cibulas puttyless skylights are not carried in stock, but are built to take care of the proper span and conditions.

They are furnished with or without ventilators, in the following types: hip, turret, sawtooth, double pitch, single pitch and marquise.

Glazed with either ribbed or rough plain or wire glass, or plain actinic glass.

Outstanding Features

(1) Cibulas skylights are made entirely of heavy gauge, non-corrosive metals, No. 18 or No. 16 gauge copper, aluminum or galvanized rust-resisting metal. They are lasting; there is nothing to rot or deteriorate.

(2) They are built to prevent sagging or breakage under heavy wind or snow pressures and are perfectly weathertight and watertight.

(3) Their construction includes complete provision for contraction and expansion.

(4) They are suitable for all classes of buildings.

(5) They safely support a weight of 35 to 40 lb. per sq. ft., the bars being made in direct proportion to the length of the span.

(6) They dispose of all condensation. Gutters are made large enough to carry off water and prevent accumulation of dust and dirt.

Our Service to Architects

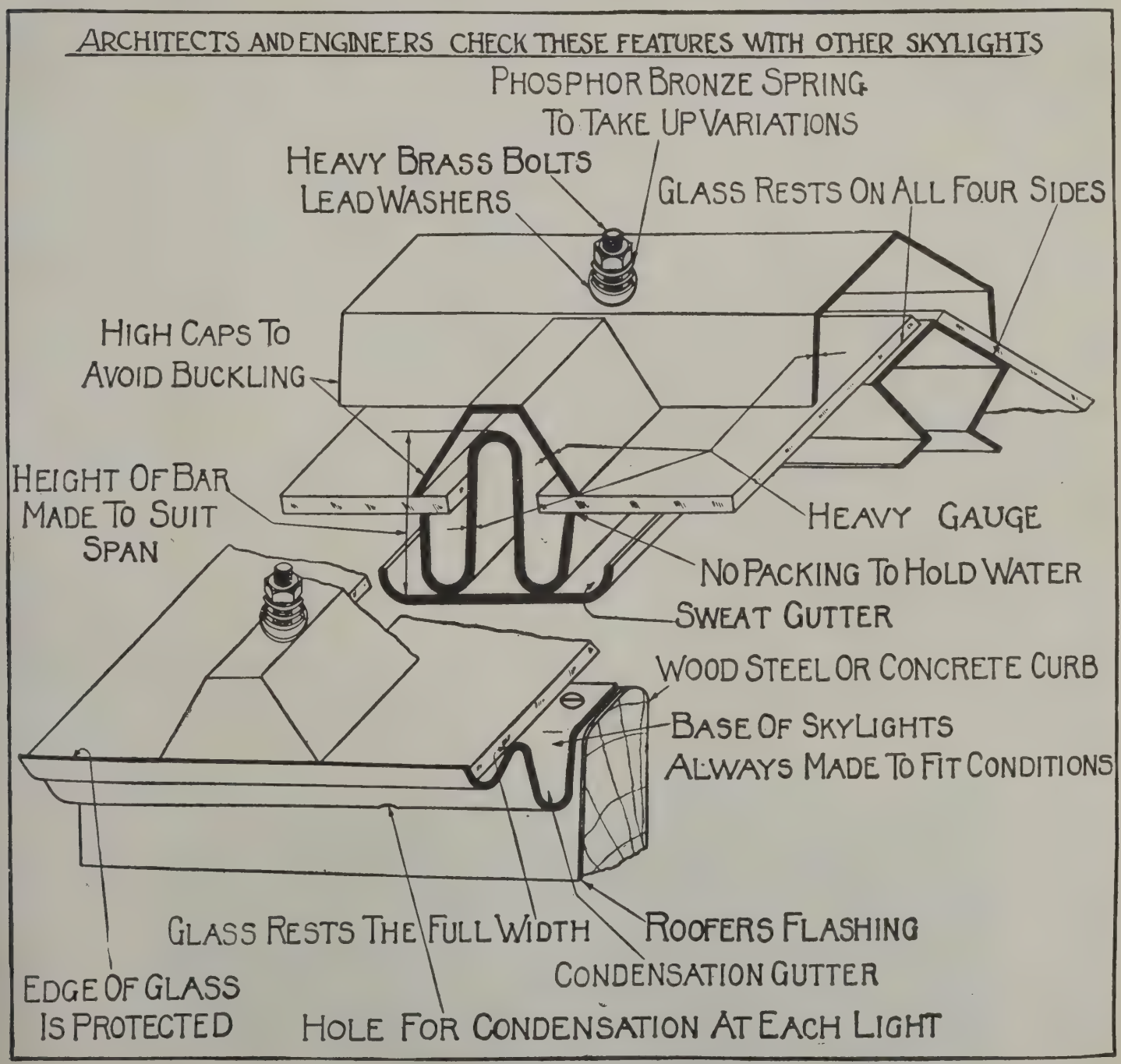
When desired, our engineers furnish complete detail drawings and estimates without obligating the architect.

Send for our latest catalogues, and chart for making curbs for all conditions to receive Cibulas skylights.

Specifications for Cibulas Skylights

Furnish and erect, where shown on plans, Cibulas Puttyless Skylights, manufactured by General Sheet Metal Works, Bridgeport, Conn., made of No. 16 [No. 18] gauge galvanized rust-resisting metals [of copper, using 48 oz. for the supporting bars and 18 oz. for the caps and gutter] [all-aluminum, $\frac{1}{16}$-in. thick].

Note: The glass commonly used in skylights is ribbed or rough plain glass, or ribbed or rough wired glass.



Detail of the Cibulas Puttyless Skylight

A. H. JETER & COMPANY, INC.

Manufacturers of Puttyless Steel Skylights

GENERAL OFFICE AND WORKS
496-498 Hancock Street
LONG ISLAND CITY, N. Y.

TELEPHONE
ASTORIA 4940

Products

PUTTYLESS STEEL SKYLIGHTS.

Also Sheet Metal Skylights, Turrets and Louvers; Architectural Sheet Metal Work of every description; Metal, Tile and Slate Roofing.

Services and Estimates

This company's estimating and drafting department is at the disposal of architects, engineers and owners. Estimates, suggestions, specifications and plans for its products will be gladly given on request. A large force of experienced men is employed, who have been carefully trained to erect the company's products.

When material only is supplied, complete instructions and drawings are furnished.

Facilities

This company's factory is situated in Long Island City, near the Long Island Railroad and Brooklyn Eastern District Terminal. This gives direct shipping facilities to any point in the world, either by railroad or water.

Jeter's Puttyless Skylights

Special Features—The sash bar of Jeter's patented puttyless steel skylight is composed of a lower channel, over which is placed a special moulded glass rest, secured to the bottom channel by means of wrought iron stirrups and tap bolts.

The glass rest is held in position by a brass bolt, which is of sufficient length to engage and secure the metal cap that covers the edges of the glass.

On the rolled steel glass rest, a cushion of heavy saturated asbestos is provided, running entirely across the glass rest. After the glass is laid in place, a saturated asbestos sealing strip is provided, which is securely held in place by the metal cap. This feature insures against any dust or moisture getting under the glass and into the sash bars or gutters.

A special moulded section is used as a continuous bottom support for the glass. This section also contains a pocket, on which is placed a strip of saturated asbestos upon which the glass rests. Connections at intervals of about 20½ in. are provided in the continuous bottom members, which receive and secure the bars. This method of asbestos cushioning device makes the skylight waterproof and dustproof and, being of a soft indestructible material, reduces the cracking of the glass to a minimum.

Adaptability—Jeter's patented system of puttyless steel glazing is adaptable for use in railroad terminals, museums, schools, hospitals, factories, machine-shops, etc.

The very simplicity of construction enables any mechanic to readily erect this system.

Specification for Jeter's Puttyless Skylights—Suggested for Architects' Use

All skylights shall be of rolled steel, of a type to allow for free expansion and contraction and made tight without use of paint, cement or putty.

Sash bar shall be composed of a special U-channel 2 in. wide and 1⅝ in. deep, made of high carbon steel ⅛ in. in thickness.

A rolled steel glass rest made of 1½x½x⅛-in. channel shall be provided. This glass rest shall be in the shape of a trough and shall be supported on wrought iron stirrups which will be tap-bolted through the walls of the special U-bar.

A heavy non-absorbent asbestos cushion shall be placed over the glass rest. Cushion and glass rest shall be securely fastened to the wrought iron stirrup by means of brass or copper machine screw.

A special continuous moulded member shall be provided at eaves of skylights. Between this member and the glass shall be placed a non-absorbent asbestos cushion and same drawn up tight under glass by means of bolts at bar centers.

After glass is set in place, provide a metal spring cap 1¾ in. out to out of flanges. This cap shall be underlined with a sealing strip of non-absorbent asbestos material, held in position by being punched and strung over the cap bolts. Edges of sealing strip shall not protrude beyond edges of cap. Securely fasten cap by means of a brass nut.

All skylights to be glazed with ¼-in. ribbed wire glass.

All caps, combing and trim shall be of (specify copper, zinc or galvanized iron).

After fabrication and before assembling the sash bars, all parts, shall be thoroughly coated with an application of bitumastic solution (or specify hot galvanizing).

Jeter's Top Ventilating Puttyless Skylights

A puttyless steel skylight made from the same steel section as our regular skylights, previously described. The steel channel bars form the top chord of a truss and are securely bolted top and bottom to a steel curb and ridge plate, of the same gage metal as the bar. When the curbs are tied by either angles or rods a perfect truss is thus formed which obviates the necessity of building up an independent steel truss as is usually the case. This method is successful in skylights not exceeding 12 ft. in width, but any length.

The ventilating sections at the ridge are made from sheet metal, either galvanized iron or copper, and are top hung by means of heavy iron butts, securely bolted

Installation of Jeter Top Ventilating Puttyless Skylights

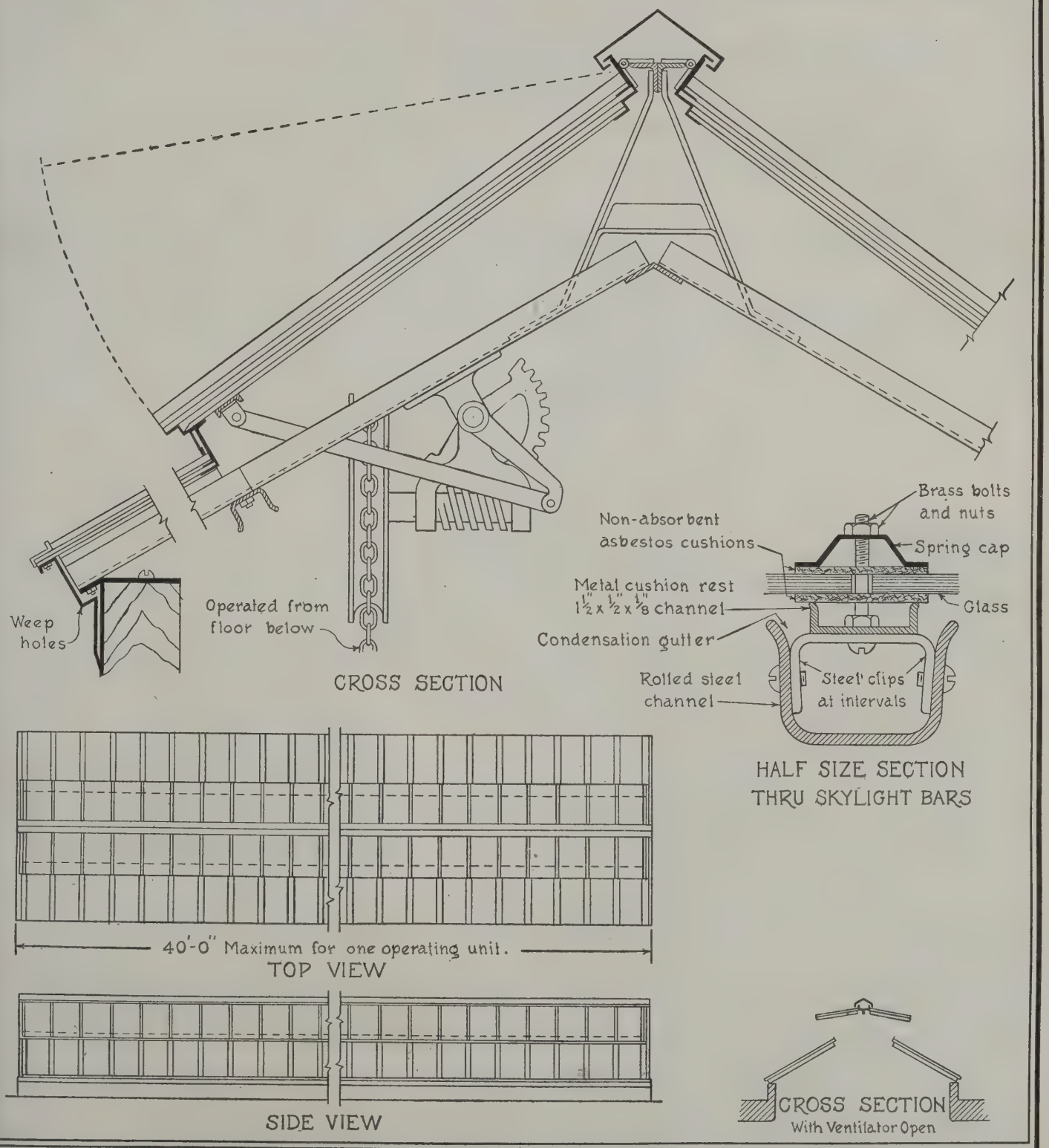
Continued on next page

to continuous angles which run the entire length of the skylight. The sheet metal sash bars of this ventilator, *besides* being securely fastened to a stiffening member top and bottom, are again reinforced and tied with a 2½x½x⅛-in. channel which is fastened to the bars the entire length of the skylight with two ¼-in. bolts at each sash bar. This channel also receives the hinges of the operating device into which the push arms of the operators work.

The ventilating section is operated by heavy chain operators of the worm and gear type. Either side can be operated separately or independently of the other. Thus when one side is opened and the other is closed a suction is caused which "pulls" the dead air from the building; both sides can be opened if desired, which causes a natural forced ventilation from the building.

Standard Details

We have prepared drawings, showing plans, elevations, sections and details of this and many different styles of skylights, which will be forwarded on application, and when sufficient information accompanies request, recommendations will be cheerfully given as to the most economical and efficient practice. Send for drawing S-13.



DETAILS OF JETER 60 IN. RIDGE VENTILATING SKYLIGHT

AUGUST KUHNLA, INC.

Manufacturers of Skylights

TELEPHONE
WILLIAMSBURGH 1017-18-19

10 to 20 Lorimer Street
BROOKLYN, N. Y.

ESTABLISHED OVER HALF A CENTURY

Member of N. Y. Building Trade Employers' Association

Products

"KUPE" AUTOMATIC STAGE VENTILATORS; "KUPE" AUTOMATIC VENTILATING SKYLIGHTS.

Also "KuPe" Better Standard Non-automatic Skylights.

KUPE
TRADE-MARK

When Specifying

Architects in specifying should mention skylight number to avoid misunderstanding in type desired.

Catalogue

Supplementary illustrated sheet for complete list of automatic and non-automatic skylights mailed on request.

Patents

"KUPE" Automatic Skylights and Ventilators are protected under various U. S. Letters Patents and the trade-mark "KUPE" is registered. Any infringement of patent or trade-mark rights, either in whole or in part, will be prosecuted.

Guarantee

All genuine "KUPE" products bear the trade-mark "KUPE", signifying excellence of workmanship and material assured by the long creditable reputation of a reliable manufacturer.

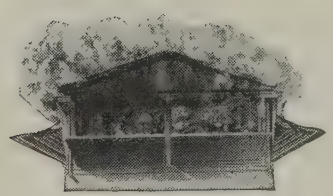
Estimates

Price lists are not available for general distribution, owing to fluctuation of market, etc. Quotations made upon application for specific jobs will be found extremely reasonable, considering the high grade product and service offered.

Inquiries

When writing, please mention job, location and architect in order to facilitate proper filing and closer estimating.

"KuPe" Standard Automatic Stage Ventilator No. 67



"KuPe" Standard Automatic Stage Ventilator No. 67
(Patented)

A combined ventilator and weather-proof skylight. It consists of a metal frame with hipped glass roof, and sides provided with bottom hinged metal shutters. Flexible cable equipped with fusible links passes over brass pulleys and connects the top of each shutter to a main rope which extends down to the stage floor. This main rope is also provided with fusible links. Under ordinary conditions the shutters are hand operated, but in times of emergency the shutters may be quickly opened by cutting the rope; in case of fire the operation of the shutters is effected either individually or simultaneously by the melting of said fusible links.

Connecting the top rail of the shutters with the head jamb is a jack-knife bracket which acts as a gravity lever in thrusting the shutters outward, overcoming any possible obstruction of ice, snow, or other encumbrances. This bracket also prevents the shutters from opening beyond a certain point, and holds same rigid against wind when open.

Gutters under the roof supports conduct condensation to the exterior.

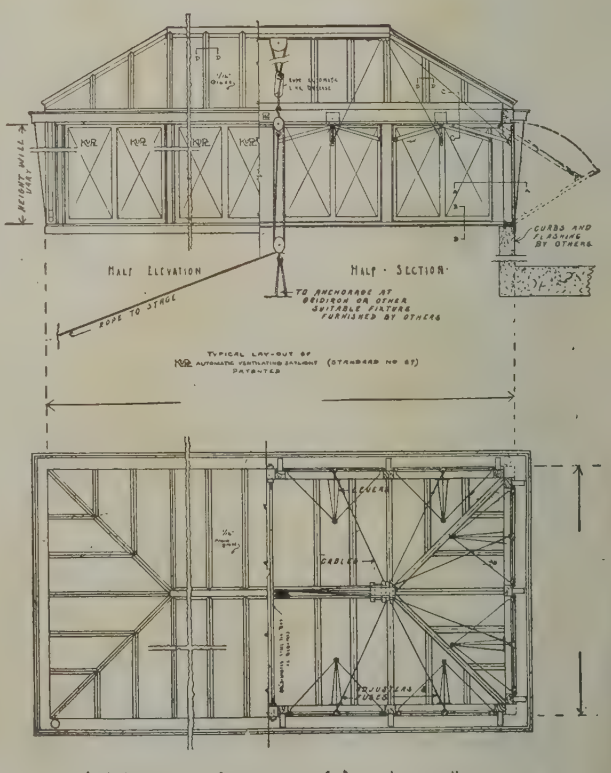
This is a scientifically constructed, efficient, self-opening ventilator, proof against obstruction by ice or snow, and positive in action under all conditions.

Construction and Installation—We manufacture and install these ventilators to any dimension, complete, glazed with 1/12-in. sheet glass and equipped with woven wire screen under the glass. We use standard gauges of galvanized steel (or copper) and the shutter hinge plates and pins are of brass.

Indorsement—Approved by the Board of Fire Underwriters, city officials, architects and owners.

Other Types—In addition to the above noted "Standard" design ventilators, we also control patent rights for the sole manufacture of various other stage skylights, including those equipped with exterior or interior bracket and weight control door, as well as those embracing the falling hood arrangement.

Installations—Prominent theaters, high schools, parochial schools, public auditoriums, masonic temples, etc., throughout the country, are now equipped with the "KuPe" Stage Ventilator; list of these installations will be gladly furnished on application. Limited space here prevents itemized mention.



½ PLAN OF HIPPED ROOF ½ PLAN LOOKING UP

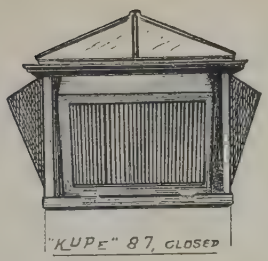
"KuPe" Standard Automatic Stage Ventilator No. 67
(Patented)

Note: Shutter openings will vary in height to conform with area of skylight shaft

Stages having no gridiron will require a beam across center of roof opening to act as an anchorage for tackle-blocks. (This anchorage not in "KuPe" contract.)

Continued on next page

"KuPe" Simplex Automatic Stage Ventilator No. 87



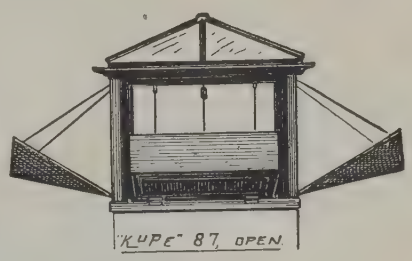
"KuPe" Simplex No. 87 Closed
(Patented)

This is another type skylight meeting with popular favor, owing to the extreme simplicity of operation.

This ventilator, like all others of the "KuPe" manufacture, is of pleasing design and exceptionally strong construction.

The sides and ends being of heavy gauge galvanized metal, while the hipped top is formed of special galvanized bars, hips and ridge to receive glass and equipped with wire screen under same; according to standard New York City requirements.

As shown in illustration, the operation of "KuPe" Simplex No. 87 is entirely on the gravity principle. The manual release of main rope or the melting of fuse links causes the cover hoods to fall downward away from the various openings, leaving the entire unobstructed area clear for immediate escape of smoke and fumes; a feature only possible in "KuPe" construction.



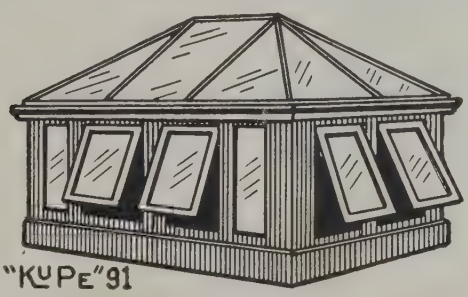
"KuPe" Simplex No. 87 Open
(Patented)

Note: This type of stage ventilator is manufactured only in square sizes up to 5x5 ft. to permit assembled shipment (without glass) often desired by purchasers who desire to install their own ventilators.

"KuPe" Automatic Dye House Skylight No. 91

This ventilator is of special design, arranged to meet a condition requiring the automatic closing of sashes in case of fire and the opening of same to allow exit for expanded gases at time of explosion.

These galvanized steel (or copper) skylights are manufactured complete (except glass) in sizes up to 5x6 ft. ready for shipment and installation by purchaser; larger sizes, if required, must be forwarded knocked down and will require assembly at job by either our own or other practical mechanics.

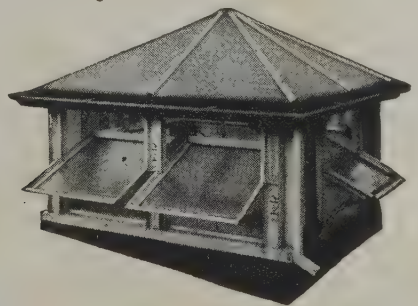


"KuPe" Automatic Dye House Skylight No. 91

"KuPe" Automatic Quick Acting Ventilator Skylight No. 66

A combined ventilator and skylight that operates instantaneously. It consists of a rectangular metal frame having a hipped roof of glass. Designed especially for immediate vent action in time of emergency.

The sides of the structure consist of vertical sash openings, fitted with side pivoted sash.



"KuPe" Automatic Quick Acting Ventilator Skylight No. 66

Struts from the bottom rail of these sash connect with a runner which is on a fixed vertical rod.

A chain from this runner extends to a point suitable for manual operation, where it passes through a key slot arrangement permitting the sash to be opened simultaneously and locked in any desired position.

Sash may also be opened thermally, if so desired, by means of a fusible link.

The weight of the operating device effects a positive opening action on sash when the chain is released. When closed, head of the sash swings under the rain shed, flanges on the side stiles fit into grooves on the panels, the apron on the bottom rail overlaps the sill, making the sash stormproof.

Gutters under the roof support conduct condensation to exterior.

Construction and Installation—We manufacture these skylights of standard gauge galvanized steel (or copper) and deliver same f.o.b. Brooklyn, N. Y., complete (except glass) ready for installation by the purchaser in the following sizes: 2x3 ft., 3x3 ft., 3x4 ft., 4x4 ft., 4x5 ft., 4x6 ft., 5x5 ft., and 5x6 ft.

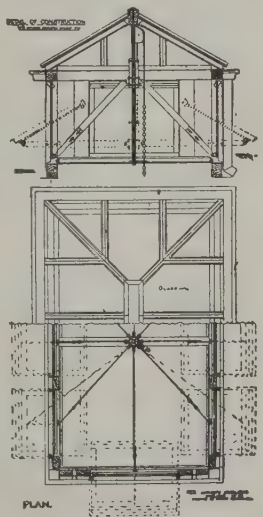
Larger sizes also furnished; these, however, are shipped knocked down and will require assembly at job by practical mechanics.

When requested, quotations will be made based on complete manufacture and installation by us. (Architects desiring this method should specify accordingly.)

Indorsement—"KuPe" Automatic Ventilating Skylight No. 66 is approved by architects, engineers, contractors and owners after rigid tests and inspection.

Recent Installations—Include dairies, baking plants, cabinet mills, ice cream and candy factories, markets, storage houses, automobile works, garages, schools, chemical plants, furniture warehouses, office buildings, acetylene works, laundry buildings, hospitals, doctors' and dentists' offices, residences, emporiums, hotels, clubhouses, department stores, police stations, etc.

Itemized lists of these would be impossible in the space allotted here.



Detail of "KuPe" Automatic Quick Acting Ventilator Skylight No. 66
(Patented)

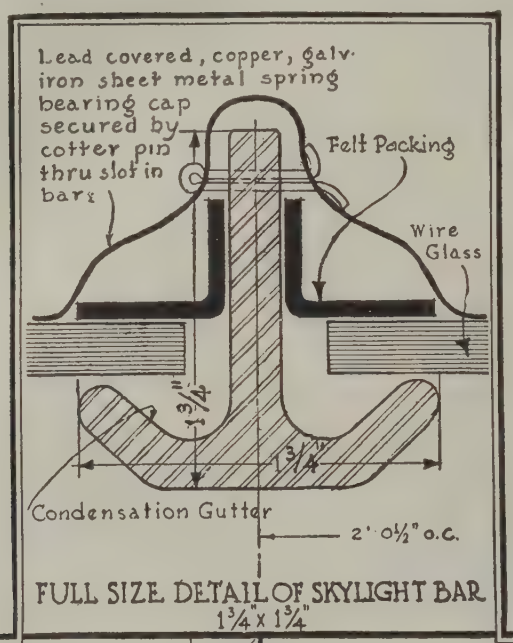
THE HOWIE COMPANY, INC.

Manufacturers of Skylights
9011 Central Avenue
DETROIT, MICH.

Products

PEERLESS SKYLIGHTS.

Also manufacturers of Fireproof Windows, Tin Clad and Metal Covered Doors, approved by Underwriters' Laboratories, Inc.; Copper and Bronze Doors, Architectural Sheet Metal Work.



FULL SIZE DETAIL OF SKYLIGHT BAR
1¾" x 1¾"

Peerless Skylight, Sawtooth and Marquise Constructions

These are designed to provide a weatherproof and dustproof skylight construction and one guaranteed against any and all possible glass breakage due to vibration, or through expansion and contraction due to temperature changes.

Specifications for Peerless Skylight and Marquise

Intent—This specification together with the accompanying drawings and details is intended to provide for all labor and material required for the completion and erection of all skylights as shown or mentioned.

Work by Others—All steel framing, wood curbs, nailing strips, gutters and roof flashings, shall be provided for under another contract, unless otherwise specified.

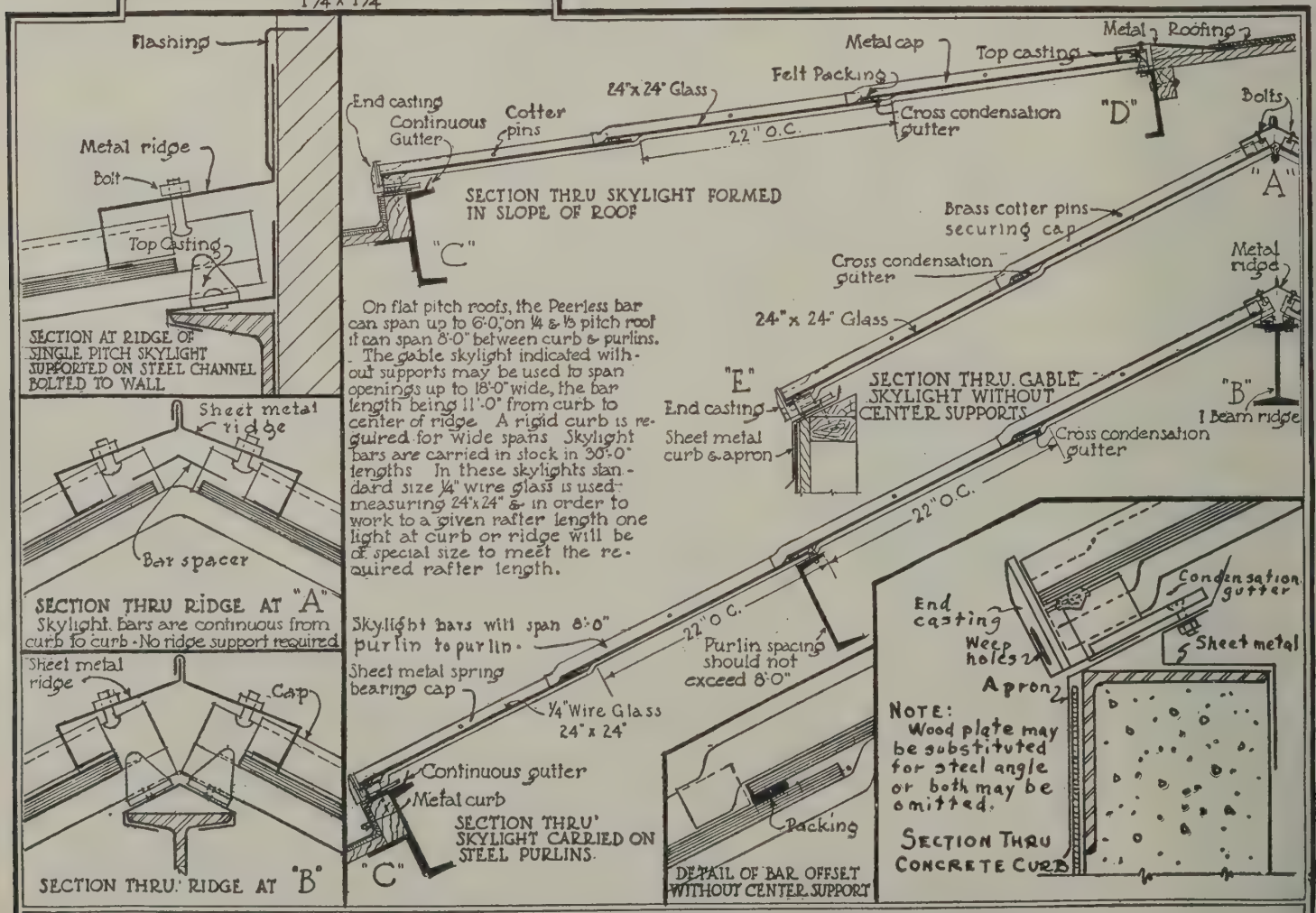
Work Required—Provide and install all skylights as shown or indicated on drawings. All skylights shall be "Peerless" skylight construction as manufactured by THE HOWIE COMPANY, INC., DETROIT, MICH., complete as shown by their standard details, and adapted to the construction of the building.

All sheet metal trimming shall be of No. 24 gauge galvanized iron [or 16 oz. cold rolled copper] [or No. 11 zinc].

Glazing—All skylights to be glazed with best quality ¼-in. rough wire glass not to exceed 24 in. in width. All glass to be left whole and clean at completion of the work.

Painting—All metal work in connection with skylight, except copper or zinc, shall be painted; also paint all skylight bars with 1 good coat of approved paint.

Guarantee—This contractor is to furnish a written guarantee for 5 years.



DETAILS OF PEERLESS SKYLIGHTS

NONPAREIL SKYLIGHT CO.

Manufacturers of Nonpareil Puttyless Skylights

MAIN OFFICE

2609-2611 Pennsylvania Avenue, N. W., WASHINGTON, D. C.

Product

The NONPAREIL PUTTYLESS SKYLIGHT (patented November 1, 1910; October 3, 1911; October 14, 1913).

Some of Our Claims, for Our Construction

(1) It can not, and does not leak.

(2) Glass breakage with this construction is reduced to a minimum.

(3) A highly practical construction.

(4) Our lead glazing cushions are practical and lasting. Detail 5, Fig. 1.

(5) These cushions are *not* attached until after all field work is done, therefore, they are always in perfect condition when the glass is put in place.

(6) They are reversible, so that in case of accident to the glass and they are injured, they can be reversed for installing new lights of glass—very advantageous feature.

(7) Our condensation gutters are so made, and of such size, as to really and properly perform the functions they are supposed to perform. Details 6 and 7, Fig. 1.

(8) Our bars are made from lead coated ingot iron in standard construction, and of cold rolled copper when so specified. They are also of the proper size and section, to make the best and most practical job. Details 6 and 7, Fig. 1.

(9) Our bolts and nuts are made from cold drawn brass (*not cast brass*) and all our exterior castings are brass.

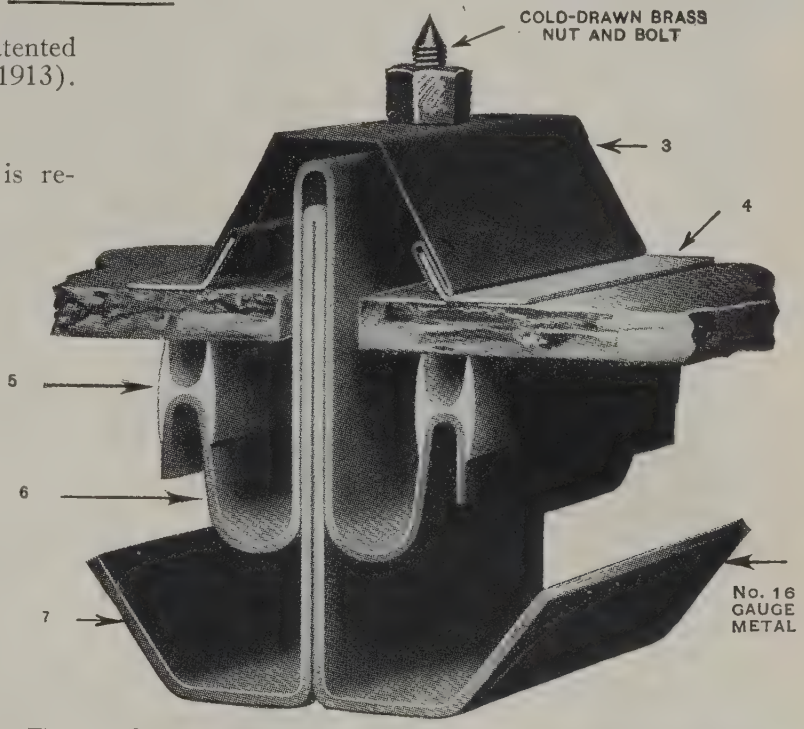


Fig. 1. Complete Bar Assembled, Showing the Glass and Details of Construction
(Patented November 1, 1910; October 3, 1911; October 14, 1913)

Specifications for Nonpareil Skylights

The skylights must be of a type that can be made watertight without the use of putty, and shall *not* contain any material other than metal and glass in their construction, and, where shingle of flexible type is used, it must not be more than ⅝ in. from one plane of glass to the one below.

Some Recent Installations of Nonpareil Skylights

Lincoln Memorial, Washington, D. C.
United States Navy Yard, Building No. 41, Washington, D. C.
Central High School, Washington, D. C.
Cuban Legation, Washington, D. C.
United States Treasury Building, Washington, D. C.
Canadian Pacific Railway, Montreal, Que.
Pratt Tennis Court, Glen Cove, L. I., N. Y.
Vitagraph Building, Brooklyn, N. Y.
New Corcoran Gallery of Art, Washington, D. C.
Currier Gallery of Art, Manchester, N. H.
New York Central R. R. Station, Watertown, N. Y.
United States Post Office, Santa Barbara, Cal.
Biograph Building, New York, N. Y.
Harrison Williams Tennis Court, Bayville, L. I., N. Y.
Eastern High School, Washington, D. C.
Beloit State Bank, Beloit, Wis.

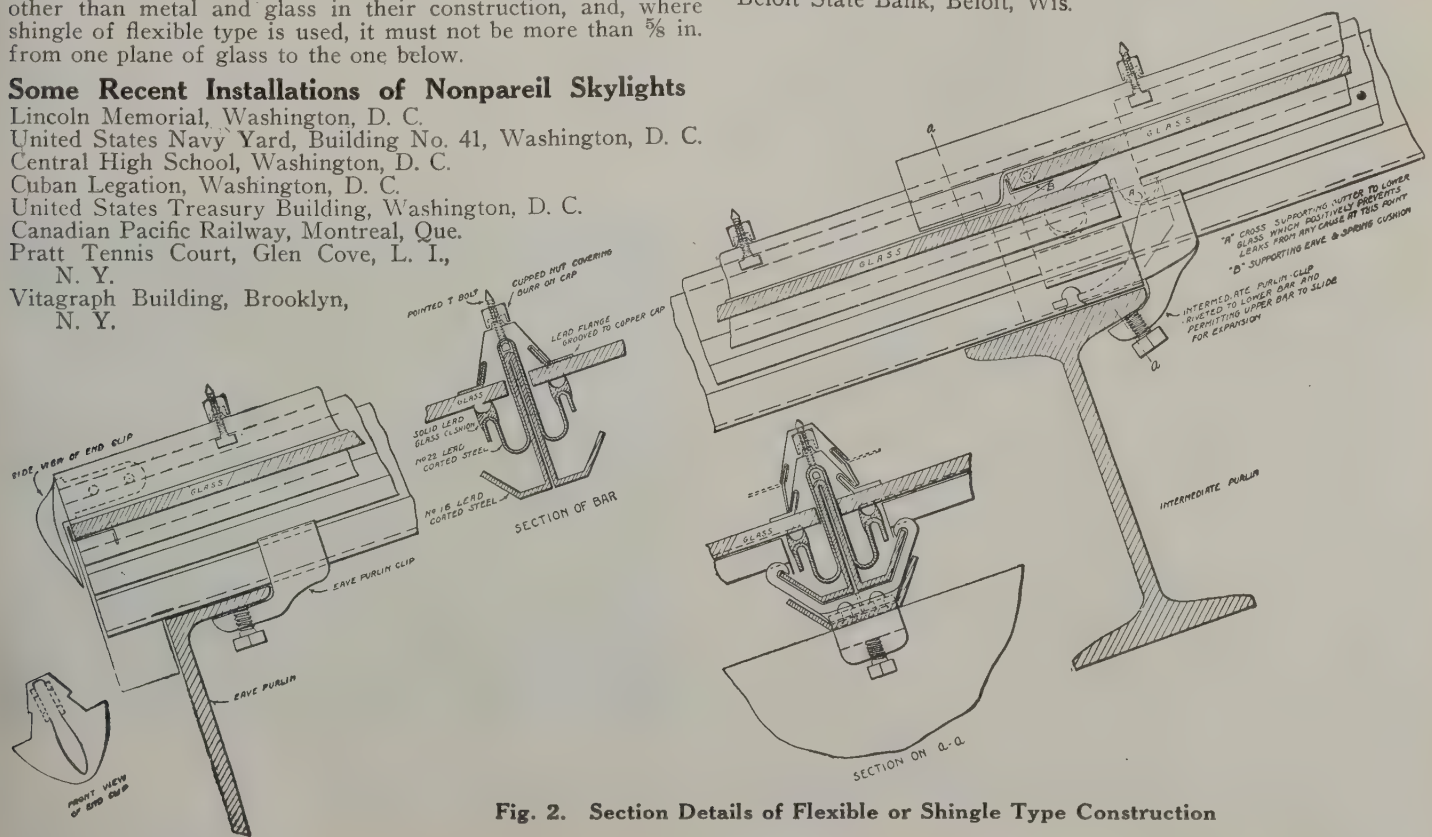


Fig. 2. Section Details of Flexible or Shingle Type Construction

NATIONAL VENTILATING COMPANY

Manufacturers of Puttyless Skylights

GENERAL OFFICE AND FACTORY

75 Tenth Street
LONG ISLAND CITY, N. Y.

TELEPHONE
STILLWELL 5733, 5734

Products

MULTI-UNIT PUTTYLESS SKYLIGHTS.

Also manufacturers of Side Lights, Operating Sash, and National Ventilating Devices; all kinds of Sheet Metal Products; Drawing and Stamping.

Adaptability

Skylights for railway terminals, power stations, machineshops, factories, foundries, libraries, museums, art galleries, and all other buildings whereon permanent watertight skylights of large area are required.

Advantages and Distinctive Features

Referring to Fig. 4 on following page, the bar and upper lights are supported in a fixed manner by the purlin thereunder; while the lower bar, supporting the lower lights, is secured by the same purlin in a loose manner, permitting it to expand freely.

This construction, being repeated at each purlin, permits movement, all in same direction, due to expansion, contraction, or vibration (along the slope of the skylight) of the cap, glass and bar of each unit or tier of glass, independently of every other unit or tier.

Along the longitudinal line of the skylight the steel frame of the building and the entire length of the glass are each taken as separate units, and the difference, nearly 100%, in the expansion and contraction of these materials (glass and steel) is likewise thoroughly taken care of by the copper spreader clips shown in transverse section at supporting bar (Fig. 2). These spreader clips are placed over each cap bolt, spaced about 10 in. along each skylight bar, and incidentally they serve also to better secure in place the brass bolts for holding the caps.

The cap is strong and yet resilient. Its upper half is of an inverted "U" shape, which provides strength and rigidity; while the lower half, especially at the lower extremities, is resilient, so as to conform thoroughly, when secured in position, to the surface of the glass.

All gutters and parts that are non-accessible, without removing the glass, are of non-corrosive material. The entire top of the bar is covered with 8-oz. copper, the same being applied while the last coat of bar-paint is still wet; and a flexible bearing for the glass is formed, which adjusts itself to any warps or irregularity of the glass along its bearing line.

The company is equipped to cover the bottom of the bar also. Both the top and bottom bar covers are made by special dies and both fit the bar snugly.

No packing or filling substance of any kind is required, and no material is used other than glass and metal.

Standard Specification, Multi-unit System Puttyless Skylights

All curb and roof flashings shall be included under heading "Sheet Metal Work." They must be well connected, ready to receive the skylight work, and must include all necessary counter flashing, well secured to roof flashings and made water-tight.

The skylights shall be of the puttyless type, of a design to allow for free expansion and contraction, or movement due to vibration, of the glass and supporting bars in line with the pitch of roof, *all in the same direction.*

Each light of glass shall be entirely independent of every other light, so that one light does not support another; and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

The bearing for the glass shall be flexible, so as to adjust itself to any warps or irregularities of the glass along its bearing line.

The caps shall be spring bearing, in order to thoroughly conform along the lines of contact, when secured in position, to the surface of the glass.

All bar gutters shall be of copper and all exposed parts other than sheet metal shall be of brass.

The supporting bars shall be of rolled steel, and shall be held in a loose manner at the upper end and in a fixed manner at the lower end.

Packing, filling substance of whatever kind, or material other than glass and metal shall not be used.

All skylight sheet metal work shall be [copper] [zinc] [galvanized iron].

The glass shall be ⅜ in. thick [wire] [plain] [ribbed].

Adopted by Leading Railroads

The Pennsylvania Railroad Company, after carefully examining all other types of puttyless skylights in actual service, adopted the construction herein shown and described for its new New York & Long Island Railroad Passenger Station, 31st to 33d Streets and 7th and 8th Avenues, New York City, on which building this company completed, about 15 years ago, the erection of 83,000 sq. ft. of skylight, embracing nearly every known variety, such as hipped, ridge, flat, barrel-roof, sawtooth with bowed ridges, circular, elliptical, etc., all constructed with flat glass.

The Central Railroad of New Jersey adopted this system of skylights for its new terminal at Jersey City, N. J., where 116,000 sq. ft. of this construction has been installed.

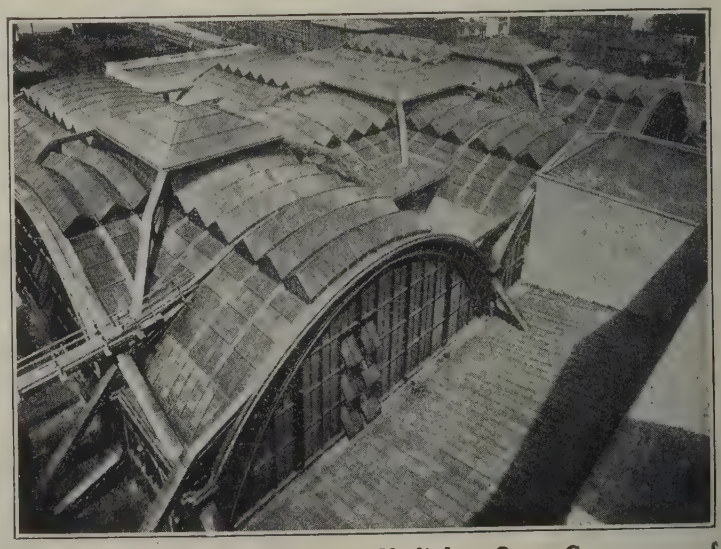


Fig. 1. Group of Multi-unit Skylights Over Concourse of Pennsylvania Terminal, New York, N. Y.

Area of this group, about 50,000 sq. ft. Total area on the terminal, 83,000 sq. ft.

Continued on next page

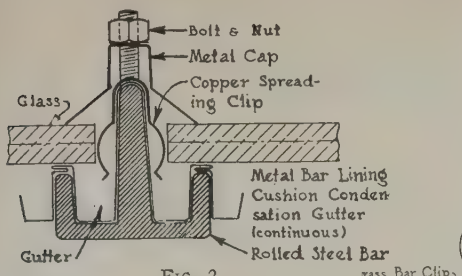


FIG. 2

Half Sized Transverse Section at Skylight Supporting Bar
(Patents applied for)

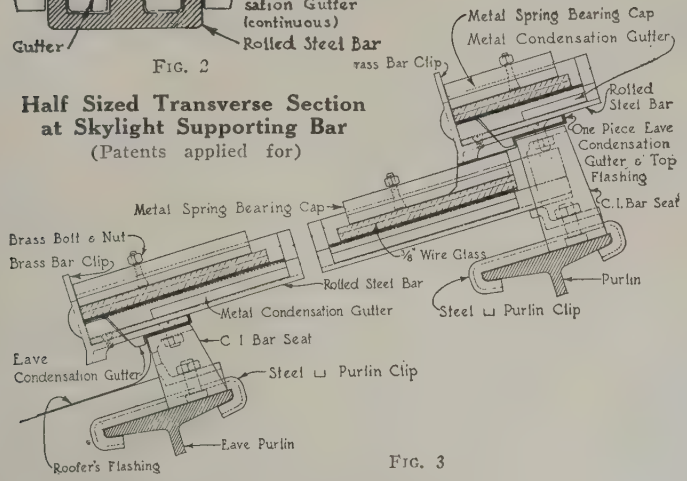


FIG. 3

Reduced Scale Cross Section from Eave to Next Purlin Above
(Patents applied for)
Construction shown on the right side is repeated at each purlin between the eave and the ridge
Scale, 2 in. equals 1 ft.

The New York Central Railroad Co. also has this construction on its new Grand Central Terminal at 42nd Street, New York City; on its New York City Power House at 50th Street and Lexington Avenue; Power Stations at Yonkers and Port Morris, N. Y.; Boiler Shops at West Albany, N. Y., Reed & Stem, Architects, and for their new Passenger Station at Utica, N. Y., Stem & Fellheimer, Architects.

Result of Thorough Investigation

The system of skylight construction described here is the result of experience and investigations made by the NATIONAL VENTILATING COMPANY in this line over a period of nearly 20 years.

All efforts during this time have been directed to producing, not the cheapest, but the best construction. As to skylights, true economy does not consist in buying the cheapest.

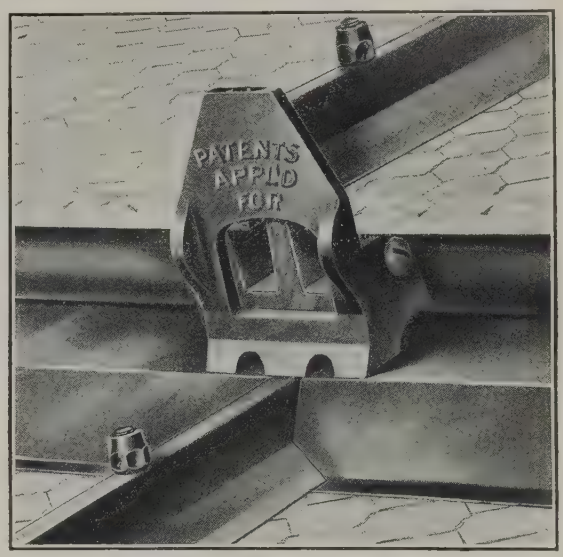


Fig. 4. Half Sized Perspective
Showing exterior view over each purlin between the eave and the ridge

Public Buildings and Other Notable Installations

The following are a few, among many, installations made by this company during the past 24 years; in some cases replacing other work with the new and improved system above described. They include building, location and architect.

New Library Building, Bar Harbor, Me., Delano & Aldrich
Sun Parlor for E. Parmalee Prentice, New York, N. Y., Delano & Aldrich
International Paper Co. Mills at Niagara Falls, Palmer and Fort Edward, N. Y., and Rumford Falls and Chisholm, Me
Maryland Institute, Baltimore, Md., Pell & Corbett
Auditorium Building, Springfield, Mass., Pell & Corbett
Municipal Building, Springfield, Mass., Pell & Corbett
New York Edison Co. Waterside Power Station, New York, N. Y.
U. S. Navy Yards at Norfolk, Va., Charlestown, Mass., Brooklyn, N. Y., Pensacola, Fla., and Washington, D. C.
Brooklyn Rapid Transit Co. Shops, Maspeth, N. Y.
American Steel & Wire Co. Mill, Worcester, Mass.
Terminal Passenger Station, Norfolk, Va., Reed & Stem
New York Stock Exchange Building, New York, N. Y.
New U. S. Post office, New York, N. Y., McKim, Mead & White
New Municipal Building, New York, N. Y., McKim, Mead & White
Munsey Building, Washington, D. C., McKim, Mead & White
Brockton Library, Brockton, Mass.
New York, Westchester & Boston R. R., Quaker Ridge Station, New Rochelle, N. Y., and 180th Street Station, Bronx, N. Y., Stem & Fellheimer.
United Electric Light & Power Co. Powerhouse, 201st Street Station, New York, N. Y.
Institute of Arts and Sciences, Brooklyn, N. Y., McKim, Mead & White
The Beaver Companies' Mill, Thorold, Ont., Canada
Museum of Fine Arts, Minneapolis, Minn., McKim, Mead & White
Administration Building, Balboa, Canal Zone, Panama
Metropolitan Museum of Art Building, Sections "J" and "K," New York, N. Y., McKim, Mead & White
Robert Brewster's Enclosed Tennis Court at Mount Kisco, New York, Walter D. Blair
Enclosed Pastime Tennis Court, Long Island City, N. Y., Walter D. Blair
Ford Motor Co. Service Building, Long Island City, N. Y.
Union Passenger Station, Macon, Ga., Alfred Fellheimer
John J. Raskob's Residence, Claymont, Del., McClure & Harper
Buffalo General Electric Co., 1917 River Station Extension, Black Rock, N. Y., Stone & Webster, Engineers
American Tobacco Co. Building, Brooklyn, N. Y., Francisco & Jacobus
American Can Co. Building, Brooklyn, N. Y., N. M. Loney
U. S. Naval Operating Base, Hampton Roads, Va.
National City Bank, New York, N. Y.
Trenton Bank Building, Trenton, N. J., Dennison & Hirons
Commodore Hotel, New York, N. Y., Warren & Wetmore
Amherst College Library, Amherst, Mass., McKim, Mead & White
Standard Oil Company, Devoe Works, Long Island City, N. Y.
Kwang Tung Electric Supply Co. Building, Canton, China
U. S. Assay Building, New York, N. Y.
Westinghouse Electric Co. Warehouse, Essington, Pa.
S. W. Straus Building, New York, N. Y., Warren & Wetmore
Continental Can Co., Jersey City, N. J., Francisco & Jacobus
Empire City Bank, New York, N. Y., Trowbridge & Livingston
New York Telephone Co., 6 Central Exchange Buildings, McKenzie, Voorhees & Gmelin
S. W. Straus & Co. Building, Chicago, Ill., Graham, Anderson, Probst & White
Paterson Paper Parchment Co., Edgerly, Pa., Abbott, Merkt & Co.
Federal Sugar Refining Co., Yonkers, N. Y., Dwight P. Robinson Co.
Tryon Art Gallery, Northampton, Mass., Frederick L. Ackerman
Fine Arts Building, Geo. Peabody College, Nashville, Tenn., McKim, Mead & White
Kleinberger Art Gallery, 12 East 54th Street, New York, N. Y., Harry Allen Jacobs
International Motor Co., Long Island City, White Plains, Rochester and Albany, N. Y., and Camden, N. J., Faile & Seelye

PENNSYLVANIA WIRE GLASS COMPANY

EXECUTIVE OFFICE
WALTER COX, President — Pennsylvania Building, PHILADELPHIA, PA. — WORKS DUNBAR, PA.

HIRES TURNER GLASS COMPANY, DISTRIBUTORS
ALBANY, N. Y. BALTIMORE, MD. ROCHESTER, N. Y. PHILADELPHIA, PA. WASHINGTON, D. C.
PACIFIC SLOPE DISTRIBUTORS, H. B. Mills Co., SAN FRANCISCO, CALIF.

Products

Skylights and Glazed Roofing; Marquises; Glazed Canopies; Sidewalls, etc.

Solid Wire Glass—Rough, Ribbed, Polished, Corrugated (CWG), Figured, and Actinic Glass.

Also Glass without wire netting, in various patterns and thicknesses, to suit every requirement.

TRADE-MARK

Wire Glass

Process—Solid wire glass, made by the Pennsylvania continuous process, is completely formed by one pouring and one rolling; the only process that makes possible the manufacture of wire glass as thin as ⅛ in.

Fire Protection—Wire glass is a valuable fire retardant—it prevents flames from attacking adjacent buildings.

Approval (Distinguishing Mark)—All of our wire glass, ¼ in. and over in thickness, has the full approval of the National Board of Fire Underwriters as a fire retardant, which requires a distinguishing mark to identify the glass. Our distinguishing mark is our *cabled strand*, appearing every 10 in. across the sheet and the full length of each sheet.

Service—We offer gratuitous engineering advice on all glass problems.

Samples—Samples, catalogues and circulars on request.

Specifications—Architects should always specify "Solid Wire Glass manufactured by the Pennsylvania Wire Glass Company" (mention the kind desired).

Corrugated Wire Glass

CWG is a corrugated sheet of glass with wire netting incorporated.

Corrugated Wire Glass Skylight—Corrugated wire glass is made to meet the demand for a substantial skylight, admitting properly diffused light. CWG can be placed on a roof of any material, including corrugated iron and corrugated asbestos.

Uses—CWG can be used also on roofs, sidewalls, marquises, canopies and wherever *daylight* is desired.

Weight—CWG weighs about 4½ lbs. to the sq. ft.

Strength—CWG has strength many times greater than any other glass of equal thickness, owing to the corrugations.

Kind—CWG is made in deep angle, 2½ in. center to center of corrugations.

Standard Size—27¾ in. wide by 42 or 64 in. long, or any length up to 126 in., conditions governing.

Specifications for Installation of CWG

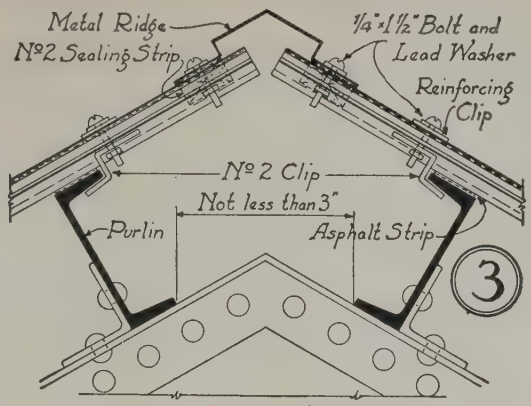
The skylights, roof or sidewall construction, where marked "Corrugated Wire Glass" on the plans and elevations, shall be formed of Corrugated Wire Glass (if Actinic Corrugated Wire Glass is wanted, say "Actinic Corrugated Wire Glass"), with standard fittings of 18-oz. copper and brass (can be furnished, if desired, in Armco iron, zinc, aluminum or lead), in accordance with details and instructions submitted.

Instruction and Details for Erecting

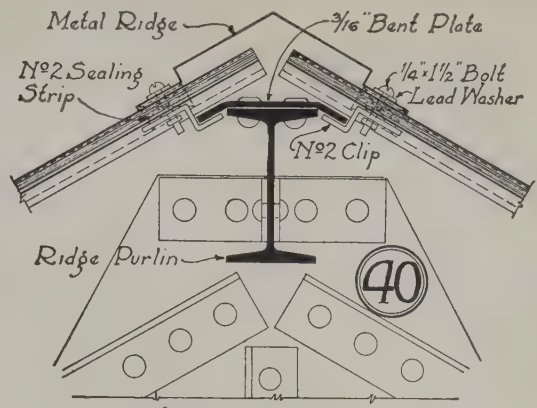
To assist the architect in detailing and supervising the erection of Corrugated Wire Glass Skylights we have prepared complete instructions and detail drawings. Some of the drawings from this book are presented on the following page and the publication, Bulletin D3, will be sent upon request.

Corrugated Wire Glass Roof, Government Printing Office, Washington, D. C.

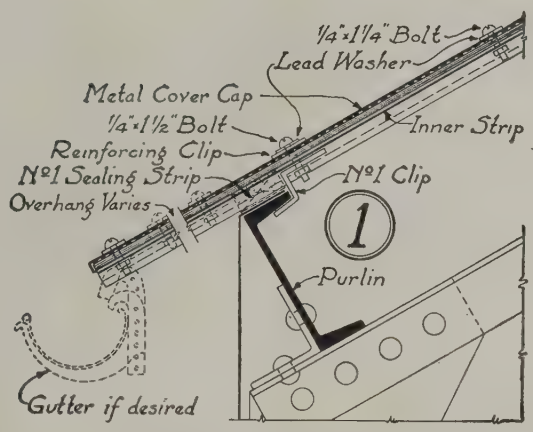
Continued on next page



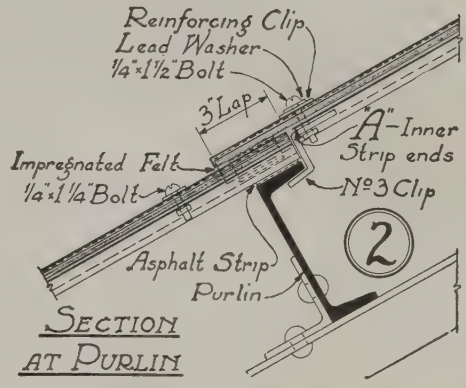
SECTION AT RIDGE



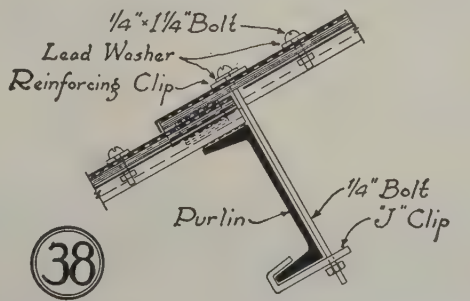
SECTION AT RIDGE



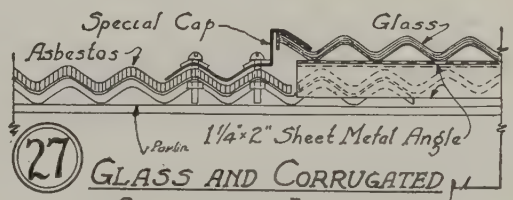
SECTION AT EAVE



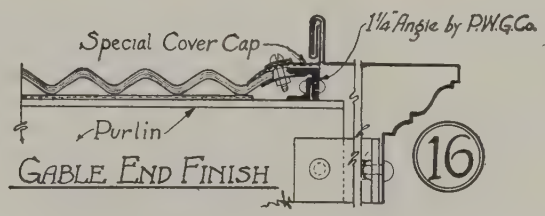
SECTION AT PURLIN



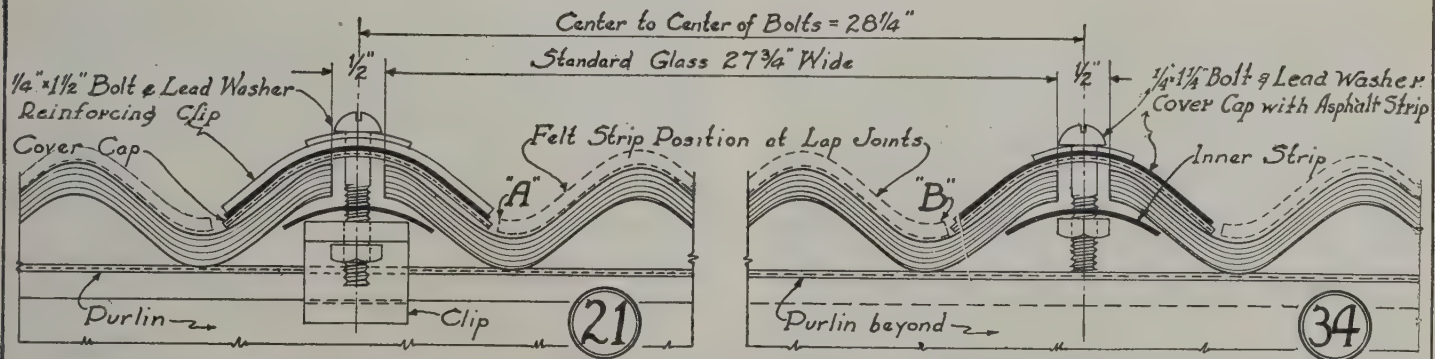
FASTENING WHEN PURLIN FLANGES POINT DOWN THE ROOF



GLASS AND CORRUGATED ASBESTOS JOINT



GABLE END FINISH



HALF SIZE DETAIL OF TYPICAL JOINT AT CLIP

HALF SIZE DETAIL OF TYPICAL JOINT BETWEEN PURLINS

PENNSYLVANIA WIRE GLASS CO.	TYPICAL INSTALLATION DETAILS CORRUGATED WIRE GLASS SKYLIGHT (SEND FOR COMPLETE DETAILED INFORMATION)	NOT DRAWN TO SCALE

Continued on next page

Actinic Glass—An Aid to Industry

Why Actinic Glass Is Needed

No one in these times would build a dark and gloomy factory with a few small windows. Yet in modern daylight construction, with its large glass areas, the problems of glare in various forms and of excessive heat from direct sunlight cannot be evaded.

Actinic Glass solves these problems so successfully that literally acres of it have been installed in new industrial buildings.

How It Differs from Ordinary Glass

Without going into technical details, the reasons why Actinic Glass reduces glare and also the heat of sunlight, lie in its special chemical composition. As to appearance, it looks like ordinary rolled glass, except it has a tint technically described as an "unsaturated yellow."

Facilitates Production by Reducing Eyestrain

Glare in various forms is such a hindrance to workers that it obviously increases manufacturing costs and impairs quality of output. As an illustration, when the sun is shining through an ordinary window or skylight, such objects as white paper or light colored textiles are often so glaringly illuminated that it may be actually painful and injurious to the eyes. When, on the other hand, Actinic is used under such conditions a person can even read print upon white paper with comfort. The relief is so pronounced that it can scarcely be appreciated without seeing an actual comparison.

Small samples for this purpose will be sent free upon request.

Improves Morale by Moderating the Sun's Heat

Daylight factories glazed with ordinary glass often suggest a florist's hothouse. The best proof of relief from heat gained by Actinic is its extensive recent use in mills of the south where it is specified by leading architects.

As indicated by thermometers, the discomfort due to direct sunlight is reduced about 55% by ¼-in. and about 40% by ⅛-in. Actinic.

Saves Costs of Curtains, Painting, etc.

Mills with large areas of Actinic have found it unnecessary to use shades or awnings, or to paint their windows, although if colorless glass had been used, glare and heat would admittedly have been intolerable.

Other Advantages

More cheerful illumination.

Improved ability to see, and retardation of undesirable chemical changes, such as fading of colors, add to the general satisfaction given by this novel product.

Technical details will be cheerfully furnished upon request.

Designs and Thicknesses

Actinic Glass is made in the following designs and thicknesses:

⅛-in. plain rough or ribbed
¼-in. rough or ribbed wire
Corrugated wire glass

Actinic Glass Used in Entire Building, John Van Range Company, Cincinnati, Ohio

Actinic Glass Used in Car Barn, Cincinnati Street Railway Co., Cincinnati, Ohio

W. F. OVERLY & SONS

Architectural Sheet Metal Work

GREENSBURG, PA.

Products

GOODWIN AUTOMATIC STAGE VENTILATOR.

For Metal Covered Doors, see pages A976-977.

Also manufacturers of Special Architectural Sheet Metal Products, including Marquees, Cornices, Skylights, Roof Ventilators, Gutters and Conductors.

Goodwin Automatic Stage Ventilator

Constructed of heavy galvanized sheets reinforced by structural steel members of sufficient cross section to support many times the wind and snow loads that may be expected. This construction is so substantial that even in case of fire the Goodwin Automatic Stage Ventilator will not be damaged greatly unless the supporting members of the roof structure are destroyed.

Primarily designed for fire protection purposes, the Goodwin Automatic Stage Ventilator may also be used for natural gravity ventilation by installing a ventilator along the ridge or by placing sash in the base. If light is desired the sash in the base may be glazed.

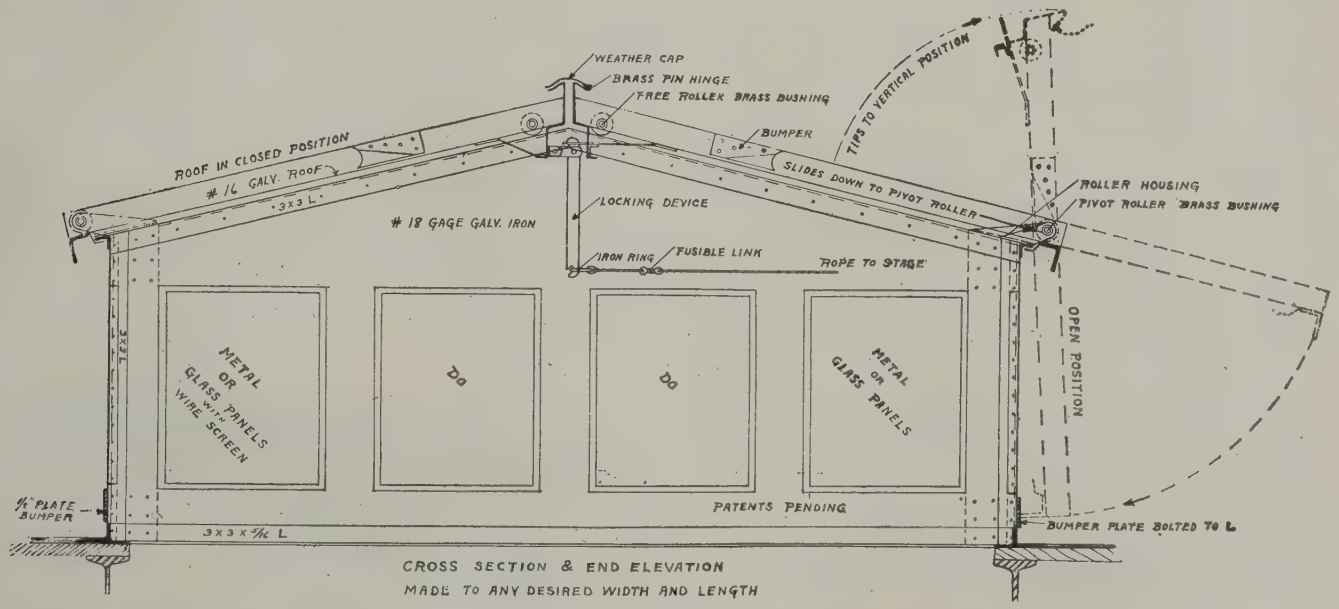
Operation—Should a fire occur on the stage of any theater which is provided with a Goodwin Automatic Stage Ventilator the first slight increase in temperature causes a fusible link to separate and allows the heavy sections to roll down on both sides. The sections assume a vertical position, providing a clean open space the full area of the ventilator for the free discharge of smoke and flame.

The proscenium arch being fully protected by the asbestos curtain, the entire stage and equipment may be completely destroyed without any material damage to the auditorium.

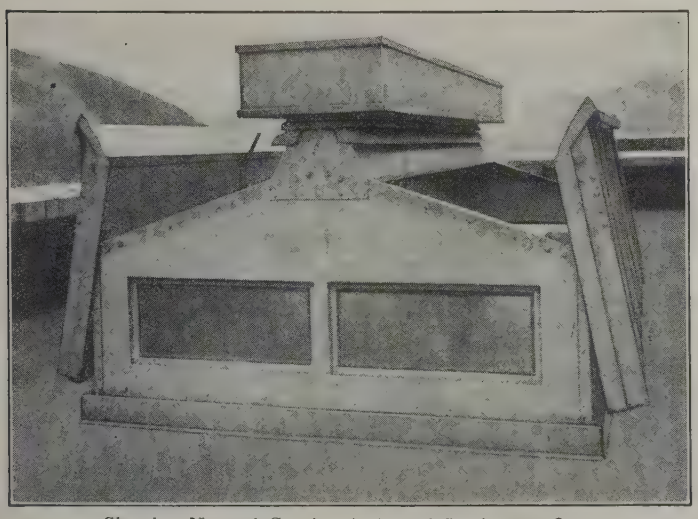
Sizes—The Goodwin Automatic Stage Ventilator is built to any desired width and length.

Engineering Service

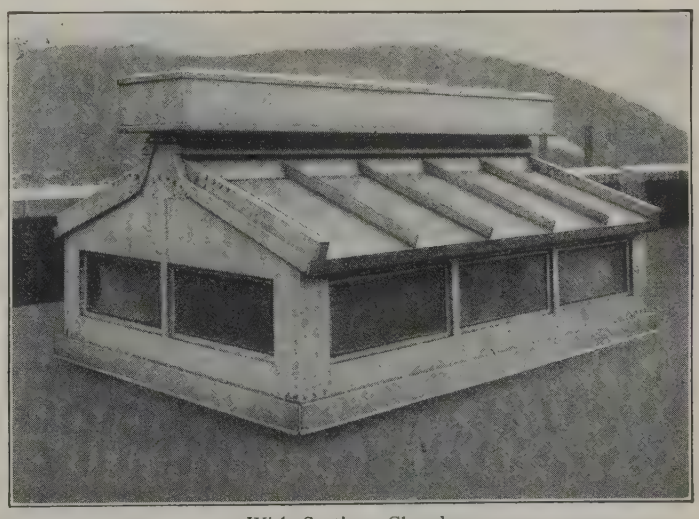
We will be glad to co-operate with architects, engineers, contractors or owners and offer our Engineering Service without obligation.



Goodwin Automatic Stage Ventilator



Showing Natural Gravity Action of Sections to Open



With Sections Closed

Exterior Views Goodwin Automatic Stage Ventilator

GLENDON A. RICHARDS CO.

Manufacturers of Puttyless Skylights and Revolving Ventilators

Winter Avenue and Blumerich Street, Northwest
GRAND RAPIDS, MICH.

Products

The Simplicity Puttyless Skylight; the Simplicity Skylight Ventilator; the Ventwell Revolving Ventilator.

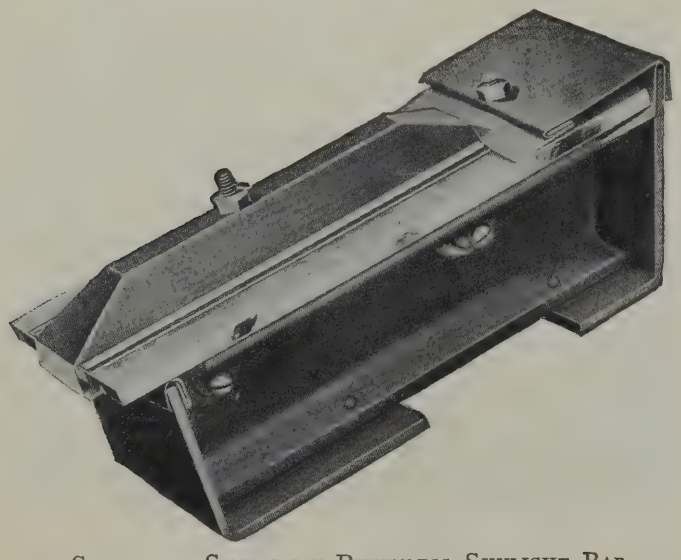
Simplicity Puttyless Skylight

Our aim in designing this skylight was to provide a product which would combine the maximum amount of daylight per square foot of area, with the lowest maintenance cost possible, and at the same time be of such construction as to lend itself to erection in the field with a minimum amount of time and labor.

The simplicity Puttyless Skylight consists of a steel supporting frame of tee iron rafters with angle curb and ridge members. The rafters are provided with sheet metal condensation gutters over which the glass (set in came lead glazing strips or channels) is laid. The mounting caps are set in place over the glass and secured, compressing the glazing channel firmly against both sides of the glass. The ridge cap and end flashing is then applied completing the assembly.

Steel Frame—The sizes of the steel members comprising the frame vary to suit conditions. Ridge and hip members are made in two sections (details on following page); this form of construction allows the frame for each slope, consisting of rafters, ridge and hip members, to be assembled complete at the factory. The erection work in the field is reduced to bolting the ridges and hips together and anchoring frame at curb.

Glazing Strips—These strips are small channels of came lead placed on the edges of the glass resting on the rafter members. When the mounting caps are set and secured they compress the lead firmly against both sides of the glass, making an absolutely windtight and weathertight joint. The soft lead takes up any unevenness in the surface of the glass and gives a continuous bearing surface; it also permits enough come and go in the glass to provide for contraction and expansion, thereby eliminating glass breakage from either of these sources.



Section of Simplicity Puttyless Skylight Bar

Materials—The sheet metal work consisting of the mounting cap, ridge cover, condensation gutter and flashing may be of lead coated metal, galvanized iron or copper.

Advantages—Absolutely weathertight construction; maximum amount of daylight; condensation conducted to the exterior; glass breakage reduced to a minimum by use of lead glazing strip; ease of erection; ease of glass replacement.

Specification—Furnish and erect where shown on plan, skylights of the puttyless type, of a design to allow for free expansion and contraction of the glass, or movements due to vibration.

Each light of glass shall be entirely independent of every other light and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

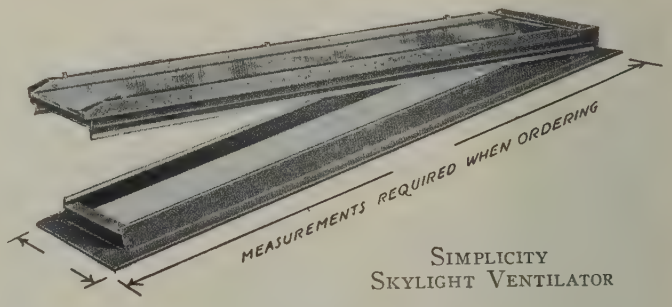
The bearing of the glass shall be flexible, so as to adjust itself to any warps or irregularities in the glass.

Simplicity Skylight Ventilator

These ventilators may be placed in any of our skylights by removing the glass and substituting the ventilating frame.

These ventilators are also made with flat flanges for use on shingle or composition roofs.

We manufacture an efficient and reliable operating device for these ventilators. Prices and description will be sent on request.



Simplicity Skylight Ventilator

"Ventwell" Revolving Ventilator

This ventilator revolves with the wind and is so constructed that the action of the outside air creates a vacuum in the ventilator itself thereby drawing up the air to be expelled. It is efficient, and guaranteed to give satisfaction under all weather conditions.

It may be had in either galvanized iron or copper.

Bases and dampers extra.

Prices quoted on application.

Ventwell Revolving Ventilator

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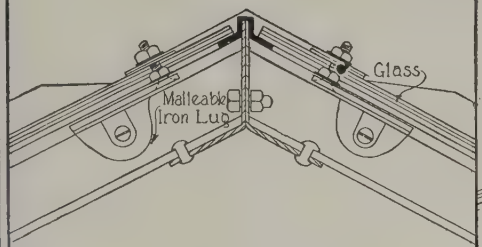
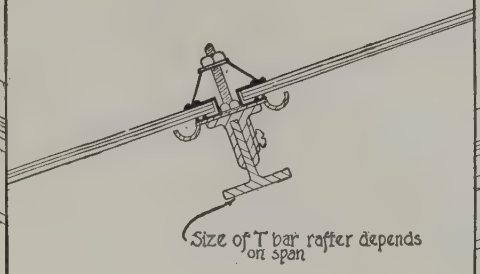
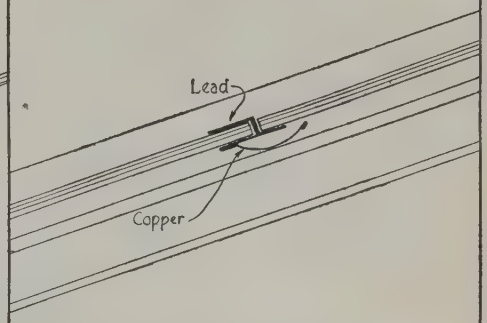


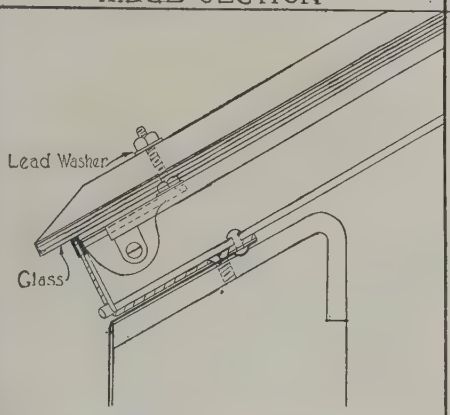
RIDGE SECTION



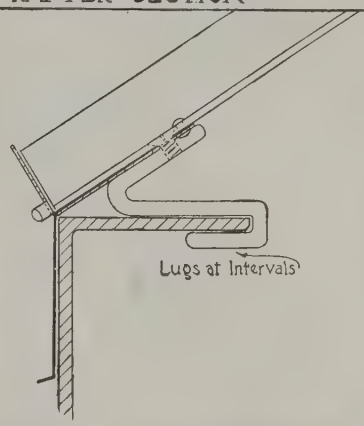
RAFTER SECTION



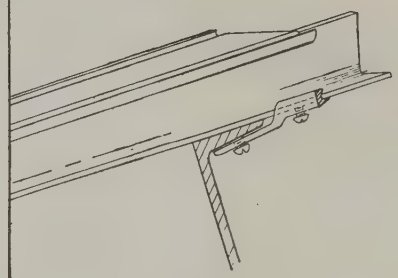
SECTION SHOWING JOINT WHERE MORE THAN ONE LENGTH OF GLASS IS USED



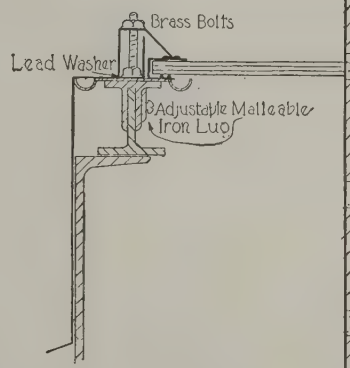
CURB DETAIL-CONCRETE OR WOOD CONSTRUCTION



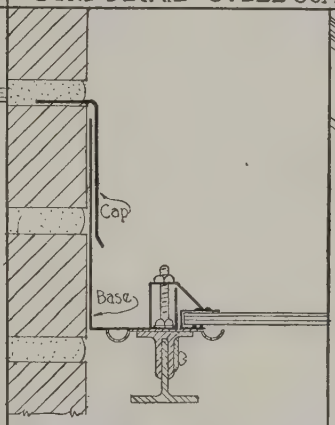
CURB DETAIL- STEEL CONSTRUCTION



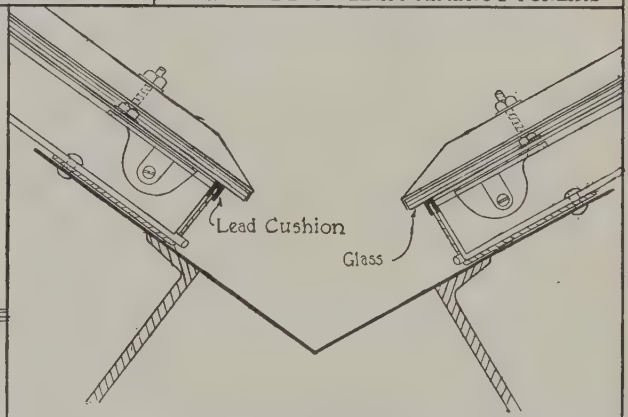
MALLEABLE IRON CLIP FASTENER AT PURLINS



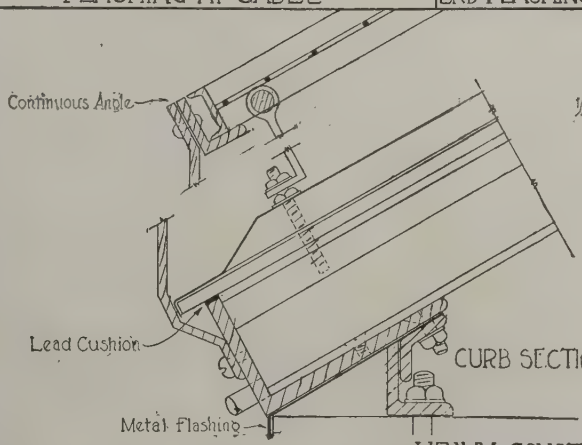
FLASHING AT GABLE



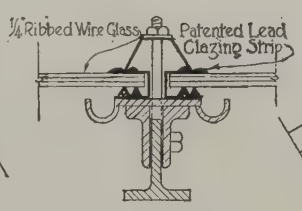
END FLASHING AT BRICK WALL



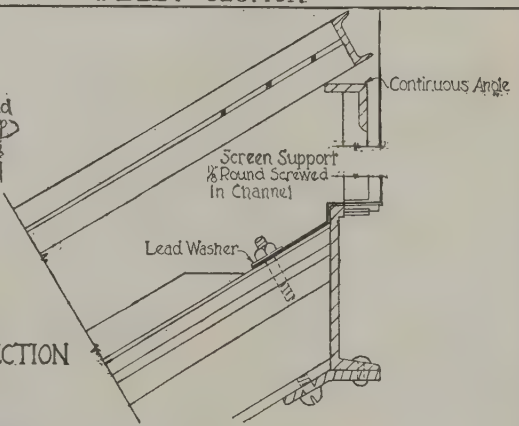
VALLEY SECTION



CURB SECTION



RAFTER SECTION



RIDGE SECTION

HEAVY CONSTRUCTION WITH GUARD

DRAWN BY SWEET'S CATALOGUE SERVICE INC.	STANDARD DETAILS OF SIMPLICITY PUTTYLESS SKYLIGHT CONSTRUCTION	SCALE 3" EQUALS 1'-0" DATE JULY 24	DRWG 1

H. H. ROBERTSON COMPANY

Robertson Glazing Construction, Skylights, Sidewall and Special Sash

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES

ATLANTA, GA. BALTIMORE, MD. BIRMINGHAM, ALA. BUFFALO, N. Y. CHICAGO, ILL.
CLEVELAND, OHIO HAVANA, CUBA HOUSTON, TEX. NEW YORK, N. Y. PHILADELPHIA, PA.
PITTSBURGH, PA. SAN FRANCISCO, CAL. ST. LOUIS, MO.

AGENCIES

ALLENTOWN, PA. EASTON, PA. MILWAUKEE, WIS. RICHMOND, VA. SCRANTON, PA.
BOSTON, MASS. EL PASO, TEX. MINNEAPOLIS, MINN. SAGINAW, MICH. SEATTLE, WASH.
BUTTE, MONT. HOUGHTON, MICH. NASHVILLE, TENN. SALT LAKE CITY, UTAH SYRACUSE, N. Y.
DENVER, COLO. HUNTINGTON, W. VA. NEW HAVEN, CONN. ST. PAUL, MINN. TROY, N. Y.
DETROIT, MICH. LOS ANGELES, CAL. NEW ORLEANS, LA. SAN DIEGO, CAL. WASHINGTON, D. C.
PORTLAND, ORE.

ENGLAND, ELLESMERE PORT, CHESHIRE: Mersey Iron Works

CANADA AND NEWFOUNDLAND: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

Robertson Glazing Construction: Skylights, Monitor, Sidewall and Special Sash; Single and Double Glazing.

Also manufacturers of Robertson Process Asphalts; Battery Sealing, Insulation, Saturation and Waterproofing Compounds.

For Robertson Protected Metal Roofing and Siding and Robertson Ventilators, see pages A640-641.

TRADE-MARK

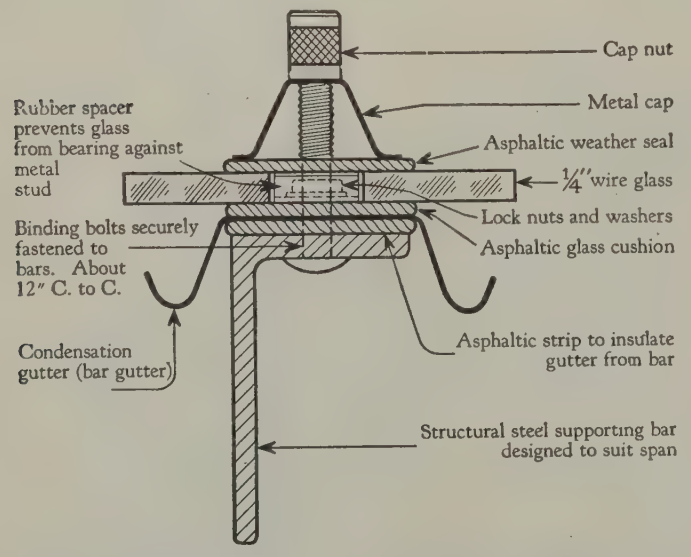
Robertson Skylights

Robertson Skylights represent the most successful solution of the two most frequent and aggravating causes of skylight troubles—that is, leakage and glass breakage, growing out of (1) deflectation (or sagging) of the glass supports, and (2) improper methods of holding the glass in place.

The detail drawing at the bottom of this page and the perspective drawing at the top of the following page show clearly how these difficulties have been overcome.

Eliminating Sagging—As shown in the drawings, the supporting member of the Robertson Skylight is a standard structural steel bar, designed and fabricated like the steel framework in a building, and as strong as the other structural members of the building. Its strength is calculable; all steel formulae apply to it. Size and weight of the bar is varied to suit exact conditions of load and span. The steel has a *minimum* thickness of $\frac{3}{16}$ in. Robertson Skylights therefore can be as wide as 20 ft. without deflection and without need for supporting trusses.

Research has shown that deflection in the supporting member must not be more than 1/30th in. per foot of span. In Robertson Skylights there is never more than 1/30th in. deflection, even under a load of 40 lb. per sq. ft., and with a safety factor of 4.



Cross-sectional View Showing Details of Robertson Glazing Construction
For further description see text herewith

The Strength Is Permanent—Corrosion in skylights usually starts in the condensation gutter. In most skylights, this gutter is a part of the supporting member, and when the gutter corrodes the supporting member is weakened. In Robertson Skylights (as you can see in the drawings) the condensation gutter is a separate unit and does not touch the supporting bar. Between it and the bar is a layer of asphaltic felt. If corrosion starts in the gutter there is little danger of it spreading to the bar of a Robertson Skylight.

Also, the supporting bar is no more affected by corrosion than is any other *structural* member of the building. It is so arranged that it is easy to reach with a paint brush from all sides. In extremely corrosive conditions, the bar can be galvanized, or covered with asphaltic coatings (such as used in the construction of Robertson Protected Metal).

Proper Cushioning of Glass—The second great cause of trouble in most skylights is improper methods of holding the glass. Skylight glass has an irregular surface. When this surface rests on an unyielding bed, it makes contact at some points and not at others. This results in unequal stresses. As shown in the illustrations, the glass in Robertson Skylights is not laid on metal or other unyielding surface, but is bedded in a layer of asphaltic felt (shown just above the condensation gutter in the drawing). This felt is flexible, resilient, and semi-plastic. It conforms to the irregularities of the glass and makes a firm but not rigid, contact. It allows for expansions and contractions. And it makes a continuous, water-tight seal.

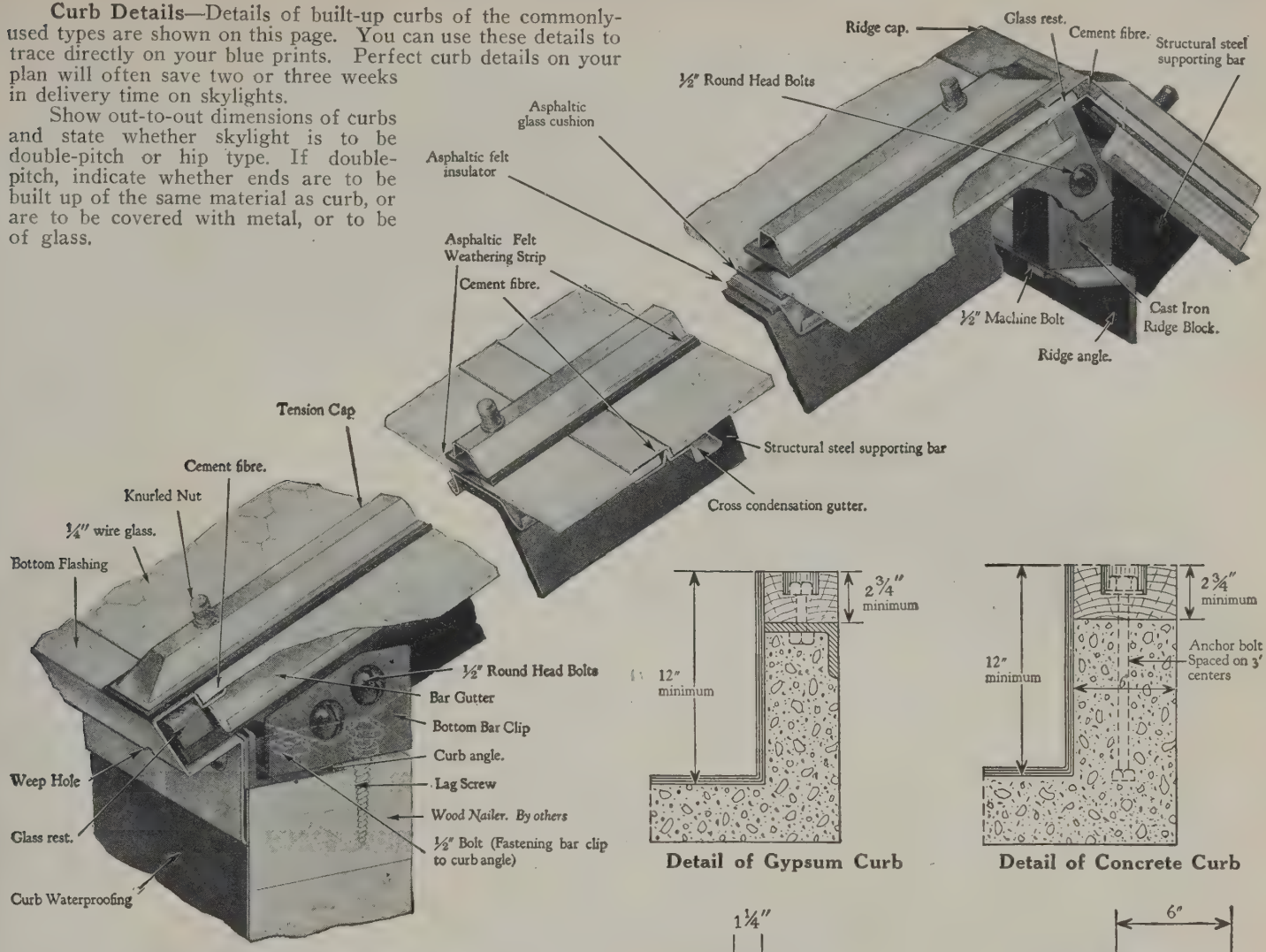
Above the glass (see drawings) another layer of this asphaltic felt makes the same sort of easy cushioning contact from the top. Above this, in turn, is the final unit of the skylight . . . the metal cap. It is a continuous strip, shaped somewhat like an inverted V, which runs the entire length of the joint. This cap is so designed that it has a spring-like effect. When tightened by a nut and bolt, it exerts a continuous, evenly distributed binding action along the length of the skylight, forcing the semi-plastic asphaltic layers into the depressions in the glass surface, yet its tension is so flexible that it allows fully for expansion.

All Glass Butt Jointed—Another advantage of Robertson Glazing Construction is that where two panes of glass come together, they are always butt jointed, *never lapped*. The glass is all in the same plane: the panes can never slip; and there is no obstruction to form a lodging place for snow, water, or dirt. The edges of the glass are held in weatherproof copper cross-gutters.

Continued on next page

Curb Details—Details of built-up curbs of the commonly-used types are shown on this page. You can use these details to trace directly on your blue prints. Perfect curb details on your plan will often save two or three weeks in delivery time on skylights.

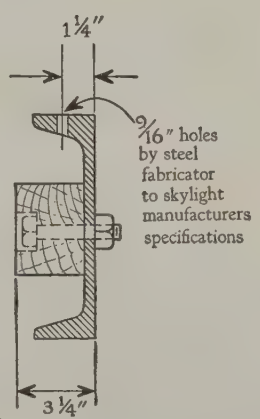
Show out-to-out dimensions of curbs and state whether skylight is to be double-pitch or hip type. If double-pitch, indicate whether ends are to be built up of the same material as curb, or are to be covered with metal, or to be of glass.



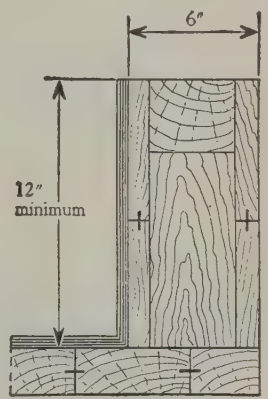
Typical Robertson Skylight Section (Double-Pitch Type)

Detail of Gypsum Curb

Detail of Concrete Curb



Detail of Steel Curb



Detail of Wood Curb

A Typical Skylight Specification

The skylights shall be of the puttyless Type "A," manufactured by the H. H. Robertson Company of Pittsburgh, Pennsylvania, and shall conform to the following description:

The skylight bars shall be of standard rolled steel shapes that can be accurately figured for deflection. They shall support a combined snow and wind load of 40 lb. per sq. ft. without a deflection greater than 1/30th in. per lin. ft. of bar length, measured center to center of supports. This deflection is to be calculated from the deflection formula for simple beams (safety factor of 4).

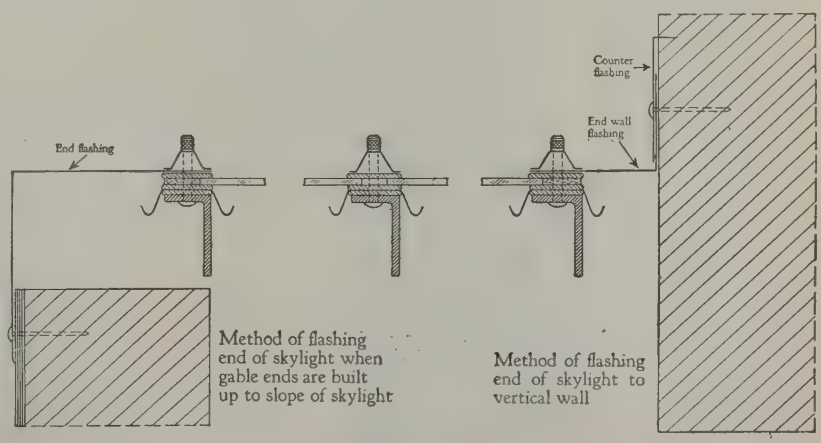
The bars shall be equipped with condensation gutters. They shall not be an integral part of the load-carrying member.

The glass shall be ¼ in. wire, and shall be embedded in a soft pliable and permanent asphaltic material.

The bars shall be covered with caps, which are to be fastened to bars by stud bolts and knurled nuts.

The trim shall be [copper] or [galvanized iron]. In case where two or more different materials meet, they shall be insulated from each other by asphaltic strips.

Detailed drawings shall be submitted by the manufacturer for the approval of the architect, engineer, or owner.



Flashing Details

Continued on next page

Robertson Double-Glazing

The Robertson Double-Glazed Skylight is one of the most important developments in glazing construction in recent years. It has been designed to overcome the difficulties encountered where considerable differences in temperature exist between the inside and outside of buildings, and where the indoor air carries excess humidity.

It minimizes condensation and drippage, reduces heat losses through skylights, and cuts fuel bills. In hot climates, it keeps buildings cool and comfortable in spite of high temperatures outside. In paper mills, textile mills, turbine rooms, power houses, swimming pools, and many other types of buildings where heat radiation and condensation are above the average it is of special benefit.

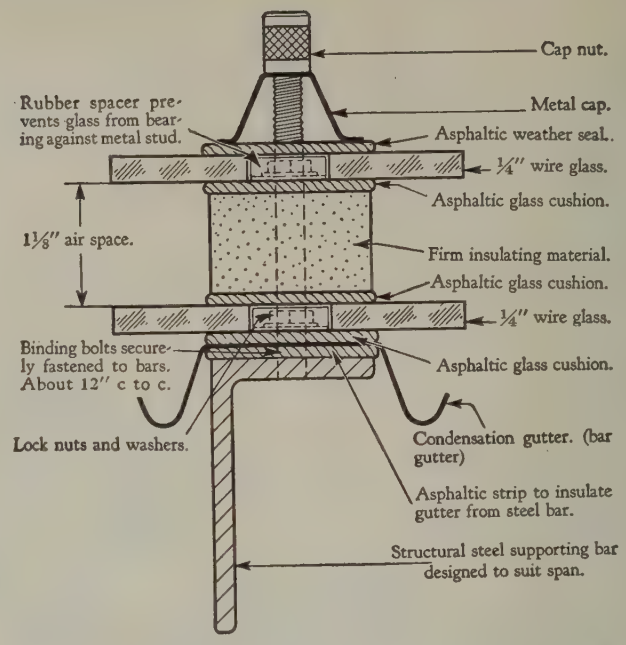
The great advantage of Robertson Double Glazing over single glazing lies in the fact that the two layers of glass with an air space between them greatly increase the heat insulation. The heat transmitted through a single glazed skylight with ¼ in. glass is approximately 1.12 B.t.u. per sq. ft. per hour for each degree of temperature difference; whereas the heat transmission of Robertson Double Glazing is only .133 B.t.u.

The large illustration on this page shows the method of attaching the skylights to the curb. The curb illustrated is concrete, but these skylights can be attached readily to steel, wood or any other standard form of construction. The illustration shows the position and attachment of the necessary flashings to make a weather-tight union between the skylight and the curb.

The Robertson perfected system of removing the water of condensation is shown in the drawings on this and the next page. Condensation on the underside of skylight glass is usually caused by differences between indoor and outdoor temperatures. Double glazing gives greater insulation between the indoor and outdoor temperatures, and this reduces condensation. Whatever condensation *does* occur forms principally between the layers of glass rather than on the inside of the bottom layer; trapped between the two panes, it cannot drip down into the building.

Water on the upper surface of the lower pane runs down the slope and out through a ¼-in. weepage space (see detail of curb) at the bottom edge of the pane, whence it drips into the interior gutter. This interior gutter runs continuously along the curb and empties into conductor pipes (as shown) spaced at regular intervals. These pipes carry water onto the roof, or, if preferred, into the building.

Water on the bottom surface of the upper glass runs down to the edge of the exterior apron flashing (see detail) then drips down through the ¼-in. space at the edge of the lower pane; thence into the interior gutter. The ¼-in. interval is not only an outlet for water but also provides for the slow continuous movement of air between the two layers of glass, and this air motion helps carry away moisture.

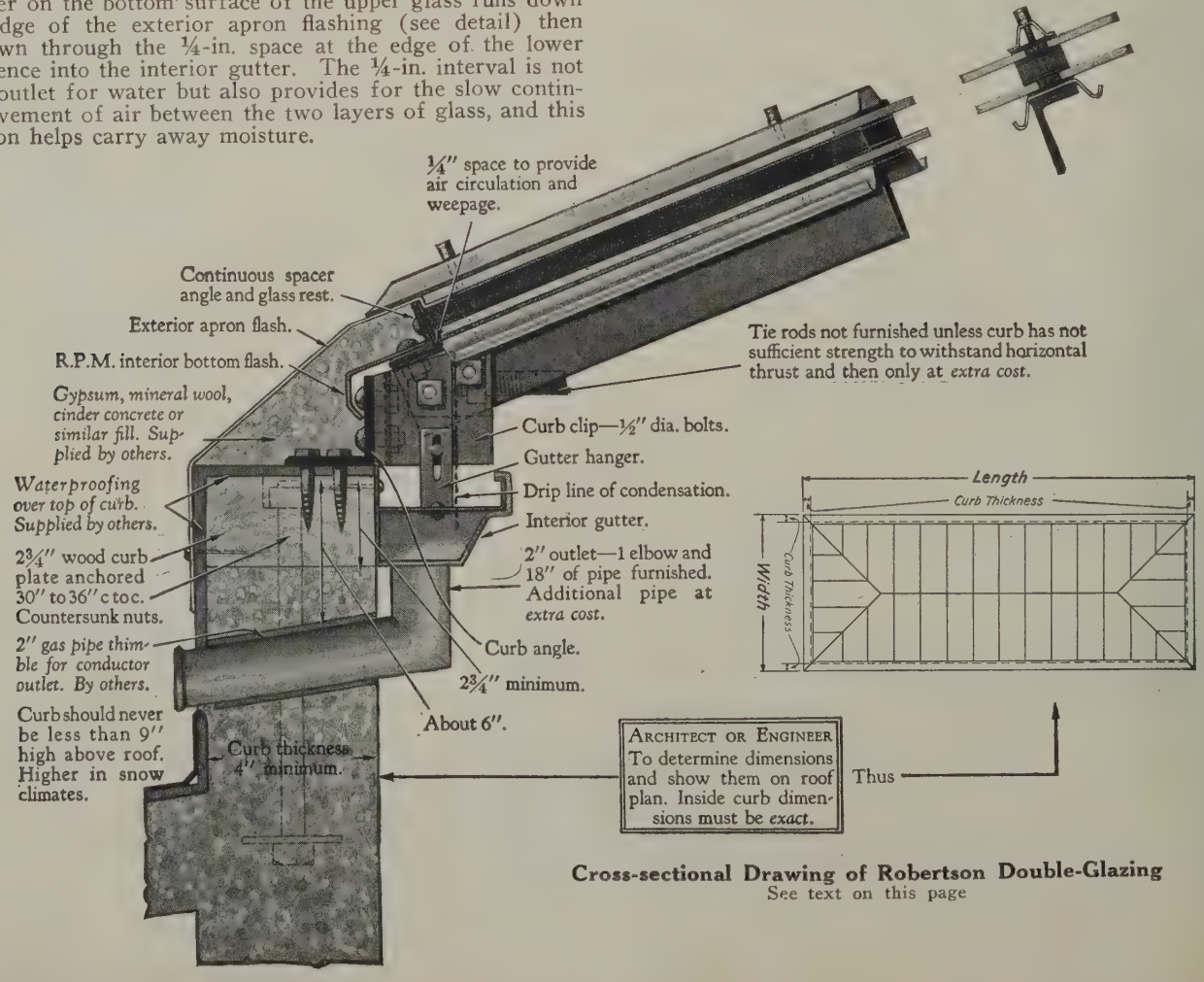


Cross-sectional Details of Robertson Double-Glazing

For general information see text on this page

Any water that may form on inside of the lower pane is caught in cross condensation gutters (as shown in the cross-section of the large detail and in the "close-up" in the upper left hand corner of the next page). Water gathering in these cross gutters empties into the bar gutters running up and down the slope, then into the interior curb gutters and out.

Interior bottom flashings should always be of Robertson Protected Metal (which is impervious to corrosion). Other sheet metal parts and flashings may be of copper, aluminum, galvanized steel or other suitable material. Interior gutters are made of the same materials as the trim. Studs or binding bolts are always made of brass.



Cross-sectional Drawing of Robertson Double-Glazing

See text on this page

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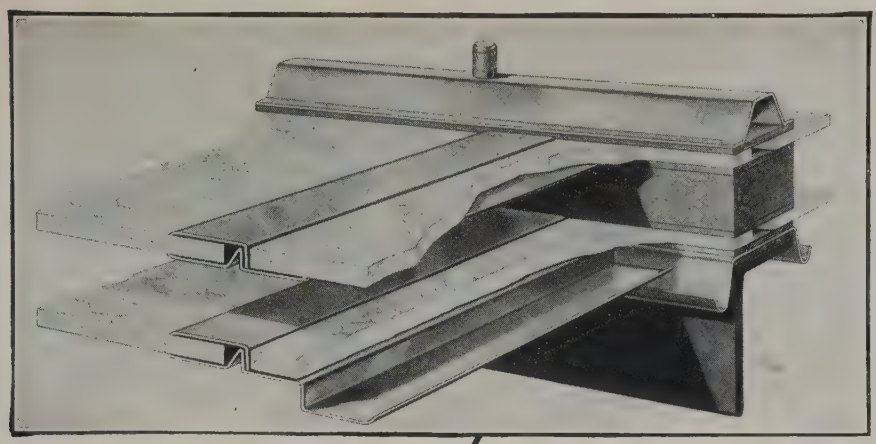
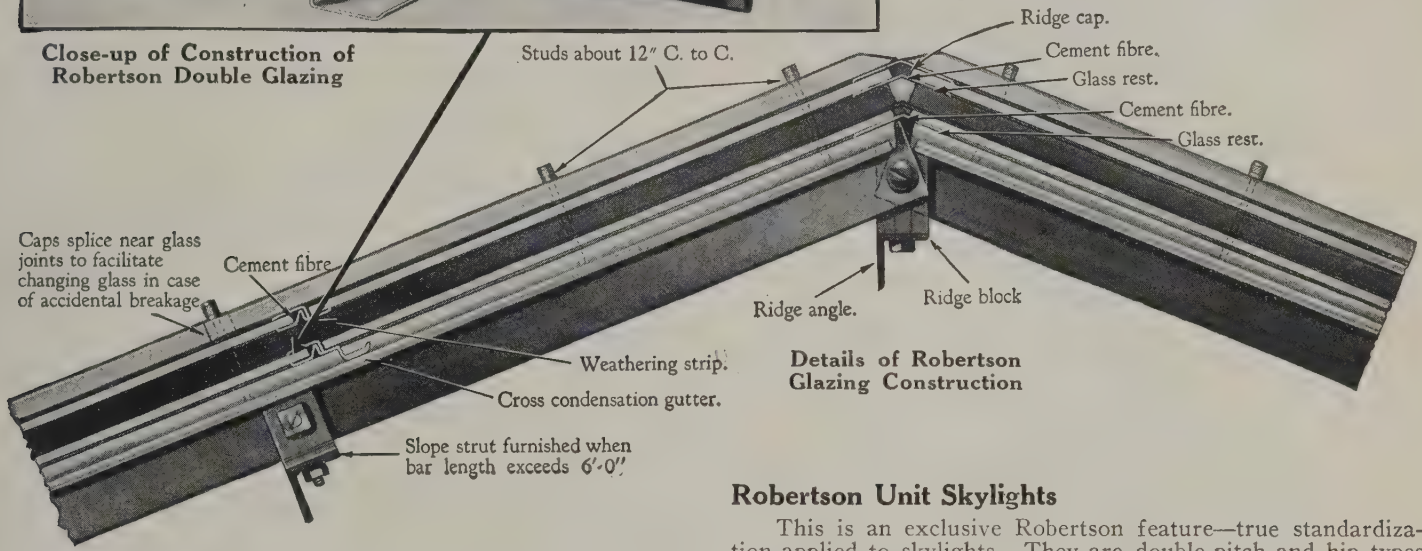


Close-up of Construction of Robertson Double Glazing

Available in All Forms

Robertson Glazing Construction is available in all forms: double-pitch and single-pitch skylights, hip skylights, monitor and special sash sawtooth sash, sidewall sash, fixed and operating; and complete glass roofs. Also in standardized unit skylights.

The H. H. Robertson Company is equipped to take your blueprints or rough preliminary sketches and recommend the most suitable type of glazing construction to meet the situation . . . to suggest the number of skylights or sash that will be needed, what size they should be and where they should be placed. Send for 48-page Robertson booklet on Daylighting which explains many of the fundamental rules governing the daylighting of buildings.



Details of Robertson Glazing Construction

Depressed Head Construction

The Robertson method of installing single-pitch skylights (known as depressed-head construction) is illustrated at the bottom of this page. Note how the head of the skylight is inserted under the roofing material, and the bottom of the skylight is extended out over the roofing material, to facilitate the free flow of water, and to eliminate any place of lodgment for snow, water, ice, or dirt.

Depressed head construction eliminates the necessity for curbs and for "saddles" or "crickets" to carry off the water. It can be used with any type of roof material or roof coverings, where the slope of the roof will permit use of skylights. Slope must never be less than 2½ in. in 12 in.

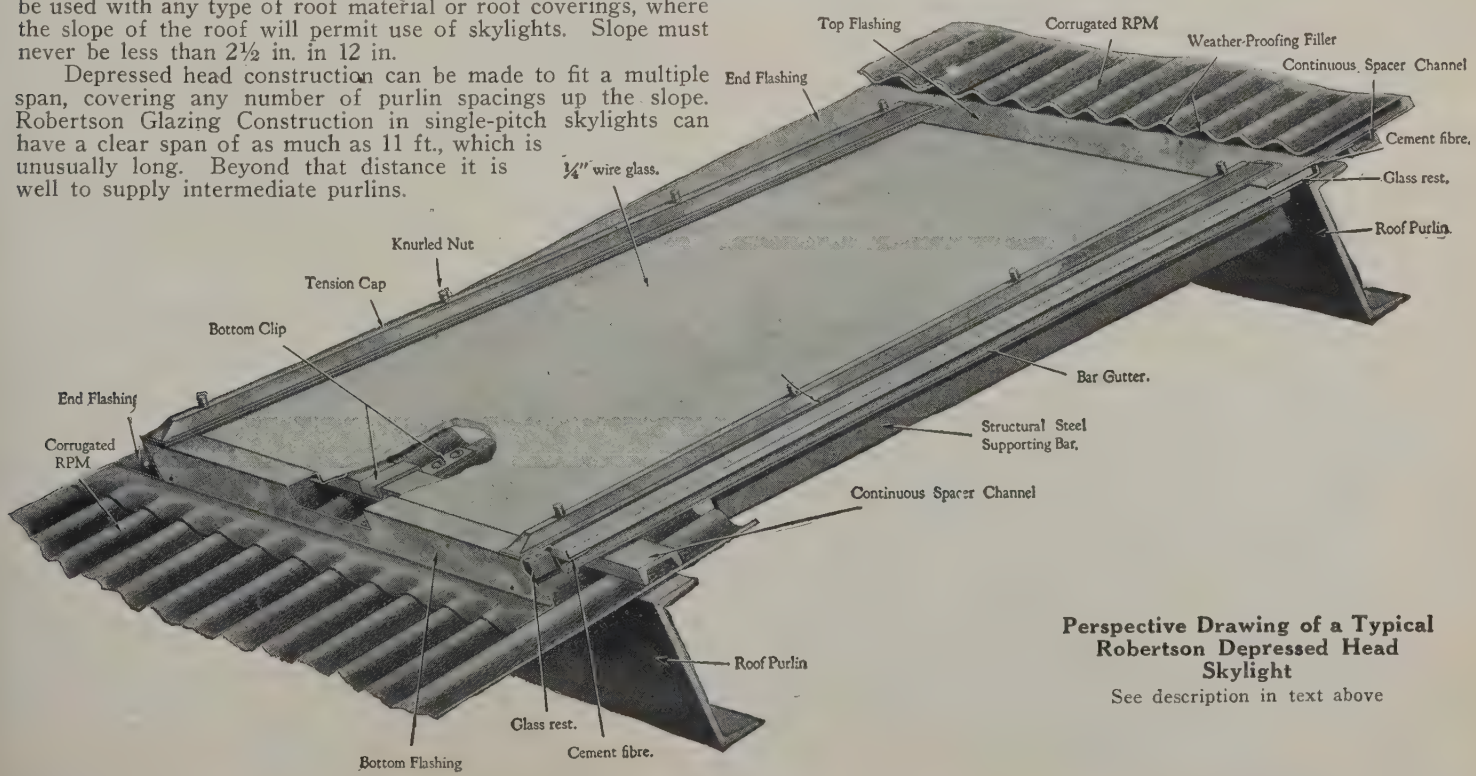
Depressed head construction can be made to fit a multiple span, covering any number of purlin spacings up the slope. Robertson Glazing Construction in single-pitch skylights can have a clear span of as much as 11 ft., which is unusually long. Beyond that distance it is well to supply intermediate purlins.

Robertson Unit Skylights

This is an exclusive Robertson feature—true standardization applied to skylights. They are double-pitch and hip types in units of standard widths from 3 to 20 ft. and in any desired lengths.

Ordering in Even Foot Widths

Skylights are primarily planned in even foot widths. If ordered on that basis, considerable savings in both time and money can often be made, and much quicker deliveries are possible. *However, Robertson Skylights can be delivered to you in any widths you desire.* Widths should be figured on the out-to-out of curbs.



Perspective Drawing of a Typical Robertson Depressed Head Skylight

See description in text above

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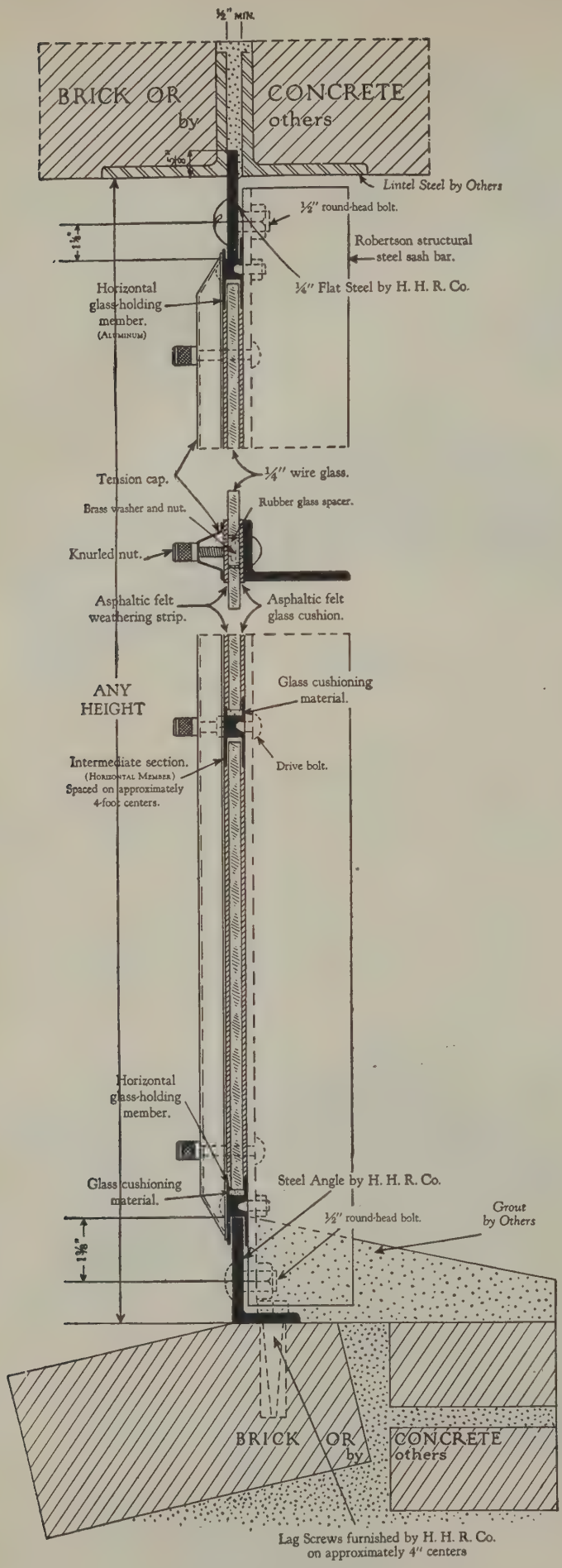
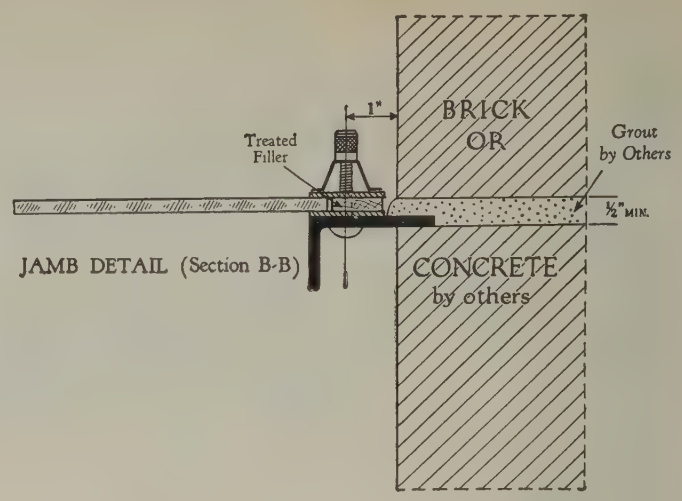


CROSS-SECTION DETAIL
(Section A-A)



JAMB DETAIL (Section B-B)

Details of Robertson Structural Sidewall Sash for Buildings of Brick or Concrete

For description see text

Robertson Structural Sidewall Sash

The name of this Robertson product suggests what it is—an industrial sidewall sash with load-carrying members of structural steel. The glass is supported on standard rolled steel bars placed vertically and attached (in the case of steel buildings) to the girt framing.

The special features and advantages of Robertson Structural Sidewall Sash are:

Greater Strength—All supporting members are of structural steel instead of light steel sash. Bars are designed like beams and can take care of any required loading. Glass is ¼-in. wire glass instead of ⅛-in. window glass.

Longer Lived—The structural steel supporting bars provide a weight of metal and a consequent resistance to corrosion that light steel sash cannot approach. On the outside, the only exposed metal part is the tension cap, which is made of corrosion-resistant aluminum. Horizontal members are few and are made of aluminum almost flush with the surface of the glass, so that there is no place for corrosive elements to lodge. Glass is held in resilient asphaltic felt strips; no metal touches it; no putty is used.

Low Maintenance—There is less glass breakage; no puttying to be done; and little or no painting. The aluminum tension caps and the horizontal members never require paint.

Remarkably Adaptable—Robertson Structural Sash is designed and fabricated to fit sidewall openings of any dimensions or proportions.

Easier to Clean and Keep Clean—The glass panes are large (2x6 ft. maximum). There are fewer corners and bars, and fewer places for dirt and dust to lodge. All horizontal members practically flush; it is possible to wipe, in one operation, a section of glass 6 ft. in height.

More Light—The large panes give more effective lighting than the small panes of ordinary sash set in a network of bars.

Better Appearance—The large panes provide a fine architectural effect; they form an appropriate relationship with the masses and lines of a structure. The bright aluminum caps harmonize in tone and color with the glass.

Key to Illustrations—Illustrations on this page show cross-sectional views of details of Robertson Structural Sash applied to buildings of brick or concrete.

Section A-A (vertical section through sash) indicates method of attaching at head and sill. With brick, Robertson Structural Sash is fitted at the head into space left by steel contractor between lintel angles. In concrete, sash is fitted into a similar space provided by concrete contractor. At sill, sash is fastened to brick or concrete by means of lag screws (as shown).

Section B-B is horizontal sectional view through the sash and its attachment to window jamb. As indicated, position of sash bar is modified at this point; glass-holding members are attached to longer leg of the bar, and the longer leg is inserted into the brick or concrete. Sash is weatherproofed by grouting as shown.

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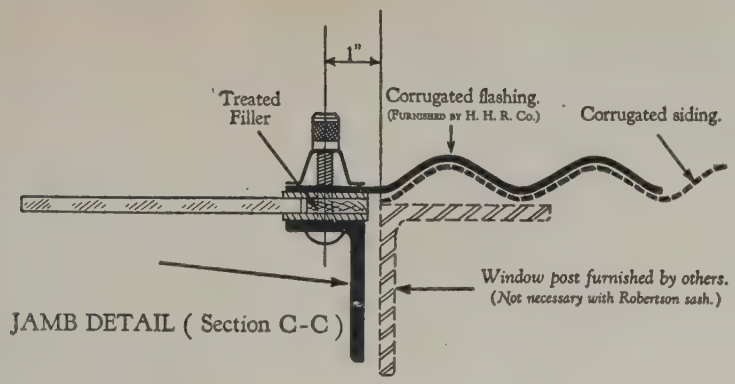


JAMB DETAIL (Section C-C)

Key to Illustrations—Cross-sectional views on this page show Robertson Structural Sash applied to buildings with sidewalls of corrugated sheets.

Section A-A (vertical section through sash) indicates method of attaching sash to head and sill. Girts placed as shown in Section A-A are recommended; but Robertson Sash can be adapted to any type of steel framework.

It is also adapted to window openings of any height. Panes of glass come in any height up to 6 ft. For openings more than one pane high, union between upper and lower edges of pane made by standard intermediate section shown in Section A-A.

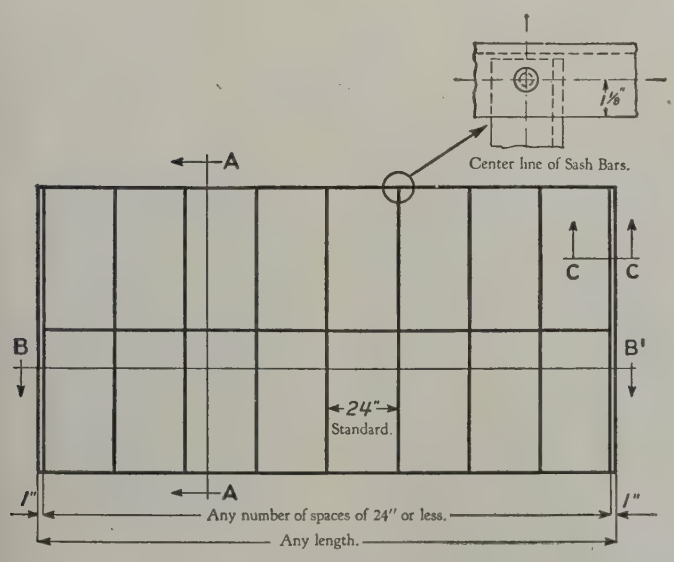
Girts to which sash is attached to be furnished and punched by building owners. Section B-B shows typical girt-punching layout. Center lines through angle lines in B-B indicate exact location of girt punchings. Sash bars should be spaced on 24-in. centers if possible, but can be varied to meet requirements of *any* opening.

Section C-C (horizontal sectional view through the sash and its attachment to window jamb) shows how Robertson Structural Sash is weatherproofed at the points. Because of strength and rigidity of Robertson Sash bars, no window posts needed.

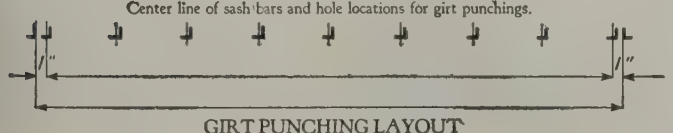
Tension caps, which form outside or weathering member, furnished in aluminum, copper or galvanized steel.

Operating Devices

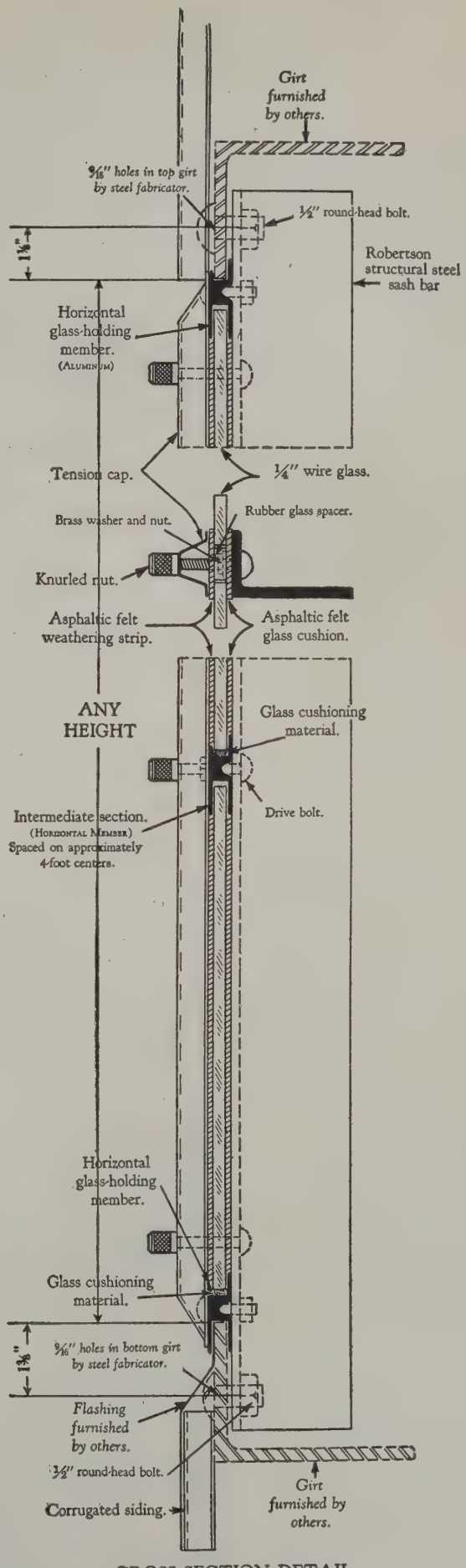
If operators are desired for side wall sash we can furnish tension or torsion types, with chain, handwheel, pole or electric drives.



SASH ELEVATION



GIRT PUNCHING LAYOUT
(Section B-B)



CROSS-SECTION DETAIL
(Section A-A)

Details of Robertson Structural Sidewall Sash for Corrugated Buildings

ESTABLISHED 1885

SAINT PAUL CORRUGATING CO.

Manufacturers of Skylights, Steel Buildings, Steel Ceilings

3-23 West Water Street, SAINT PAUL, MINN.

Products

SAINT PAUL SKYLIGHTS (puttyless or putty type).

Also manufacturers of Saint Paul Guaranteed Steel Ceilings, Pruden System Steel Buildings, Sheet Metal Building Material, including Cornices, and Stamping and Spinning Work in Copper, Brass and Zinc.

Adaptability

Skylights for industrial plants, paper mills, machine shops, railway terminals, school buildings and all other structures where adequate lighting is a requisite.

Distinctive Features

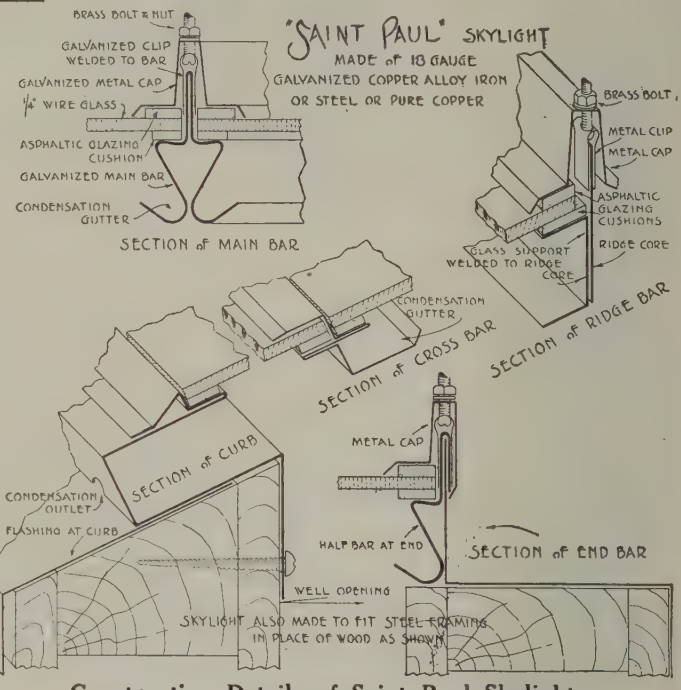
By examining the detail drawing of the Saint Paul Skylight you will note that the main bars interlock at the ridge, also at the curb. This interlocking feature, together with the construction of the ridge and hip bars, adds considerably to the strength of the skylight. Settlement which may be caused by weight of glass and climatic conditions is entirely eliminated.

A metal flashing insert around wall and skylight which is formed with a projected drip is entirely a separate member and is not a structural part of the skylight. It can be put in place either before or after the skylight is set up.

All glass supporting bars and curb are provided with condensation gutter of ample size, the condensation being carried through the interior by these gutters and to the exterior through weep holes in the curb between each main bar.

On Big Freight House

The Chicago & Northwestern Railway selected the Saint Paul (putty type) Skylights for its freight transfer house at Proviso, Ill., covering 21 acres. This transfer house is in 12 units (see below), three skylights going into each unit, 36 skylights in all. Each skylight provides a glass area of 3740 sq. ft.; total area under glass 134, 640 sq. ft.; 16,000 panes of wire glass glazed in putty. All skylight bars and caps are machine cut, and all formations power pressed. Curb, ridge and supporting bars are 18 gauge. The bar caps are 24 gauge.



Construction Details of Saint Paul Skylight

The job required 420 ventilators (also made by us). They are 24 gauge, Saint Paul oval dome type.

Drawings Available

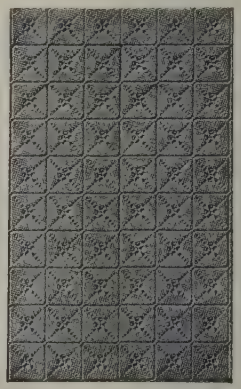
We shall be glad to supply drawings, showing plans, elevations, sections and details of Saint Paul Skylights (puttyless or putty type) on application. Ask for Drawing 28, stating which type is desired. Also if you give us workable information, we shall be glad to give you our suggestions based on long practice as to the most efficient and economical form of construction for your particular job.

Everything in Sheet Metal

Our General Catalog G shows our entire line of Saint Paul Sheet Metal Products. Available on request. Samples of materials and products supplied gladly.

Copper Alloy Galvanized Sheets Used in Cornice Work on the Milwaukee Passenger Terminal, Minneapolis

Saint Paul Skylights in Chicago & Northwestern Ry. Freight Transfer House, Proviso, Ill.



Steel Ceilings Fabricated by Us Vary from Gothic Designs of Quiet Dignity for Churches, to Elaborate Patterns for Dance Halls and Cabarets

Continued on next page

ESTABLISHED 1888

BARNEY GOLDMAN, Pres.

SUPERIOR SKYLIGHT COMPANY, INC.

Automatic Gravity Theater Ventilators

95 Webster Avenue, LONG ISLAND CITY, N. Y.

Products

Superior Automatic Gravity Ventilator.

Also Yard, Floor and Roof Drains; Sheet Metal Work of every description.

For Superior Roof Leader Connections and Expansion Roof Fittings for Vent Stacks, see pages C2792-2793.

Superior Automatic Gravity Ventilator for Theater Stages and Auditoriums

A combined ventilator and skylight. Universally approved for use over the stages of theaters, fraternal buildings and school auditoriums. Efficient, reliable and automatic in action in case of fire.

Operation

The operation and automatic action depend on a series of hempen cords, each of which is attached to a sash or ventilator and which are immediately released, either independently or all at once, by the melting of fusible links, such as are in common use on fire doors, sprinkler systems, etc. They will melt and release the ventilators at a temperature of 160° F.—long before the flames reach them.

The ropes connecting with the sash are brought down to the stage and attached to a triangle plate which is connected with one main rope to the stage floor. Chains are also attached to the ropes permitting the manual opening and closing of the sash from the stage floor.

The automatic ventilator is to be mounted on an ordinary curb of concrete or angle iron frame made level with the wood plate set flush with the outside of the curb. The curb should be not less than 2 ft. 6 in. high from the finished roof in order that snow drifts and other encumbrances will not prevent outward gravitation.

The roof of the ventilator skylight is to be of first class hip ridge construction with heavy bars and condensation gutters, glazed with a thin glass in accordance with the New York Building Code and made perfectly watertight. A No. 12 Galvanized 1-in. Underwriters wire mesh is placed underneath this roof to gather in the glass which invariably breaks from excessive heat in case of fire.

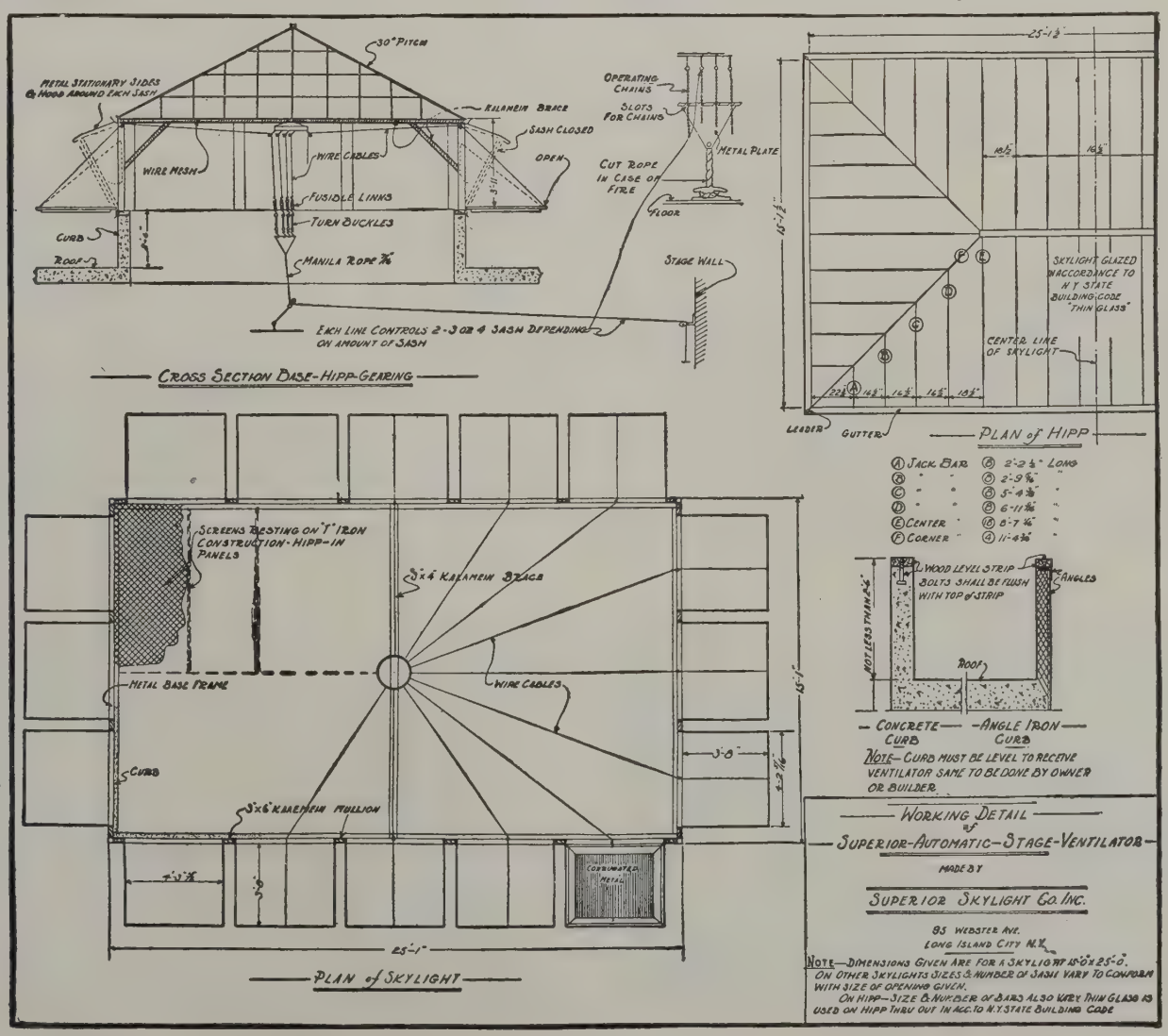
Construction and Installation

We manufacture these ventilators to any specified dimensions using standard gauges of galvanized iron or copper, and will deliver them, ready to assemble, to any part of the United States, Canada and Europe.

We will supervise their installation and guarantee that they will meet with the approval of local fire marshals, inspection bureaus, fire insurance underwriters, etc.

Endorsement

Superior standard automatic ventilators are constructed in a manner approved by the National Board of Fire Underwriters, and in accordance with "An Ordinance Regulating the Construction and Equipment of Theater Buildings, and Auditoriums as approved by the National Fire Protection Association and the Board of Standards of the City of New York."



ESTABLISHED 1873

E. VAN NOORDEN COMPANY

Puttyless Skylights

TELEPHONE
HIGHLANDS 3040, 3041, 3042

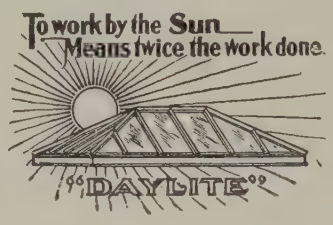
100 Magazine Street, near Massachusetts Avenue
BOSTON, MASS.

Products

Manufacturers of "ANCHOR-BAR" ROLLED STEEL PUTTYLESS SKYLIGHTS.

Also manufacturers of Sheet Steel and Copper Skylights of every type, Sheet Steel or Copper Windows and Trim, Kalamein Doors and Windows; Bois Steel Stairs.

For Roof Ventilators and Steel Door Bucks, see page A647.



TRADE-MARK

Rolled Steel Puttyless Skylights—"Anchor-bar" Type (Patent No. 931638)

The Van Noorden rolled steel "Anchor-bar" puttyless skylight is designed particularly for large skylight areas, and is a most economical construction for skylights where the bar length exceeds 8 ft. *Fewer purlins* and *steel supports* are required than for any other skylight.

This company solicits from architects an opportunity of suggesting framework for any type of glazed roof structure, and a saving in the steel framework required is assured.

The structural parts of rolled steel, and the trim of sheet metal (generally copper), form a combination which can not be surpassed; namely—steel for strength and copper for weather protection.

Bar—The bar consists of a tee and angle combination as shown. The angle member serves as a gutter for condensation. Glass rests loosely on cushion of pure wool felt.

Curb—The "Anchor-bar" skylight is the only skylight of prominence which has continuous steel reinforcement at the base. The thrust of skylight bars is directly against this member, which can not give way while the curb holds.

General Features—The distinctive feature of "Anchor-bar" skylight is the unit steel frame, consisting of bars, base and ridge—an independent self-supporting steel structure, upon which the glass is loosely bedded; after which, the exposed portions, such as bar caps, ridge caps, base and side apron of sheet metal (generally copper), are applied. Caps are secured with brass bolts.

Expansion and Contraction—Owing to the fact that the sheet metal parts of "Anchor-bar" skylights are independent of the rolled steel parts, expansion and contraction are amply provided for. Glass sets loosely on the cushion of wood felt, thus there is no possibility of breakage due to expansion and contraction.

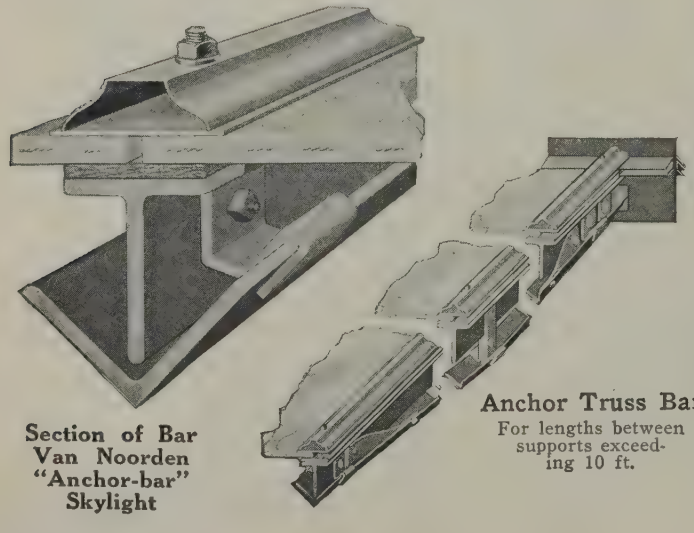
Accessibility for Re-painting—A feature to be recommended in "Anchor-bar" skylights is their accessibility for the easy repainting of the rolled steel portions. The sheet metal portions, being preferably of copper, are impervious to weather conditions.

Adaptability—"Anchor-bar" skylights are recommended wherever overhead light is desired. Inquiries should state over-all length of outside of curb, bar length, pitch of skylight (5 in. to the foot, or more) and distance between intermediate purlins.

"Anchor Truss Bar" (Patent No. 1140909)—"Anchor Truss Bars" are used where bar length is more than 10 ft., unless intermediate purlins are provided. Truss bars are self-supporting for a bar length up to 15 ft. The saving effected in the steel frame support is far greater than the excess cost of truss bar construction. Details on application.

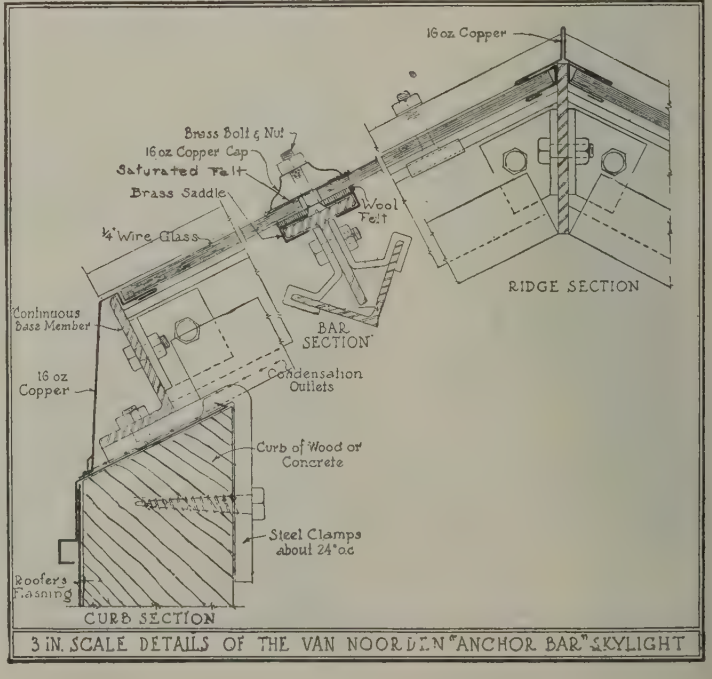
Notable Installations of "Anchor-bar" Skylights

U. S. Treasury Annex, Washington, D. C.
U. S. Naval Hangar, Lakehurst, N. J.
General Electric Co., Lynn, Mass.
Base Ball Cages at Harvard University, Cambridge, Mass.; Yale University, New Haven, Conn.; Bates College, Me.; Amherst College, Amherst, Mass.; Phillips-Andover, Andover, Mass.
Pontiac Plant, General Motors Co., Pontiac, Mich.
West Virginia Pulp and Paper Co., Mills at Mechanicville, N. Y. and Piedmont, W. Va.
State Capitol, Augusta, Me.
Widener Library, Cambridge, Mass.
U.S. Post Offices: New Haven, Conn.; Ashtabula, Ohio; Brazil, Ind.
Western Electric Buildings, Kearny, N. J.



Section of Bar Van Noorden "Anchor-bar" Skylight

Anchor Truss Bar
For lengths between supports exceeding 10 ft.



3 IN. SCALE DETAILS OF THE VAN NOORDEN "ANCHOR BAR" SKYLIGHT

VENT-O-LITE COMPANY

Manufacturers of Solderless Ventilating Skylights

30 North La Salle Street
CHICAGO, ILL.

Product

VENT-O-LITE SOLDERLESS VENTILATING SKYLIGHTS.

TRADE-MARK

Construction Features of Vent-O-Lite Skylights

Supporting Trusses—Vent-O-Lite Skylights are supported by trusses built of 2x1½x⅛-in. angle iron, spaced approximately 6 ft. on centers. These trusses carry the entire load and require no special preparatory construction, except the curb.

Panels, Ridge, etc.—The bars, rails, ridge, end panels, etc., are all constructed of 18 gauge galvanized iron, and the entire skylight is made rigid and weathertight *without the use of solder*. Ample provision is made for condensation at all necessary points.

Operating Device—A heavy rack and pinion type operating device of special design is furnished as an integral part of Vent-O-Lite Skylights. This device facilitates smooth and even operation. Little effort is required to quickly raise sash to any desired position. Tubular shafting prevents loss of torque and insures permanent ease of operation in both raising and lowering the ventilating sash.

Glass—¼-in. wire glass set in putty and securely held by 18 gauge galvanized iron glazing caps.

Flashing—Vent-O-Lite standard curb flashing consists of a 6-in. strip of heavy 3-ply asphalt felt underneath a 24 gauge galvanized iron curb strip which extends 2 in. below the top of the curb.

Paint—The entire skylight is given one coat of mineral paint before it leaves the factory.

Sizes—Vent-O-Lite Skylights are manufactured in standard widths of 6, 8, 10, 12 and 14 ft. and can be furnished to any length in multiples of 2 ft. Greater widths can be furnished when required.

Ventilating Feature—Vent-O-Lite Skylights can be furnished either part or full length ventilating as required.

Shipments from Stock

Since we maintain large stocks of standard sizes at all times, we are always able to make prompt shipments of Vent-O-Lite Skylights, to all parts of the United States.

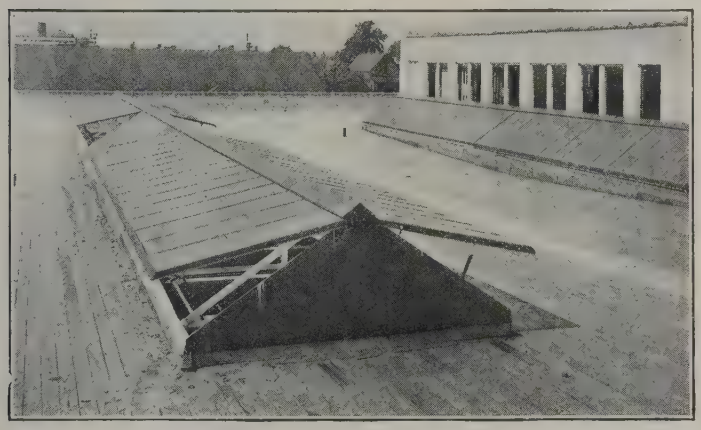
Erection

These skylights are regularly quoted with glass and erection included. However, when desired, shipment may be made knocked down for erection by the customer.

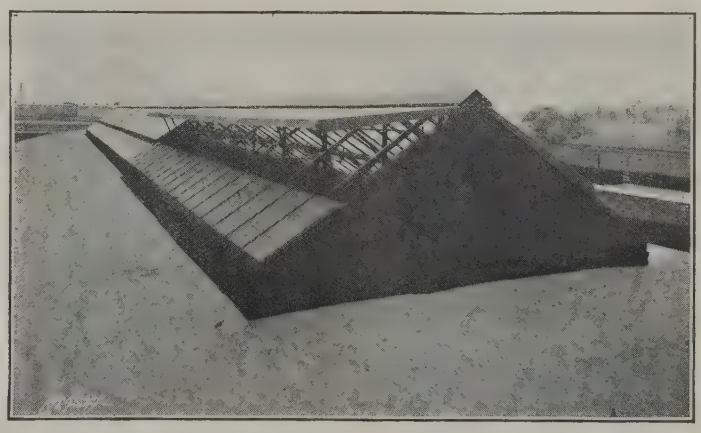
Vent-O-Lite Service

Vent-O-Lite Service includes assistance in designing for better light and ventilation in garages, industrial buildings, etc.

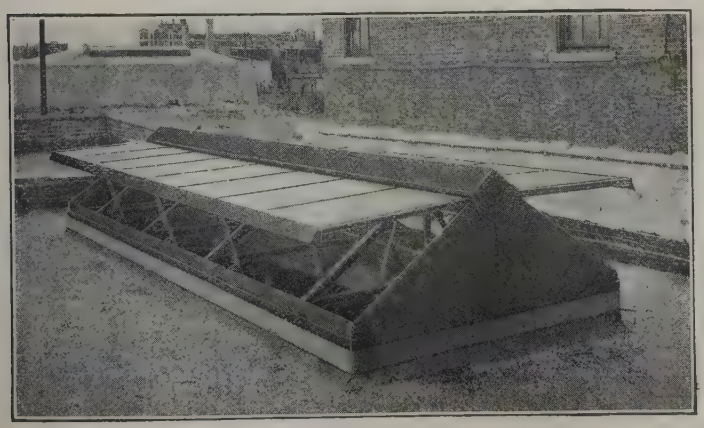
Details and suggestions for special applications furnished on request.



10-ft. Wide Vent-O-Lite Skylight with Two 32-ft. Ventilating Sections Opened on Each Side



12x118-ft. Vent-O-Lite Skylight. Widths of 12 Ft. and Over Open the Upper Section Only, as Shown Here



Vent-O-Lite Skylight, 6 Ft. Wide

Vent-O-Lite Skylights Serve This 100x400-ft. Garage

AMERICAN BAR LOCK CO., INC.

Manufacturers of "Barlock Transparent Roofing" for Skylight and Roof Light Construction

LONG ISLAND CITY, N. Y.

BRANCH OFFICES OR REPRESENTATIVES IN ALL LARGE CITIES

"Bar Lock Transparent Roofing" for Skylight, Roof Light and Floor Light Construction

Designed for permanency, protection of glass from breakage, leakage and maintenance expense. It is mechanically correct and is as strong and durable as the walls of the building. Can be walked on; is wear, burglar, fire and water proof. Requires no protecting screens. Will support the loads required, and withstand the action of the elements. Not affected by smoke or acid fumes. No maintenance cost.

Advantages of "Bar Lock Transparent Roofing"

The surface will harbor neither water nor dirt.

Glass units are cushioned with a specially prepared waterproof composition. Galvanized cast iron frames entirely surround each unit of glass for its full depth, providing perfect protection against concrete expansion.

The ½ in. thick wired glass is of the replaceable type, and can be replaced by unskilled labor without any cutting of concrete, leaving of patch work or liability of leakage, should any ever become broken by accident or abuse.

Expansion joints relieve pressure, and are calked and made watertight with oakum and "Bar Lock" calking compound. Spans, up to 8 ft. in the clear without intermediate supports, for any type of building.

Construction of "Bar Lock Transparent Roofing"

Made in completed factory finished slabs ready to drop over the openings, or we will send our own mechanics, if preferred, to install in the field anywhere in the United States.

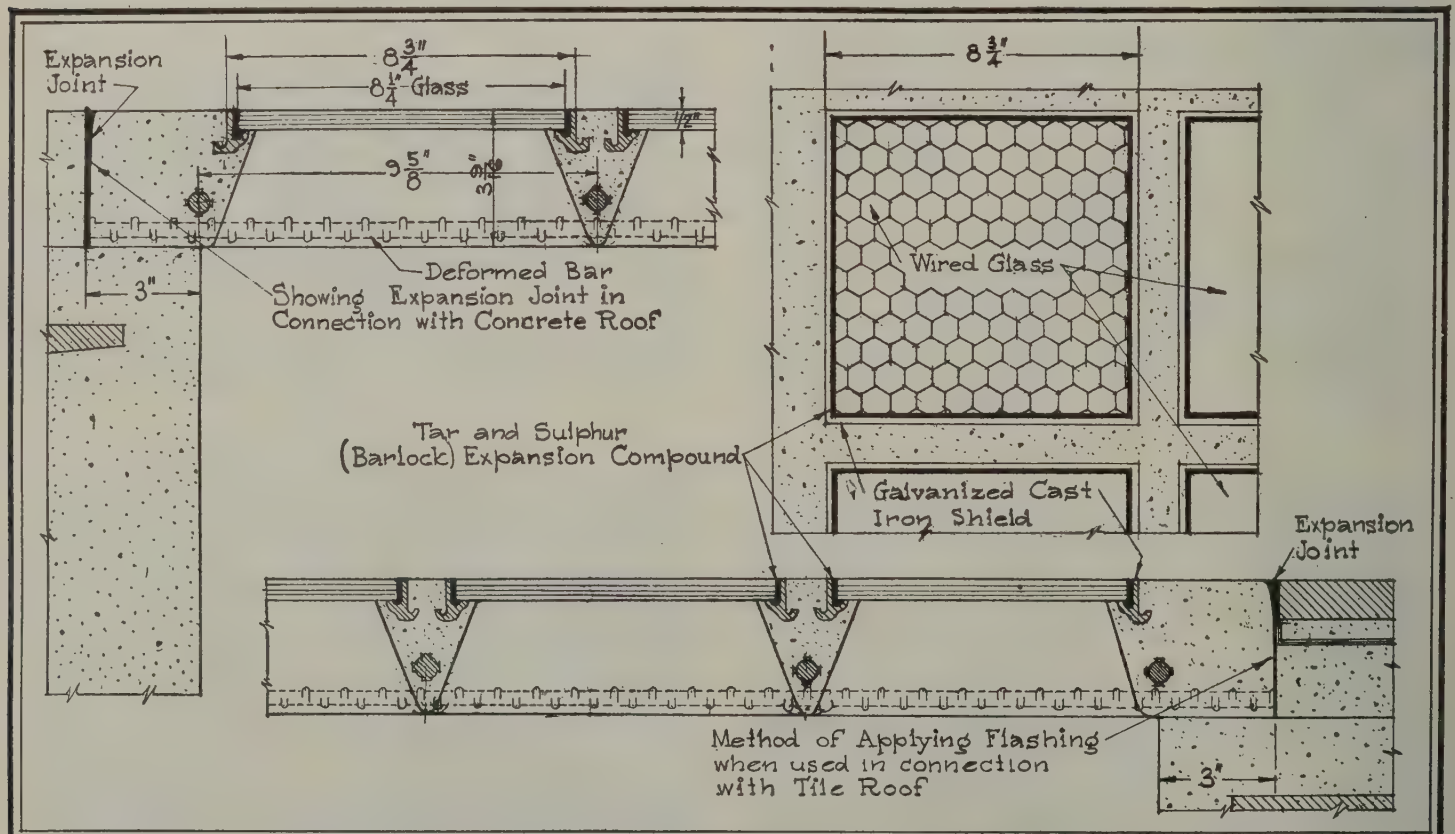
Specification

"Bar Lock Transparent Roofing" Double Reinforced Concrete Construction using 8¼ in. square, ½ in. thick, wired glass, protected by galvanized cast iron shields, with a signed guarantee to furnish glass for replacement free of charge (f. .o. b. factory) for a period of 5 years.

Guarantees

We guarantee to maintain all work against defective workmanship and materials, and any leakage caused thereby, for a period of one year.

The AMERICAN BAR LOCK CO., INC., further guarantees to furnish glass for replacement in the "Bar Lock" wired glass skylight construction free of charge (f. o. b. factory) for a period of 5 years.



DETAILS OF "BAR LOCK TRANSPARENT ROOFING"

AMERICAN 3 WAY-LUXFER PRISM CO.

Daylight Engineers

1313-1315 South 55th Court
CICERO, ILL.
(Suburb of Chicago)

55 West 42nd Street
NEW YORK, N. Y.

For Transoms and Ventilators, see pages B2194-2195

3-Way Armored Sidewalk Lights (Glass Guaranteed for 5 Years)

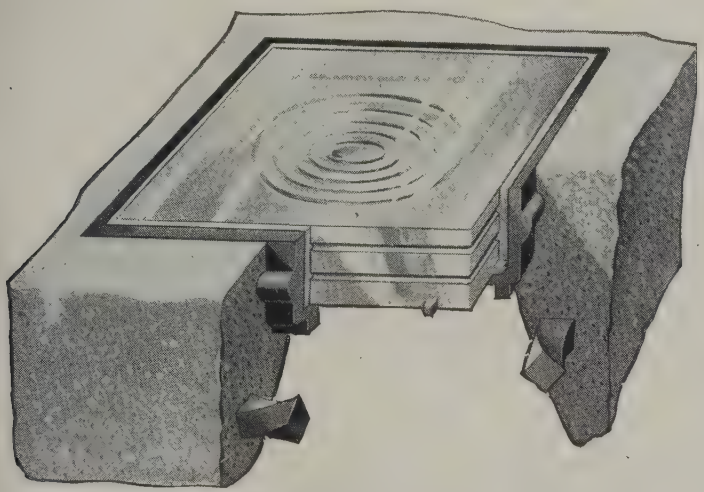
Daylight in basements and vaults is more important today than ever. Sunlight and Daylight make for health and efficient operations.

3-Way Armored Sidewalk Lights accomplish this in more of a permanent way than any other light medium we know of.

Abundance of daylight. Lasting qualities in construction. And practically no maintenance cost.

Why

Concrete—Of special hard aggregate granite mixture—cured under ideal conditions—mixed and finished by skilled and trained mechanics.



Cut-away View of 3-Way Armored Glass, Showing Shield Embedded in Concrete

Glass—Is armored by a heavy cast iron shield. Hot galvanized treated. Glass is sealed under special heat treatment with pure tar and sulphur compound in this shield, thus overcoming the detriments to glass from expansion pressure.

Glass is Flintex-Lazalite quality free from internal stresses, each piece having passed polariscope test. Is made from special mixture for this purpose only.

Instant Replacement of Glass—Should it become necessary to replace a glass unit, replacement can be made in a moment's time by any help about the building. No special skill required. This means sidewalk lights can be kept in perpetual good condition at practically no maintenance cost.

5-year glass guarantee.

Watertight—Compounds which we use for waterproofing are prepared specially for this purpose and are of the highest grade and quality for additional insurance against any leakage. When drawing plans and writing specifications, see detail on second following page.

3-Way Armored Sidewalk Lights

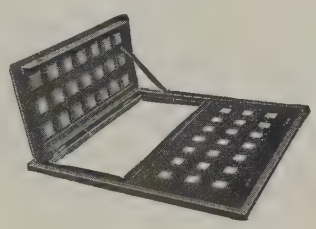
Specifications—Sidewalk Lights as shown on plans shall be of 3-Way Armored Glass Construction, Flintex-Lazalite Glass units sealed in galvanized cast iron shields, embedded in reinforced concrete construction.

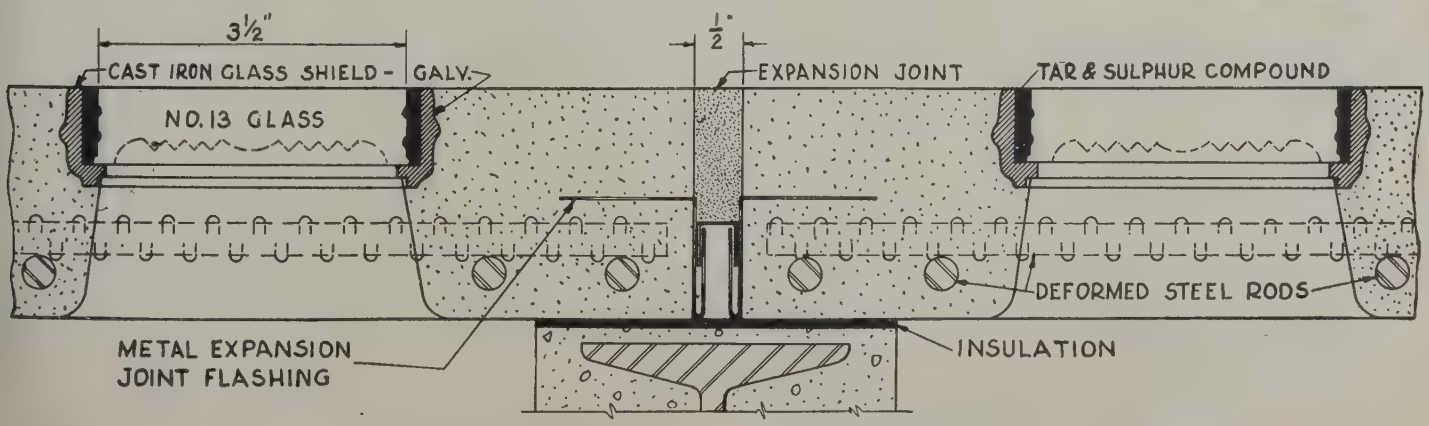
Glass shall be No. 13A (3½ in. square Fresnel lens in 4-in. galvanized cast iron shields spaced 5 in. centers), or No. 12 (2¾-in. round sunburst lens in 3-in. galvanized cast iron shields spaced 4¼ in. centers). Glass for replacement to be supplied free of charge f.o.b. factory for period of 5 years.

(Can be furnished in factory finished slabs) or (Installed complete by manufacturer).

Sidewalk Doors

3-Way Type "C" Watertight Sidewalk Door. Channel frame, tapped for drain connection, heavy bronze hinges, flush top, quality door. Hand lift or equipped for elevator lift.





Section 3-Way Armored Glass Sidewalk Lights Showing Waterproof Intermediate Joint

Continued on next page

3-Way Daylight Roofing (Glass Guaranteed for 5 Years)

Construction—A roof light construction without equal. Gives abundance of light, is fireproof, burglar-proof, weatherproof (see details following page). Easily cleaned. Can be walked upon with safety. Designed and constructed for permanence and to eliminate maintenance costs.

A roof light that harmonizes with the architectural lines of the modern structure.

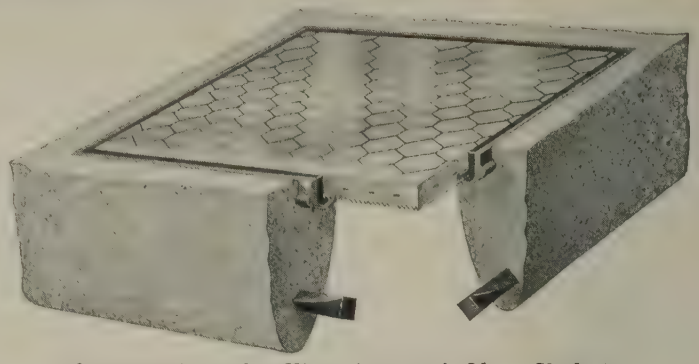
Glass is 8¼ in. square, standard ½ in. wired glass units, 9⅝ in. centers, sealed under special heat treatment with tar and sulphur into heavy cast iron hot galvanized treated shields, protecting the glass from expansion pressure and at the same time permitting easy and instant replacement without skilled help at any time it should be necessary.

Construction has a thickness of 3⅜ in. Weight approximately 30 lb. per sq. ft. (See details following page.)

Can be furnished in factory finished slabs.

We recommend installation at building with our own mechanics.

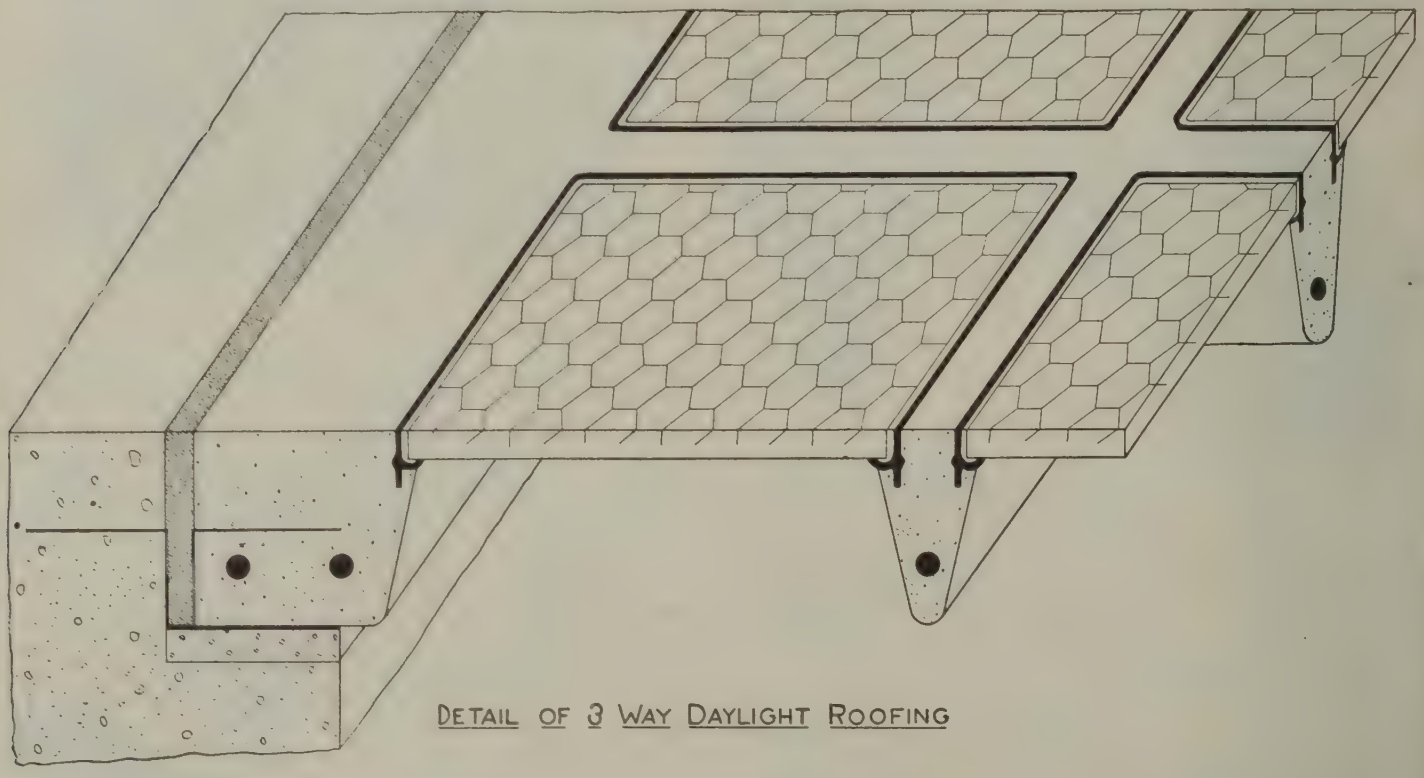
Specifications—Roof Lights where shown to be 3-Way Daylight Roofing Construction, 8¼ in. wire glass units of standard ½ in. wired glass, sealed in cast iron galvanized shields 9⅝ in. centers. Reinforced concrete construction; flashed as shown on plans (set up on curbs as shown on plans); installed complete by manufacturer.



Construction of 3-Way Armored Glass Skylight

Glass for Replacement—To be supplied free of charge f.o.b. factory for a period of 5 years.

Use 3-Way Caulking Compound for filler in all joints.



DETAIL OF 3 WAY DAYLIGHT ROOFING

Floor Lights

To light corridors, first floors, and the like, can be furnished and finished in color to match.

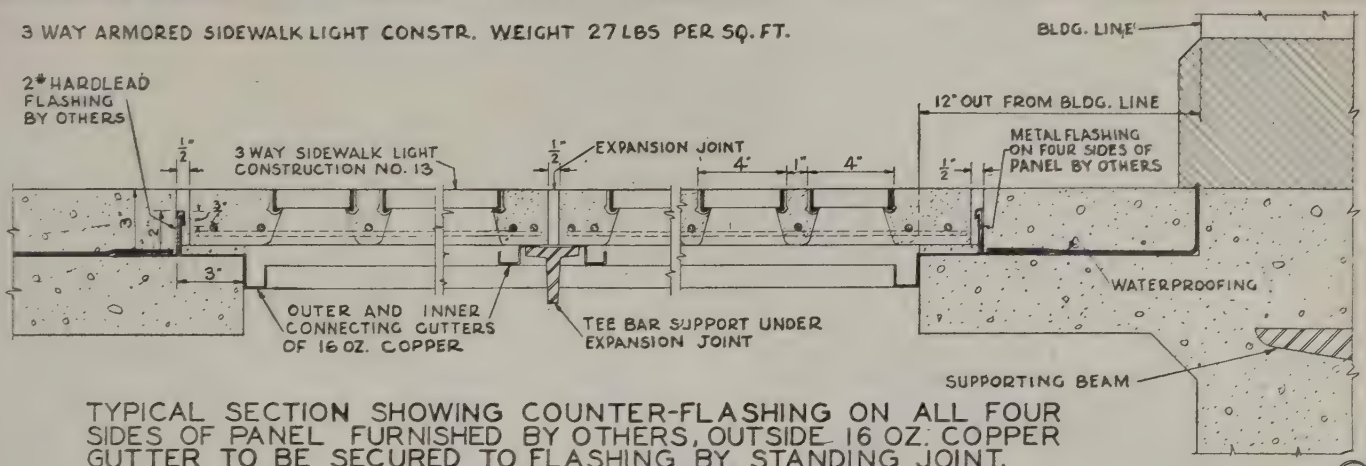
Glass either 4 in. square Fresnel design, 4¾ in. centers, or 6⅛ in. square, set 7½ in. centers.

Thickness of construction 2½ in.

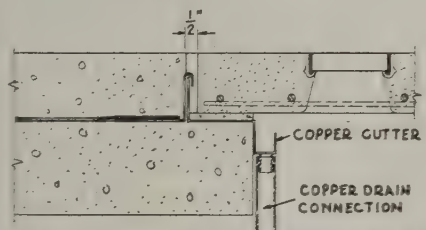
Weight, approximately, 25 lb. per sq. ft.

Continued on next page

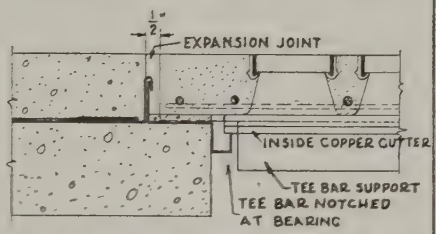
DETAILS OF STANDARD WATERPROOFING AND INSTALLATION METHODS FOR 3 WAY-LUXFER ARMORED GLASS SIDEWALK LIGHT CONSTRUCTION



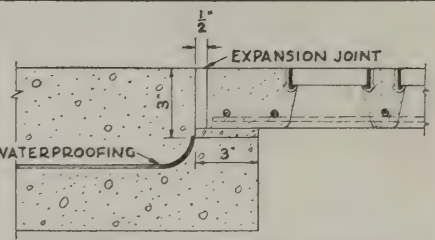
TYPICAL SECTION SHOWING COUNTER-FLASHING ON ALL FOUR SIDES OF PANEL FURNISHED BY OTHERS, OUTSIDE 16 OZ. COPPER GUTTER TO BE SECURED TO FLASHING BY STANDING JOINT. INSIDE GUTTER TO BE SET ON TOP OF OUTSIDE GUTTER (S1)



SECTION SHOWING COPPER GUTTER AND COPPER DOWN-SPOUT AT BEARING
MAXIMUM LENGHT OF COPPER DRAIN PIPE FURNISHED 8'0" (S2)

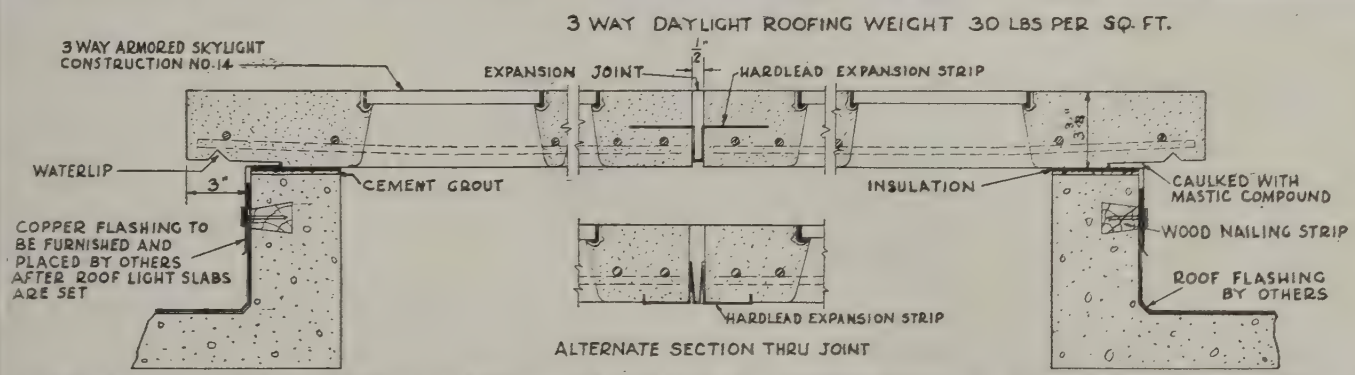


SECTION SHOWING TEE BAR SUPPORT NOTCHED AT BEARING TO ALLOW CLEARANCE FOR COPPER GUTTER (S3)

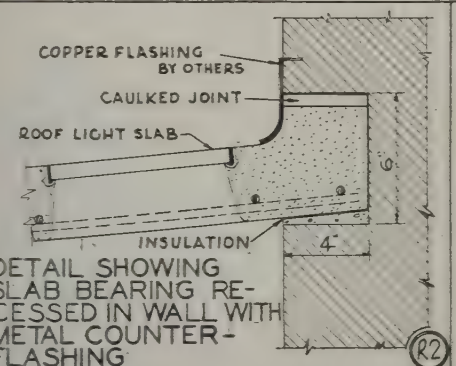


SECTION SHOWING WATER-PROOFING MEMBRANE OF SURROUNDING WALK BROUGHT UP INTO FORM OF COVE ON ALL FOUR SIDES OF SIDEWALK LIGHT PANEL (S4)

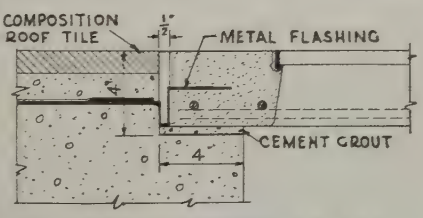
DETAILS OF STANDARD WATERPROOFING AND INSTALLATION METHODS FOR 3 WAY-LUXFER ARMORED GLASS CONSTR. NO. 14 REINFORCED CONCRETE SKYLIGHTS- ROOF LIGHTS-FLOOR LIGHTS.



TYPICAL SECTION SHOWING BEARING ON CONCRETE CURBS WITH FLASHING AND COUNTER-FLASHING BY OTHERS- STANDARD EXPANSION STRIP OF HARDLEAD AT JOINT BETWEEN SLABS (R1)



DETAIL SHOWING SLAB BEARING RECESSED IN WALL WITH METAL COUNTER-FLASHING (R2)



SECTION SHOWING METAL FLASHING SET FIRST AND THEN WATERPROOFING MEMBRANE MOPPED ON OVER FLASHING ON ALL FOUR SIDES OF ROOF LIGHT (R3)

3-WAY Daylight Roofing

AMERICAN
3 WAY-LUXFER PRISM CO.
CHICAGO CICERO, ILL. NEW-YORK

P. M. BRUNER GRANITOID CO.

ESTABLISHED 1878

Sidewalk Lights, Floor Lights, Skylights

523-524 Frisco Building

ST. LOUIS, MO.

Bruner Construction

Bruner sidewalk lights, floor lights and skylights conform to recommendations adopted by United States Department of Commerce, Division of Simplified Practice, as per bulletin No. 49.

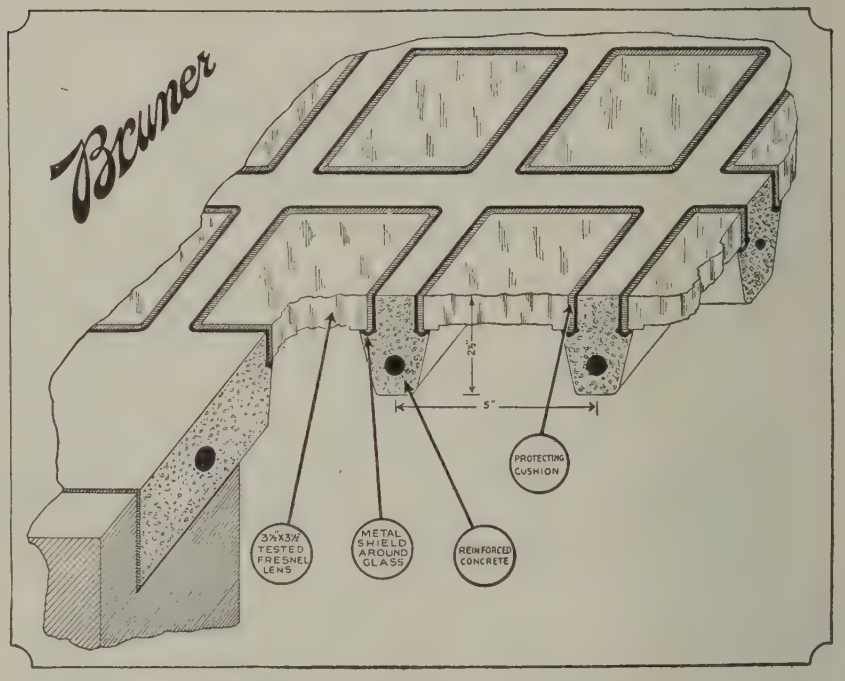
Standard Sidewalk Light Construction

In this construction there can be no leakage and no breakage of glass from structural or expansion stresses. Glass broken from accident or abuse can easily be repaired without disfiguring the construction in any way.

Specifications—The sidewalk lights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. Bruner Granitoid Co.'s Standard Sidewalk Light Bulletin, capable of carrying safe live load of 300 lb. per sq. ft. The glass to be 3½ in. square by ¾ in. thick at supporting edge, set in 4-in. square metal shields with elastic compound. The lenses shall be set 5 in. on center. The ribs shall be 2½ in. deep.

Bearing furnished for this construction should be 3 in. wide by 2¾ in. deep.

The entire construction to be guaranteed waterproof and free of defects for a period of one year. Replacement glass to be furnished free f.o.b. factory for 5 years.



Standard Sidewalk Light Construction

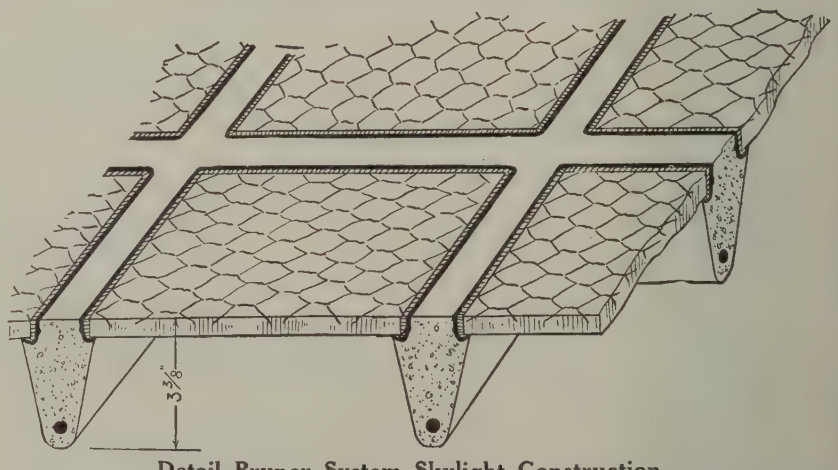
Bruner Skylight Construction (Trade Name, "Daylight Roofing")

We recommend that concrete curbs be formed as part of the reinforced concrete roof. Bruner reinforced concrete skylights being laid over these curbs and projecting beyond with drip formed on under side (as shown), a permanently mechanical watertight job is assured.

Where required, however, this skylight construction can be made flush with roof by setting same in rabbet formed in reinforced concrete and calking with our special waterproof compound.

Specifications—The skylights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. Bruner Granitoid Co.'s Skylight Bulletin. Glass to be ribbed wire 8¼ in. square, set in metal shields with elastic compound. Ribs shall be 3½ in. deep, set 9¾ in. on centers both ways. The entire construction is to be guaranteed for one year, and replacement glass is to be furnished free of charge for a period of five years.

[Plans should show detail of bearing furnished.]



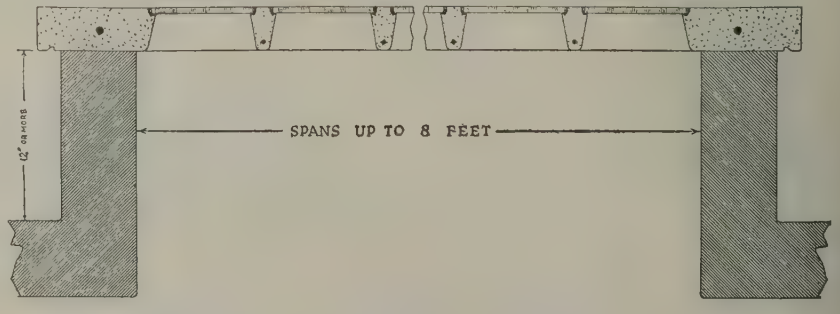
Detail Bruner System Skylight Construction

Spans up to 10 ft. can be made without intermediate beams. Standard construction beams are on 9¾-in. centers. Standard wire glass is 8¼x8¼ in. The metal shield and protecting cushion construction is similar to that in the Bruner sidewalk lights

Broad Flexible Service

Bruner sidewalk lights, floor lights and skylights can be constructed in place, or made in panels at our factory and shipped anywhere.

We are at all times ready to give information, make details, or quote prices on our construction.



Bruner Reinforced Concrete Skylights Mounted on and Projecting Beyond Concrete Curbs

DAVIS CARPENTER & CO., INC.

Transparent Roofing
Ray-Placeable Sidewalk and Floor Lights

MAIN OFFICE AND PLANT
285 East 134th Street, NEW YORK, N. Y.

Products

TRANSPARENT ROOFING.
RAY-PLACEABLE SIDEWALK LIGHTS.
Also Watertight Vault Light and Checkered Steel Sidewalk Doors; Safety Coalhole Covers, Ventilating Gratings and Calking and Waterproofing Compounds.

Our products are all in accordance with the Division of Simplified Practice, Recommendation No. 49, United States Department of Commerce, Washington, D. C.

Transparent Roofing No. 880

Transparent Roofing No. 880 is a Government standardized product of double reinforced concrete with shield protected, insulated ribbed wire glass units.

The tar and sulphur cushion between the glass, together with the galvanized iron shield, protect it from expansion and contraction of the concrete and make easy replaceability a feature, should the glass become broken by abuse.

Being burglar, fire and weather proof, its many uses are obvious where long life and practicability are desired.

Many notable installations have been made in roofs of rear extensions, porches, marquises, garages, hospitals, comfort stations and mausoleums.

Strength—Forty pounds to the square foot with a factor of safety of four on a nine-foot span.

Glass Area—Seventy per cent glass area in a panel nine by nine feet.

Specifications—Where shown on plans, furnish and set Transparent Roofing (as manufactured by DAVIS CARPENTER & CO., INC., New York, N. Y.) using standard 8¼-in. square ½-in. thick wired glass units, each sealed with tar and sulphur compound in a galvanized cast iron shield. Glass units are to be set 9⅝ in. on centers and embedded in a 3⅜ in. thick concrete slab, reinforced longitudinally and transversely with steel rods between each glass.

Expansion joints are to be formed at proper intervals and thoroughly calked. Glass for replacements to be supplied free of charge f.o.b. plant for a period of five years.

Weight Test on Transparent Roofing Slab Clear Span 9x9 Ft. Total Load—6075 Lb.

Ray-Placeable Sidewalk Lights No. 440 and No. 100

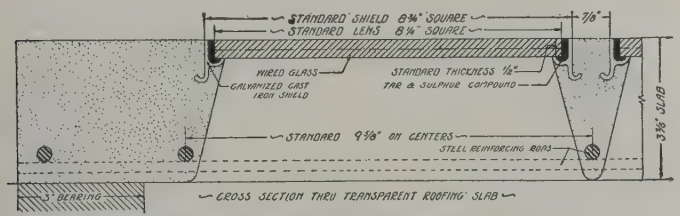
Our sidewalk light constructions have similar features to the No. 880 but are designed with the required increase in strength for greater loading.

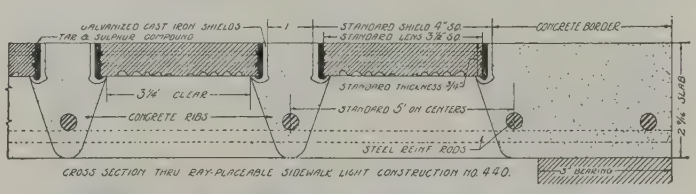
A 3½-in. *square glass,* No. 440 of Lazalite Flintex quality with a Fresnel lens, designed to spread the light rays, spaced on 5-in. centers, and a 2¾-in. *round glass,* No. 100, of the same quality with a sunburst pattern, spaced on 4¼-in. centers, are also furnished in a shield protected, insulated type of construction.

We make up our various types of construction in *factory finished ready-to-set slabs* where customers desire to make their own installation.

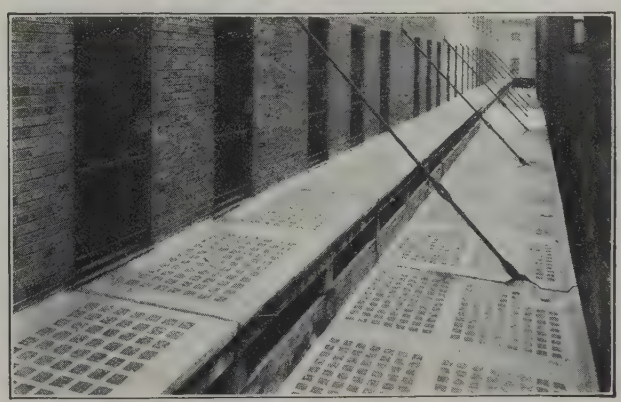
Specifications—Where shown on plans, furnish and set 3½-in. square glass, No. 440 (as manufactured by DAVIS CARPENTER & CO., INC., New York, N. Y.) using 3½-in. square Fresnel Flintex-Lazalite lens, polariscope tested, sealed with tar and sulphur compound in galvanized cast iron shields. Lenses are to be spaced 5 in. on centers and embedded in a concrete slab $2\frac{9}{16}$ in. thick reinforced longitudinally and transversely with steel rods between each glass.

Expansion joints are to be formed at proper intervals and thoroughly calked. Glass for replacements to be supplied free of charge f.o.b. plant for a period of five years.





Transparent Roofing No. 880 Over Swimming Pool of Country Residence



Ray-Placeable Sidewalk Light Construction No. 440 in Marquise Over Driveway, New York, N. Y.

ALBERT GRAUER & COMPANY

Sidewalk Lights, Skylights, Floor Lights, Marquise Lights

1408-1424 Seventeenth Street
DETROIT, MICH.

REPRESENTATIVES

ATLANTA, GA., S. R. Hewitt, 606 Walton Building
BUFFALO, N. Y., Edwin G. Day & Co., Erie County Bank Building
CHARLESTON, W. VA., Fireproof Products Co., 216 Professional Building
CHARLOTTE, N. C., Soule-Hoffman Co., Inc., 1906 South Boulevard
CINCINNATI, OHIO, Al Levinson Co., 504 Provident Bank Building
CLEVELAND, OHIO, Republic Engineering Co., 1836 Euclid Avenue
COLUMBUS, OHIO, The B. M. Freeman Co., 42 E. Gay Street
DALLAS, TEX., Southwestern Flooring & Sales Co., 1300 Young Street
DAYTON, OHIO, John G. Pool Co., 494 Ludlow Arcade
FLINT, MICH., D. C. Brown, 203 Genesee Bank Building
FORT WAYNE, IND., Arc-Con Specialties Co., 226 E. Columbia Street
GRAND RAPIDS, MICH., Charles Vandervelde, 757 Hawthorne Street
HUNTINGTON, W. VA., E. L. Warnick, P. O. Box 1581
HUNTSVILLE, ALA., Aiken & Kendall, Tennessee Valley Bank Building
KANSAS CITY, MO., Builders' Material Supply Co., 815 Continental Building
KNOXVILLE, TENN., Chas. M. Allen Co., 712 So. Gay Street
LIMA, OHIO, Lugabill Fuel & Building Material Co., Bryce Avenue and Metcalf Street
LOUISVILLE, KY., Equipment & Supply Co., Box 110, Baxter Avenue Station
PHILADELPHIA, PA., R. C. Kratz, 419 Perry Building
PITTSBURGH, PA., Pittsburgh Building Specialties Co., 1106 Jones Law Building
RICHMOND, VA., Lee O. Miller & Co., Builders Exchange
ST. PETERSBURG, FLA., E. L. March, 303 Third Avenue
TOLEDO, OHIO, Better Floors Co., 1916 Vermont Avenue
WASHINGTON, D. C., Lally-Rohlader Co., Inc., 1756 M Street, N. W.
YORK, PA., C. H. Strayer, 50 W. Philadelphia Street

Products

Grauer Reinforced Concrete Sidewalk Lights, Skylights, Floor Lights, and Marquise Lights; for all classes of buildings, tunnels, subways, train sheds, canopies, etc., installed in place or shipped in slabs ready to set.

Also manufacturers of Grauer Cement Floor Finish; Rubber, Linoleum and Cork Tile Floors, Composition Floors, Illuminating Sidewalk Doors, Coalhole Covers and Rings, Sidewalk Ventilators, Bullseye Glasses of every size for repairing sidewalk lights and skylights of any style or manufacture.

For Grauer-Watkins Red Asphalt Floor, Style-Tile Floors and Borders and Graustic Floor, see pages B1980-1982.

Advanced Design

Grauer daylighting installations for all purposes are built on a scientifically correct design which makes them positively proof against any conditions of weather or use. Accident or excessive abuse only can break them.

New type Grauer Shield Protected Lights eliminate repairs. Plastic cushions (non-leakable) around the glasses protect them from shaling and breakage due to expansion of surrounding concrete.

Grauer
Skylights
Floor Lights
Sidewalk Lights
Graustic Floors
Red Asphalt Floors

With Grauer daylighting equipment, you can give buildings the great convenience and profitable investment of daylighting throughout, with assured permanent durability. When breakage does occurs, due to accident, new glasses are easily installed by unskilled labor at a trifling cost, and without showing the repair.

Fully Guaranteed

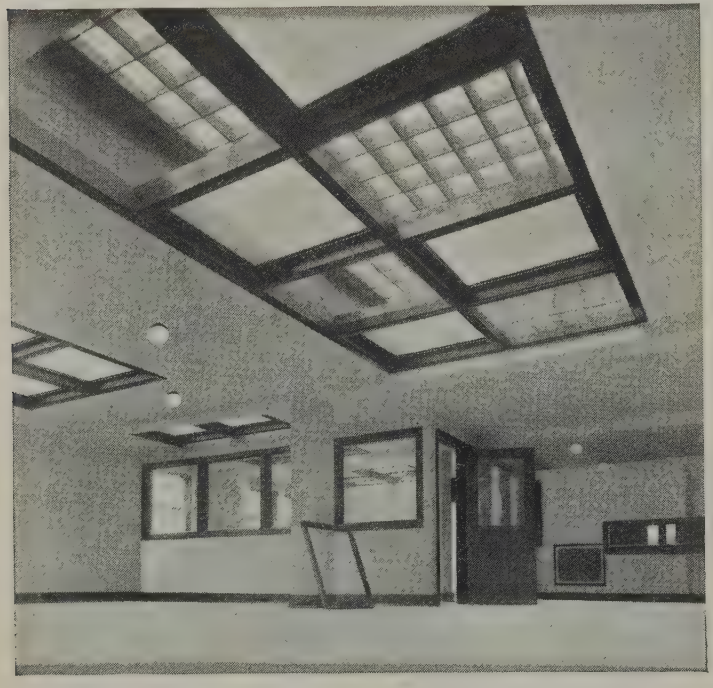
Grauer Shield Protected Sidewalk Lights are unconditionally guaranteed for one year, to be rustproof, leakproof, and free from defect. Replacement glasses will be supplied free f.o.b. factory for five years.

Sidewalk Lights

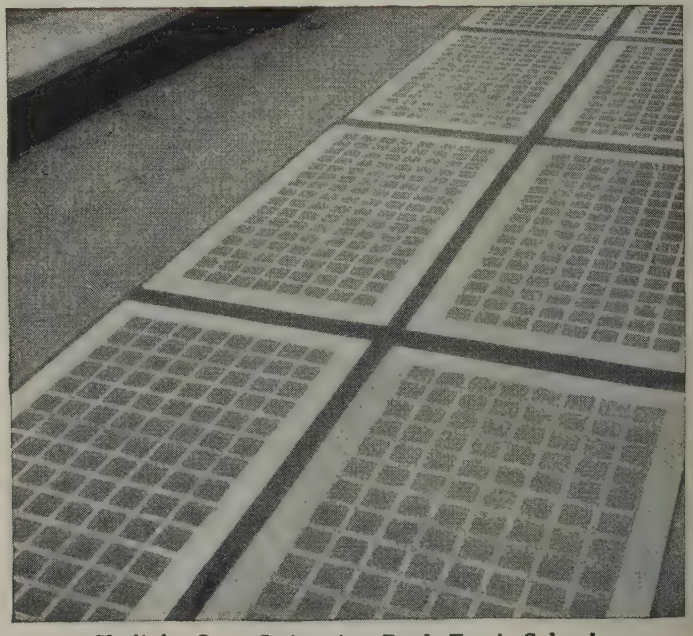
The diagrams on following page, illustrate the construction of Grauer Shield Protected Sidewalk Lights. This construction carries a load of 300 lb. per sq. ft. and can be built to carry 1000 lb.

Glass—The best quality of glass (Grauer No. 20) is used, and guaranteed to be properly annealed, each glass having passed polariscope test.

Economy—The saving in electric current alone will pay for Grauer Shield Protected Sidewalk Lights in a short time, usually in one and a half years, the time depending on current rate. The added efficiency of employees or tenants using the basement, their health, comfort, and pleasant working condi-



Skylights Over Restaurant, Nolan School, Detroit, Mich.



Skylight Over Swimming Pool, Ferris School, Highland Park, Mich.

Continued on next page

tions, pay many-fold for the daylight provided. Where basement spaces are daylighted, and used as salesrooms, the increased revenue frequently pays for the entire cost of construction in *less* than one year.

Ready-to-set-Sidewalk Slabs—Completely built slabs can be supplied on order, to fit specified spaces, when for any reason it is not desired to have our own skilled workmen install daylighting construction.

Specifications—The sidewalk lights shown on plans shall be constructed with carrying members of reinforced concrete. The glass shall be Grauer No. 20, set in rustproofed metal shields with an elastic compound. The design to permit glass replacement with unskilled labor. All glass is to be polariscope tested and guaranteed free of internal strains. The construction shall be capable of carrying a uniformly distributed live load of 300 lb. per sq. ft. without injury.

The entire construction is to be guaranteed waterproof and free of defects for a period of one year. Replacement glass to be furnished free, f.o.b. factory for five years.

Floor Lights

Floor lights permit the daylight to do double duty. Light thus admitted to a lower floor, even though diffused through one story, comes from above and is more efficient than light from side windows.

The construction is similar to that of Grauer Sidewalk Lights. The glass is, however, set directly in concrete as the extra expense of shields is unnecessary in interior installations.

Grauer Floor Lights maintain more weight than an ordinary floor will hold. They are permanently watertight, proof against rust and fire, require no upkeep expense.

The concrete carrying ribs are 3½ in. in depth and on 6-in. centers both ways. The two styles of glasses are 4¾ in. square by ¾ in. thick. No. 89 is plain flat; No. 88 is diffusing and ornamental.

Specifications—The floor lights shown on plans shall be constructed of reinforced concrete and glass according to the Grauer System; installed complete in place by the manufacturer's own workmen. The glass shall be diffusing glass No. 88 [plain glass No. 89] 4¾ in. square, guaranteed free of strain by polariscope test. Spans up to 8 ft. are to be made without intermediate beams, with a guaranteed safe live load of 250 lb. per sq. ft., with a factor of safety of 4.

The floor lights are not to be installed until after the surrounding floors have been laid complete. The floor light manufacturer is to provide an elastic, waterproof expansion joint of approved materials on the four sides of each opening.

The construction and glass is to be guaranteed for a period of one year, and any defects appearing within this period are to be promptly corrected to the satisfaction and without cost to the owner.

Skylights

Grauer Skylights with wire glass set in metal shields supported by a reinforced concrete grill, represent the greatest advance in skylight construction in years. Glass is protected from pressure, both structural and expansion. These skylights defy all weather conditions and are unconditionally guaranteed. If broken by smashing (the only way they can be broken) replacement is easy by unskilled labor.

Grauer Skylights may be walked on. They give large light area; are permanently watertight and proof against rust, fire and burglars. The upkeep expense is negligible.

Specifications—The skylights shown on plans shall have structural members of reinforced concrete, supporting permanent metal shields in which glass is set. Metal shields are to be rustproofed. Glass to be ribbed wire 8¼ in. square, ½ in. thick, set in an elastic, watertight compound. Spans are to be made without intermediate beams up to 9 ft. clear. The entire construction is to be guaranteed for a period of one year and replacement glass is to be furnished free of charge for a period of five years.

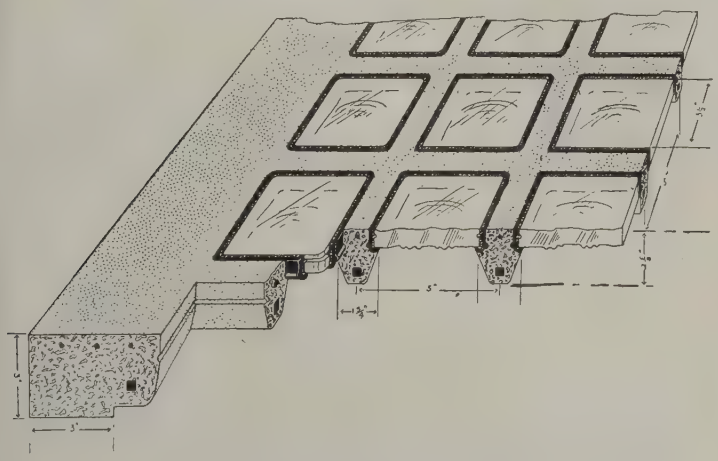
Marquise Lights

The Grauer Skylight construction is admirably suited for use in marquises, and is now being generally utilized for this purpose. Architects, builders and building owners who have had trouble with the constant breaking of the ordinary sheet glass formerly used in marquise work, have come to realize the economy and satisfaction of permanently meeting this problem in the first construction. The Grauer System is a most durable product adaptable to work of this character.

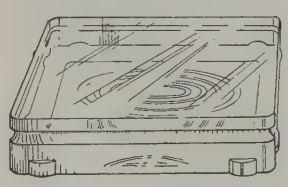
National Service

This organization is equipped to install Grauer Shield Protected Daylights in any building anywhere. Skilled crews are placed in charge of each installation. Our experience of 22 years in the design and construction of daylighting equipment, assures scientifically correct installation and permanent satisfaction.

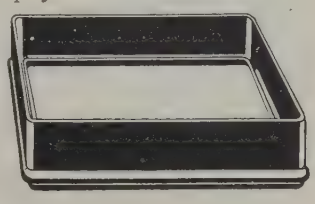
Illustrated bulletins on lights for all uses, quotations and information, will be supplied promptly.



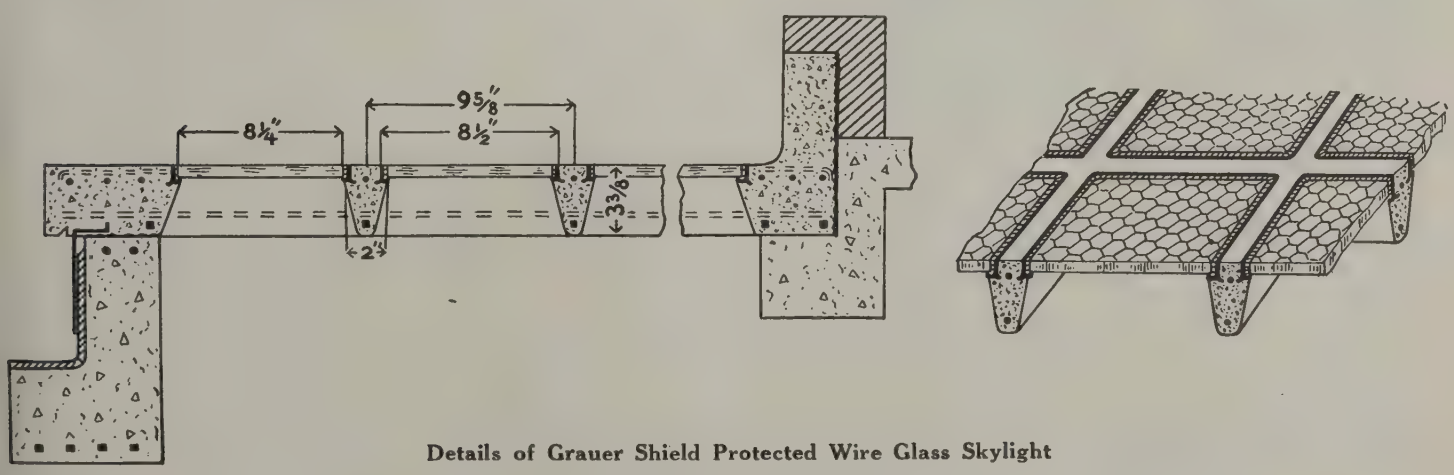
Section Through Grauer Shield Protected Sidewalk Light Construction



Diffusing Glass No. 20
3½x3½ in.



Protecting Shield



Details of Grauer Shield Protected Wire Glass Skylight

J. MERRILL RICHARDS

Manufacturer of Sidewalk Lights, Glass Roofs and Transparent Roofing

119-122 West First Street
BOSTON, MASS.

Products

RICHARDS' "UNITY" PERMANENT SIDEWALK LIGHTS and GLASS ROOFS, Standardized Constructions.

For Magnalite Obscuring Glass, see page B2176.

Shield Protected Glass Constructions

Sidewalk Lights—Double reinforced concrete and glass construction, with glass set into hot-dip galvanized cast iron protecting shields with elastic material. 2¾-in. diameter round, and 3½-in. square glass units.

Glass Roofs—8¼-in. square, ½-in. thick glass set into hot-dip galvanized shield with elastic material. Glass roofs are effective in barrel arches as shown below. They can be installed on flat pitch in interior courts or on roof to keep skylight off the skyline.

Advantages of Shield Constructions

Shields protect the glass from all compression in the top of the slab, eliminating glass breakage.

Glass broken by accident can be replaced in a moment's time by unskilled labor, making no unsightly repair patch. There is no leakage. Permanency.

Five-year glass guarantee.

Specifications for Shield Constructions

Sidewalk Light—Shall be Richards' "Unity" Construction using (2¾-in. round or 3½-in. square glass) set into hot-dipped galvanized cast iron shields with elastic compound.

Glass Roofs—Shall be Richards' "Unity" Construction with 8¼-in. square ½-in. thick glass set into hot-dipped galvanized cast iron shields with elastic compound.

Guarantee

This contractor shall furnish written *guarantee* to maintain the construction against faulty materials and workmanship and any leakage caused by such for a period of one year.

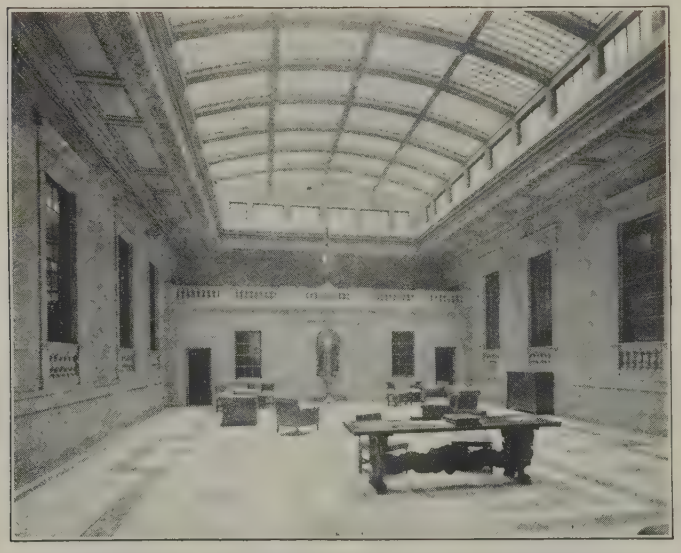
Glass for replacement shall be furnished owner, free of cost f.o.b. factory, over a period of five (5) years for units broken by any cause outside of fire.

List of Installations

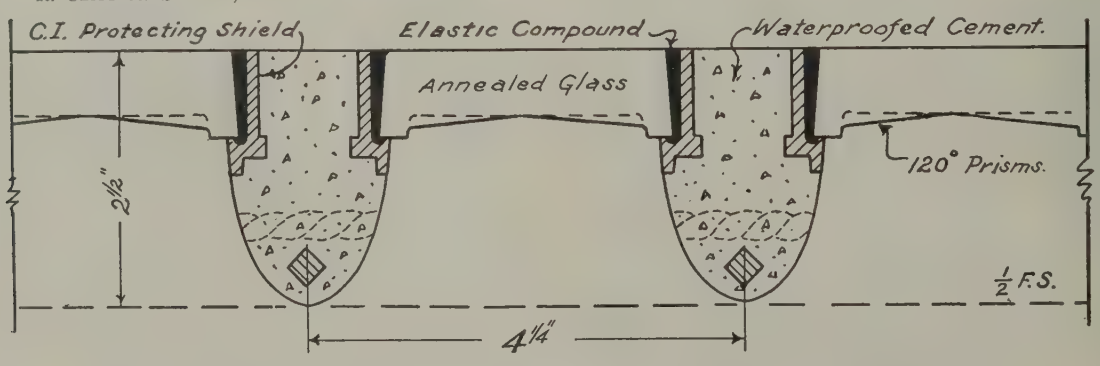
BUILDING AND LOCATION	ARCHITECTS
Banks	
*New England Trust Co., Boston, Mass.	Appleton & Stearns
*Federal Reserve Bank, Boston, Mass.	R. Clipston Sturgis
*National Shawmut Bank, Boston, Mass.	Parker, Thomas & Rice
*Louisville Trust Co., Louisville, Ky.	James J. Gaffney
*Central Trust Co., Cambridge, Mass.	Monks & Johnson
*Union & New Haven Trust Co., New Haven, Conn.	Cross & Cross
*First National Bank, Louisville, Ky.	
Hadley Falls Trust Co., Holyoke, Mass.	McKim, Meade & White
Office Buildings	
*John Hancock Mutual Life Insurance Building, Boston, Mass.	Parker, Thomas & Rice; F. A. Waldron, Engineer
Lawyers Building, Boston, Mass.	Coolidge, Shepley, Bulfinch & Abbott
*Decatur-Hopkins Building, Boston, Mass.	Monks & Johnson
Lawrence Building, Boston, Mass.	Coolidge, Shepley, Bulfinch & Abbott
*Provident Mutual Life Insurance Building, Philadelphia, Pa.	Cram & Ferguson
Schools and Halls	
*Dearborn District School, Roxbury, Mass.	McLaughlin & Burr
*Latin School, Boston, Mass.	McLaughlin & Burr
*Putnam District School, Roxbury, Mass.	J. J. Driscoll
Lyons Union School, Lyons, N. Y.	Carl C. Ade
*Faneuil Hall, Boston, Mass.	Cram & Ferguson
*East Boston High School, Boston, Mass.	John M. Gray Co.
Harvard Business School, Cambridge, Mass.	McKim, Meade & White
Continuation School, Boston, Mass.	J. J. Driscoll

(Over 30,000 sq. ft. in New England schools.)

*Glass roof installations.



Federal Reserve Bank of Boston (Installed 1919)
R. CLIPSTON STURGIS, Architect



Section 2¾-in. Round Glass, Typical of Shield Protected Glass Construction
Besides shielded glass we stock 6¼-in. square replaceable glass adaptable for interior floor lights only

RICHARDS & KELLY MANUFACTURING CO.

Manufacturers of Prismatic Lights

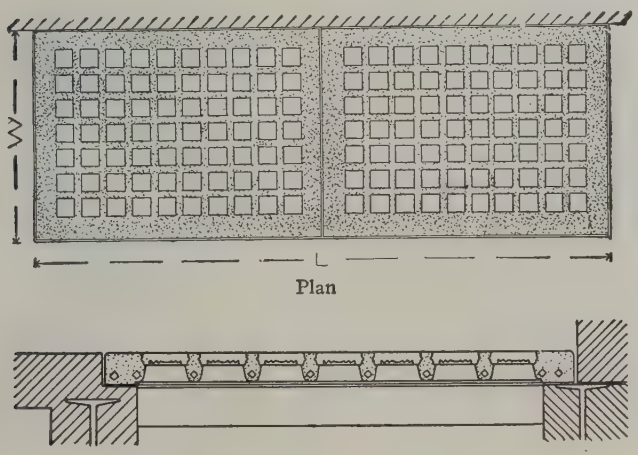
309-311 West Twenty-third Street
CHICAGO, ILL.

Products

REINFORCED CONCRETE SIDEWALK LIGHTS.
REINFORCED CONCRETE FLOOR LIGHTS.
REINFORCED CONCRETE ROOF LIGHTS.
CAST IRON SIDEWALK LIGHT REPAIRS and REPLACEMENTS.
SIDEWALK DOORS.
COALHOLE COVERS.

Reinforced Concrete Sidewalk, Floor and Roof Lights

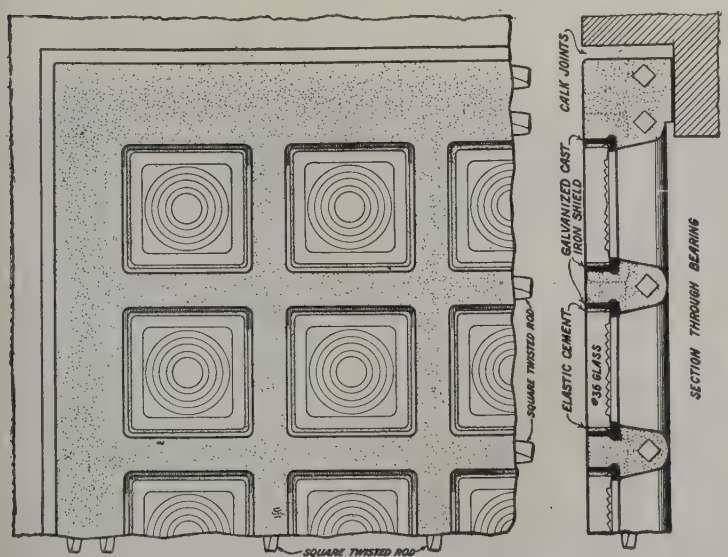
Manufactured in accordance with simplified practice recommendations adopted at Washington, D. C., November 18, 1925, by Sidewalk, Floor and Roof Light manufacturers, distributers and users, acting in conjunction with the Division of Simplified Practice.



Plan

Cross Section

Details Construction of Reinforced Concrete Sidewalk Lights



Detail Showing Galvanized Cast Iron Shield Protected Glass

Glass

For Sidewalk Lights—3½x3½ in. in *galvanized cast iron shields;* 3-in. diameter in *galvanized cast iron shields.*

For Floor Lights—3½x3½ in. in *galvanized cast iron shields;* 4x4 in. and 6⅛x6⅛ in. without shields.

For Roof Lights—8¼x8¼ in. wire glass set in *galvanized cast iron shields.*

Guarantee—We will furnish free of charge f.o.b. our factory any glass broken in our *galvanized cast iron shield* type construction for a period of five years from date of installation, unless breakage is caused by fire or misuse.

Cast Iron Sidewalk Lights

We have discontinued furnishing cast iron sidewalk lights for new installations, but have patterns and glass for repairs and replacements.

Glass—For concrete setting 2, 2½ and 3-in. diameters, 3 in. square, 2½x3½ in. and 2¼x5 in.

For sulphur setting 1⅝-in. diameter.

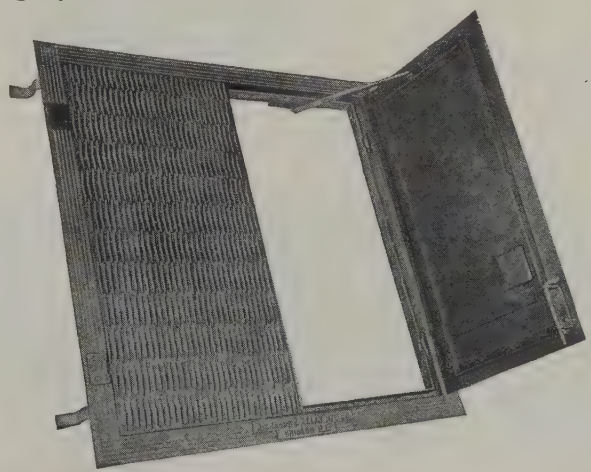
Sidewalk Doors

Manufactured in flush or raised types with checkered steel plate door leaves.

Illuminating doors made in either flush or raised type with 3 in. square glass set in checkered steel plate door leaves.

All doors are fitted with brass hinges, device to hold doors while open, slide bolt to lock from below and anchors to build into concrete. Door leaves can be fitted with striker plates if doors are operated with arch on car platform.

Flush type door frames made either of one piece iron castings or welded steel channel frames with gutter tapped for ¾ in. pipe to carry off water which seeps through joints between doors and frames.



Flush Type Checkered Steel Sidewalk Door

Coalhole Covers and Frames

Sidewalk Type Stock Sizes—16, 18, 20, 24 and 30 in., with or without glass. Special sizes 26, 28 and 36 in.

Driveway Type Stock Sizes—20, 24 and 30-in. diameter; 20x20, 24x24 and 30x30 in.

Quotations and Details

Furnished promptly upon request, prices on sidewalk, floor or roof lights, given either f.o.b. cars or installed at building.

ÆOLUS DICKINSON

INDUSTRIAL DIVISION PAUL DICKINSON, INCORPORATED

Ventilators

TELEPHONE
LAFAYETTE 1862, 1863

3324-3354 South Artesian Avenue
CHICAGO, ILL.

Products

DICKINSON CAST IRON FLOOR VENTS, MUSHROOM TYPE; "ÆOLUS" ROOF VENTILATORS.

For Dickinson Cast Iron Exhaust Heads and Dickinson Cast Iron Scuppers, see page A697.

Dickinson Cast Iron Floor Vents (Mushroom)

Oval Type—Standard size—8x12 in. Cap size—11¾x15¾ in. Squared floor size—6, 8 and 10 in. Maximum height—at full capacity 3½ in. from floor.

Round Type—Standard sizes—6, 8, 9 and 10 in.

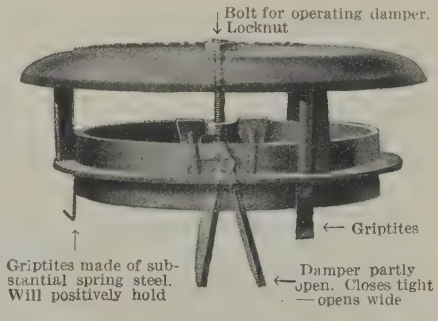
The floor section may be had with or without means for bolting to the floor.

The caps are easily and fully adjustable, and the only tool needed is a screwdriver, the nuts being held firmly in slots.

E-Z Damper Griptite Mushrooms

Standard sizes—6, 8, 9 and 10 in. round and also 8x12 in. square floor.

The advantages of this method of controlling air are evident, as the space between the damper and cap acts as an expansion chamber, reducing the velocity of air before leaving the mushroom instead of at the time of leaving.



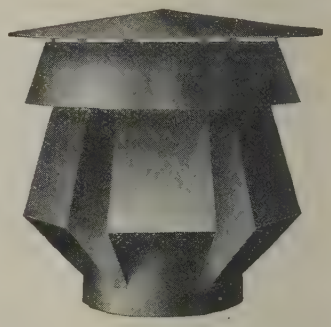
Some recent installations:

Palace Theater, Gary, Ind.
Zaring Theater, Indianapolis, Ind.
Colony Theater, Chicago, Ill.
Fisher's Theater, Fond du Lac, Wis.
Harding Theater, Chicago, Ill.
Midwest Theater, Chicago, Ill.
Drake Theater, Chicago, Ill.
Milo Theater, Chicago, Ill.

Æolus Roof Ventilators

Manufacturers of ventilators since 1888. During this time we have supplied vents to many industries, under all conditions.

Materials employed in construction to suit any requirements.



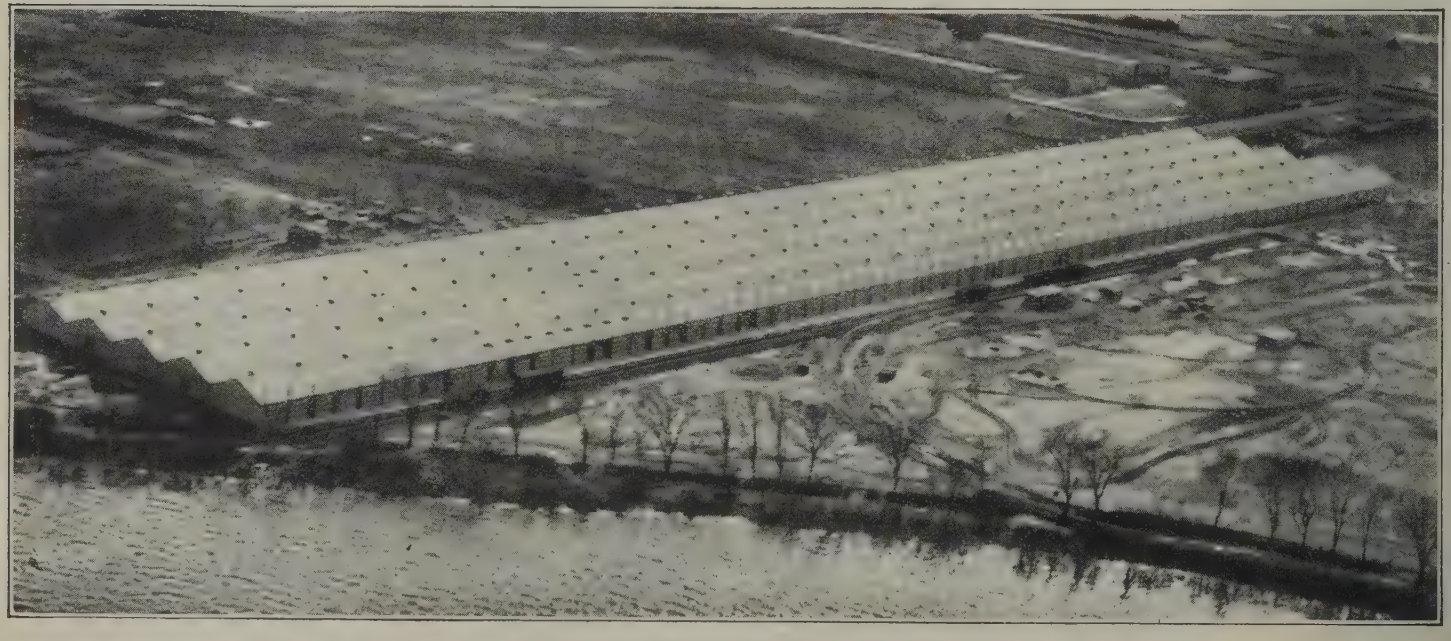
Galvanized steel, armco iron, toncan metal, lead clad, zinc, copper, aluminum, monel metal, and light gray cast iron which is recommended for buildings where destructive gases or chemical action is prevalent. Railroads are the largest users of this type.

Recent installations include:

American Can Co.
Armour & Co.
Commonwealth Edison Co.
Corn Products Co.
Crane Co.
Grasselli Chemical Co.
International Harvester Co.
Jos. T. Ryerson & Son
Universal Portland Cement Co.
Western Electric Co.
Atchison, Topeka & Santa Fe Ry.
Illinois Central R. R.
Oxweld Acetylene Co.

Information

Further information, prices, etc., gladly supplied on request.



Installation of 185 24-in. "Æolus" Ventilators

AKRAT VENTILATORS, INC.

Ventilating Engineers
1180 Builders Building
CHICAGO, ILL.

FACTORY AND WAREHOUSE
CHICAGO, ILL.

"Akrat" (Accurate) Siphonage Roof Ventilator

All that a roof ventilator should be. Simple in design—accurate in detail—efficient in exhaust capacity. Their neat appearance insures a graceful skyline wherever installed.

Design—The design is scientifically correct, as the slightest air currents coming in contact with any portion of the ventilator creates a siphonage action which greatly increases the volume of the exhaust.

Akrat Siphonage Ventilator

Uses

Akrat Ventilators should be installed to exhaust foul air, smoke, dust, fumes, gases, steam, etc., from all types of buildings: also to create a constant circulation of air by gravity ventilation. When the installation has been completed, they require no further attention and their powerful exhaust capacity can be utilized twenty-four hours of each day.

Features

The table of comparative dimensions indicates that the over-all height is very low in comparison to the diameter of the various sizes. This feature was developed by our engineers *at no sacrifice in exhaust capacity.*

Another feature is that the ventilators do not detract from the appearance of the buildings on which they are used.

To facilitate the erection of the larger sizes, Akrat Siphonage Ventilators are assembled in two sections. These two sections are fastened together with brass bolts, nuts and washers. The upper section, which consists of the top and weather-band, is securely riveted together with heavy bars of material. The lower section consists of the eduction pipe with siphons riveted solidly thereon. The top section can be removed easily by taking out the brass bolts. This is of importance when it becomes necessary to paint the ventilators after they have been installed. All joints of these ventilators are securely riveted—absolutely no solder being used in their assembly.

Material

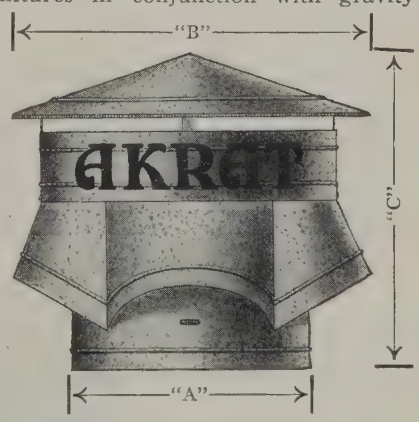
Fabricated from prime galvanized sheets; also of keystone copper-steel, armco ingot iron, toncan metal, cold rolled copper, zinc, aluminum, monel metal, or any other sheet metal. Our standard gauges are adequate for the various sizes. Braces and reinforcements are of galvanized material. When ventilators are made of special metal, the braces will be made of the same material from which the ventilator is fabricated.

Engineering Service

To obtain the greatest exhaust possible, many important elements, such as prevailing conditions to be remedied, temperature differences both inside and outside, humidity, location of ventilators, type of bases used, height above roof parapets or surrounding obstructions, etc., must be considered before specifying any particular size or quantity of ventilators.

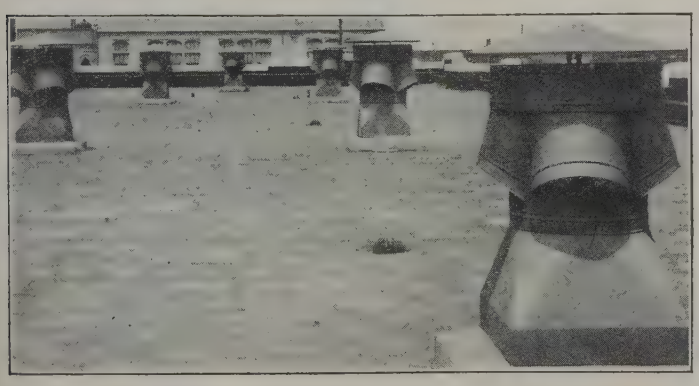
Canneries, dye works, paper mills, etc., require special aprons, hoods or fixtures in conjunction with gravity ventilators.

We are prepared to furnish such equipment and our Engineering Department will gladly cooperate with architects and engineers who desire to obtain data and information regarding such installations.



Capacities

These capacities are compiled from tests that were conducted at the Armour Institute of Technology, Chicago, Ill.



Holy Trinity High School, Chicago, Ill.
Slupkowski & Piontek, Architects
Narowetz Heating & Ventilating Co., Contractor

DIMENSIONS AND EXHAUST CAPACITIES*

Dimensions, in.			Area, sq. in.	Exhaust, cu. ft. per hr.
A	B	C		
6	9¾	9	28	5328
8	13	12	50	9515
10	16¼	15	79	15034
12	19½	18	113	21504
14	22¾	21	154	29306
16	26	24	201	38250
18	29¼	27	254	48336
20	32½	30	314	59754
22	35¾	33	380	72314
24	39	36	452	86016
30	48¾	45	707	134542
36	58½	54	1018	193725
42	68½	63	1385	263565
48	78	72	1810	344443
54	87¾	81	2290	435787
60	97½	90	2827	537978
66	107¼	99	3421	651016
72	117	108	4072	774902
84	136½	126	5542	1054643

**Note:* It must be borne in mind that these figures are conservatively based upon wind velocities only. Temperature differences will increase these capacities.

AMERICAN-LARSON VENTILATING COMPANY

MAIN OFFICE
Keystone Bank Building
PITTSBURGH, PA.

Product

AMERICAN-LARSON SUCTION VENTILATORS (Patented 1927).

The Principles of Static Ventilation

Two distinct sets of forces produce natural air currents in ventilators. These forces are stack action, and wind action.

Stack action occurs when air in a stack is heated above the temperature of the surrounding atmosphere. This action is independent of wind velocity, and ceases when the temperatures inside and outside of the stack are equalized.

Wind action is not so simple, and its effects follow different laws at different wind velocities.

In the flow of fluids in pipes, ducts, etc., it is found that there are two critical velocities. Below the lower critical velocity, the fluid moves in parallel lines, and pressure drop is due to viscosity only. Above the upper critical velocity, the fluid moves in a turbulent manner, and pressure drop grows as the square of the velocity. Between the upper and the lower critical velocities, the motion of the fluid is unstable, and vacillates between one or the other states of motion, depending upon small irregularities and accidental happenings.

Design of High Efficiency Ventilators

The air moving force due to stack action or buoyancy is

$$h_1 = 39.7\ H\left[\frac{1}{t_o + 460} - \frac{1}{t_1 + 460}\right] \times \frac{B}{30}$$

or very closely,

$$h_1 = \frac{H\ (t_1 - t_o)\ B}{206{,}000}$$

in pounds per square foot, where H is the height of the column of warm air in the building at temperature t_1; t_o is the temperature of the outside air, and B is the height of the barometer in inches of mercury. This force is the same for all types of ventilator.

The other air-moving force, the suction produced by the action of the wind on the ventilator, has as its upper limit of possibility the full-impact pressure of the wind, or

$$h_2\ (\text{limit}) = \frac{v^2.\ B}{12000}$$ pounds per sq. ft., where v is wind velocity in miles per hour. This ultimate value can never be reached, because the full impact of the wind cannot be utilized. In the ordinary cowl type of ventilator and in most stationary ventilators, the suction is produced only by viscous drag and not by impact, and for these it is only about 30% of the full-impact. In the improved American-Larson Ventilator, due to the efficient utilization of the impact of part of the wind stream, the suction attains the high value of 50% of the full-impact pressure difference, and, to the best of our knowledge, this figure has never been exceeded or equalled. The force produced by the action of the wind on the ventilator then is

$$h_2 = \frac{v^2.\ B}{24000}$$

Furthermore, the suction is produced at all wind velocities, even the lowest—whereas for the other types the suction drops rapidly, and finally disappears altogether below 3 miles per hour, as is evidenced by the curves of test results at the right.

If these two air-moving forces could be added together, the velocity of discharge which they would produce, in feet per second (barometer 30 in. Hg. standard) would be

$$v' = 29.1\sqrt{\frac{H\ (t_1 - t_o)}{6870} + \frac{v^2}{800}}$$

and the air discharged per square inch of cross section of the throat, if the ventilator had 100% coefficient of discharge, would be

$$Q \text{ cu. ft./hr.} = 728\sqrt{\frac{H\ (t_1 - t_o)}{6870} + \frac{v^2}{800}}$$

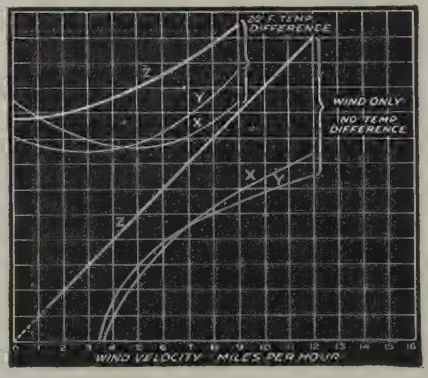
No air-discharging device, however, can have 100% coefficient because there is always some contraction of the air stream entering the throat, and some friction against the sides; furthermore, in any ventilator head, the air must change its direction from vertical to horizontal, which causes some added resistance. These effects are unavoidable, but in the American-Larson they are reduced to the minimum; the conical inlet to the throat reduces the contraction, and the air is required to make only one easy turn of less than 90°. The discharge coefficient therefore reaches the high value of 70% for this ventilator, as compared to 50% or less in some designs where the air is compelled to make a number of turns before it can leave the ventilator head. The discharge would therefore be

$$Q = 510\sqrt{\frac{H\ (t_1 - t_o)}{6870} + \frac{v^2}{800}}$$

cubic feet per hour for each square inch of throat area in the American-Larson ventilator.

It is evident from these figures that not only has the American-Larson a much higher capacity than other types of ventilator, but that in the improved form it approaches closely to the highest limit of what is physically possible in an ideal ventilator.

In the practical ventilator, the two forces do not add directly, and there are other modifying conditions such as the influence of wind pressure on the building, which make it preferable to use, in calculation of capacities, the American-Larson formula given in a paragraph below.



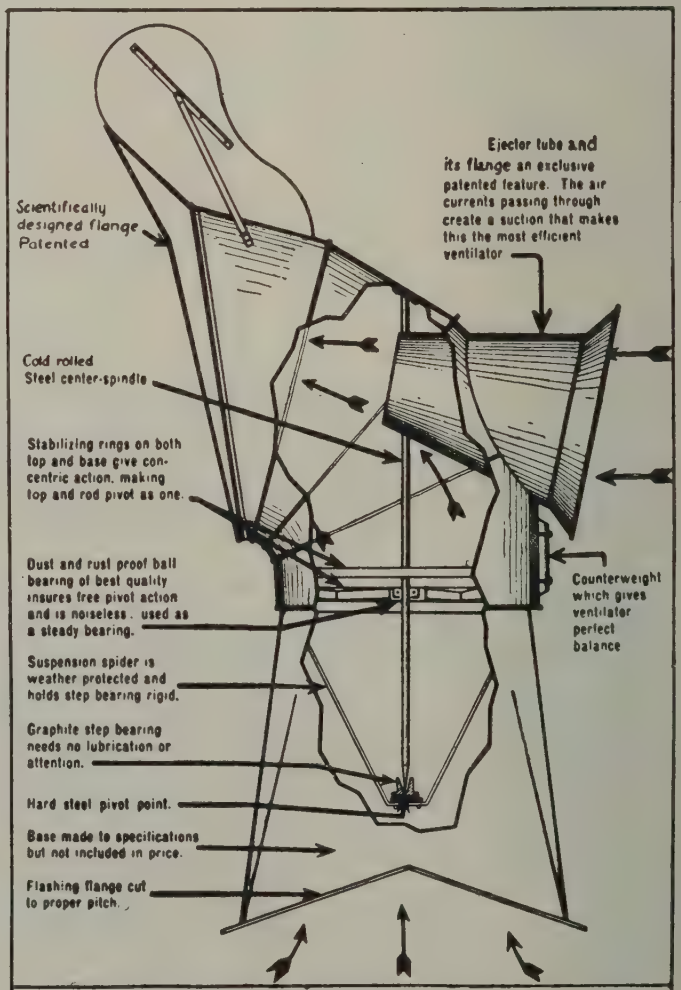
Graphic Record of Comparative Tests by Professor Trinks at Carnegie Institute of Technology

X = 18-in. stationary siphon ventilator
Y = 18-in. rotary siphon ventilator
Z = 18-in. American-Larson suction ventilator

The Practical Design of Ventilators

The practical designer of ventilators endeavors to combine the greatest possible draft, with the least possible resistance to air flow. He must accomplish this at extremely low wind velocities. The action at low wind velocities must be quite independent of temperature differences. Under no conditions must the design be subject to interference by back-drafts.

Unless proper provisions are incorporated in the design these features are very hard to combine. In the American-Larson Ventilator however, the patented ejector tube effects air movement in direct ratio to wind velocities and temperature dif-



Cut View of Typical American-Larson Ventilator

Continued on next page

ferences. When there is no temperature difference many ventilators do not function at all unless wind velocity is greater than 3½ miles per hour; furthermore under temperature differences as great as 20° F., the efficiency of such ventilators actually decreases in gentle breeze up to 4 or 5 miles per hour velocity.

In the American-Larson the kinetic energy of the wind is used to the maximum possible extent, by creating suction, due to the viscous drag both inside and outside the cowl.

On account of the easy or gradual turn of the air current and the unobstructed discharge area, the discharge for a given pressure drop in the American-Larson is unusually high —about 75% of that through a rounded opening of the same area.

In the stationary type of ventilator the great number of turns of direction of the air causes excessive resistance or pressure drop. To avoid this the proportions of the passage have in some designs been made excessively large in order to reduce air velocities, but these large passages mean that the ventilator is not properly shielded and that down-draft is an ever present source of trouble in high winds, so one or the other feature (freedom from downdraft or low pressure drop) which ever is considered of least importance must be sacrificed. This condition is particularly unsatisfactory when snow is falling with relative humidities around 96 to 98%.

Static Draft

The static draft produced by the wind action on the ventilator is equal to h_2. Expressed in inches of water, it is

$$\text{Draft} = \frac{v^2}{4160}$$

v being wind velocity in miles per hour. This value, which is very high for natural ventilation, applies only to the improved American-Larson Ventilator, and is attained by the combination of ejector tube and flanges developed through extensive and scientifically planned experimentation.

This is the static draft produced by the wind action only. Where there is a temperature difference, the total static draft is the sum of h_2 plus h_1 as given in the paragraph on design of high efficiency ventilators.

Solution of a Typical Ventilation Problem

A given building is 44x110x28 ft. average height and will be used to house equipment and appliances which will throw off approximately 416 lb. of steam per hour.

The ventilator capacity to be figured on the following conditions: 10 changes of air per hour; temperature difference, 20° F.; wind velocity, 5 miles per hour; ventilators 36 ft. above the floor level. The heating system will be adequate.

In summer the proper ventilating requirements will be a question of providing sufficiently rapid flow of air into the building to (a) absorb a large part of the water vapor, and (b) produce sufficient upward velocity of air flow to carry upward the minute globules of water which compose visible steam. The temperature difference between air inside and outside the building in summer is usually small, but the building is wide open. Under these conditions the problem is simply that of providing sufficient ventilator capacity.

In winter, while the same requirements are to be met as in (a) and (b) above, the temperature difference is great and the wind velocity usually high; since the building must be kept at a reasonable temperature, the air inflow will naturally be restricted by closing doors and windows. It is evident that the ventilation conditions in winter do not depend entirely upon the number or size of ventilators installed, but on the capacity of the heating system and the amount of heat given off by the equipment and appliances in the building.

Another item which must be considered is that of condensation and dripping of water from the roof. This is rather a question of roof construction than one of ventilation. If the roof is unprotected sheet iron, and if the building is kept at a rather high temperature in winter, with very restricted air inflow, condensation on the under surface of the roof will inevitably occur. On the other hand, with a roof laid on wood or protected with insulation, if a reasonably large air inflow is permitted, condensation will not occur.

Considering all of these features it would appear proper to install the ventilator capacity required under summer conditions.

Calculation of Capacity—The volume of air moved per hour by a ventilator or set of ventilators can be derived from the following American-Larson Ventilator capacity formula,

$$Q = A\left[\frac{36\sqrt{H\,(t_1 - t_0)}}{6 + v} + 20 \times v\right]$$

where Q = cu. ft. of air exhausted per hour; A = throat area of ventilators in sq. in.; H = center of ventilator outlet to floor; v = (wind velocity) miles per hour; t_1 = inside, and t_0 outside average temperatures.

In solving; $Q = 10\ (44 \times 110 \times 28) = 1{,}357{,}000$ cu. ft. per hour ventilating capacity, whence, from the formula, $A = 7200$ sq. in.

Seven 36-in. American-Larson Ventilators have an area of 7150 sq. in.
Six 40-in. American-Larson Ventilators have an area of 7540 sq. in.
Four 48-in. American-Larson Ventilators have an area of 7220 sq. in.

Actually, the results given by the formula are very conservative and the last term of the equation should be multiplied by the factor of 140% which would, with any of the three combinations figured on, give a capacity of 12 changes per hour instead of 10. The lower figure has been used, however, to allow a greater "factor of safety." And since the average wind velocity for the vicinity in which the building is located is shown by the U. S. Weather Bureau reports to be about 12 miles per hour, the ventilating capacity at most times would be considerably greater. It is best, however, to provide for the least favorable conditions.

Moisture Absorption—(A) Moisture content of air 70°, 75% relative humidity = .00086 lb. cu. ft.

If raised to 90° F. and saturated, moisture content = .00213.

Moisture absorbed per cu. ft. = .00213 — .00086 = .00127.

Moisture absorbed by 10 changes of air per hour = .00127 × 1,257,000 = 1720 lb. per hour.

Steam given off by the equipment and appliances = 416 lb. per hour, or only 24% of what could be absorbed.

(B) If air is not heated at all, but absorbs all of the steam given off by the equipment and appliances, $\frac{416}{1{,}357{,}000} = .00030$ lb. per cu. ft. = increase in moisture.

This corresponds to a relative humidity of 100%—that is to say, the air at 70° F. could absorb all of the steam without becoming over saturated.

Recommendations—The combined throat area of all ventilators should be approximately 7000 sq. in. This is equivalent to seven 36-in. ventilators, or six 40-in., or four 48-in. of the American-Larson type.

The location of the ventilators or the best number to use, will depend largely upon the number of bays of the building, since it is generally preferable, although not essential, to locate each ventilator at the center of a bay (i.e., midway between the roof trusses).

Suggested Form of Specification

(1) All ventilators shall be American-Larson Suction Ventilators, as manufactured by the American-Larson Ventilating Company, of Pittsburgh, Pa., and shall [shall not] be equipped with dampers.

(2) The ventilators shall be made of *(see Note 1)* and shall be of the following gauges:

Below 18-in. diam., No. 24 gauge; 20 to 24-in. diam., No. 22 gauge; 30 to 48-in. diam., No. 20 gauge; 54-in. diam., No. 18 gauge.

(3) Where so indicated, the ventilators shall be mounted on extension piping of sufficient height to raise ventilators above surrounding obstruction.

(4) The ventilators shall be erected plumb and in a substantial manner. Where extension pipes are used they shall be anchored to four points with heavy gauge guy wires.

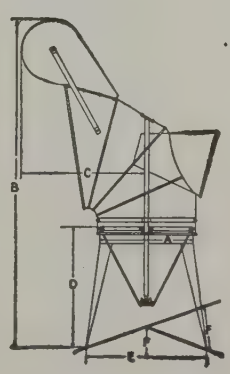
(5) Ventilators for ———— shall be equipped with fusible links to close dampers automatically in case of fire.

Note 1:

Material of ventilator	Uses of ventilator
Galvanized iron	1. All purposes for which no acid or corrosive fumes pass; standard practice.
Copper	2. All purposes for which long life is desired, provided that no strong acid or alkaline fumes pass.
Choice of metal	3. For ventilating buildings or rooms from which acid or other corrosive fumes rise.
Monel metal	4. Same as No. 3; has longer life, but is more expensive.
Zinc	5. Similar to copper, but a little cheaper.

DIMENSIONS, GAUGES, WEIGHTS, PRICES AND CAPACITIES

Size (throat diam.), A in.	B in.	C in.	D in.	E in.	Iron gauge No.	List price, damper	List price, ventilators only	Net weight, lb.	Crated weight, lb.	Conservative average discharge 5 miles velocity, cu. ft. per hour
8	27	10	10	10	24	$1.50	$20.00	12	26	14,438
10	34	13	12	12	24	2.15	20.00	18	35	22,273
12	41	16	13	13	24	2.90	30.00	26	46	31,000
14	48	18	17	17	24	3.30	35.00	32	57	43,725
16	55	21	20	20	24	3.80	40.00	39	70	57,750
18	62	24	21	21	24	4.30	45.00	49	85	73,013
20	69	26	25	25	22	4.80	50.00	68	115	89,925
24	83	32	30	30	22	5.80	60.00	92	145	129,525
30	104	40	38	38	20	7.15	75.00	146	206	202,125
36	125	48	46	46	20	9.30	110.00	225	325	291,113
40	139	53	51	51	20	11.50	140.00	282	412	359,700
48	167	64	61	61	20	17.00	170.00	390	560	515,625
54	187	72	63	63	18	20.00	220.00	620	820	655,875
60	208	80	76	76	18	25.00	360.00	790	1025	808,500
66	229	88	84	84	18	35.00	375.00	930	1215	977,625



Prices subject to change without notice. Discounts furnished on request.

AREX COMPANY

ESTABLISHED 1906

Industrial Ventilating Engineers

28th Floor, 333 North Michigan Avenue Building

TELEPHONE
STATE 2772

CHICAGO, ILL.

FACTORY AND WAREHOUSE
GARY, IND.

BRANCH OFFICES IN PRINCIPAL CITIES

EASTERN OFFICE: 132 Nassau Street, NEW YORK, N. Y.—Telephone, Beekman 7980

Products

AREX-AUSTOR (Air Exhauster), the Original Siphonage Roof Ventilator—*"The Power Fan's Only Rival."*

ECONOMY ROOF VENTILATOR (Plain Type).

UTILITY VENTILATORS.

"ARIN" ADJUSTABLE LOUVERS.

"ARIN" ANTI-DRAFT WINDOW VENTILATORS. (Installed in Sash.)

Arex-Austor

Scientific Design—This ventilator, designed on the original siphonage principle, assures by natural means constant, positive and uniform ventilation.

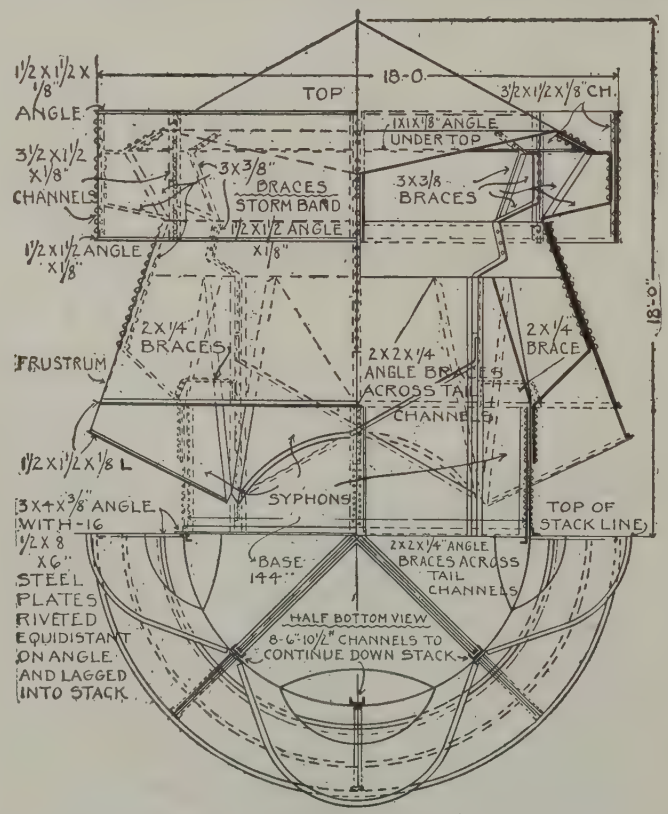
The siphon or vacuo chambers are so placed as to concentrate all wind currents into a steady pulling force; by means of deflections opposite each siphon (see sectional view on following page) a powerful vacuum is created, drawing out air at a tremendous speed.

Foul air, warm air, fumes, gases, vapors, steam and smoke are quickly and completely removed. Passing wind plays upon the siphons so as to accelerate the outflow of foul air from interior of building, but it permits none of the outside wind to enter the ventilator. Every opening is an outlet.

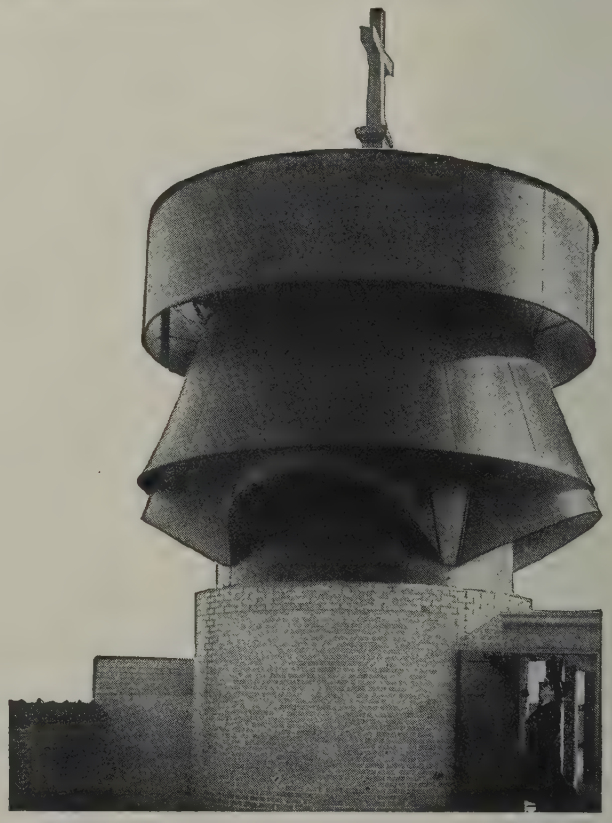
Under ordinary conditions Arex-Austor will remove 300 cu. ft. of foul air per square inch per hour on a 9-mile wind velocity.

Upper part consists of a conical deflector top surrounded by a scientifically adjusted broad storm-guard, making the Arex-Austor absolutely storm-proof.

120 Arex-Austors on This Forge Shop



Working Drawings and Dimensions



Arex-Austor Installed and in Operation on Roof

Details of Installation of World's Largest Ventilator, St. Francis Hospital, Peoria, Ill.

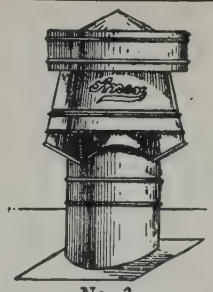
A. J. MORATZ, Architect, Bloomington, Ill.

This Arex-Austor alone ventilates this 7-story hospital through a carefully engineered duct system. Capacity more than 125,000,000 cu. ft. of air daily. Base diameter, 12 ft.; spread from siphon to siphon, 18 ft.; height, 18 ft.; weight about six tons

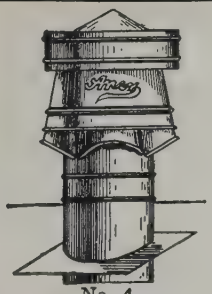
Continued on next page

No. 1
Round Base for Flat Roof

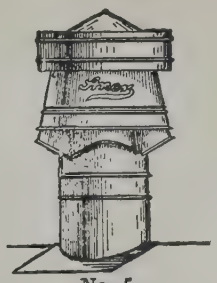
No. 2
Round Base for Flat Roof with Extension



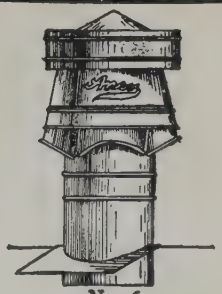
No. 3
Round Base for Slant Roof



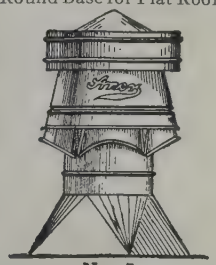
No. 4
Round Base for Slant Roof with Extension



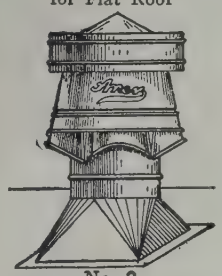
No. 5
Round Base for Gable Roof



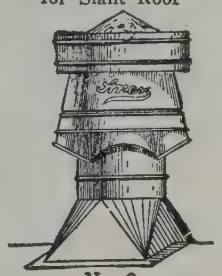
No. 6
Round Base for Gable Roof with Extension



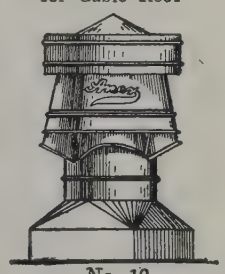
No. 7
Square to Round Base for Flat Roof



No. 8
Square to Round Base for Slant Roof



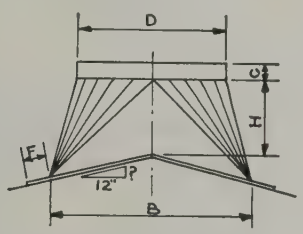
No. 9
Square to Round Base for Gable Roof

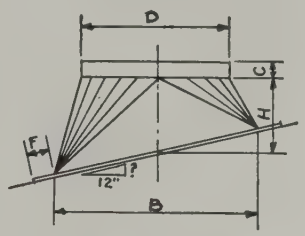


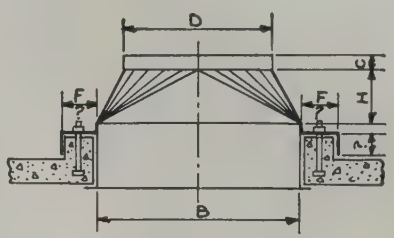
No. 10
Square to Round Base with Shoulder for Flat Roof

How to Order Arex Ventilators

Simply multiply cubical contents of room by number of air changes required per hour. The exhaust capacity table below will indicate the exact size of Arex-Austor required.



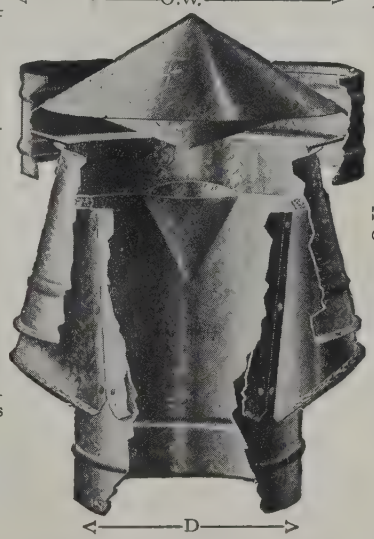




DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) VENTILATORS

Principal dimensions, in.			Exhaust per hour, cu. ft.	Gauge of ventilators		*Ship. wt., lb.
D	O.W.	O.H.		Galv. iron	Copper, oz.	
12	18	24	37,699	24	16	28
14	21	28	51,313	24	18	38
16	24	32	67,021	24	18	54
18	27	36	84,823	24	18	68
20	30	40	104,720	22	18	93
24	36	48	140,796	22	20	130
30	45	60	235,619	22	20	225
36	54	72	339,293	20	24	405
42	63	84	461,813	20	24	475
48	72	96	603,187	20	28	620
54	81	108	763,407	20	32	800
60	90	120	942,477	18-20	36	910
66	99	132	1,140,397	18	36	1170
72	108	144	1,357,167	16-18	44	1450
84	126	168	1,847,256	16	48	2225

*Weights given are for ventilators only.



Sectional View of Arex-Austor

DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) BASES

Dimensions of bases, in.				Gauge of bases	
B	H	F	C	Galv. iron	Copper oz.
15 x 15	12	4	3	24	16
17½x 17½	13	4	3	24	18
20 x 20	14	4	3	24	18
22½x 22½	15	4	3	24	18
25 x 25	16	4	3	22	18
30 x 30	18	4	3	22	20
37½x 37½	21	4	3	20	20
45 x 45	24	4	3	20	24
52½x 52½	27	5	4	20	24
60 x 60	30	5	4	18	28
67½x 67½	33	5	4	18	32
75 x 75	36	5	4	18	36
82½x 82½	39	6	5	16	36
90 x 90	42	6	5	16	44
105 x105	48	6	5	16	48

Shipping weight of bases is approximately one-third of that given for ventilators.

Arex-Austor Construction

Arex-Austors are made of Galv. Iron, Ingot or Toncan Metal, Cold-rolled Copper or any other special metal, in any size or gauge. The installations shown on this page are standard; special bases and pipe connections made to order—submit sketch.

Arex-Austors, 24-in. and upwards are provided with brass bolts connecting the frustum to the siphons. This permits installation in two halves and facilitates painting inside and outside at any time after they have been installed.

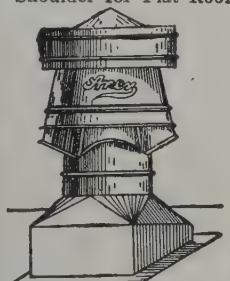
Condensation arrestors furnished at nominal cost when requested.

Unequalled facilities for turning out any quantity of any size ventilators on short notice. Prompt shipments from large stock always on hand.

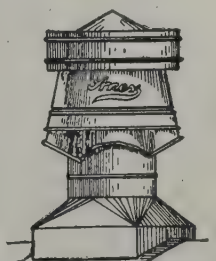
Our engineering department will solve your ventilating problems.

Expert advice without obligation. It will pay you to investigate.

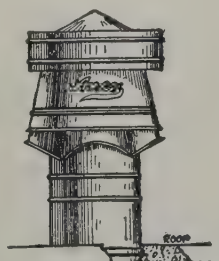
Thousands of installations without a single complaint.



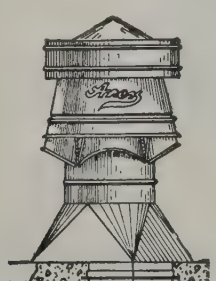
No. 11
Square to Round Base with Shoulder for Slant Roof



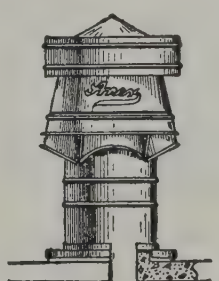
No. 12
Square to Round Base with Shoulder for Gable Roof



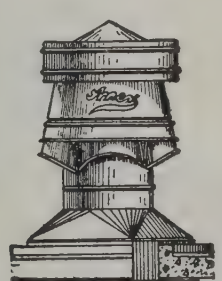
No. 13
Round Base for Flat Concrete Roof with Angle Iron Ring at Bottom



No. 14
Square to Round Base for Flat Concrete Roof with Angle Iron at Bottom



No. 15
Round Base for Flat Concrete Roof with Curb



No. 16
Square to Round Base for Flat Concrete Roof with Curb

Details and Data, Arex-Austor Ventilators and Bases

Continued on next page

First Class Construction—Fabricated in one solid unit, no solder used, every joint rigidly riveted. Has no movable parts, no shutters or louvers to break off, no ball bearings to clog, no meaningless fancy trimmings to impede ventilating action, nothing to get out of order.

In short, a ventilator, simple in principle, durable in construction and sure to give year-in and year-out service without attention or repair.

Made of galvanized iron, Ingot or Toncan metal, cold rolled copper; or in any special metal in size or gage.

Prompt shipments from large factory stock.

Bottom View

Actual photograph. Note the extraordinary outlet for escape of air—greater than in any other ventilator. Observe the immense ventilating area—the deep, penetrating siphons—the triangular channels between the siphons.

Well-balanced and mechanically perfect *throughout*

Wide Adaptability—Thousands of installations have proven the Arex-Austor to be the ideal ventilator for mills, factories, foundries, warehouses, power plants, train sheds, railway cars, ships, theaters, hospitals, schools, etc.

Can be installed on flat roofs, sawtooth roofs, slant roofs or on skylights and monitors.

Caution: The phenomenal success of Arex ventilators has provoked petty imitations by name, design or principle. Beware of such infringements.

Arex is the only trade-name under which our ventilator is sold.

Standard Specifications for Arex Ventilators

All roof ventilators to be Arex original siphonage ventilators as patented and manufactured by the Arex Company, 2815, 333 North Michigan Avenue Building.

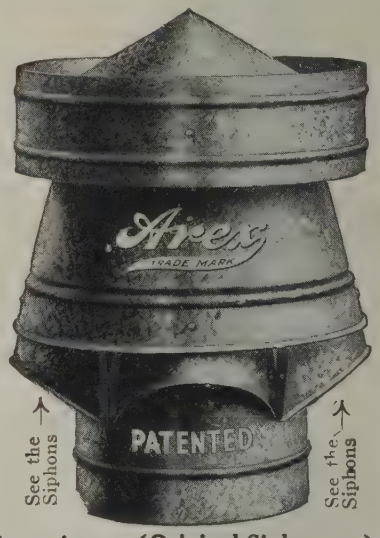
Engineering Service

The first and foremost requirement is air exhaust capacity. Every factor that makes for or against results is of vital importance. The mere purchase of ventilating units does not in itself always solve a problem. That is why we, with 20 years' experience and the record of 200,000 successful installations, recognizing our position and responsibility as the world's largest exclusive manufacturers in this field, surround our product with an engineering service aimed to assure maximum Arex efficiency. This service consists of analyzing a problem, preparing sketch or blue print, making correct recommendation and giving valuable information and expert advice on this all-important subject of ventilation.

Manufacturing Facilities

Our own modern plant and warehouse at South Gary, Ind., afford us unequalled advantages for manufacturing and shipping standardized ventilators in large quantities on short notice.

Special bases and pipe connections made to order from submitted sketches.

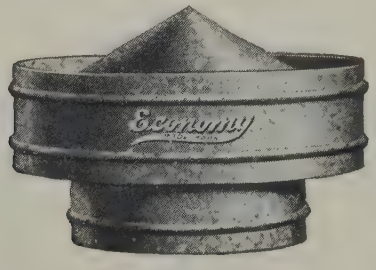


Arex-Austor (Original Siphonage)

Economy Roof Ventilator

This ventilator is designed to meet the demand for a ventilator at lowest possible cost, yet capable of solving any ordinary ventilating problem.

Manufactured in attractive proportional design of solid sturdy construction. Absolutely guaranteed stormproof.



Economy Roof Ventilator

Made in same sizes and gages as Arex-Austors. Workmanship and materials are of the same high quality.

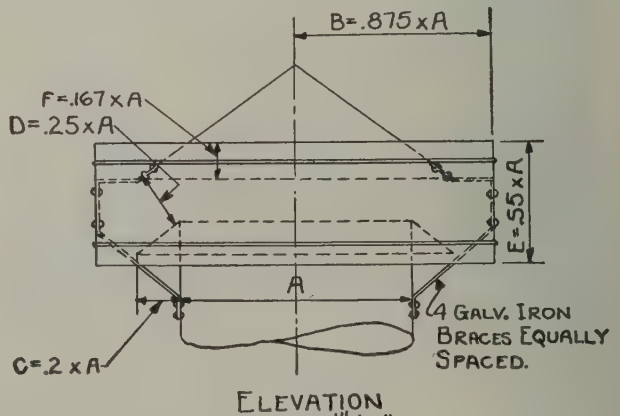
Furnished with or without damper or base.

Prompt shipment from large stock always on hand.

Utility Ventilators

This ventilator is designed especially for use on school buildings. They are made with a storm band larger in circumference and width than those on the Economy Ventilators, but are lower in proportion to width to conform to certain architectural roof lines.

They are made in a full range of sizes and in all metals.



Utility Ventilator

Continued on next page

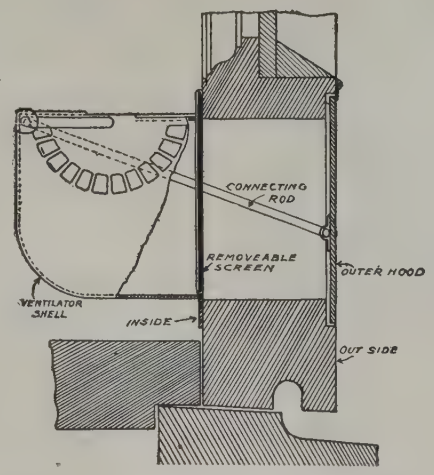
"Arin" Anti-draft Window Ventilator

An adjustable sash ventilator, especially adapted to windows in schools, hospitals, shops, offices, hotels, apartment houses and residences for providing fresh air without creating a draft.

The "Arin" Window Ventilator bears the endorsement of architects, health commissioners, school committees, etc., and complies with every requirement of states and municipalities.

Construction—"Arin" is constructed throughout of hard brass, making it absolutely rustproof and durable. All connections are rigidly reinforced, there being no parts to be damaged through misplacement or careless handling. The workmanship is of the highest class and the entire ventilator is beautifully finished in statuary bronze. Being small, neat and part of the window, it represents a practical, permanent installation of ornamental appearance.

Adjustable Deflector—The sectional details and perspective view herewith illustrates the adjustable deflector plate that permits control of the volume of air admitted to the room and its distribution within the room as well.



Installation Details, "Arin" Ventilator When Closed

Method of Removing or Replacing the "Arin" Removable Screen

Installation—Some architects and engineers when installing "Arin" Window Ventilators in new buildings prefer them placed in the top window rail as well as in the bottom rail.

When desired in buildings already erected, the most practical method of installation is to place them on a 4 or 6-in. panel which will set under the window and may be removed entirely when desired.

Preparation of Rail—Rabbet outside surface of rail around opening $\frac{1}{8}$ in. deep and $\frac{5}{16}$ in. wide. This gives outer hood flush fit and allows $\frac{1}{8}$ in. margin to prevent binding.

Air Filter—Every atom of air entering the "Arin" Ventilator filters through a fine screen mesh which keeps out dirt, soot and insects.

Thus, "Arin" provides a double service—positive protection against draft and dirt.

Standard Specification for "Arin" Ventilators—All window ventilators to be "Arin" Anti-draft ventilators as patented and manufactured by the Arex Company, 1577 Conway Building, Chicago, Ill.

DIMENSIONS AND CAPACITIES OF "ARIN" WINDOW VENTILATORS

Style	No.	Projection inside, in.	Outside dimensions including flange, in.	Outer hood, in.	Minimum depth, in.	Opening in rail, in.	Size, in.	Rail depth, in.	Free area, sq. in.	Capacity, cu. ft. air per hour
A-1	1	2x12	2½x12½	2½x12½	4	2x12	2x2x12	3	17.4	5,660
A-2	2	2x18	2½x18½	2½x18½	4	2x18	2x2x18	3	26.5	8,620
A-3	3	2x24	2½x24½	2½x24½	4	2x24	2x2x24	3	35.4	11,515
A-4	4	2½x12	3x12½	3x12	4½	2½x12	2½x2½x12	3½	23.25	7,563
A-5	5	2½x18	3x18½	3x18	4½	2½x18	2½x2½x18	3½	35.25	10,572
A-6	6	2½x24	3x24½	3x24	4½	2½x24	2½x2½x24	3½	47.25	15,270

Note: The rail depth is the clearance required in the lower rail above stool when window is closed. The free area is the sum of the openings for the flow of air. When ordering, be sure and state thickness of window rail which is usually about 1¾ or 2 in. Prices on application.

"Arin" Adjustable Louvers

Adaptability—These high grade louvers are installed to insure adequate fresh air supply in connection with any heating and ventilating system, in schools, factories, power plants, transformer vaults, etc.

Advantages—(1) Easy to operate—no sticking.

(2) Absolutely foolproof. Practically indestructible.

(3) Absolutely stormproof and weatherproof.

(4) Blades do not protrude when louver is open.

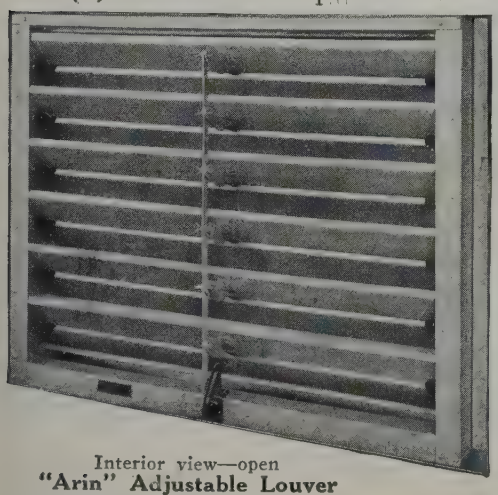
(5) Can be installed in series of two or more units to fit any size opening.

(6) Blades can be removed entirely in case of emergency.

(7) Furnished with birdscreen if required.

(8) Reasonably priced, considering the high grade material and workmanship.

(9) Also made of cold rolled copper or any other special material.



Interior view—open
"Arin" Adjustable Louver

Construction Features—(1) Frame and blades made of No. 16 gauge galvanized steel.

(2) Bronze bearings in frame.

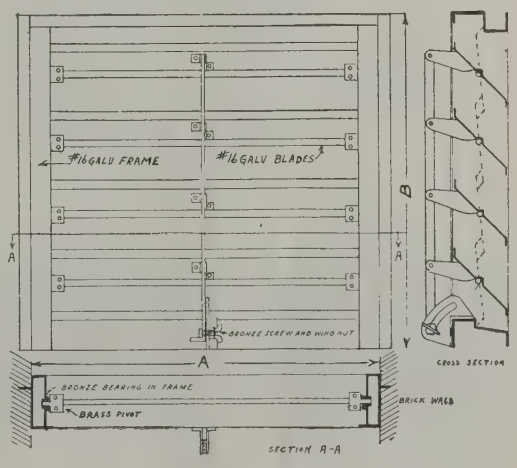
(3) Bronze pivots in blades.

(4) Bronze setscrew and slide.

(5) Adjustable device to lock in any position.

(6) Standard depth 4 in. for any brick or concrete wall.

(7) Perfectly balanced.



Construction Features

ALLEN AIR-TURBINE VENTILATOR CO.

GENERAL OFFICES AND FACTORY

Fourteenth and Lafayette Streets, DETROIT, MICH.

SALES ENGINEERS IN PRINCIPAL CITIES

Allen Turbine Ventilator

"Let Allen Clear the Atmosphere"

The New Allen Turbine Ventilator—Patented and Patents Pending

A new sturdy, durable and automatic exhauster embodying the turbine principle in its construction, and designed so that it operates not only continuously, efficiently and silently, but to fit into the architectural lines of any building. It has the merits of the power driven systems without the heavy initial cost and continuous operating expense. The perfectly balanced turbine, actuated by the air not only pulls up and ejects smoke, fumes, foul air, gas, dust and moisture, but creates an air circulation.

Whenever a definite number of air changes are required in any type of building the Allen Ventilator can be used. Its constant and uniform displacement enables engineers to predetermine the air condition of any building by applying the guaranteed table of displacements as published on the following page.

This ventilator is absolutely leakproof; its operation is not hampered by ice, sleet or rain. Constant operation under all conditions insures positive and uniform ventilation. The powerful upward suction force of the rotary turbine makes down-drafts a mechanical impossibility. They are constantly efficient and not affected by cross air currents as in the case of types equipped with placement wings.

Lower First Cost with No Upkeep

The first cost of the Allen Turbine Ventilators is not only less than the cost of power-operated exhaust equipment, but all maintenance and operating expense is eliminated. Once installed it requires no attention, care or adjusting.

Construction

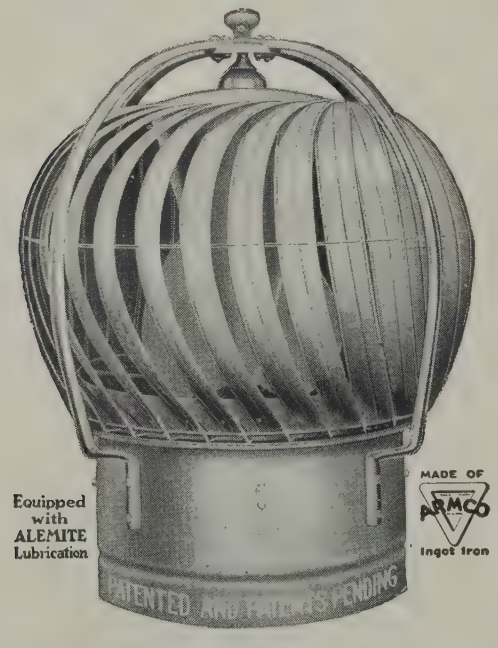
This ventilator is constructed of armco galvanized ingot iron, protected with a special solvent and enamel which resists rust, acid fumes, heat and weather action. This feature is exclusive with our product.

It is also constructed of cold rolled copper.

Alemite Lubricating System—There is embodied in its construction a complete Alemite pressure lubricating and relubricating system.

Sizes—Made in eleven different sizes, 8, 10, 12, 15, 18, 20, 24, 30, 36, 42 and 48 in. These dimensions refer to the diameter of bases of ventilators.

This range of sizes makes them adaptable to care for any ventilating problem.



The New Allen Turbine Ventilator

Typical Allen Installation

Allen Turbine Ventilators Providing Constant, Care Free Ventilation in One of the Largest Installations of Ventilators in the World

Continued on next page

Uses

The Allen Turbine Ventilator is particularly adapted and proven to be most satisfactory in actual installation in displacing vapor (steam), smoke, fumes, poisonous gases, dust, etc., from factories, mills, laundries and garages, and for displacing foul air, moisture, odors and dust from barns, stables, etc. It is preeminently designed and adapted for removing excessive heat units and vitiated air from factories, theaters, schools, etc.

RECOMMENDED AIR CHANGES

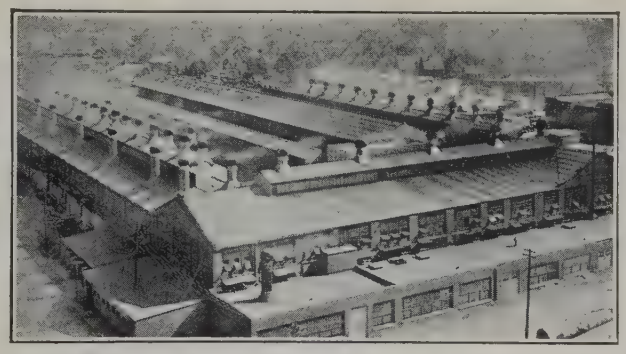
Building	Exhaust	
	Per occupant cu. ft. per min.	Minimum number of air changes
Assembly and convention halls	30	8
Boiler rooms		10
Engine rooms		8 to 10
Factories	20 to 30	4
Foundries		4
Garages		12
Halls and assemblies	30	8
Mill buildings	20 to 30	4
Offices	20 to 30	6
Laundries		10
Churches	20	8
Schools	30	8
Theaters	30	8

Great Displacement Capacities

The displacement capacities of the respective sizes in which Allen Ventilators are shown below are conservative, and fully guaranteed. These capacities have been substantiated by numerous actual installation tests.

ALLEN TURBINE VENTILATOR DISPLACEMENTS

Diam. of throat, in.	Air displacement, cu. ft. per hr.		Diam. of throat, in.	Air displacement, cu. ft. per hr.	
	Wind velocity, 4 miles per hr.	Wind velocity, 8 miles per hr.		Wind velocity, 4 miles per hr.	Wind velocity, 8 miles per hr.
8	17,300	21,600	24	149,000	185,000
10	26,500	32,500	30	225,000	272,000
12	38,600	46,200	36	281,000	330,000
15	54,000	69,000	42	324,000	414,000
18	85,200	102,100	48	360,000	473,000
20	105,100	125,600			



This Plant Completely Equipped with Allen Ventilators

Guarantee

The displacement capacities of Allen Turbine Ventilators, as published and tabulated here, are guaranteed if installed in accordance with the instruction tag attached to each ventilator.

Engineering Service

The Allen Air-Turbine Ventilator Co. maintains an Engineering Department, the service of which is extended to council without cost or obligation.

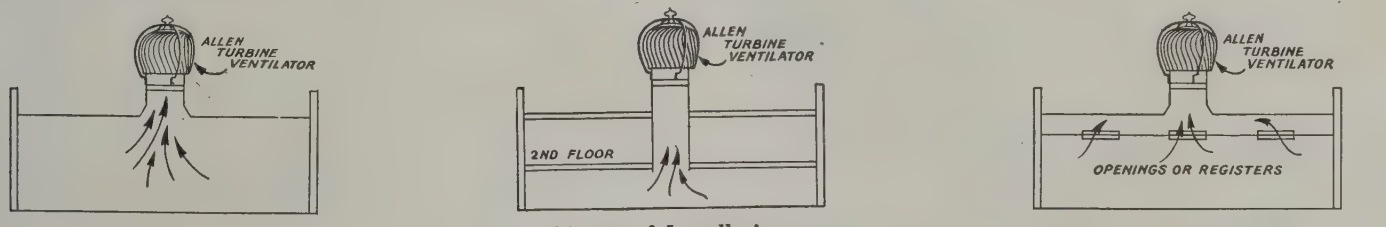
Our engineering staff have had a most diversified experience in handling all kinds of ventilating problems in connection with various types of buildings and the broadest experience in eliminating not only smoke, excessive heat units, vapor, etc., but heavier-than-air bodies, such as gases, fumes, dust and foul air.

Our sales engineers in the principal cities supplement this service and make practical and definite recommendations for the adaptability of Allen Exhausters.

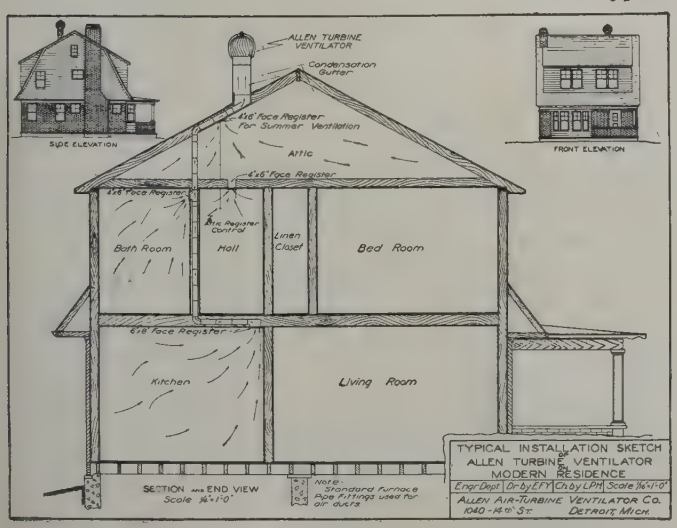
Inquiries as to requirements and cost receive immediate attention.

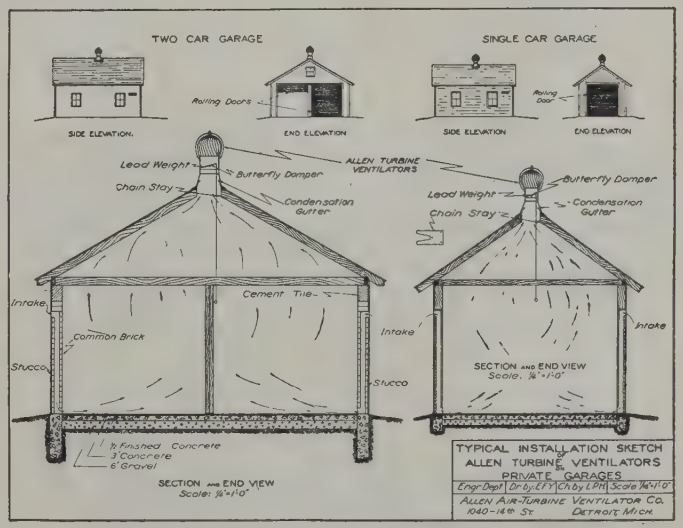
Industrial Ventilation

All industries present unusually difficult problems of ventilation. Allen Ventilators, wherever installed in every line of industry, have proven to be not only the most economical in first cost and maintenance, but efficient in operation. "Ask the user—he knows."



Types of Installation





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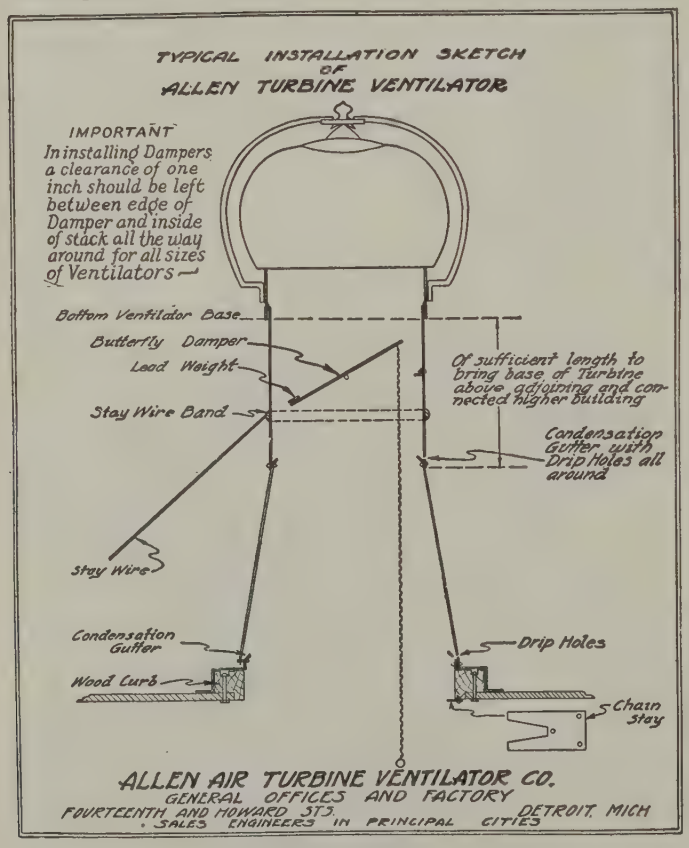
Installation Information

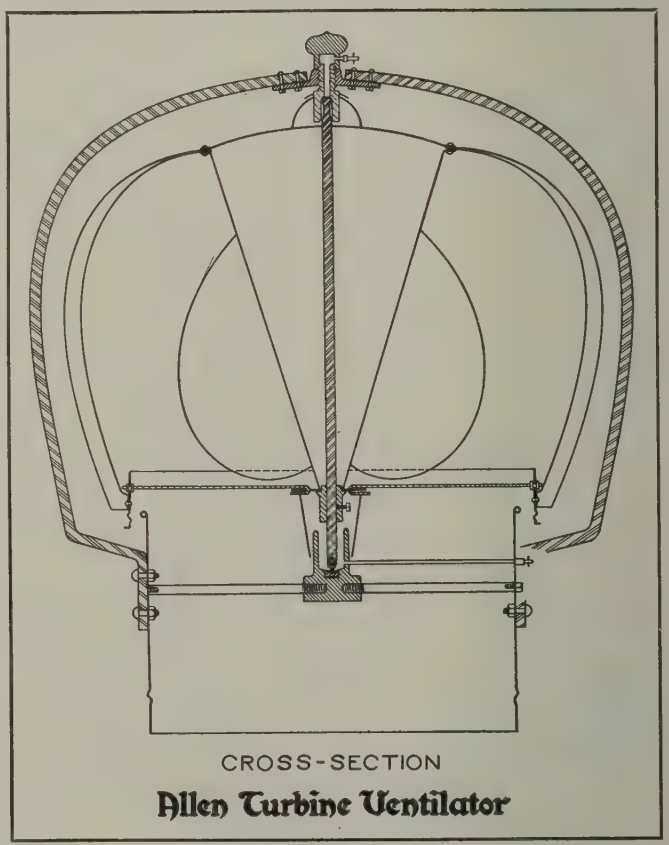
Bases should be constructed of a heavy gauge of galvanized iron, which should be square to round and long tapered as shown. This type of base construction not only lends itself well to adaptation on any type of roof but has decided advantages; it increases the area or broadens the scope of exhaust and lessens friction, thereby increasing the displacement. Bases of this type further make for rigidity and long life.

Typical Allen Ventilator Installation

Partial List of Prominent Installations

American Chain Co. Inc.
American Hard Rubber Co.
American Lead Pencil Co.
American Linoleum Co.
American Plate Glass Co.
American Railway Express Co.
American Rolling Mill Co.
American Shipbuilding Co.
American Steel & Wire Co.
American Tobacco Co.
American Window Glass Co.
Atchison, Topeka & Santa Fe Ry. Co.
Baldwin Locomotive Co.
Bell Telephone Co.
Best Foods, Inc.
Borden Co.
C. & G. Spring Co.
Champion Spark Plug Co.
Consolidated Textile Co.
Consumers Power Co.
Continental Furniture Co.
Continental Motors Co.
Crosley Radio Corp.
Deere, John, Plow Works
Delco Light Co.
De Vilbiss Mfg. Co.
Diamond Crystal Salt Co.
duPont de Nemours & Co. Inc.
Eagle Pencil Co.
Edison Co.
Fairfield Paper Co.
Federal Motor Truck Co.
Fisher Body Corporation
Fisk Rubber Co.
Ford Motor Co.
Fox, William, Circuit of Theatres
Great Lakes Engineering Works
General Baking Co.
General Electric Co.
General Fire Extinguisher Co.
General Motors Co.
Geometric Tool Co.
Graham-Paige Motor Co.
Grennan Baking Co.
Heekin Can Co.
Hershey Chocolate Co.
Hudson Motor Car Co.
Industrial Steel Casting Co.
International Harvester Co.
International Shoe Co.
International Silver Co.
Johns-Manville Co., Inc.
Keith, B. F., Theatre Co.
Kelvinator Corp.
Kewanee Boiler Co.
Kirk, James S. & Co.
Kroger Grocery Co.
Lee Rubber & Tire Co.
Link-Belt Co.
Marion Steam Shovel Co.
McCord Radiator & Mfg. Co.
McCray Refrigerator Co.
Michigan Central Railroad Co.
Minneapolis Heat Regulator Co.
Morse Chain Co.
National Biscuit Co.
National Carbon Co.
National Lead Co.
National Sugar Refining Co.
New York Central R. R. Co.
New York, New Haven & Hartford R. R.
Nixon Nitrate Works
Northern Pacific Ry. Co.
Pacific Match Co.
Peninsular Stove Co.
Pennsylvania Railroad Co.
Pittsburgh Plate Glass Co.
Proctor & Gamble Co.
Reo Motor Car Co.
Roxana Petroleum Corp.
Standard Oil Co.
Stauffer Chemical Co.
Stetson, John B., Co.
Studebaker Corp.
Swift & Co.
Thermoid Rubber Co.
Truscon Steel Co.
U. S. Asbestos Co.
U. S. Can Co.
U. S. Gypsum Co.
U. S. Rubber Co.
U. S. Sandpaper Co.
Victor Talking Machine Co.
Webster Cigar Co.
Western Clock Co.
Western Union Telegraph Co.
Westinghouse Lamp Co.
Wheeling Steel Corp.
Willard Storage Battery Co.
Wrigley, Wm., Co.
Yale & Towne Mfg. Co.





MEASUREMENTS

Sizes, in.	*Extreme heights, in.	†Widths overall, in.
8	24	16
10	25	18
12	27	20
15	33	24
18	35	28
20	37	31
24	45	37
30	52	46
36	55	48
42	59	58
48	63	66

"Sizes" refer to diameter of bases of ventilators.
*From bottom of base to top of lubricating cap.
†From outside to outside of rotor supporting arms.

WEIGHTS

Sizes, in.	Ventilators only, lbs.	Crated singly, lb.	Crated two in crate, lb.	Crated three in crate, lb.
8	17	27	Crated singly shipped in cartons	
10	22	33		
12	26	40		
15	35	85	139	200
18	46	95	182	250
20	61	121	230	
24	101	185		
30	139	236		
36	168	314		
42	252	500		
48	281	600		

ESTABLISHED 1890

THE BURT MANUFACTURING COMPANY

Manufacturers of Roof Ventilators

600 Main Street, AKRON, OHIO

BRANCH OFFICES

ATLANTA, GA., The Steel Specialties Co.
BOSTON, MASS., F. M. Mills, 10 High Street
BUFFALO, N. Y., R. J. Rodman
CHARLOTTE, N. C., Metal Window Products Co., P. O. Box 94
CHICAGO, ILL., C. A. Pipenhagen, 169 West Chicago Avenue
DENVER, COLO., George P. Heinz & Co., 1740 Champa Street
DETROIT, MICH., B. E. Englander, Hoffman Building
FORT WAYNE, IND., Domestic Sales Co., 2016½ Fairfield Avenue
KANSAS CITY, MO., Natkin Engineering Co.
LOUISVILLE, KY., Sheet Metal Supply Co.
NEW ORLEANS, LA., Woodward-Wight & Company
NEW YORK, N. Y., E. A. Fraser, Mgr., 7 West 42nd Street
PITTSBURGH, PA., Dravo Equipment Co., Dravo Building
ST. LOUIS, MO., F. A. Cammann Builders Service Co.
WASHINGTON, D. C., Fries, Beall & Sharpe
MONTREAL, QUE., George W. Reed & Co., 84-87 St. Antoine Street

ALL OTHER PRINCIPAL CITIES

Roof Ventilators for All Requirements

Our 30 years' experience in the roof ventilator business has proven beyond doubt that *no one type* of ventilator will adequately meet all conditions.

We have designed *various* types and are prepared to tell exactly which of these types of the proper size will handle any particular requirement. Some installations require revolving type ventilators, others require metal top sliding sleeve damper ventilators, still another will need a fire retarding type, and weave sheds will best be served by our double damper ventilator. The new Burt Direct Connected Fan Ventilator gives positive action for bad conditions and natural action with fan shut off so for many jobs it is the ideal installation.

Conclusive tests have proven that under certain conditions one of these ventilators will exhaust its maximum per cubic foot while another type will hardly pull anything.

At Akron, we maintain an engineering department which will expeditiously co-operate with architects, engineers, contractors and others in selecting the proper types and sizes of ventilators to suit particular conditions and requirements.

Blue prints of our various types will be furnished on application. Send your specifications, rough pencil sketch or blue print to our engineers, and they will, without cost or obligation, send a detailed analysis of your situation, together with recommendations and quotations.

Materials Used in Burt Ventilators

Burt Ventilators are made of prime open hearth galvanized steel. They can be made of zinc, copper, lead clad sheets, toncan metal, armco iron, alcumite, aluminum or monel metal at slight additional cost.

Burt Patented and Exclusive Features

Among the many features that account for the popularity of Burt Ventilators are the sliding sleeve damper, the spring clip, the notch rim, the condensation gutter and heavy construction.

The sliding sleeve damper efficiently regulates the flow of the air. The spring clip holds the damper rope in place after changing adjustment. The notch rim holds the glass in place on top of ventilator. The condensation gutter gathers the condensation and carries it off to the roof. Burt Ventilators are from 4 to 6 gauges heavier throughout than is customary in many makes of ventilators.

The above features are more fully described under the various ventilators of which they are a part.

Uses

No single type of building, classified either as to use or construction, has been missed by Burt engineers in their surveys. Their experience includes ventilation of buildings from capitol buildings to chicken houses, from power plants and weave sheds to public auditoriums.

Residence Ventilation—Ventilation is also necessary in a residence. It is almost the only way many houses can get fresh air without causing a draft. The top floors in summer months are usually uninhabitable because of the sweltering heat. A Burt Stationary Ventilator in the roof will allow this air to escape. The lines of Burt ventilators have been so simplified that they can be made to harmonize with the general design and construction of the house.

Garage Ventilation—A ventilator placed on roof of a small garage will carry off the carbon monoxide fumes fast enough to make conditions comfortable and safe.

Farm Building Ventilation—Burt Rotary or Stationary Ventilators on barns, assure keeping the animals in a healthy condition. Ventilation of poultry sheds is necessary to obtain the maximum production of eggs and the maximum increase in weight. The smallest of Burt Ventilators will be ample to assure the best ventilation.

Ventilator Capacities

We are very much opposed to publishing ventilator capacities because as a general proposition they simply confuse the person desirous of securing information. We have reliable tests, and will furnish copies with comprehensive explanations to any one interested.

We believe, however, that our guarantee in proposing to place any of our ventilators of any type side by side with any other ventilator, allowing the engineers of the companies interested to be the sole judges of the merit of our product, is the best proposition that we can offer.

We give this in lieu of capacities, because the Bureau of Standards, at Washington, a reliable authority, has given reports which indicate that Burt Ventilators of all types are the equal or superior of any ventilator on the market.

Again, there are so many variables entering into a problem of this kind that a published table is very confusing. We are, therefore, prepared and willing to give you data as to why we take this stand along with information which will enable you to arrive at the number and size of ventilators that might be required. As a matter of fact, the best way to handle this, provided your engineers are not familiar with the situation, is to submit a rough sketch of your building and let us place the ventilators for you.

The Liberal Burt Guarantee

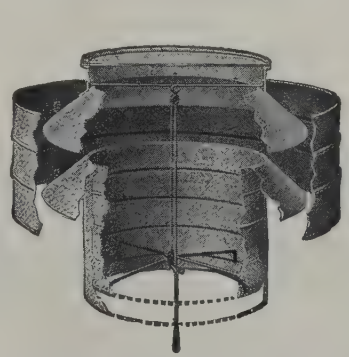
We guarantee Burt Ventilators to be free from defects in workmanship and material, and will replace at any time free of charge, any Burt Ventilator proven defective.

Burt Sliding Sleeve Damper Ventilator

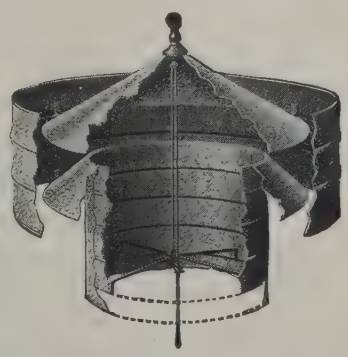
Marketed for over thirty years, this ventilator is not an experiment—it is used by many of the largest industrial plants in the United States.

These ventilators may be had with either metal tops or glass tops. The metal top ventilator serves as a ventilator only, while the glass top serves as a *combination skylight and ventilator.*

Exclusive Features—(1) The patented damper in this ventilator consists of a sliding (telescopic) sleeve, which is operated from below by means of a cord or chain running over a rust resisting pulley. Each ventilator is equipped with a patented clip so that damper can be set in any position and held



Sectional View of Glass Top Sliding Sleeve Damper Ventilator Showing Some Burt Patented and Exclusive Features



Sectional View of Burt Sliding Sleeve Damper Ventilator Metal Top

Continued on next page

there without fastening the cord to a nail, hook or post. As the sliding sleeve damper is not affected by air currents, *it maintains its position* and requires no attention. This construction is a marked improvement over the flat damper type.

(2) The sliding sleeve damper has no flat surface, therefore, it does not collect dust or dirt to be shaken off into the building.

(3) The air shaft is open and unobstructed at all times. Air currents are not deflected downward, and it is possible to adequately ventilate with a smaller number of Burt Ventilators than most competing types.

(4) The sliding sleeve damper makes our glass top ventilator an ideal skylight, as the light is never obstructed.

(5) The glass top ventilator is equipped with heavy ribbed wire glass held in place by a patented notched rim, and made absolutely watertight by means of waterproof cement. Glass can be replaced quickly by merely removing the notched rim, without removing ventilator from the roof.

(6) Our patented trough or lip is placed below the glass top, into which runs any condensation which may gather on the glass. A similar trough on the lower part of the base collects all condensation forming on the air shaft.

How to Specify—See specifications on the following page.

BURT SLIDING SLEEVE DAMPER VENTILATORS

Diameters, in.		Gauge of steel	Height without base, in.		Length air shaft from bottom of windshield, in.	Net weight without crating, lb.		Area of neck sq. in.	Price
Neck	Outer rim or band		Glass top	Metal top		Metal top	Glass top		
12	22	22	14	17	4¼	17	20	113.10	$ 8.00
14	24	22	15	17½	4¼	20	24	153.94	12.00
16	26	22	15½	19	5	24	30	201.06	15.00
18	29	20	16	21	5½	28	34	254.47	19.00
20	32	20	18	23	5½	33	42	314.16	23.00
24	38	20	22	26	6	45	56	452.39	27.00
30	46	20	24	30	6	90	105	706.85	38.00
36	54	18	27	36	8	130	155	1017.88	57.00
40	64	18	33	40	10	175	200	1256.00	75.00
42	68	18	34	42	10	190	225	1386.00	81.00
48	78	18	36	46	11	300	320	1809.00	90.00
54	86	18	40	51	14	350	400	2390.00	105.00
60	94	16	43	54	12½	430	480	2827.00	120.00
66	102	16	46	55	15½	500	550	3456.00	135.00
72	110	16	51	66	15½	560	610	4071.00	150.00

Prices f.o.b. Akron, Ohio, and include sliding sleeve damper.
Ventilator bases are charged for extra, for which prices will be quoted on receipt of specifications. Operating rope or chain not furnished.
Discounts on application.

New Burt Fire Retarding Cone Damper Ventilator

In this type of ventilator, an inverted cone is used as a damper, which is operated from the floor (moved up and down) by a copper chain running over a rust resisting pulley as shown.

The damper of this ventilator is furnished with fusible link which insures it automatically closing in case of fire. When the damper is thus equipped this ventilator passes the approval of the Underwriters' Laboratories, Inc.

The elongated slot in the damper can be used as a clip when the fusible link is placed above the damper. When it is desired to place the fusible link below the damper, the elongated slot is omitted and the chain simply falls through a round hole in the damper. The patented clip furnished then can be placed anywhere within reach of the operator.

The elongated slot and fusible link, of course, obviate the necessity of tying the chain to a post, nail or hook in the building itself.

The construction of this ventilator embodies all the essential features of construction recommended by the American Society of Heating and Ventilating Engineers.

The patented raising and lowering device is simple and positive in action, and is guaranteed not to stick or bind. The air shaft is open and unobstructed at all times—there are no braces of any kind in the air shaft or neck.

The inverted cone damper permits easy flow of air outward—there are no sharp turns or obstructions, and no air pockets.

The *extra wide wind band* makes this ventilator absolutely stormproof and creates a larger low pressure area, and a better exhaust. The location of the louvers, top and wind band have been scientifically worked out so that regardless of the direction of the wind, it can not pass through the ventilator head and get into the building—guaranteed against back-drafts.

Exhaust area is larger than cross-sectional area of pipe, which assures guaranteed exhaust capacity.

How to Specify—See specifications on the following page.

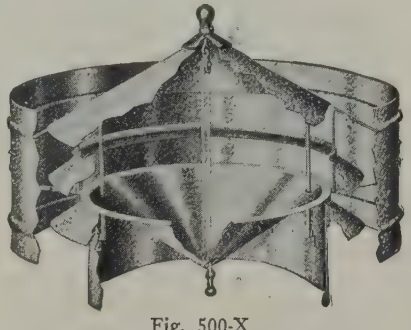


Fig. 500-X
Sectional View, Burt Sliding Cone Damper Ventilator
With cone damper closed

BURT SLIDING CONE DAMPER VENTILATORS

Diam. neck, in.	Width wind band, in.	Gauge of steel	Diam. outside rim, in.	Height without base, in.	Weight, lb.		Price
					Net	Crated	
10	6	22	18	15½	18	22	$ 7.00
12	6	22	22	16	27	34	8.00
14	7	22	24	17	30	40	12.00
16	7	22	26	19	37	49	15.00
18	8½	20	29	21	43	54	19.00
20	9	20	32	22	50	65	23.00
24	10	20	38	27	60	78	29.00
30	12	20	46	33¼	112	152	38.00
36	15	18	54	39	164	235	57.00
40	16	18	64	43½	215	285	75.00
42	16	18	68	43¾	240	320	81.00
48	18	18	78	48¼	337	398	90.00
54	22	18	86	56½	400	492	105.00
60	22	16	94	58	448	560	120.00
66	24	16	102	62¼	500	635	135.00
72	26	16	110	68½	555	895	150.00

Prices f.o.b. Akron, Ohio. (Discounts on application.) Bases extra. Bird screens furnished at slight additional cost.

Burt Ball Bearing Revolving Ventilator

A neat and well constructed ventilator of the revolving type that has been perfected to the highest point of efficiency.

Its design and open back construction causes the air currents to pass not only over the top and sides, but directly through it, thus creating a partial vacuum in front of the air shaft, which greatly increases its capacity or pulling power. This construction also holds the ventilator steady with the wind.

Each Burt Ventilator is erected and tested in our factory before shipment, insuring perfect balance.

This ventilator is equipped with two sets of high grade steel ball bearings—it is positively guaranteed not to stick or bind. May also be had with Timken roller bearings.

There are no louvers in the revolving head, consequently maximum efficiency is obtained. If bases are furnished by us, we will install flat dampers without charge (see illustration). When specified, we furnish dampers of the fire retarding type which close automatically in case of fire.

This ventilator has proven a success under a wide range of conditions and thousands are now in use.

How to Specify—See specifications on the following page.

BURT BALL BEARING REVOLVING VENTILATORS

Diam. neck, in.	Gauge of steel	Weight, lb.		Price without damper
		Net	Crated	
8	22	18	30	$12
10	22	20	35	14
12	22	30	50	16
14	22	35	65	24
16	22	42	75	30
18	20	50	100	38
20	20	60	125	46
24	20	90	160	54
30	18	140	220	76
36	18	190	310	114
40	18	250	350	150
42	18	280	470	162
48	18	390	650	180
54	18	575	750	210
60	16	650	980	250

F.o.b. Akron, Ohio. Discounts on application.
Quotations on larger sizes on application. Bases extra.

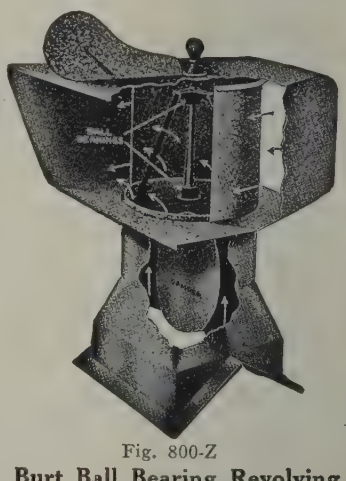


Fig. 800-Z
Burt Ball Bearing Revolving Ventilator

Burt Fan Ventilator

This ventilator effectively and quickly removes excessive fumes, smoke, odors, etc., from theaters, schools, churches, laundries, blacksmith shops, dyehouses, foundries, and other buildings.

Being power driven, it will exhaust, approximately, ten times more vitiated air than a stationary or revolving ventilator.

Other features are quietness of operation, inverted cone damper, fire retarding, low power consumption, and with power off, normal ventilation continues.

There are three distinct types of Burt Fan Ventilators, their grouping depending only upon the way in which they are driven.

Continued on next page

Direct Connected Fan Ventilators—*Group One*—Small sizes from 14 to 20 in. The one illustrated is 20-in. size. This size delivers 1750 cu. ft. of air per minute alternating or direct-current motor. Four-blade fan.

Group Two — Larger sizes 24 to 48 in. Motors available are of five models. Alternating or direct-current motors, 670 to 700 r.p.m. The 24-in. ventilator will remove 4500 cu. ft. of air per minute, the 30-in. 8500, the 36-in. 11500, the 42-in. 13200, and 48-in. 14275 cu. ft. Cost of operating 36-in. size at 8c per kilowatt hour is 22c for 10 hours.

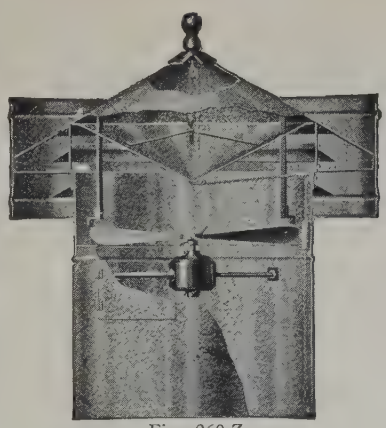
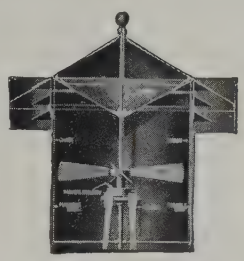


Fig. 260-Z
Burt Direct Connected Fan Ventilator

Belt Driven Fan Ventilators—*Group Three*—Made in four types, classified entirely as to method of handling belt drive. Can be driven from line shafting or from individual motors. The two types operating from a line shaft drive are arranged so the idlers can be placed outside the ventilator shaft to operate on a line shafting installed outside on the roof, or with the idlers in the ventilator shaft directly under the fan so as to be driven from a line shafting in the building under the ventilators.



Type 1 has the outside drive.

Type 2 has the inside drive.

Type 3 employs separate motor to drive belt with motor housing outside of building.

Fig. 265-Z
Burt Double Damper Ventilator

Type 4 also has separate motor, but motor is placed inside of the building.

Fans have 6 blades. Motors are standard, 1750 r.p.m. with fans made to be driven between 500 and 650 r.p.m.

Burt Double Damper Ventilator

Designed for weave sheds and places where the condensation forming on the air shaft and the cowl must be prevented from entering the building.

Adopted by many of the largest textile mills in the United States.

The condensation trough in the air shaft of the Burt Double Damper Ventilator collects most of the moisture and passes it out on the roof through the condensation drain. When condensation is severe, the trough-shaped lower damper acts as a drip pan and collects the moisture, the latter being quickly evaporated.

The lower drip pan (below bottom damper) is a safety device that collects any overflow from the bottom damper. It can be piped to pass water out on the roof.

The two dampers are operated simultaneously by means of a cord from below. The cord is held firmly by a patented clip fastened to the roof. Made in all sizes.

How to Specify—See specifications below.

Burt Rectangular Ventilators

Made in all sizes, of any metal desired, with either metal or glass tops, and equipped with our patented sliding sleeve damper described on preceding page.

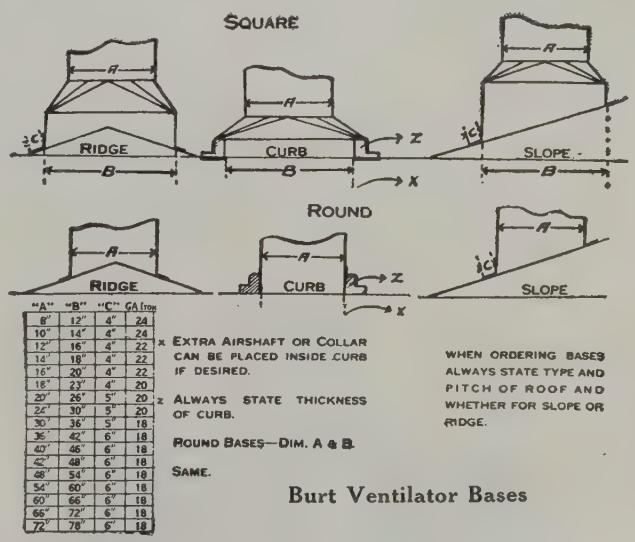
Suitable for public buildings, foundries, schoolhouses, etc. Can be adapted to any size or shape of roof opening.

How to Specify—See specifications below.

Ventilator Bases

Ventilator bases are made to conform to the pitch of the roof, either round or square. Square bases are recommended for maximum efficiency, capacity and rigidity. Extra heavy (of the same gauge metal as the ventilator itself).

Burt Bases have the following features: condensation trough in every base, 4-in. flashing or more on every base to insure stormproofness, four different types, a type for every condition, and every base made separately for each particular job.



"A"	"B"	"C"	GA Iron
8"	12"	4"	24
10"	14"	4"	24
12"	16"	4"	22
14"	18"	4"	22
16"	20"	4"	22
18"	23"	4"	20
20"	26"	5"	20
24"	30"	5"	20
30"	36"	5"	18
36"	42"	6"	18
40"	46"	6"	18
42"	48"	6"	18
48"	54"	6"	18
54"	60"	6"	18
60"	66"	6"	18
66"	72"	6"	18
72"	78"	6"	18

X EXTRA AIRSHAFT OR COLLAR CAN BE PLACED INSIDE CURB IF DESIRED.

Z ALWAYS STATE THICKNESS OF CURB.

ROUND BASES—DIM. A & B SAME.

WHEN ORDERING BASES ALWAYS STATE TYPE AND PITCH OF ROOF AND WHETHER FOR SLOPE OR RIDGE.

Burt Ventilator Bases

How to Specify Burt Ventilators

Metal Top Ventilator—(1) Furnish and install on roof, where shown on drawings, Burt Metal Top Ventilators, as manufactured by The Burt Manufacturing Company, Akron, Ohio.

(2) Ventilators shall be of diameters shown and shall be constructed of prime open hearth galvanized steel sheets of The Burt Manufacturing Company's standard gauge, strongly braced with galvanized steel bands and properly riveted.

(3) Ventilators shall be provided with sliding sleeve dampers, operating by chains or cords over rust resisting pulleys and equipped with clips so that they can be set in any position and held permanently. When sleeve is at its highest point it shall completely close ventilator.

(4) Ventilators shall be guaranteed against defects in workmanship and material by the manufacturer, who shall agree to replace or repair without charge, any ventilator proving so defective.

(5) Ventilators shall be thoroughly flashed to the roof and be made absolutely watertight.

Glass Top Ventilator—(6) Furnish and install on roof, where shown on drawings, Burt Glass Top Ventilators, as manufactured by The Burt Manufacturing Company, Akron, Ohio.

(Insert paragraph 2 here.)

(7) Ventilators shall be provided with notched rims as manufactured by The Burt Manufacturing Company, Akron, Ohio, for holding glass in place so that same can be replaced if necessary without removing ventilators from roof.

(8) Ventilators shall have troughs or lips placed below glass so as to conduct any condensation or moisture that may form to the roof.

(Insert paragraphs 3, 4 and 5 here.)

Double Damper Ventilator for Weaving Rooms—(9) Furnish ventilators for weaving rooms, as shown on drawings, to be provided with double dampers as manufactured by The Burt Manufacturing Company, Akron, Ohio.

(Insert paragraphs 2, 4 and 5 here.)

Fan Ventilators—(10) Ventilators in ....., as shown on drawings, shall be Burt Fan Ventilators, provided with 6-blade fan mechanism which can be operated by belt from line shafting [belt from motor] [4 blade fan mechanism operated by direct-connected motor].

Note: 24-in. fan to have ¼ hp. motor; 30 and 36-in., ⅓ hp. motor; above 36-in., ½ hp. motor; to be standard as furnished by The Burt Manufacturing Company, Akron, Ohio, unless otherwise specified.

(11) Fan ventilators shall be provided with cone dampers, operated by cord or chain and rust resisting pulleys with fusible links which will cause dampers to drop and completely close in case of fire.

(Insert paragraphs 2, 4 and 5 here.)

Sliding Cone Damper Ventilators—(12) Furnish and install on roof, where shown in drawings, Burt Fire Retarding Sliding Cone Damper Ventilators as shown on drawings, and manufactured by The Burt Manufacturing Company, Akron, Ohio.

(13) These ventilators shall pass the approval of the Underwriters Association of America.

(13a) Ventilator is to have an extra wide wind band as per The Burt Manufacturing Company's standard for this type. Wind band to be located so as to prevent any entrance of outside wind into the ventilator head, whether up from a sloping roof or any other angle.

(Insert paragraph No. 11, but substitute "cone damper regulators" in place of fan. Follow with paragraphs 2, 4 and 5.)

Ball Bearing Revolving Ventilators—(14) Furnish and install on roof, where shown on drawings, Burt Ball Bearing Revolving Ventilators as manufactured by The Burt Manufacturing Company, Akron, Ohio.

(15) Ventilators shall be equipped with two sets of hardened steel ball bearings, and shall have open back construction so as to hold ventilators steady with the wind.

(Insert paragraphs 2, 4 and 5 here.)

Note: In order to satisfy people who are not convinced as to our type of bearing, we are prepared to install at no additional charge bronze ball bearings in place of the hardened steel bearings. We do not recommend nor guarantee this type, but will furnish them if specified.

Square and Rectangular Ventilators—(16) Furnish and install on roof where shown on drawings, Burt Square or Rectangular Ventilators as manufactured by The Burt Manufacturing Company, Akron, Ohio. These ventilators shall be equipped with sliding sleeve dampers [common flat dampers] and with glass [metal] top.

(Insert paragraphs 2, 4 and 5 here.)

Note: If ventilators are to be constructed from copper, zinc, lead clad sheets or any other metal, insert these words in proper space above.

WALTER B. GILBERT & CO.

Manufacturers of "Pullman Ventilators"

YORK, PA.

REPRESENTATIVES

NEW YORK, N. Y., 101 West 31st Street — HELENA, MONT., Raymond C. Grant — TORONTO, ONT., A. & F. Fisher
ST. LOUIS, MO., H. A. Woodworth Engineering Co. — ST. PAUL, MINN., O'Connell Supply Co.

Products

Pullman Ventilating Roof Cowls; Pullman Sash Ventilators.

Also, Pullman Window Ventilators; Automatic Fire Retarding Dampers and Bases.

TRADE MARK
Reg. U. S. Pat. Off.

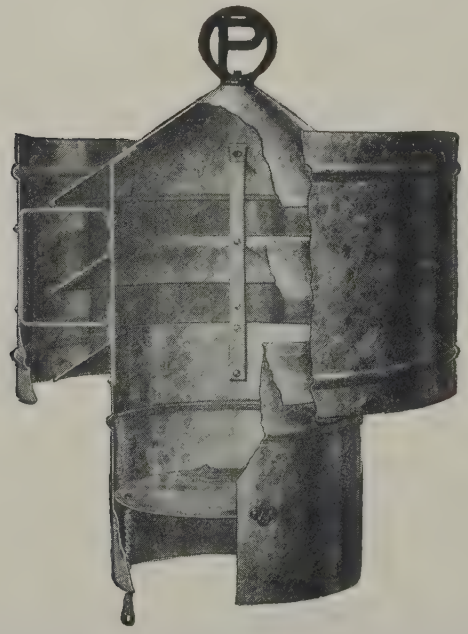
Improved Pullman Ventilating Roof Cowls

Operation—These consist of three cones of the same diameter and arranged one above the other with wide storm band surrounding same.

The ventilator is proportioned correctly to take advantage of the area of low pressure produced by the outside wind back of the ventilator and will not intake under any weather conditions, and is absolutely storm-proof.

The ventilator follows the recommended proportions as determined by the United States Bureau of Standards from an exhaustive series of tests made by them of different type ventilators, and also from our own tests.

Pullman Cowls are always in position to work.



Sectional View Improved Pullman Ventilating Roof Cowl Fitted with Automatic Fire Retarding Damper

Specification Data—Improved Pullman Cowls are regularly made of prime galvanized steel sheets of proper gauges and with galvanized iron braces. Can be furnished made of galvanized armco, toncan or cold rolled copper as specified.

Cowls fitted with Pullman Automatic Fire Retarding Dampers and Bases with condensation troughs to carry the water of condensation from the inside of the ventilator to the roof outside.

Pullman Sash Ventilators

Description—These consist of two parts, i.e., an inside diffusion box and an outside hood.

The outside hoods are made in two styles which are called "Standard" and "Louvre." The inside box is the same in both cases.

The opening required is cut in the bottom sash rail at the mill where the sash are made, and the ventilators are screwed fast to the sash after the same are in place.

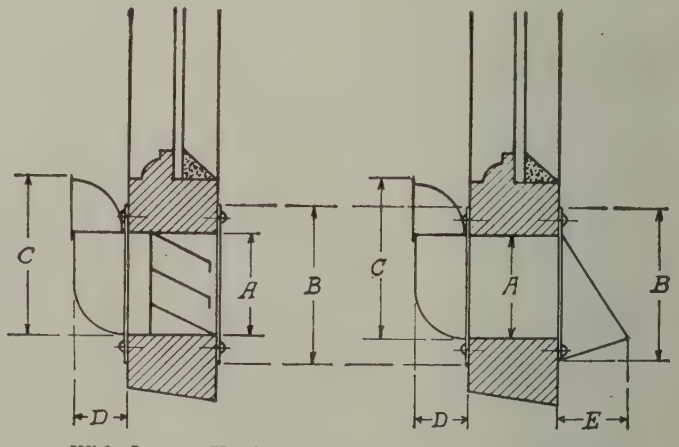
Ventilators are furnished complete with wood screws for mounting.

Specification Data—Pullman Sash Ventilators are regularly made with inside diffusion boxes of sheet brass with brushed brass finish and lacquered all over.

Fitted with hinged shutters to stay in any position from full open to closed.

Outside hoods, "Standard" and "Louvre," are made of sheet steel and finished in rubber finish black lacquer.

Fitted with 16-mesh copper screen cloth.



With Louvre Hood — With Standard Hood

Cross Sections of Bottom Sash Rail Fitted with Pullman Sash Ventilators

STANDARD SIZES OF PULLMAN SASH VENTILATORS

Nominal sizes Height and width, in.	A	B	C	D	E	Sash openings Height and width, in.
2 x12	2	3 1/8	3 1/8	1	1 3/8	2 1/8 x12 1/8
2 1/2 x16	2 1/2	3 3/4	4 1/4	1 5/8	1 7/8	2 5/8 x16 1/8
3 x15	3	4 1/8	5	1 7/8	2 1/4	3 1/8 x15 1/8
4 x18	4	5 1/4	6	2 1/8	2 5/8	4 1/4 x18 1/4

Special sizes and finishes to order.

GLOBE VENTILATOR COMPANY

Manufacturers of Roof Ventilators

TROY, N. Y.

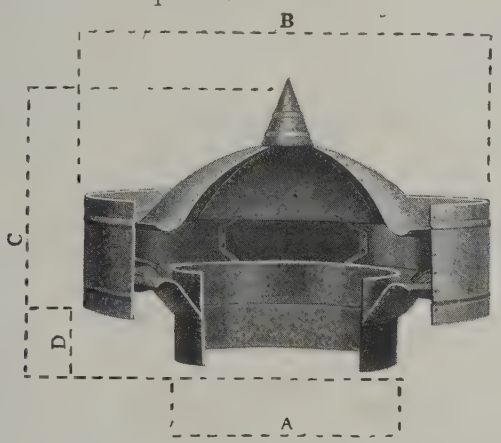
Products

"Globe" Ventilating Devices:
Roof Ventilators.
Barn Ventilators.
Chimney Caps.
Car Ventilators.
Lamp Jacks.

"Globe" Ventilator Construction

"Globe" ventilators are made of heavy gauges open hearth galvanized copper-bearing steel (see table below) and are rigidly braced with extra heavy steel bars. In sizes 18 in. and above, the tops and bottoms are made in sections which overlap and are riveted, making them double at each of these points and exceptionally strong ventilators. Their simple and sturdy construction guarantees long life.

They can also be furnished in Armco iron, Toncan metal and copper and with glass tops when light as well as ventilation is required.



Section of "Globe" Ventilator

A—Diameter of pipe
B—Diameter of band
C—Height of ventilator
D—Distance from bottom of band to bottom of ventilator

DIMENSIONS, GAUGES OF MATERIAL, AND LIST PRICES OF "GLOBE" VENTILATORS

Principal dimensions, inches				Gauge of iron	Wt. of copper, ounces	Area, sq. in.	*Price list subject to liberal discount
A	B	C	D				
6	11	9	1½	26	18	28.27	$ 3.40
8	14	11	1¾	26	18	50.26	4.65
10	17	13	2	24	18	78.54	5.75
12	19	14	2	24	18	113.10	6.75
14	25	18	3	20 & 24	18	153.94	13.00
16	28	20	3	20 & 24	18	201.06	20.00
18	32	23	4	20 & 24	20 & 18	254.47	27.00
20	36	25	4½	20 & 24	20 & 18	314.16	33.00
24	43	30	6	20 & 22	24 & 20	452.39	40.00
30	52	35	6	18 & 22	24	706.8	65.00
36	66	50	8	18 & 20	24	1017.9	120.00
40	74	57	9	18 & 20	24	1256.6	180.00
48	84	64	10	18 & 20	24 & 28	1809.6	240.00
54	92	67	10	18 & 20	28	2290.2	300.00
60	99	70	10	18 & 20	28	2827.4	360.00
72	111	80	12	18 & 20	28	4071.5	480.00

The heavier weights of material are placed in bands and collars of ventilators.
Fire-retardant dampers furnished when desired.
*Galvanized iron ventilators only. Prices of copper ventilators on request.

The design of the "Globe" ventilator, with its curved inner and outer surfaces, is such as to induce a rapid movement of the air outward, at the same time offering a minimum of resistance to the flow. Every inch of its opening is effective in creating efficient, positive ventilation. It utilizes all wind currents and works without wind by natural suction.

If It Isn't a Curved Top It Isn't a "GLOBE"

Metal Top "Globe" Ventilator

Uses—The "Globe" ventilator has been in operation for many years on practically every known type and class of building.

It is removing smoke, steam, fumes, gases, dust, etc., from factories, foundries, steel mills and other industrial buildings, and providing for fresh air in school buildings, churches, theaters, barns, etc. It has back of it years of *proved efficiency.*

Information and Estimates—Prices, blue prints, capacities, working model and complete information will be furnished on request.

Shipment—"Globe" ventilators are carried in stock in the leading cities, and immediate shipment can be made from our factory.

"Globe" Ventilator Bases

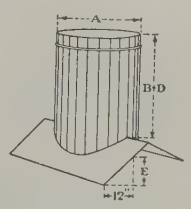
Ventilator bases, either round or square, are made to fit accurately the roof pitch, and have 4-in. flanges.

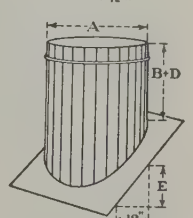
Different types of bases, dimensions, gauges of materials used and average shipping weights are shown below. Square bases are recommended for maximum capacity and strength.

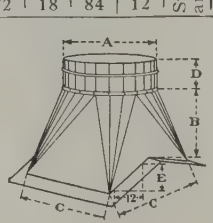
When inquiring or ordering, please furnish pitch of roof (E), state whether for ridge or slope and whether round or square bases are desired. When ordering bases to fit over concrete curbs, give size of opening and curb.

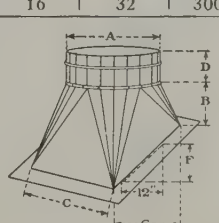
GLOBE VENTILATOR BASES

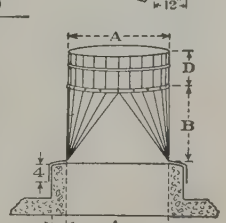
A in.	B in.	C in.	D in.	E in.	Gauge iron	Wt. copper, oz.	Aver. crated wt., lb.
10	10	12	6	State pitch of roof in rise to run and whether for slope or ridge	24	20	21
12	10	14	6		24	20	24
14	10	16	6		24	20	30
16	10	18	8		22	20	35
18	10	22	8		22	20	39
20	12	24	8		22	20	45
24	12	30	10		20	24	56
30	12	36	10		20	28	63
36	14	42	10		20	28	81
40	14	48	10		18	32	116
42	14	52	10		18	32	130
48	16	56	10		18	32	150
54	16	64	12		18	32	190
60	18	72	12		18	32	215
72	18	84	12		16	32	300











W. F. HIRSCHMAN CO., INC.

Manufacturers of Rotary Ball Bearing Roof Ventilators

BUFFALO, N. Y.

FACTORY: LE ROY, N. Y.

NEW YORK, N. Y., 525 Sixth Avenue — BOSTON, MASS., 37 Pearl Street — DETROIT, MICH., Builders-Traders Exchange

Products

EFFICO FAN EQUIPPED ROTARY BALL BEARING ROOF VENTILATOR HEAD.

EFFICO INTERNAL LOUVER UNIT ROOF VENTILATORS.

EFFICO WIND ELECTRIC FULL AUTOMATIC VENTILATORS.

HIRSCHMAN-PANCOAST VENTILATOR HEADS.

HIRSCHMAN-PANCOAST FAN VENTILATORS, non-automatic.

EFFICO STANDARDIZED ROOF VENTILATOR BASES.

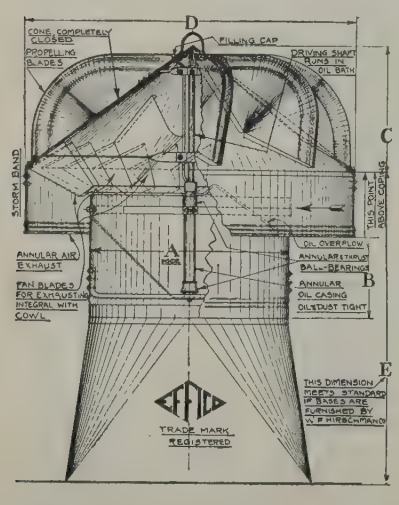
Also Le Roy Internal Louver Unit Roof Ventilators and Effico Skylight Ventilator Unit (Puttyless).

Effico Fan Equipped Rotary Ball Bearing Roof Ventilators

Construction and Principle of Operation—The Effico rotating cowl exterior is covered by wind propelled blades; interior by suction blades. There are no moving parts. Effico shaft rotates on ball bearings, fitted with clock precision in solidly enclosed dusttight and oiltight housings, and is flooded in inches of non-freezing oil (furnished by us); no oiling required for years (proven), but we oil flood them as an extra precaution, and the Effico is absolutely noiseless.

Great Air Volume Exhaust at Low Wind—All Efficos will draw considerable air at a 1-mile breeze (an apparent calm) without stack or heat assistance. The 30-in. size will rotate (standing start) at .7-oz. pressure, ½-mile breeze. Cowl outlet is over 50% larger than its stack area, which is ample, as no wind enters ventilator to gain the so-called siphonage effect. Suction fan is same size as rotating cowl (note dimension chart). Thus each Effico is equipped with fan over 50% greater in diameter than its stack area. Fan pulls air up stack at even the slowest turning movement and wind blowing across the outlet adds to its efficiency.

Percentage of Constancy—With United States Weather Bureau reports as a basis, and their findings that the wind at line of ventilators (over roof) is three miles slower than the tower records, shows the Effico Wind Driven Head during July and August to be 96% constant in New York City, Philadelphia, Boston, Buffalo, Cleveland, Detroit, Galveston, Kansas City, San Francisco, Chicago, Jacksonvile, Florida; 90% constant in Columbus, Ohio, Toronto, Louisville, St. Louis; 80% constant in New Orleans, Milwaukee, Cincinnati and Baltimore.



Symmetry — The Effico has artistic lines and pleasing appearance. Lowest in height of rotary ventilators by over 50% average. Note dimension chart.

Weatherproofness—The Effico Rotary Ball Bearing Ventilator operates during all kinds of weather—rain, ice, snow or sleet does not affect or hamper its exhausting. No drip pans or bird screens are needed.

Cost—Effico Ventilators exhaust more air per-dollar-cost of installation. The wind (only) driven heads exhaust greater volumes and during lower winds, thus a greater capacity within a given period. Effico Wind-Electrics, of course, 100% constant, see second page following.

Effico Rotary Ball Bearing Ventilator Installation

EFFICO STANDARDIZED VENTILATORS

Dimensions in inches					Galvanized steel: Gauge Cowl	Galvanized steel: Gauge Neck and base	Galvanized steel: Net weight, lb.	Copper, oz. Cowl	Copper, oz. Neck and base	Code
A	B	C	D	E						
6	9	5	13	.....	26	26	10	14	14	sheck
10	9	5	16	.....	26	26	18	14	14	sachem
12	11	8	21¾	23	24	24	25	14	14	scene
18	11½	10	28½	24	24	24	38	16	16	saturn
24	16	14	42	26	24	22	95	16	18	shake
30	22	14	52	32	22	20	140	16	20	sank
36	24	18	62	34	22	18	180	18	24	sergeant
42	33	22	68	45	22	18	300	18	24	serpent
48	34	24	74	45	22	18	370	18	24	serve
54	35	24	86	46	22	18	525	20	24	sham
60	37	24	98	49	20	18	650	20	24	shawl
66	43	30	103½	61	20	18	700	20	32	sunk
72	50	30	114	68	20	18	750	20	32	shop
84	54	36	130	72	18	16	900	24	32	slave
96	54	45	153	72	18	16	1025	24	32	shekel

CAPACITIES OF EFFICO ROTARY BALL BEARING VENTILATORS
Guaranteed and Conservative
Cubic Feet of Air Exhausted Per Minute

Wind velocity, miles per hour	Temperature difference in degrees Fahrenheit in building and outside: 0	10	20	30	0	10	20	30	0	10	20	30
	12-in. Ventilator				**18-in. Ventilator**				**24-in. Ventilator**			
5	350	440	515	560	600	850	950	1040	1020	1600	1780	1900
10	430	525	600	625	910	1050	1200	1300	1490	1900	2100	2300
14	480	600	635	700	1050	1200	1300	1400	1800	2230	2460	2590
	30-in. Ventilator				**36-in. Ventilator**				**42-in. Ventilator**			
5	1560	2300	2690	2900	2300	3400	3810	4100	3150	4500	5010	5500
10	2300	3210	3490	3600	3250	4200	4720	5050	4390	5700	6300	6800
14	2900	3650	9850	4020	4040	4800	5300	5600	5600	6700	7400	7800
	48-in. Ventilator				**54-in. Ventilator**				**60-in. Ventilator**			
5	4000	5900	6700	7400	5100	7300	8450	9500	6500	9300	10600	11900
10	5900	7900	8900	9050	7850	9900	11000	11500	9200	12500	14000	14500
14	7000	9000	10000	10500	9500	11800	12500	12800	11400	14000	15000	16000
	72-in. Ventilator				**84-in. Ventilator**				**96-in. Ventilator**			
5	9800	13500	14600	16000	12500	18000	21000	23000	16000	22500	27000	29000
10	13000	17000	19000	20000	18000	24000	27000	28000	22800	30000	33500	35500
14	16500	20000	21600	22800	22000	28500	30600	32000	27500	36000	37000	41000

Suggested Specifications—The roof ventilators to be of the sizes as shown in plans and are to be constructed of [galvanized steel] [.... iron] [copper]. They shall be the Effico Rotary Ball Bearing Ventilators as manufactured by the W. F. HIRSCHMAN CO., INC., Buffalo, N. Y. The bases to be [square type] [round type] of same gauge metal as the ventilator neck. The ventilator stack to be sufficiently high to elevate the ventilator propelling blades above coping.

Effico Oil, Dust and Acid Proof Bearing Housings

Continued on next page

Effico Internal Louver Unit Ventilators

The Effico internal louver unit comprises the Effico rotary ball bearing ventilator head constructed with a specially short base, or neck. In this base is built a circular multiple blade louver damper. The damper is carefully balanced and heavily constructed. The blades lap and are fitted in a circular frame. It is adaptable for manual control, but is intended for a thermostatic control system. The roof base is very low, is part of this unit and is supplied with either the square or round base.

The roof base and the ventilator head are connected by means of angle iron companion rings, which give solidity and facilitate the taking down of the ventilator when required. Each ventilator neck has also a tight fitting door to give free access to the louvers and to the operating motor which is suspended underneath the damper to a cross brace. The object of the specially low base and the low roof base is to make the entire unit as low to the roof as possible.

Effico Louver Dampers—Made of stretcher leveled sheet steel. The pneumatic damper motor is supplied and installed with these units unless not desired. (Note specifications below.)

Exhaust Capacity—Same as Effico Rotary Ball Bearing Head on preceding page.

Effico Louver Unit—*Low height.* The Effico louver unit sets very low (note dimensions at right).

Height above Coping—Louver Unit "C" dimension should be above coping.

Effico Rotary Ball Bearing Ventilator Head—The Effico rotary ball bearing ventilator head is already lower in height by 50% than other rotary types of ventilator. By using the construction as outlined above, the entire unit is brought as *low* to the roof as is permissible to still allow the air free exhausting, and to maintain the outlets above the snow line.

Cost—By adopting the circular multiple louvers, of which we are the inventors, we can standardize on sizes and build the round louver for considerably less than the square or rectangular styles, many of which we have built in the past years.

By installing same in the neck of the ventilator at our shop, we not only give a perfect fit, but also eliminate all indefiniteness as to the correct location and size of the damper and cut the installing cost to one-quarter. It is also easier to install the operating motor and makes it more accessible. The size of the damper is the full size of the stack, and yet is about 40% smaller in area than those heretofore used in the square or rectangular louver, again reducing the cost considerably. By supplying the contractor with the complete unit the builder is assured of a well designed, uniform and complete apparatus.

Heretofore, the contractor purchased the ventilator from one manufacturer, probably built the roof base himself, and purchased the dampers elsewhere, or even the dampers were supplied and installed by another contractor. This added materially to the cost.

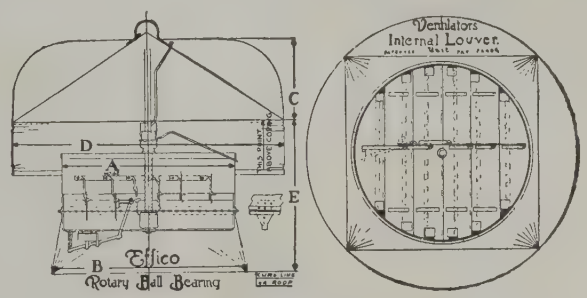
Corrosion Protection—All interior fabrication members are Cadmium plated after forming and punching. For galvanized ventilators, bolts and nuts are also Cadmium plated. For copper ventilators, bolts and rivets are solid brass and copper. Only carefully selected prime sheets and materials are used throughout, whether of galvanized, copper, or other special metals.

Typical Effico Louver Unit Installation

EFFICO LOUVER UNIT SIZES AND DIMENSIONS

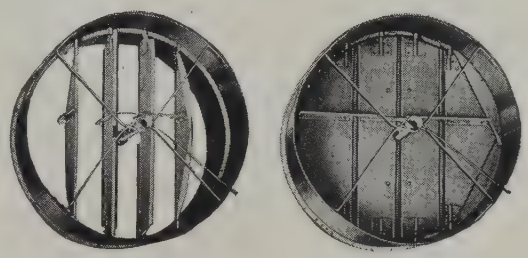
Dimensions, inches					Galvanized steel			Copper, oz.		
					Gauge					
A	B	C	D	E	Cowl	Base	Net weight, lb.	Cowl	Base	Code for telegraphy
18	20	10	28½	23	24	24	90	16	18	vale
24	30	14	40	30	22	22	140	18	20	valet
30	36	14	50	32	22	20	190	20	20	vive
36	42	18	60	32	22	18	225	24	24	varve
42	48	22	68	43	22	18	350	24	24	vetch
48	54	24	76	43	22	18	400	24	24	vax
54	60	24	86	43	22	18	600	24	24	vaid
60	66	24	98	43	20	18	710	24	24	valor
66	72	30	103½	49	20	18	800	24	24	vamp
72	80	30	114	54	20	18	880	24	32	vane
84	92	36	130	54	18	16	1050	24	32	vang
96	116	45	153	54	18	16	1200	24	32	van

For round bases, "E" dimension remains the same.
For capacities note preceding page.



Patented

Effico Rotary Ball Bearing Ventilator—Internal Louver



Open Closed

The Multiple Circular Louver Damper in Neck of Ventilator

Suggested Specifications—The roof ventilators shall be of the sizes as shown in plans, [square base] [round base] style. Shall be made of [..... steel] [..... metal] [copper]. [The pneumatic damper motor to be supplied with these units]. [The pneumatic damper motor to be supplied by the heating and ventilating Contractor]. They shall be the Effico Internal Louver Unit Ventilators as manufactured by the W. F. Hirschman Co., Inc., Buffalo, N. Y.

Permanent Exhibit

Permanent exhibit of our complete line at all offices, also stock carried at New York, Buffalo and Detroit. Visitors also are welcome at our factory at LeRoy, N. Y. (see thousands of ventilators in course of production).

Continued on next page

Effico Wind-Electric Ventilator, Full Automatic

Principle of Operation—This is the regular Effico wind driven head as described on second page preceding with an auxiliary electrically-operated fan.

When the wind is blowing sufficiently to drive the wind turbine, and remove the desired amount of air from the building being ventilated, the electric motor is still. Instantly, when the wind turbine moves below previously-determined revolutions, the electric motor carries the load, starting automatically, and runs until the wind again drives the wind turbine. The *electric motor is cut off and on automatically.* The throat is slightly enlarged to allow for the motor.

When to Use—For installations which require a definite minimum exhaust at all times or which may require an unusually heavy exhaust at intermittent periods. For exceedingly difficult installations, where Effico Ventilator Heads (wind driven only) due to location are not practical, the Effico Wind-Electric Ventilator will successfully ventilate any type of building.

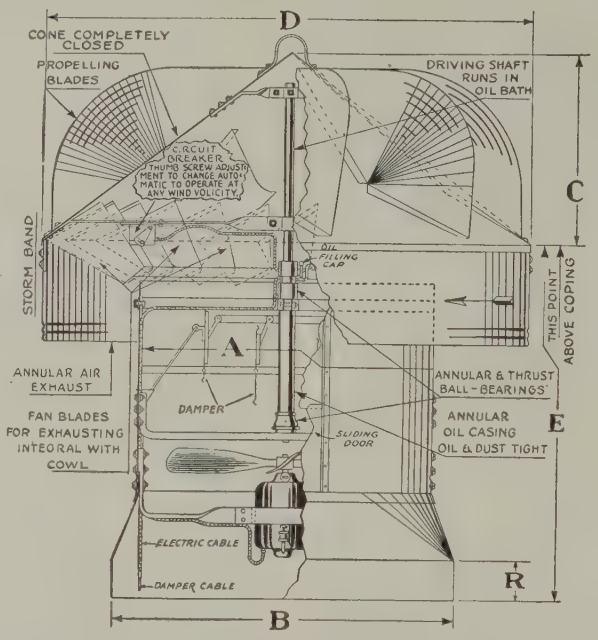
Special Advantages—Besides the regular automatic operation the motor may also be so connected as to give a maximum exhaust capacity (running full speed) by manual control, thus allowing a great volume of air to be exhausted at will.

Adaptability—Adjustable to exhaust various quantities of air within the limits of given sizes and is regularly supplied at capacities equivalent to a five-mile wind and ten-degree temperature difference rating.

If the wind drops below five miles per hour or temperature below ten degrees difference, the Effico Wind-Electric Ventilator maintains its regular exhaust capacity.

Any other capacity can be supplied and the ventilator is adjustable to any constant capacity after installation.

Power Consumption—1/30 hp. to ½ hp. Effico Wind-Electric Ventilators require very little power.



Details of Effico Wind-Electric Rotary Ball Bearing Ventilator

Patented May 20, 1922, Mar. 20, 1928
Other patents pending

Static Pressure—Motor and fan can be supplied to pull against ⅛-in. static resistance by the employment of motor only, or motor and wind turbine. This will have no deteriorating effect on using apparatus for regular ventilating purposes.

Selecting a Ventilator—When in need of a ventilating apparatus it is best to choose one that does not depend upon mechanical exhausting *only,* for a good roof ventilator is acknowledged to be *superior* to an arrangement that closes entirely unless the motor is running.

Self Contained Unit Construction—The Effico Wind-Electric Ventilator comprises the wind turbine, the same type head as described on previous pages, electric motor, fan, and roof base which form a complete exhaust unit. The motor is furnished and installed by us in the ventilator.

Dampers—Effico Wind-Electric Ventilators are supplied with tight fitting, carefully balanced dampers. The larger sizes are furnished with Effico Multiple circulator Louver Dampers. See preceding page.

All are operatable by chain or by compressed air in connection with thermostatic controlled heating and ventilating systems. Pneumatic damper motor is supplied and installed in the ventilator if desired.

Effico Low Height—All Effico Ventilators are lower in height than any other ventilator by almost 50%. "C" dimension should be above coping. Note dimensions below.

Finish—Handsomely painted in red or any desired color if made of galvanized sheets.

Specifications—The roof ventilators to exhaust from (....) to be the Effico Wind-Electric Ventilators (full automatic) as made by the W. F. Hirschman Co., Inc., Buffalo, N. Y., the sizes to be as shown on the prints. They shall be of [galvanized steel] [toncan metal] [copper]. The current for the motors is: current ....; voltage ....; cycle .....

CAPACITIES OF EFFICO ROTARY BALL BEARING VENTILATORS—AUTOMATIC WIND-ELECTRIC

Cubic Feet of Air Exhausted Per Minute

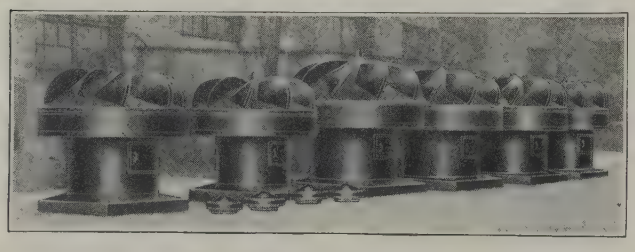
Wind velocity, m.p.h.	Temperature difference in degrees Fahrenheit between air in building and outside air								
	0°-10°	10°-20°	20°-30°	0°-10°	10°-20°	20°-30°	0°-10°	10°-20°	20°-30°
	12-in. Ventilator			**18-in. Ventilator**			**24-in. Ventilator**		
0 to 5	440	515	560	850	950	1040	1600	1780	1900
	30-in. Ventilator			**36-in. Ventilator**			**42-in. Ventilator**		
0 to 5	2300	2690	2900	3400	3810	4100	4500	5010	5500
	48-in. Ventilator			**54-in. Ventilator**			**60-in. Ventilator**		
0 to 5	5900	6700	7400	7300	8450	9500	9300	10600	11900
	72-in. Ventilator			**84-in. Ventilator**			**96-in. Ventilator**		
0 to 5	13500	14600	16000	18000	21000	23000	22500	27000	29000

Other capacities for adjustment to any of these capacities can be made after installation.

DIMENSIONS OF EFFICO WIND-ELECTRIC VENTILATOR

Ventilator sizes, in., corresponding to those in capacity table	Dimensions, in. (see diagram)					Thickness of metal			H.P. of motor
	A Actual size of ventilator	B Base	C Height of blades	D Diam. of storm band	E Height to propellor blades	Gage G. I. Cowl	Gage G. I. Base	Copper oz.	
12	14	20	8	21¾	32	24	22	16	⅛
18	19	26	10	28½	32	24	22	18	
24	25	38	14	40	40	24	20	18	
30	31	40	14	50	42	24	20	20	
36	37	44	18	60	45	22	18	24	⅛
42	43	50	22	68	51	22	18	24	
48	49	56	24	76	51	22	18	24	
54	55	62	24	86	51	22	18	24	¼
60	61	66	24	98	55	22	18	24	
72	73	80	30	114	55	20	16	24	
84	85	92	40	130	55	20	16	32	½
96	97	116	45	153	55	20	16	32	

R dimensions—5 in. on all sizes.



Battery of Effico Wind-Electric Full Automatic Ventilators

This battery of three 48-in., two 42-in., and one 36-in. Effico Wind-Electric Full Automatic Ventilators were photographed before installing. Note size by contrast with the background. They have a combined exhausting capacity of 31,500 c.f.m., regardless of wind velocity or temperature difference and can be adjusted to a 25% increase if necessary. Combined motors have only 2 hp. consumption. Now installed in a Massachusetts school.

Continued on next page

Hirschman-Pancoast Ventilators

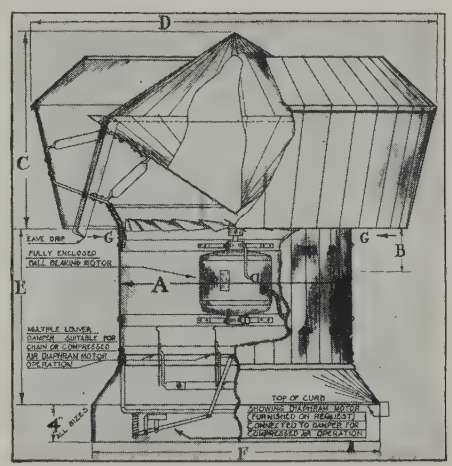
The Hirschman-Pancoast Ventilator heads are made of only prime sheets. The fabricated members are carefully formed to offer the least resistance to the air flow. These members for galvanized ventilators, are cadmium plated after forming. For copper ventilators, the smaller size members are made of copper. For very large ventilators the members are iron, cadmium plated. Electric welding is used considerably, all rivets have washers under the burred end of rivet, like all Hirschman products.

Hirschman-Pancoast Ventilator Head

Design and Appearance—A ventilator designed to exhaust air at the highest possible velocity. Strength (sturdy construction), weather-proven, high syphon exhaust capacity and appearance, in the order named are given consideration in the design of this ventilator.

Exhaust Head—The design is such that air driven 1200 ft. velocity through the head, registers only .015 water gauge static pressure. This is unequalled by any other known shape. Thus for a fan or high heat exhaust head, it is unequalled. When so used and the fan is cut off the ventilator still ventilates as a syphon ventilator. There are no shutters to blow or freeze shut.

Weatherproof — Absolute, no rain, snow or storm can beat in. Is also visionproof, will resist back-drafting during a five-mile wind against an adverse temperature difference of ten degrees Fahrenheit. Also during the same wind velocity will not back-draft unless a greater than static pressure resistance of .025 water gauge.



Hirschman-Pancoast Fan Ventilator (Patented)

Exhaust Capacity Syphonage Principle—Note capacity chart, these capacities are conservative. The Hirschman-Pancoast is a very high grade stationary type syphon ventilator. It starts exhausting at slightly over a two-mile wind without any temperature difference.

The Hirschman-Pancoast Fan Ventilator (non-automatic)

For free air or as a pressure blower, is decidedly an apparatus of high merits for a specific application.

Recommendation — Is a high class ventilator where a high exhaust velocity against resistance is required, especially at certain periodical times. Where the Effico Rotary Head, or the Effico Wind-Electric Automatic Ventilator, due to obstructed location or its moderate even capacity is not required, then we recommend the Hirschman-Pancoast Ventilator.

Construction—Very heavily made, and employing only the best types of motors. *Access door to motor and fan provided.* Motor and fan protected against the elements as well as if installed in the building.

Dampers—Chain operating, close fitting damper supplied with all sizes unless otherwise ordered. Can be supplied with circular multiple louver damper with, or for, pneumatic damper motor.

Bases—Included with fan ventilators.

Cost—A moderately priced exhauster of unusual merits.

DIMENSIONS OF HIRSCHMAN-PANCOAST VENTILATORS

Dimensions, in. (see diagram)						Thickness of metal			
						Ga. galvan.		Oz. copper	
A	B	C	D	E	F	Head	Base	Head	Base
12	6	10	22	24	16	24	24	16	16
18	6	16	32	24	22	24	24	16	16
24	8	21	42	30	30	24	24	16	16
30	8	27	52	30	36	22	20	18	20
36	10	33	36	30	42	22	18	20	24
42	10	38	71	30	48	20	18	20	24
48	12	42	81	36	54	18	18	20	24
54	12	46	91	36	60	18	18	20	24
60	12	60	102	36	66	18	16	24	24
66	16	66	102	36	72	18	16	24	32
72	16	70	120	36	78	18	16	24	32
84	16	76	120	36	92	18	16	24	32

For utilizing heads only use "C" and "B" dimensions.

GRAVITY EXHAUST CAPACITIES HIRSCHMAN-PANCOAST VENTILATOR HEADS

Cu. ft. of air exhausted per minute

Wind velocity, miles per hour	Temperature difference in degrees Fahrenheit in building and outside											
	0	10	20	30	0	10	20	30	0	10	20	30
	12-in. Ventilator				**18-in. Ventilator**				**24-in. Ventilator**			
5	160	275	330	380	360	610	740	800	600	1050	1280	1380
10	250		460	525	560		950	1050	900	1400	1675	1800
	30-in. Ventilator				**36-in. Ventilator**				**42-in. Ventilator**			
5	940	1660	2000	2200	1300	2400	2950	3150	1900	3275	4000	4300
10	1410	2220	2600	2800	2100	3160	3700	3900	2700	4300	5000	5300
	48-in. Ventilator				**54-in. Ventilator**				**60-in. Ventilator**			
5	2450	4200	5100	5500	3100	5375	6400	6800	3800	6600	7850	8500
10	3400	5390	6500	7000	4400	7200	8300	8800	5500	8000	9200	10000
	66-in. Ventilator				**72-in. Ventilator**				**84-in. Ventilator**			
5	4600	8000	9550	9800	5500	9500	11400	12000	7400	13000	14800	16000
10	6500	10600	11500	12000	7700	12700	14000	15000	9800	17400	19000	22000

CAPACITIES OF HIRSCHMAN-PANCOAST VENTILATOR

Size of stack, in.	Speed r.p.m.	Cu. ft. min. less than ⅛ in. sp.	Cu. ft. min. ¼ in. sp.	Cu. ft. min. ⅜ in. sp.	Type of motor	Hp.	Telegraph code
12	1425	650	.....	.....	T.D.	1/30	Range
	1750	900	.....	.....	S. R.	1/25	Ram
18	855	1675	900	.....	S.D.R.	⅛	Rank
	1140	2000	1350	.....	S.D.R.	⅙	Rap
	1420	2200	1600	1200	T.Q.	⅙	Raze
24	780	2600	1700	900	S.T.D.Q.	⅙	Ray
	780	3000	2100	1300	T.D.Q.	¼	Raw
	850	3400	2600	1400	D.S.R.	¼	Rat
	570	4000	3000	2100	S.T.	⅛	Rash
	870	3500	3000	2600	T.D.S.	½	Rase
	1140	4500	3700	3200	S.D.R.	½	Rugn
30	680	4500	3600	2700	D.Q.	¼	Rein
	680	5500	4500	3200	D.Q.	½	Ride
	900	6000	5000	3600	S.R.T.	½	Rinse
36	550	6500	5200	3900	S.R.	½	Rime
	575	8500	7200	5900	S.T.Q.R.D.	¾	Rig
	900	7000	6000	5000	.....	½	Rip
42	575	11000	8000	6500	S.T.Q.R.D.	¾	Roar
	490	10000	7000	5000	S.T.R.Q.D.	1	Roast
	490	7000	5700	.....	S.T.R.Q.D.	½	Rook

Prefix letters in motor column indicate kind of current for which the motors are available.

Alternating—S, single-phase, 60 cycle. R, two or three-phase, 60 cycle. T, single-phase, 25 cycle. Q, two or three-phase, 25 cycle. D, direct current.

The low speeds are suitable for schools, theaters, auditoriums and other quiet running requirements.

Suggested Specifications for Fan Ventilators—The Fan Ventilators shall be the size as shown in plans [square base] [round base] style, to be of [galvanized ....] [copper alloy extra refined] [copper] the motors of (....) r.p.m., (....) h.p., (....) current, delivering each (....) c.f.m. They shall be the Hirschman-Pancoast Fan Ventilators as manufactured by W. F. Hirschman Co., Inc., Buffalo, N. Y.

THE IONA VENTILATOR COMPANY, INC.

2821-29 West Dauphin Street, PHILADELPHIA, PA.

Products

XIT VENTILATORS, Round or Rectangle, metal tops; XIT AUTOMATIC TEMPERATURE-CONTROLLED DAMPERS.

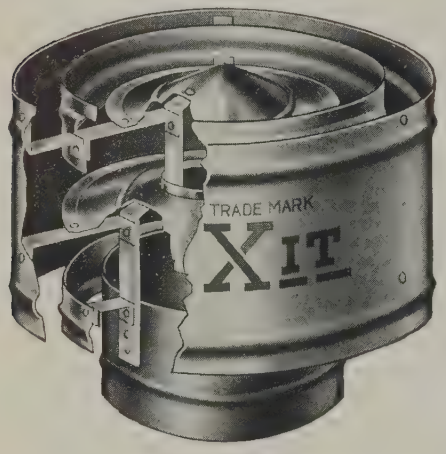
IONA VENTILATORS, Round or Rectangle, with metal or glass tops.

Xit Ventilators

Designed to meet perfectly those cases where the highest possible efficiency is demanded. Its construction is unusually substantial. Warranted stormproof, and its exceptional efficiency has been repeatedly demonstrated in actual comparative tests with the best ventilators previously available.

We believe the XIT to be the most efficient ventilator ever built because of its large area of vertical exits and its great total exit area.

Basic Principles of Design—(1) Head 80% greater in diameter than shaft of ventilator. (2) Width of storm band 80% of diameter of shaft and so placed as to exclude external air from ventilator head. (3) Area for air leaving ventilator head (not including bottom opening at head) 75% greater than cross-sectional area of shaft. (4) Principle of action or suctions is that of chimney or stack, which is doubled by a second or internal band, thereby making two points of suction which are always to the lee side of ventilator, resulting in greater increased movement of air therefrom.



Xit Ventilator

Dampers — Flat, butterfly, fire retarding or temperature-controlled types, with felt edge when desired to be airtight.

Xit Guarantee—Our guarantee is of the most substantial character, providing not only against defective materials, but backing our claims for this unusual ventilator to the extent of offering to take back within 60 days of date of purchase at our expense, refund any payments made and bear transportation costs both ways, any XIT ventilator that fails to fulfill what we specify for it at the time of sale.

SIZES AND STANDARD PRICE LIST XIT VENTILATOR

Vent size, in.	Outside diam., in.	Height, in.	Gauge iron or metal	Approx. finished weights, lb.	Gauge copper, oz.	List price
6	10¾	8¾	26	5	16	$ 12.00
7	12½	10¼	26	6	16	14.00
8	14¼	11	26	8	16	16.00
9	16¾	12	26	10	16	18.00
10	18	13½	26	12	16	20.00
12	21½	15½	24	16	16	24.00
14	25	16¾	24	28	16	28.00
15	26½	17	24	31	18	30.00
16	28¾	18½	22	34	18	32.00
18	30	19½	22	43	18	36.00
20	34	22½	22	50	18	40.00
22	38½	24	22	55	18	44.00
24	43	26	22	61	18	48.00
26	46	28	22	84	20	52.00
28	50	30	22	105	20	56.00
30	54	32	22	131	20	65.00
32	57	34	22	146	20	80.00
34	60	36	22	160	20	100.00
36	64	38½	22	178	20	120.00
40	71¾	42	20	238	20	180.00
42	77	45	20	275	20	190.00
44	79	48	20	305	20	200.00
48	86	51	20	350	20	240.00
54	97	57	18	615	24	300.00
60	107	63	18	757	24	360.00
66	118	69	18	880	24	420.00
72	129	75	18	980	24	480.00

Xit Automatic Temperature-Controlled Dampers

Operation—XIT Automatic Temperature-Controlled Dampers are operated through The Fulton Company's Sylphon Regitherms (which, as used on this damper with patented operating connections, are complete operating units, regulating the temperature at a set point) or they may be locked in open or closed position. It is obvious that even temperature is desirable in all rooms with varying exposures without loss of heat through improper operation of ventilating controls. This may be accomplished through the use of XIT Automatic Temperature-Controlled Dampers.

Specifications—Furnish and install XIT Automatic Temperature-Controlled Dampers as made by the IONA VENTILATOR COMPANY, INC., Philadelphia, Pa., and sylphon regitherm with necessary registers and connections.

(2) All damper blades to be made of aluminum with brass connections and ball bearings.

(3) The regitherm shall operate ventilator damper to which

***GUARANTEED EXHAUST OF CUBIC FEET OF AIR PER MINUTE FROM XIT VENTILATORS**

Inside excess temperature F.	Wind velocity miles per hr.	Height of ventilator above intake, in.	Sizes of ventilators, in. 12	14	16	18	20	24	30	36	42	48	54	60	66	72	84
0	2	15	58	67	77	88	98	116	145	176	204	232	261	290	321	352	408
		30	82	95	110	123	136	164	205	246	287	328	369	410	451	492	574
		50	106	123	141	158	176	212	264	316	370	424	476	528	580	632	740
		100	150	175	200	225	250	300	375	450	525	600	675	750	825	900	1050
0	4	15	70	82	94	106	117	140	176	212	246	280	316	352	388	424	492
		30	99	115	132	148	164	199	247	296	347	398	446	494	543	592	694
		50	127	148	169	190	211	254	317	380	443	508	571	634	697	760	1088
		100	180	210	240	270	300	360	450	540	630	720	810	900	990	1080	1260
0	6	15	87	101	116	130	145	174	217	260	304	348	391	434	477	520	608
		30	123	143	164	184	205	246	307	368	430	492	553	614	675	736	860
		50	159	185	212	238	265	318	397	476	556	636	705	794	873	952	1112
		100	224	260	298	335	373	448	559	670	783	896	1007	1118	1229	1340	1566
0	8	15	103	120	137	154	171	206	257	308	360	412	463	514	565	616	720
		30	145	169	193	217	241	290	362	434	507	580	652	724	796	868	1014
		50	188	219	250	282	313	376	470	564	658	752	846	940	1034	1128	1316
		100	266	309	354	399	443	532	665	798	929	1060	1195	1330	1463	1596	1858
0	10	15	120	140	160	180	200	240	300	360	420	480	540	600	660	720	840
		30	169	197	225	253	281	338	422	506	591	676	760	844	928	1012	1182
		50	219	255	292	328	365	438	547	656	766	876	985	1094	1203	1312	1532
		100	310	363	413	465	518	620	775	930	1085	1240	1395	1550	1705	1860	2170
5	4	15	88	102	117	132	145	177	220	264	309	354	397	440	484	528	618
		30	124	145	165	185	206	248	309	370	433	496	557	618	679	740	866
		50	160	187	214	241	267	320	401	482	561	640	721	802	883	964	1122
		100	227	265	303	341	379	454	568	682	795	908	1022	1136	1250	1364	1590
5	6	15	115	134	153	172	191	230	287	344	402	460	517	574	631	688	804
		30	162	188	216	243	270	324	405	486	567	648	729	810	891	972	1134
		50	210	244	280	315	350	420	525	630	735	840	945	1050	1155	1260	1570
		100	298	347	397	447	497	596	740	884	1038	1192	1336	1480	1624	1768	2076
5	8	15	133	155	177	199	221	266	332	398	465	532	598	664	725	796	930
		30	188	219	250	282	313	376	470	564	658	752	846	940	1034	1128	1316
		50	243	283	324	364	405	486	607	728	850	972	1098	1214	1335	1456	1700
		100	343	400	457	514	571	686	857	1028	1200	1372	1543	1714	1885	2056	2400
5	10	15	161	188	214	241	268	322	402	482	563	644	724	804	884	964	1126
		30	227	264	303	341	379	454	530	606	757	908	984	1060	1136	1212	1514
		50	294	342	392	441	490	588	735	882	1029	1176	1323	1470	1617	1764	2058
		100	416	484	554	623	692	832	1039	1246	1455	1664	1871	2078	2285	2492	2910

**Note:* The figures in this table are for immediate practical use without reduction. They are not theoretical calculations but can be depended upon for actual ventilator capacities. They do not have to be divided by 2 or 3 to arrive at a practical working basis.

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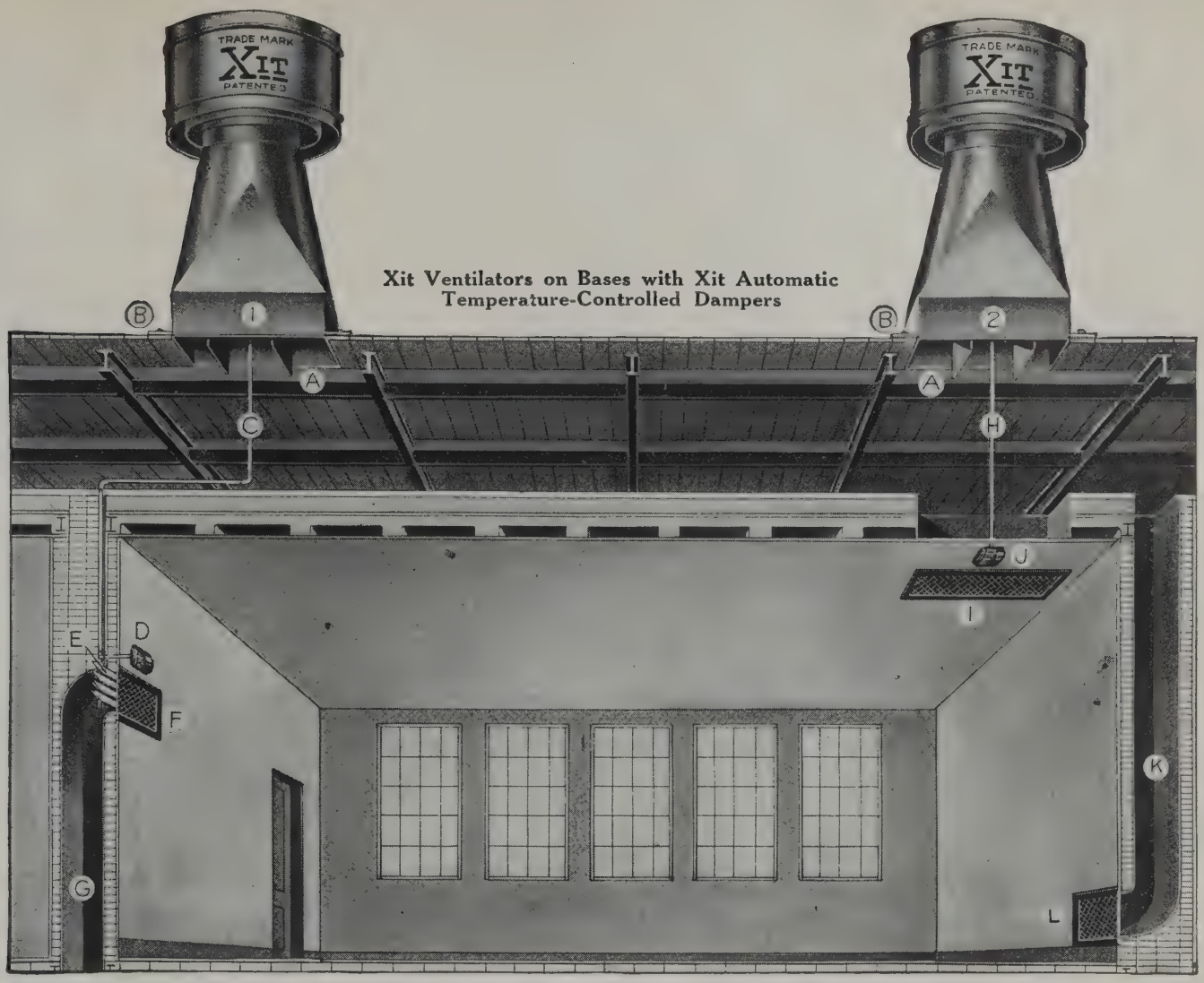


Two Systems of Installing Xit Automatic Temperature-Controlled Damper

Figure 1—Joint unit operation from temperature of room, by Xit Automatic Temperature-Controlled Damper (A) with heat flue damper (E) which is operated by sylphon regitherm (D) through connecting rod (C). Air enters room from heat flue (G) and register (F) and is drawn from room through register (L) and duct (K) to loft, and out of building by Xit Ventilator (1).

Figure 2—Represents connection to room through loft flue and ceiling register (I) Xit Automatic Temperature-Controlled Damper (A) connected to sylphon regitherm (J) by operating rod (H) which operates damper from temperature of room, or flue (K) may be used. Flange for connecting to roof (B)

it is attached at a variation not to exceed 2° above or below any given point.

Heat Register—The regitherm shall operate ventilator damper and heat regulating damper to which it is attached at a temperature variation not to exceed 4° above or below a given point.

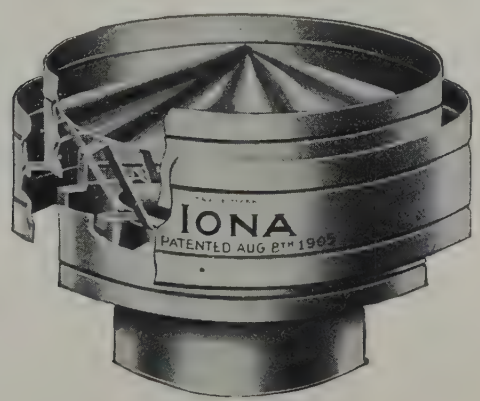
Bases—All bases to be of the box to transformer type and of material not lighter than that of which ventilator is made, with flange of sufficient width to guarantee a watertight connection at roof.

Further Information and Prices—Furnished on request.

Iona Ventilator

The nearest approach to the straight pipe ventilator; standard and successful for 20 years.

Fire Retarding Damper—Damper used exclusively in this ventilator automatically opens or closes, as desired, in case of fire. It requires no attachment inside of building to hold it in any desired position.



Iona Ventilator

SIZES AND STANDARD PRICE LIST IONA VENTILATOR

Vent size, in.	Outside diam., in.	Height, in.	Gauge iron or metal	Approx. finished weights, lb.	Gauge copper, oz.	List price
6	10	6	26	3	16	$ 3.40
8	14½	7	26	4	16	4.65
10	18	9	24	6	16	5.75
12	21	10	24	8	16	6.75
14	24	12	22	14	18	13.00
16	27	13	22	20	18	20.00
18	31	14	22	26	18	27.00
20	34	15	22	30	18	33.00
24	42	18	22	42	18	40.00
30	51	23	20	75	20	65.00
36	62	27	20	118	20	120.00
42	72	31	18	182	20	190.00
48	82	35	18	275	20	240.00
54	94	38	18	300	24	300.00
60	104	43	18	335	24	360.00
72	130	60	18	630	24	480.00

The prices of bases and dampers are always extra, regulated according to the number and size required.

ESTABLISHED 1909

PAUL R. JORDAN & CO.

Roof Ventilators

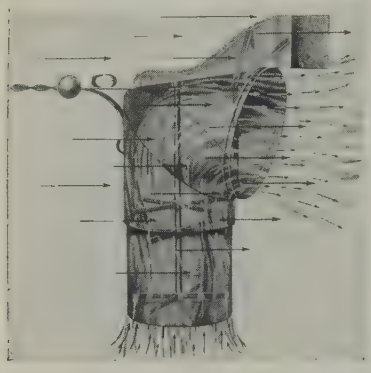
MAIN FACTORY AND OFFICE
631 South Delaware Street
INDIANAPOLIS, IND.
AGENTS IN ALL PRINCIPAL CITIES

Products

AEROPLANE ROTARY VENTILATORS; AEROSQUARE (Rotary Principle) VENTILATORS; JORDAN SYPHON VENTILATORS; JORDAN TURBINE VENTILATORS; AEROPULL STORM BAND VENTILATORS.

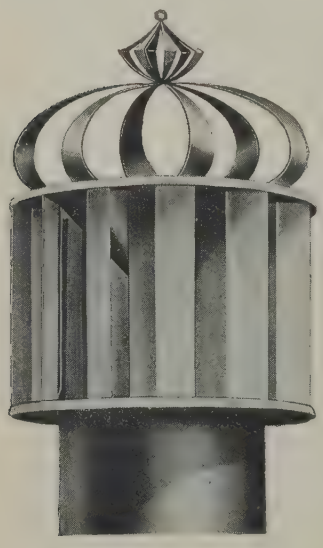
Aeroplane Rotary Ventilator

A rugged, top balanced rotary ventilator with main bearing at the top. Free swinging, perfectly balanced, sensitive to lowest air movements. Four special shaped planes keep the mouth always away from the wind; exceptional—a cheap ventilator on the basis of capacity. The patented main bearing is of bronze or steel one-ball type, non-corrosive, absolutely reliable, with no setting tendency. Well braced with steel flats set edgewise, reinforced with riveted steel segments, seamed and riveted throughout. Heavy storms or high winds cannot affect its shape or impair its efficiency. No maintenance of operation costs.



When used on a gravity system Aeroplane insures a positive flue action at all times.

Where used on a blast system it relieves pressure on the fan and saves current and wear.

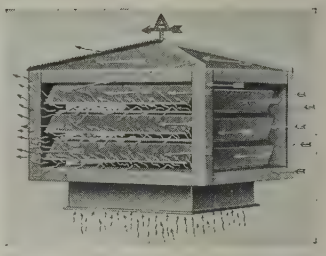


Jordan Turbine Ventilator

A sturdy new perfected turbine ventilator with a higher ratio of efficiency than the usual turbine ventilator. In fact, it is on an equal basis with our rotary or syphon ventilator. A distinctive feature is the tight top with an overhang of 25% in all directions beyond the neck of the ventilator, eliminating water leakage. The bearing is special of bronze on polished iron running in oil. Ornaments on top can be furnished to suit the architectural line of the building.

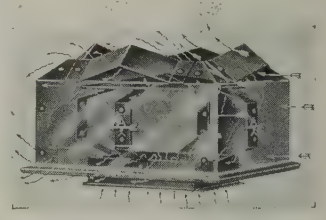
Aerosquare Rotary Principle Ventilator

A pleasing rotary principle ventilator. Square and low, it conforms to the usual lines of American architecture. It calls no attention to itself nor does it break up the roof line. The dimensions are generous and adjustments positive. The obstruction to the wind is wide, giving a large area of low pressure. The neck is square and the exhaust area is about 30% greater than the usual exhaust area.



Jordan Syphon Ventilator

A new type of syphon ventilator with tubes at the top emptying entirely outside of the ventilator. It is the result of experiments which brought out the fact that ejector tubes (commonly called syphon tubes) should not empty into the area of low pressure. Ejector tubes emptying into the ventilator have the same effect as opening a check in a furnace flue. They kill the draft. Extreme efficiency in a syphon ventilator will be found in the Jordan.



Aeropull Storm Band Ventilator

A good low priced ventilator designed especially for fan work. It is well designed and free from choking down tendencies. The storm band and the free exhaust area are 50% greater than are usually standard with this type of ventilator.

What Size Ventilator to Use

A long experience in determining sizes and in testing results has built up for us a knowledge of the proper size of ventilator to be used under different conditions for any required footage, which we now pass on to you. Manifestly, the same ventilator will do more on a fan job than on an open roof, and less on a gravity flue installation than on either of the former. We have considered this in making up our table as follows:

The figures below apply to either Aeroplane, Aerosquare, Jordan Siphon or Turbine Ventilators, whose relative capacities are very close to each other. A liberal factor of safety is included.

Size of ventilator to be used	Fan flue installation, cu. ft. per hr. required	Gravity flue installation, cu. ft. per hr. required	Open roof installation, cu. ft. per hr. required	Price of G. I. ventilators	Price of G. I. bases
12	33900	21000	24000	$ 18.00	$ 3.90
14	46200	28800	32100	24.00	5.40
16	60000	37800	42000	32.00	7.20
18	76500	48000	54000	40.00	9.00
20	94200	58800	66000	48.00	10.80
24	135600	84900	97000	64.00	13.80
30	211800	132000	150000	90.00	18.00
36	305100	190800	216000	130.00	27.00
42	415100	259800	295000	180.00	36.00
48	542400	339600	385000	220.00	45.00
54	686400	429600	488000	250.00	57.00
60	847500	530400	600000	290.00	72.00
66	1025400	642000	726000	325.00	87.00
72	1220800	764000	870000	360.00	102.00
84	1661000	1040000	1180000	480.00	140.00

ESTABLISHED 1866

MERCHANT & EVANS CO.

Manufacturers of Roof Ventilators

PRINCIPAL OFFICES

PHILADELPHIA, PA.

Also Sold by: GLOBE AUTOMATIC SPRINKLER COMPANY (General Agents)
OFFICES IN PRINCIPAL CITIES

Products

"STAR" VENTILATORS: Standard, Fire Retarding, and Glass Top Types.

For "Almetl" Doors and Shutters, see page A967.

Standard "Star" Ventilators

A scientific combination of the ejector and siphon principles applied to stationary roof ventilators, which in conjunction with large exhaust outlets protected to defy the elements, gives a maximum of efficiency at a minimum of investment cost.

Furnished with flat glass top when desired by replacing the conical metal top with wire glass. In no way are the exhaust and stormproof qualities affected.

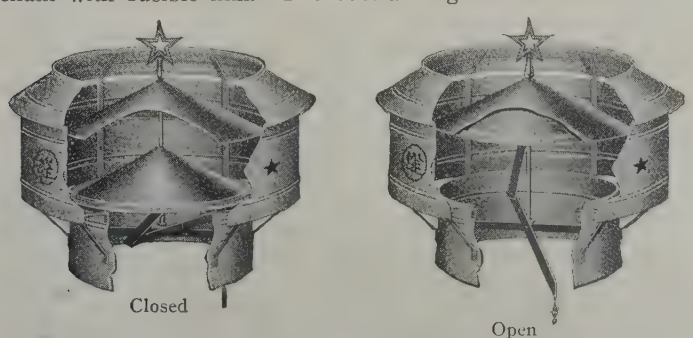
Standard Type "Star" Ventilator

Fire Retarding "Star" Ventilators

Of the same appearance and construction details as the Standard with the addition of a patented gravity damper. A chain connected by a fusible link holds the damper in any position between open and closed; and is arranged to automatically drop to a closed position when exposed to a high temperature. This style is particularly recommended for factories, warehouses and buildings where control of heat losses during winter months is desired.

Fire Retarding Skylight "Star" Ventilators

This device is a combination skylight and dampered ventilator. It is provided with annular damper connected to a chain with fusible link. The outstanding feature of this ventilator is the admission of light even though the damper may be in closed position. This type differs somewhat in appearance and construction details from the standard type, is weatherproof and has ample exhaust capacity.



Fire Retarding "Star" Ventilator with Automatic Gravity Damper (Patented)

Bases

Bases are regularly made of the same weight material as the ventilator proper. Regulation bases are made square at the bottom and gradually taper to cylindrical shape at the top. Straight pipe bases furnished when requested.

All bases have roof flanges of suitable width. All seams and joints thoroughly soldered to prevent leakage.

Flat disc counterbalanced dampers, strongly reinforced for rigidity, operated by either cord or chain, also furnished when required. These flat dampers are held on specially designed pivots, made of brass to prevent corrosion.

Base without Ventilator Showing Disc Damper

Exhaust Capacity

Recent comparative tests based on wind action only of roof ventilators conducted at Engineering Experimental Station, Kansas State Agricultural College, developed the "Star" to have a greater average exhaust capacity than any in the following groups of types tested: open pipe, plain stationary, siphoning stationary, and plain rotary, with wind velocities at 4. 6, 8 and 10 miles per hour.

EXHAUST CAPACITIES OF "STAR" VENTILATORS

Size, in.	Gauge steel	Weight C. R. copper, oz.	Exhaust* capacity in cu. ft. per hour based on wind action only at 10 miles per hour no temperature difference	Exhaust capacity in cu. ft. per hour based on wind velocity at 10 miles per hour; temperature difference 20° F. and height above intake 20 ft.	Regulation square to round bases: Opening in roof, in.	Regulation square to round bases: Height of base, in.
3	26	16	1,260	1,880	.....	.....
4	26	16	2,230	3,380	.....	.....
5	26	16	3,490	5,280	.....	.....
6	26	16	5,020	7,600	.....	.....
7	26	16	6,830	10,340	.....	.....
8	26	16	8,930	13,510	10x10	15
9	26	16	11,300	17,100	12x12	15
10	26	16	13,950	21,110	12x12	24
12	24	16	19,930	30,160	14x14	24
14	24	16	27,350	41,380	16x16	24
15	24	18	31,400	47,500	18x18	30
16	24	18	35,720	54,040	18x18	30
18	22	18	45,200	68,400	22x22	30
20	22	20	55,800	84,440	24x24	30
22	22	20	67,530	102,170	28x28	30
24	22	20	79,740	120,645	30x30	30
26	22	20	93,580	141,580	32x32	30
28	20	20	108,520	164,200	34x34	36
30	20	20	124,570	188,470	36x36	36
32	20	20	141,750	214,460	38x38	36
34	20	20	160,020	242,120	40x40	38
36	20	20	179,400	271,440	42x42	40
40	20	24	221,490	335,110	48x48	48
42	20	24	244,190	369,450	50x50	48
44	20	24	267,990	405,470	50x50	48
46	20	24	292,730	442,910	52x52	48
48	20	24	318,930	482,530	56x56	48
54	18	24	403,640	610,710	64x64	48
60	18	24	498,340	753,984	72x72	60
64	18	24	566,810	857,590	.....	.....
66	18	24	602,980	912,310	.....	.....
72	18	24	717,600	1,085,720	.....	.....
84	18	24	976,740	1,477,810	.....	.....
96	18	24	1,275,750	1,930,200	.....	.....

*According to comparative tests made by engineering experiment station, Kansas State Agricultural College.

Prices on application.

Ventilators larger than 50-in. diameter shipped in sections.

KERNCHEN COMPANY

Ventilating Engineers
101 East Wacker Drive, CHICAGO, ILL.
EASTERN OFFICE—15 Beekman Street, NEW YORK, N. Y.
AGENCIES IN PRINCIPAL CITIES

FACTORY
SOUTH GARY, IND.

Product

"K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS).

"K-S-V's" Are Correct Siphons

The correct siphon is the most powerful pulling force known to this field of ventilation. It not only exhausts, but it pulls terrifically. The siphons harness the lightest air currents, compressing and compelling them to co-act in mightily increasing the suction of air out through the ventilator.

TRADE-MARK

Construction

Simplicity of construction and complete absence of the friction inevitably involved in old-style rotary mechanisms make the "K-S-V" a troubleproof, lasting investment. Free area of outlet over 200% of pipe area. Nothing to choke or hinder. Friction at minimum, exhaust at maximum.

The eduction pipe is cylindrical with V-shaped notches or openings at the top, each covered by a siphon tapered inwardly toward the top, the total of four siphons being covered by a jacket of conical shape, whereby other siphons (four) are formed, greatly increasing the terrific pulling power. In addition, a top construction of two specially designed hoods is used, augmenting considerably the pulling force and making the unit stormproof.

The absence of friction, no revolving mechanism being present, means silent performance, nothing to wear out, nothing flopping around, no maintenance cost. A rotary requires a certain wind energy to swing it around *before it gets ready to ventilate.* The "K-S-V" *uses this wind energy to ventilate.*

Furnished in any size and made of any metal desired such as galvanized steel, Keystone copper steel, Armco iron, Toncan metal, cold rolled copper, aluminum zinc, monel metal, etc.

Furnished with or without base (see following page) damper or condensation arrestor.

Special Ventilation Service

The KERNCHEN COMPANY specializes in ventilation and its engineers are always available, gratis.

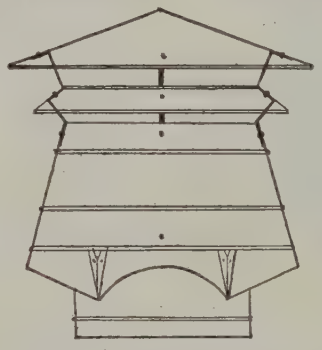
Particular attention given to difficult or unusual problems involving great heat as well as temperatures below the freezing point; steam conditions; elimination of condensation, moisture, fumes, gases or smudge, foul or vitiated air, in every type of building or room.

Specifications

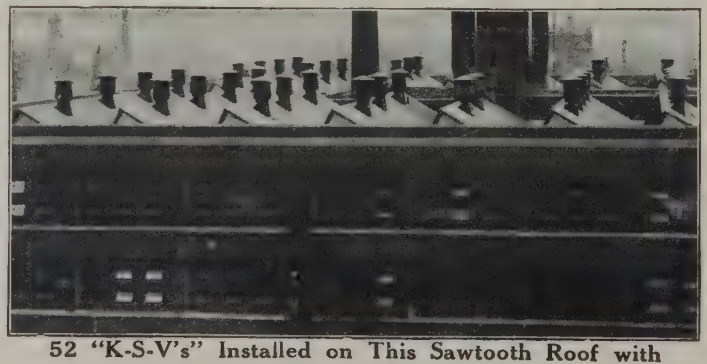
Roof ventilators to be "K-S-V's" as manufactured by the KERNCHEN COMPANY, 101 East Wacker Drive, Chicago, Illinois, in the following sizes (specify sizes by neck diameter and quantity of each size).

Bases are to be "K-S-V's" as manufactured by the KERNCHEN COMPANY, 113 West Washington Street, Chicago, Illinois, and furnished in following types to fit ventilators (specify by type number; see following page and give pitch of roof in inches per foot).

Caution—Beware of imitations and infringements; protect yourself by specifying "K-S-V's."



"K-S-V" Drawn to Exact Proportion



52 "K-S-V's" Installed on This Sawtooth Roof with Pivoted Sash

Where Used

For all buildings and all bad air conditions. A "K-S-V" does the work of three others. Save this cost!

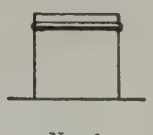
Booklet—"It Pulls"

A postal will bring our latest illustrated booklet, "It Pulls," containing complete information concerning "K-S-V's" (Kernchen Siphonage Ventilators).

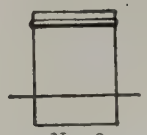
Five 42-in. Ordinary Ventilators Replaced by Five 36-in. "K-S-V's"

This is one of hundreds of instances where ordinary ventilators have had to be torn out and replaced by "K-S-V's." But there is *not one* instance we know or ever heard of where "K-S-V's" were replaced by any other kind of ventilator

Continued on next page



No. 1
Round Base for Flat Roof



No. 2
Round Base for Flat Roof with Extension

No. 3
Round Base for Slant Roof

No. 4
Round Base for Slant Roof with Extension

No. 5
Round Base for Gable Roof

No. 6
Round Base for Gable Roof with Extension

No. 7
Square to Round Base for Flat Roof

No. 8
Square to Round Base for Slant Roof

No. 9
Square to Round Base for Gable Roof

No. 10
Square to Round Base with Shoulder for Flat Roof

No. 11
Square to Round Base with Shoulder for Slant Roof

No. 12
Square to Round Base with Shoulder for Gable Roof

No. 13
Round Base for Flat Concrete Roof with Angle Iron Ring at Bottom

No. 14
Square to Round Base for Flat Concrete Roof with Angle Iron at Bottom

No. 15
Round Base for Flat Concrete Roof with Curb

No. 16
Square to Round Base for Flat Concrete Roof with Curb

No. 17
Straight Round Base for Federal or Similar Concrete Tile Roof

Official Tests

Nothing is more deceptive than irresponsible, theoretical tests.

Exaggerated performance figures will appear to be justified at times by laboratory tests conducted under conditions which are more favorable than those found in actual service.

It is only when laboratory and *field* tests agree, that the results can be taken as conclusive.

Note particularly the consistent figures in the two accompanying tests by national authorities, one conducted in the laboratory, the other on the Leader Building installation in Cleveland, Ohio.

OFFICIAL TEST OF "K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS) CONDUCTED BY ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO

SHOWING EXHAUST UNDER DIFFERENT WIND VELOCITIES, AND WHICH SCIENTIFICALLY PROVES THE TERRIFIC PULLING POWER AND 100% TO 300% MORE EFFICIENCY THAN THAT OF OTHER VENTILATORS

Wind velocity, miles per hour	Air pulled through ventilator, lineal ft. per min.	Cubic feet air pulled through ventilator									
		Size of ventilator, in.	12	14	16	18	20	24	30	36	42	48
5	460	Per min.	364.0	492.2	644.0	814.2	1,003	1,444	2,250	3,247	4,485	5,776
		Per hr.	21,840	29,532	38,640	48,852	60,180	86,640	135,000	194,820	269,100	346,560
10	670	Per min.	525.0	717.0	938.0	1,186	1,460	2,103	3,280	4,730	6,533	8,412
		Per hr.	31,500	43,020	56,280	71,160	87,600	126,180	196,800	283,800	391,980	504,720
15	960	Per min.	754.0	1,027	1,344	1,699	2,100	3,014	4,700	6,777	9,3[illegible]	12,056
		Per hr.	45,240	61,620	80,640	101,940	126,000	180,840	282,000	406,620	561,600	723,360
20	1,220	Per min.	957.0	1,305	1,708	2,159	2,660	3,830	5,980	8,613	11,89[illegible]	15,320
		Per hr.	57,420	78,300	102,480	129,540	159,600	229,800	358,800	516,780	713,700	919,200
25	1,480	Per min.	1,161	1,584	2,072	2,619	3,230	4,647	7,250	10,448	14,430	18,588
		Per hr.	69,660	95,040	124,320	157,140	193,800	278,820	435,000	626,880	86 ,800	1,115,280

(Signed) G. F. GEBHARDT, A. H. ANDERSON, Mechanical Engineers, Armour Institute of Technology

Case School of Applied Science—Test Nov. 6, 1913 on Roof of Leader Building, Cleveland, Ohio		Armour Institute of Technology—Test April 17, 1911, in Laboratory
15 inches	Diameter of ventilator	15 inches
5.32 miles per hour, or 6⅔% stronger than Armour's	Velocity of outside wind	5 miles per hour
497	Velocity of air pulled through ventilator per min., lineal ft.	460
610	Exhaust of ventilator per min., cubic ft.	564
Outside temperature, 67° Fahr.	Inside temperature, 85.8° Fahr.	

(Signed) F. H. Rose
Head of Mech. Eng. Dept.,
Case School of Applied Science

(Signed) W. F. Schaphorst
A. H. Anderson
Mech. Engrs., Armour Institute of Technology

Note: We challenge all to furnish such authentic unbiased and *official* tests as conducted and *signed* by three institute of technology professors.

Details of "K-S-V" Ventilator Bases and "K-S-V" Test Data

H. H. ROBERTSON COMPANY

Manufacturers of Ventilators

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES

ATLANTA, GA. BALTIMORE, MD. BIRMINGHAM, ALA. BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO HAVANA, CUBA
HOUSTON, TEX. NEW YORK, N. Y. PHILADELPHIA, PA. PITTSBURGH, PA. ST. LOUIS, MO. SAN FRANCISCO, CAL.

AGENCIES

ALLENTOWN, PA.	EL PASO, TEX.	NASHVILLE, TENN.	ST. PAUL, MINN.
BOSTON, MASS.	HOUGHTON, MICH.	NEW HAVEN, CONN.	SALT LAKE CITY, UTAH
BUTTE, MONT.	HUNTINGTON, W. VA.	NEW ORLEANS, LA.	SAN DIEGO, CAL.
DENVER, COLO.	LOS ANGELES, CAL.	PORTLAND, ORE.	SCRANTON, PA.
DETROIT, MICH.	MILWAUKEE, WIS.	RICHMOND, VA.	SEATTLE, WASH.
EASTON, PA.	MINNEAPOLIS, MINN.	SAGINAW, MICH.	SYRACUSE, N. Y.

TROY, N. Y. WASHINGTON, D. C.

ENGLAND, ELLESMERE PORT, CHESHIRE: Mersey Iron Works

CANADA AND NEWFOUNDLAND: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

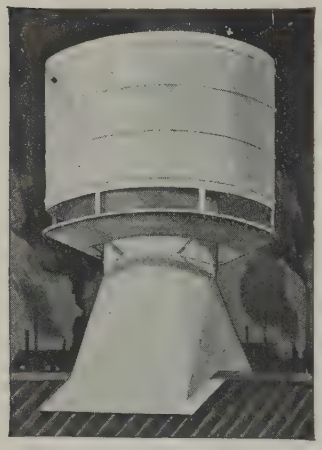
Robertson Ventilators.
Robertson Protected Metal.
For Robertson Skylights and general Glazing Construction see pages A594-599.

TRADE-MARK

Robertson Ventilator

The successful ventilation of industrial and commercial buildings depends directly on the achievement of correct answers to these fundamental questions:

How many roof ventilators will be needed to ventilate the building effectively and economically?. . . . . What should be the *size* of these ventilators?. . . . . Just *how* and *where* should the ventilators be installed for best results?



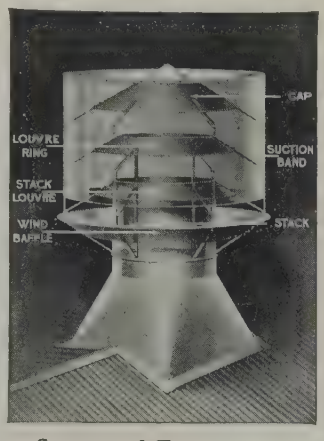
Robertson Ventilator

Equipped with an installation of Robertson Ventilators, a building will be ventilated with *maximum* efficiency and at the lowest cost obtainable with such efficiency. For every Robertson Ventilator installation is based on *facts*. Guesswork and rough estimates of ventilator requirements have no place in Robertson Ventilation Engineering.

The services of the Robertson Ventilation Engineering Department are available without cost or obligation to architects, engineers and plant officials. Robertson Ventilation Engineers make a thorough and comprehensive study of each ventilation problem. They get at the facts underlying every particular requirement. They bring to bear on each specific problem the *facts* which they have accumulated through years of experience in the ventilation of buildings of almost every type.

Then, after having determined the building's ventilation requirements with scientific accuracy, our engineers specify an installation of Robertson Ventilators that meets each specific need in every respect. A Robertson proposal will call for exactly the size and number of ventilators required for the efficient and economical ventilation of the building. Robertson Engineers specify no more ventilators than are needed and no less.

These are the reasons why a Robertson Ventilator installation—based on facts throughout—can be depended upon to maintain proper air conditions in industrial and commercial buildings at all times, and assures *most ventilation per dollar.*

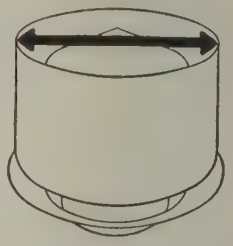


Structural Features of the Robertson Ventilator

Robertson Ventilator Construction and Advantages

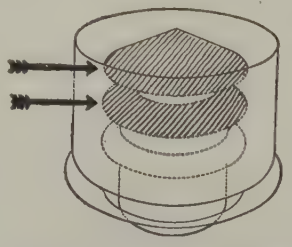
The Robertson Ventilator has an exceptionally powerful exhaust capacity—a superiority which is due primarily to the Robertson *suction band*. This band, scientifically designed as to size, proportions and position, multiplies the displacement or air pulling area of the ventilator more than six times.

Passing winds blowing across the top and bottom of the *suction band* create a partial vacuum in the *ventilator pipe*—a strong, continuous suction which literally pulls foul air, fumes, smoke, steam, etc., out of the building.



Enlarged Air Displacement Area
Gives powerful exhaust capacity

The condensed table of capacities below shows the exhaust capacity of Robertson Ventilators of various sizes under the following conditions: wind velocity—8 miles per hour; difference in temperatures of indoor and outdoor air—20° F.; height of ventilators above air intake—50 ft. These figures are dependable. They represent *actual* discharge capacities, not the so-called "rated" capacities which are widely used in connection with roof ventilators and which are, as a rule, merely a matter of estimate.



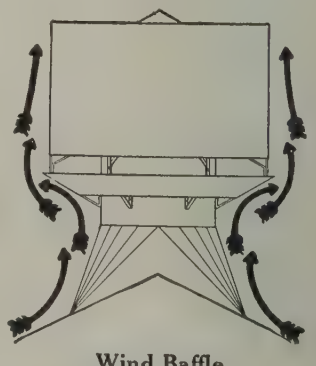
Cap and the Louvre Ring
Make the ventilator positively stormproof

CAPACITIES OF ROBERTSON VENTILATORS

Size, in.	Discharge cap. per min., cu. ft.	Size, in.	Discharge cap. per min., cu. ft.
12	462	42	5658
16	898	48	7398
18	1041	54	9341
20	1499	60	11560
24	1848	66	13872
30	2882	72	16646
36	4160	84	22472

A roof ventilator whose design permits rain, snow and wind to enter a building is not an efficient ventilator. One of the great advantages of the Robertson Ventilator lies in the fact that the *cap* and the *louvre ring* render it positively stormproof and make it impossible for downward air currents to enter the ventilator and interfere with its natural discharge.

The *wind baffle* of the Robertson Ventilator is the invention of Robertson Engineers and is to be found on no other ventilators. This feature has solved one of the most difficult problems in roof ventilator design. It positively overcomes the adverse effect of wind currents deflected upward from pitched roofs. Upward air currents entering a ventilator from below seriously interfere with the discharge of air. The Robertson *wind baffle* deflects such air currents, as shown in the illustration, and thus prevents them from entering the ventilator. This is the reason why no other ventilator on the market today can compare with the Robertson Ventilator in efficiency on pitched roofs.



Wind Baffle
(A patented feature)
Produces remarkable efficiency on pitched roofs

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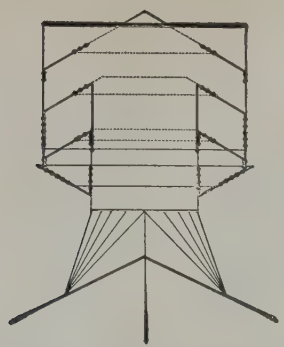
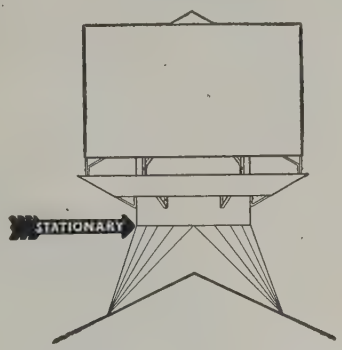


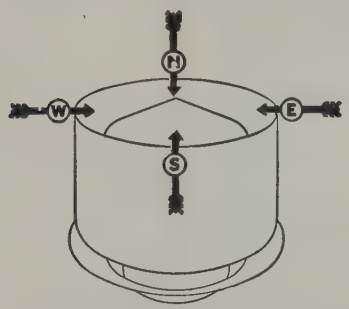
Braces Efficiently Designed, Placed and Secured Provide Exceptional Rigidity and Strength

The various component parts of the Robertson Ventilator are joined together into a strong, rigidly constructed unit by an efficient system of bracing (as shown in the accompanying illustration and also in the phantom view on opposite page). The ventilator parts are bolted to the braces and held permanently tight by lock washers. The result is a ventilator of exceptional structural strength and rigidity.

The modern tendency is distinctly towards ventilators of the *stationary* type—ventilators with no moving parts that require a perfectly level setting for efficient operation. The Robertson Ventilator is of the *stationary* type. Once erected, it requires no further attention, no adjustments of any kind, no repairs.

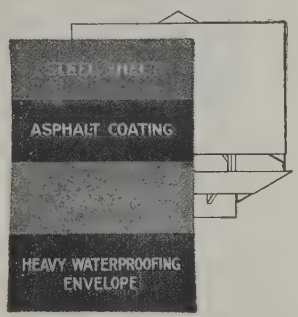


A Ventilator of the Stationary Type
No moving parts



Robertson Ventilator Operates Efficiently Regardless of Wind Direction

Because it is of the *stationary* type—with no moving apparatus to be caught and operated by the wind—and because it presents a uniform surface in all directions, the Robertson Ventilator operates efficiently at all times *regardless of the direction of the wind.*



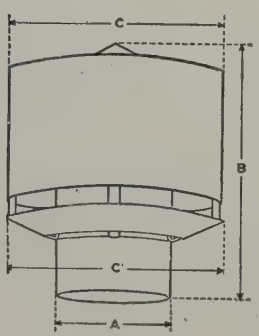
Ventilators Made of Robertson Protected Metal Are Rust Proof and Never Require Painting

Robertson Ventilators are made of Robertson Protected Metal (RPM), copper, galvanized steel, or any other material that may be specified. In cases where ventilators will be exposed to severe corrosive conditions, Robertson Protected Metal is the ideal material.

For ventilators made of Robertson Protected Metal are rust and corrosion proof and never require painting.

Dimensions, Gauges and Weights—As can be seen from the table below, Robertson Ventilators are made in all sizes used in standard practice. You will note, too, that the Robertson Protected Metal or galvanized iron used in each size is of a gauge which assures rigidity, strength and endurance.

Complete erection instructions are forwarded with each ventilator.



Dimensions, in.				Gauge, galv. and RPM	Approximate net weights, lb.		Shipping weights, lb.	
A	B	C	C'		Galv.	RPM	Galv.	RPM
12	22 5/8	22 3/4	24	24	31	46	62	77
14	27 1/16	26 1/2	28	24	40	59	75	95
16	29 3/4	30 1/8	32	24	48	70	88	110
18	32 7/8	34	36	24	57	87	127	157
20	38 7/8	37 1/2	40	24	80	103	147	170
24	45	45 3/8	48	24	130	160	220	250
30	55 3/8	57	60	22	191	247	408	464
36	67 3/4	67 1/2	72	22	275	258	513	596
*42	74 7/8	79 3/8	84	20	528	584	638	694
*48	89 3/8	91	96	20	635	782	835	982
*54	101 3/4	102	108	20	796	969	1061	1234
*60	108 5/8	113	120	20	1127	1395	1467	1735
*66	126 1/2	125	132	20	1360	1645	1731	2015
*72	129	136	144	20	1680	1995	2084	2398
*84	149 3/4	158 3/4	168	18	2314	2805	2869	3360

*Indicates that ventilator is shipped partially knocked down.

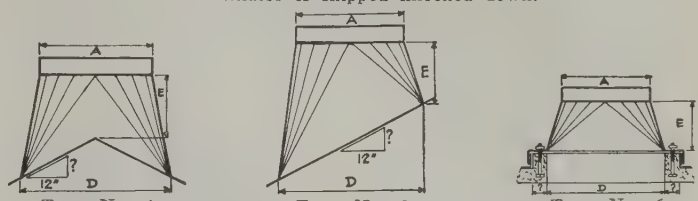
Robertson Ventilator Bases

Bases can be furnished with Robertson Ventilators to meet the requirements of any kind of roof. The three types diagrammed below are most commonly used. Types 1 and 3 are made to fit roofs of any slope; in ordering specify roof pitch. Type 6 is made to fit over concrete curbs; in ordering give size of opening and curb. Round to square bases are strongest and are shipped unless special construction is ordered.

DIMENSIONS, GAUGES AND WEIGHTS OF VENTILATOR BASES

Dimensions, in.			Gauges, RPM and galv.	App. net wt., lb.		Shipping wt., lb.	
Size A	Size D	Size E		Galv.	RPM	Galv.	RPM
12	16x 16	10	22	12	16	35	40
14	18x 18	10	22	18	23	43	48
16	21x 21	10	22	25	30	50	55
18	24x 24	10	22	35	40	70	75
20	28x 28	10	22	45	55	90	100
24	32x 32	10	22	55	75	110	130
30	38x 38	12	20	75	100	135	160
36	45x 45	14	20	110	140	170	200
*42	52x 52	14	18	140	180	200	250
*48	60x 60	15	18	190	230	270	310
*54	68x 68	16	18	240	300	330	390
*60	78x 78	20	18	300	380	400	480
*66	87x 87	22	18	360	480	480	620
*72	96x 96	24	18	460	540	600	750
*84	110x110	26	16	660	770	850	950

*Indicates that ventilator is shipped knocked down.



Type No. 1 Type No. 3 Type No. 6

Typical Robertson Ventilator Bases

Prices and Complete Descriptions

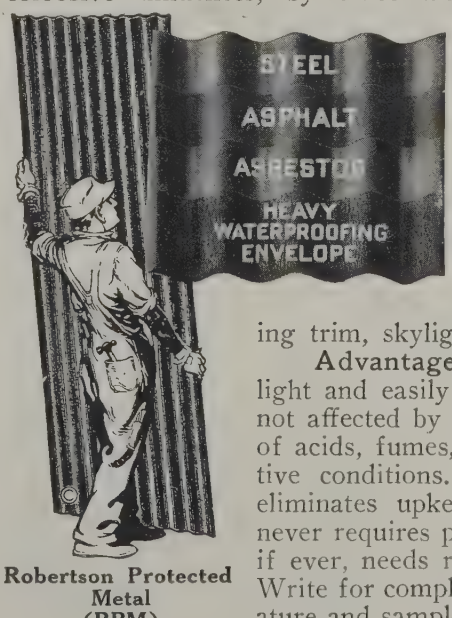
Prices, tables of capacities and complete descriptive data for Robertson Ventilators of all sizes will be sent on request.

Robertson Ventilation Data Book

The 5th Edition (52 pages) of the Robertson Ventilation Data Book contains a wealth of interesting and valuable data on ventilation. So far as we know, it is the first book that has ever been published containing data on ventilation exhaust capacities under every probable combination of severe conditions. An invaluable book for architects, engineers and plant operators. A copy is yours for the asking.

Robertson Protected Metal (RPM)

A metal building material with a steel core, which is fully protected from the most severe weather conditions, smoke, gases, fumes, condensation and all other corrosive influences, by three impervious protective coatings: (1) asphalt, (2) asbestos felt, (3) waterproofing, applied under heat and great pressure. It is made in sheets and bars for use as roofing, siding, downspouts, gutters, general building trim, skylights and ventilators.



Robertson Protected Metal (RPM)

Advantages—RPM sheets are light and easily erected. They are not affected by the corrosive action of acids, fumes, and other destructive conditions. RPM practically eliminates upkeep expense, for it never requires painting and seldom, if ever, needs repairs of any kind. Write for complete descriptive literature and sample of the product.

ROYAL VENTILATOR COMPANY

412 Locust Street
PHILADELPHIA, PA.

Products

Manufacturers of "ROYAL" VENTILATORS of Galvanized Steel, Copper, Toncan Metal, Armco Iron, etc.:

Glass Top Ventilators; Rectangular and Square Ventilators with fire retarding dampers; Smoke Jack and Combination Ventilators; Insectproof and Birdproof Ventilators.

The ROYAL TRADE-MARK (Reg. U. S. Pat. Off.)

Features of "Royal" Ventilators

Actual tests have developed the necessity of the following parts, in combination, for producing the greatest efficiency in ventilators:

The inverted cone
Tapered frustrums
Identical areas of neck and outlet

The above are standard features, embodied in every "Royal" Ventilator. It is not necessary to specify these in ordering; simply

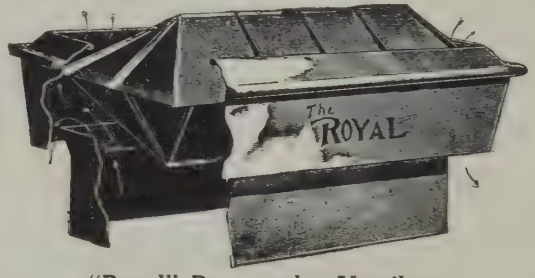
Specify—"Royal" Double Ventilators made by ROYAL VENTILATOR COMPANY, Philadelphia, Pa.

"Royal" Glass Top Ventilator

Contains a greater area of glass, reflects more light and gives more ventilation. Thus a 24-in. has a glass top 29 in. Full capacity of ventilation without interference with light

WITH FIRE DAMPER

Double Cone Ventilator

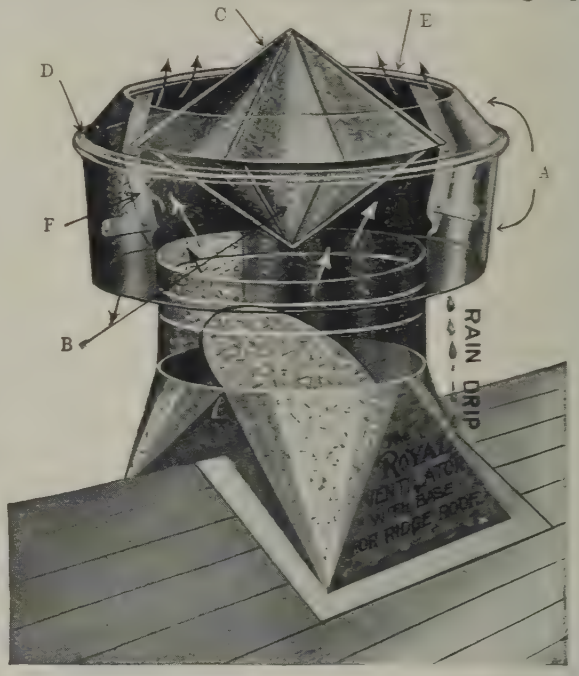


"Royal" Rectangular Ventilator

Designed to meet conditions where the maximum amount of ventilation is required at all times. Made in any desired size, with or without dampers, glass or metal top. Also made square

Construction and Operation of the "Royal" Double Cone Ventilator

The "Royal" is so designed that full advantage is taken of the wind to produce additional draft. Complete renewal of air is accomplished under the most difficult and unusual conditions by installing "Royal" Double Cone Ventilators. The many unique and original principles embodied in the design of the "Royal" make it 100% effective and insure positive ventilation under any weather condition. Tapered frustrums (A) deflect the outer air over and under the edges of the frustrums resulting in a powerful suction in the tube; this means maximum exhausting capacity.



"Royal" Principle, Double Cone Ventilator, 100% Efficient
Bases made to fit any type or pitch of roof

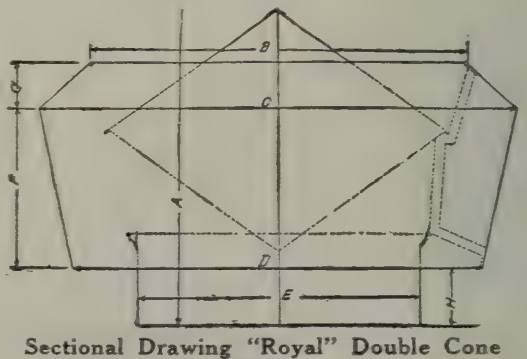
Foul gases, etc., will readily pass out even when no wind is blowing. The inverted or bottom cone (B) of the "Royal" avoids the creation of eddies, the outgoing air having free outlet unimpeded by excess friction. The upward moving foul air, etc., strikes the inverted cone and is drawn directly upward and outward. The "Royal" is not affected by down-drafts. It is adaptable to every type of building.

In the selection of materials and in the construction the greatest care is taken to maintain the highest standard.

Superior and exclusive construction features include lapped seams (D), giving three thicknesses of metal at joints, usually the weakest point. Edgewise braces (F) of malleable iron or copper running the complete length of the ventilator head, wired edges (E) of the deflectors and standing seams (C) in the cones all add strength and durability. The double cone has standing seams and gives two thicknesses of metal instead of one. Made in standard sizes 2 to 96 in.

"ROYAL" DOUBLE CONE VENTILATOR DATA

Size, in.	Cu. ft. exhaust per min., wind 5 miles per hour — Temp. dif. in bldg. and outside		Dimensions, in.								Area, sq. in.	Gage of iron	Weight of copper, oz.
	0°	20°	A	B	C	D	E	F	G	H			
10	141	186	12	13	16	14	10	5	2	3	78	24	16
12	159	417	13	15	19	16	12	6	2	3	113	24	16
16	388	512	17	20	26	23	16	8	3	3	201	24	16
18	490	832	18	23	29	26	18	8	3	3	255	24	16
20	606	911	21	25	31	28	20	10	4	5	314	24	16
22	709	1059	24	26	34	32	22	11	4	5	380	24	16
24	874	1373	24	30	39	34	24	11	5	5	453	22	16
26	1005	1631	24	33	42	36	26	13	4	3	527	22	16
28	1186	2080	26	35	45	40	28	13	5	3	615	20	16
30	1364	2390	26	35	45	41	30	14	5	4	707	20	18
32	1551	2700	25	37	47	44	32	14	5	4	804	20	18
34	1765	2987	28	40	50	48	34	15	5	4	908	20	18
36	1961	3361	28	44	56	51	36	15	6	4	1017	20	18
40	2424	4124	34	47	61	55	40	16	7	5	1257	18 and 20	18
42	2673	4680	32	52	68	63	42	17	7	3	1386	18 and 20	18
44	3124	5310	35	54	70	64	44	18	7	5	1620	18 and 20	18
48	3489	5987	39	59	75	70	48	19	8	4	1809	18 and 20	20
54	5414	8304	42	68	84	77	54	22	9	4	2390	18 and 20	20
60	6665	9721	47	76	94	82	60	23	8	8	2807	18	24
66	7851	13346	52	81	103	94	66	26	9	6	3504	18	24
72	10682	16910	50	86	108	98	72	26	10	6	4071	18	24



Sectional Drawing "Royal" Double Cone Ventilator

Send for catalogue and detail card.

ESTABLISHED 1909

STANDARD VENTILATOR COMPANY

Manufacturers of "Standard" Rotable Ventilators

LEWISBURG, PA.

DISTRIBUTERS IN ALL PRINCIPAL CITIES

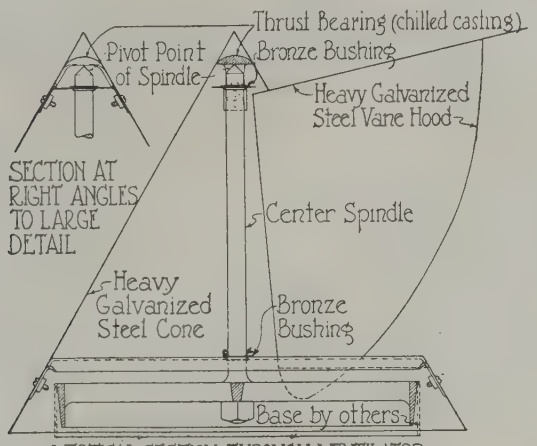
MANUFACTURED IN CANADA BY GEO. W. REED CO., LTD., MONTREAL

"Standard" Rotable Ventilator

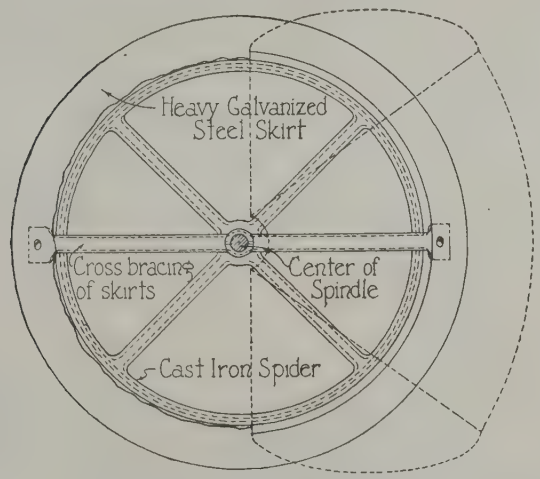
The "Standard" Rotable Ventilator is built in the form of a cone with a vane hooded opening. The cone shape offers least resistance to the wind and gives a greater ease of balance as the wind does not have a flat surface to strike.

The vane hooded opening keeps the mouth away from the wind. The wind passing the mouth induces a siphon effect causing a continual up-draught.

The operation is noiseless and as there are practically no wearing parts it is almost costless.



VERTICAL SECTION THROUGH VENTILATOR



PLAN SECTION THROUGH VENTILATOR

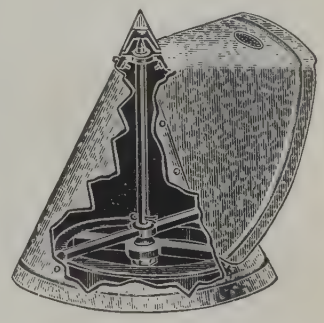
The "Standard" Rotable has been used extensively since 1909, giving complete satisfaction. During this time the manufacturer has been continually experimenting to produce, if possible, greater results and has introduced several new features. The new features, cone tip suspension, bronze bushings and cross bracing of skirt, have resulted in a highly improved ventilator in the following ways: greater durability, greater efficiency, quieter operation and better balance.

Uses—The ventilators are used by factories, schools, garages, public buildings, poultry houses, dairy barns, etc., to carry off gases, smoke, moisture, steam, vapor, foul air, odors, heat fumes and dust.

Body Material—The "Standard" is made of heavy armco ingot iron in gauges of Nos. 22, 24 and 26, according to size.

Pivot Point Spindle—The body of the ventilator turns on the simple pivot point spindle. The slightest current of air will move the ventilator.

Cone Tip Suspension—The entire weight of the ventilator body is carried on a concave thrust bearing nested in the apex of the conical body. This bearing turns upon the pivot point of the stationary center spindle.



Bronze Guide Bushings—Bushings are of non-corrosive bronze. They carry no weight and serve only to keep the body vertical under stress. They minimize the friction and reduce the tendency to screech.

Cross Braced Skirt—The skirt of the conical body is provided with cross brace to increase the rigidity. The lower guide bushing is carried in this cross bracing.

Method of Attachment—The "Standard" is made with round sleeve to slip over the permanent base, or exhaust pipe.

Sizes and Siphoning Rates—Made in flue diameter sizes from 4 to 24 in. and siphoning rates of 30 cu. ft. to 1110 cu. ft. as shown in table.

"STANDARD" ROTABLE VENTILATORS

Opening or flue diam., in.	Gauge iron	Weight, lb.	Minimum siphoning rate per min., cu. ft.*	Code word	List price
4	26	1¼	30	Ruddy	$ 2.20
5	26	1½	50	Rub	2.40
6	26	2½	68	Rotary	2.60
7	26	3	93	Rotate	2.80
8	26	3½	122	Rotula	3.20
9	26	4½	162	Rotund	3.50
10	24	6	201	Rouge	4.20
12	24	8½	272	Round	5.40
14	24	9½	373	Rouse	9.50
16	24	13½	488	Route	14.00
18	24	15	650	Rover	18.00
20	22	20½	804	Royal	23.50
24	22	28	1110	Rope	28.80

*In tests the ventilators invariably show a considerably greater siphoning capacity than the ratings here given. The figures presented here represent the minimum siphoning rate with a wind velocity of 5 miles per hour which is approximately one-half the average wind velocity of the United States.

A Few Users and Jobbers of "Standard" Ventilators

J. M. & L. A. Osborn Co., Cleveland, Ohio
Hibbard, Spencer, Bartlett & Co., Chicago, Ill.
Wright & Wilhelmy Co., Omaha, Neb.
Follansbee Bros. Co., Pittsburgh, Pa.
Demmler Bros. Co., Pittsburgh, Pa.
Herrick Company, Boston, Mass.
Harry L. Doton & Sons, Boston, Mass.
York Corrugating Co., York, Pa.
J. M. Warren & Co., Troy, N. Y.
Lyon, Conklin & Co., Washington, D. C.
Pennsylvania Supply & Mfg. Co., Allentown, Pa.
H. P. Kinsey, Easton, Pa.
C. A. Crosta, Inc., Denver, Colo.
Conklin Tin Plate & Metal Co., Atlanta, Ga.
Berger Bros. Co., Philadelphia, Pa.
W. F. Potts, Son & Co., Philadelphia, Pa.
Marshall Bros. & Co., Philadelphia, Pa.
Fries, Beall & Sharp Co., Washington, D. C.
The C. S. Mersick & Co., New Haven, Conn.
Holmes Hardware Co., Pueblo, Colo.
Congdon & Carpenter Co., Providence, R. I.
Charles Millar & Son Co., Utica, N. Y.
Albany Hardware & Iron Co., Albany, N. Y.
J. Kinsner & Son Co., Cleveland, Ohio
Bostwick-Braun Co., Toledo, Ohio
Burhans & Black, Inc., Syracuse, N. Y.
Dumphey-Smith Co., Newark, N. J.
Mathews & Boucher, Rochester, N. Y.
Stichter Hardware Co., Reading, Pa.
Bayonne Steel Products Co., Newark, N. J.

THE SWARTWOUT COMPANY

Rotary Ball Bearing Ventilators

MAIN OFFICE AND FACTORY
18515 Euclid Avenue,
CLEVELAND, OHIO

NEW YORK, N. Y., 103 Park Avenue
ST. LOUIS, MO., 1124 Chemical Building
PITTSBURGH, PA., 1009 Diamond Bank Building
CHICAGO, ILL., 549 W. Randolph Street
AGENTS AND STOCKS IN MOST PRINCIPAL CITIES, INCLUDING THE PACIFIC COAST

Swartwout
Rotary Ball Bearing
Ventilators

Products

"SWARTWOUT" ROTARY BALL BEARING VENTILATORS.

Other products manufactured are Hydromatic Steam Traps, Low Pressure Traps, Cast Iron Exhaust Heads, Feed Water Regulators, Feed Water Heaters, Sediment Strainers, Industrial Ovens, Steam and Oil Separators, Air Separators.

Swartwout Principle and Operation

Swartwout principle is very simple. It actively compels the flow of air. Rotating on accurately machined ball bearings, the Swartwout Ventilator always faces away from the wind; the passing breeze continually creates an active suction above the mouth of the ventilator, thus pulling out a steady flow of used air from the room it is connected to.

The entire area of the opening is always efficient. As it responds to every change in wind direction made possible by perfect bearing, no part of the ventilator is ever inoperative. The wind always blows past, never into, the ventilator.

Swartwout Rotary Ball Bearing Ventilator

Standard Type—Made of rust resisting galvanized Armco ingot iron sheets or special metals, of ample gauge, on a framework of sturdy angle iron, coated after accurately forming and punching. Built for lasting resistance, it is practically indestructible.

Bearings on all ventilators are bronze, all large size to insure correct balance, and practically frictionless. No grease or oil is necessary, which is a valuable feature.

Operates easily and effectively. Only one right angle turn is required for air flow, which is accurately controlled by stormproof louvers or dampers operated simultaneously from within by means of rustproof chains over brass pulleys.

Louver-setting device permits setting of the louvers at open or closed positions. Distinctly efficient without sacrificing appearance and on account of its great capacity, fewer Swartwout ventilators are required.

Air-light Type—The standard construction, except for the substitution (on specification) of a full size, strong, wire glass top for the metal top, providing a combination skylight and ventilator. The top, steeply pitched, is self-cleaning. No obstruction of the direct passage of light is possible.

An Analysis of Ventilator Requirements

For those in whose mind there is still some confusion as to the fundamental requirements in the choice of an efficient ventilator, we offer the following:

(1) Gauge of material in regard to relative overall dimensions and weight.

(2) Quality of material. Select a factory assembled ventilator built to endure, one built of heavy rust resisting galvanized metal or copper sheets with coated interior bracing, non-corrosive bronze bearings and bronze balls.

(3) Completeness. The selection of a ventilator complete with dampers, without additional cost.

(4) Capacity and general design. The years of service given under unusual conditions and the greatest possible capacity consistent with good substantial and practical design must be compared.

(5) Complete, ready for erection.

Testing Ventilators and the Swartwout Ventilator Testing Room for the Use of Architects and Engineers

So many laboratory ventilator tests have been made on identical ventilators in various parts of the country and with such varying results, that we now maintain a testing room, installed under natural conditions, for the testing of ventilators. This room is for the use of architects, engineers and prospective customers.

It is located where the wind has free access to it which avoids unfavorable eddies and uncertain results. It is equipped with the most accurate and reliable instruments obtainable, the measuring instruments being similar to those used in the United States Weather Bureau.

Comparative tests will be made or the reports of various tests of the Swartwout with other ventilators will be given upon application to this company. These tests extend over a considerable length of time and are as accurate as it is possible to make tests of this nature.

Fresh Air Requirements for Various Services

Figures in cubic feet per person per hour from table prepared by Prof. John R. Allen, Department of Mechanical Engineering, University of Michigan:

Workshops and barracks	3000
Office rooms	1800
Schools	2400
Hospitals	3600
Churches and theaters	2000
Dining rooms	1800
Toilets and bathrooms	2400

Capacities and Sizes of Swartwout Rotary Ventilators

For capacities, sizes and data on Swartwout ventilators, see detail drawing on following page.

Standard Specifications for Swartwout Ventilators

All ventilators to be of the rotary ball bearing type [metal top] [glass top] of [galvanized] [copper] metal, all interior members of angle iron, coated *after* forming and punching. Ventilators to turn sensitively on accurately machined special hard bronze bearings, employing bronze balls, and counterweighted on outside. Ventilators to be equipped with outside louver dampers to throw accumulated dirt outside of building, louver to be operated from within by chains over brass pulleys.

Gauge of metal to be THE SWARTWOUT COMPANY, Cleveland, Ohio, standard, as furnished in Swartwout Rotary Ball Bearing Ventilators at regular prices. Top of collar and bottom of hood to be stiffened with cadmium coated angle iron rings. (If desired, give standard gauge for each size, as shown.)

Note: Specifications and data for both ventilators and

Continued on next page

bases will be gladly furnished, on request, in convenient card form to fit your card index.

When specifying, inquiring or ordering, state character and pitch of roof, and whether ventilator will rest on peak or slope of roof.

Determining Proper Ventilator Sizes

The volume of air handled by any roof ventilator is affected by many conditions. Among these conditions are wind velocity, direction of wind, location and sizes of surrounding buildings or other obstructions to free movement of air, inside and outside temperatures, location and size of open windows or doors, and methods of heating.

In planning an installation, it is essential to use a sufficient factor of safety to be certain of complete ventilation at all times. The cost of a few more or larger ventilators is insignificant when compared to the difference between satisfactory and unsatisfactory ventilation. The table in the lower right-hand column is for your guidance in determining ventilator sizes. The actual capacity will, in most cases, be much greater than that shown.

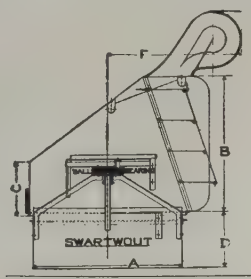
Specifications for Bases

Build each base individually for its job.

Ventilator bases to be of galvanized rust-resisting metal, two gauges heavier than ventilator, according to THE SWARTWOUT COMPANY standard for ventilator bases, and of sizes corresponding to nominal size of ventilators. Collars to be 5 in. high, grooved and riveted to body of base with 1-in. lap and 5-in. spacing. Body of base to be a square-to-round section with opening of the square 4 in. larger than the collar. Bases 18 in. and smaller to be 23 in. high over all, and larger sizes 27 in. high.

All bases to fit roof dimensions accurately with 5-in. flange, bent out, not sharp (if concrete roof, to fit detail shown), and must form an absolutely watertight juncture with the roofing material and be left so on completion. Seams at roofing line can not be allowed, except to fill in corners of base. Top of base to be absolutely level and round.

Note: For capacity, rigidity, tightness, economy, use square bases only.



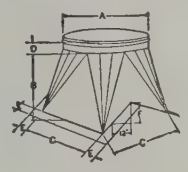
DIMENSIONS, WEIGHTS AND GAUGES OF SWARTWOUT VENTILATORS

For dimensions, "A," "B," "C," "D," "F," in inches see table below. In ordering, only dimension "A" is required.

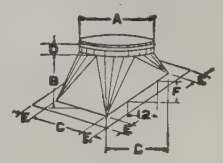
INSTALLATION

To insure proper installation and immediate satisfaction, complete directions for mounting are supplied on each ventilator.

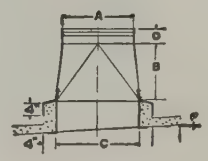
A	B	C	D	F	Gauge iron	Wt. copper, oz.	Net wt., lb.	Crated wt., lb.
10	9⅛	4	5	11½	24	18	15	20
12	11	4¾	5	14¼	24	18	20	25
14	12⅞	5¾	5½	15½	24	18	30	30
16	14¾	6	5½	17	24	18	35	40
18	16½	6⅝	6½	19	24	18	45	55
20	18½	7 9/16	6½	21	24	18	50	65
24	22	9	6¾	24½	24	20	60	80
30	27½	11 5/16	9⅛	30	22	24	120	175
36	33	13½	11	34½	22	24	160	240
42	38½	15¾	11¼	41¼	20	28	225	390
48	44	18⅞	11¼	46½	20	28	320	465
54	49½	20¼	13¾	47	20	28	485	690
60	55	22½	15½	61	20	28	560	750
66	60½	24¾	16¾	62½	20	28	650	825
72	66	27	16¾	67½	20	28	780	950



Type A



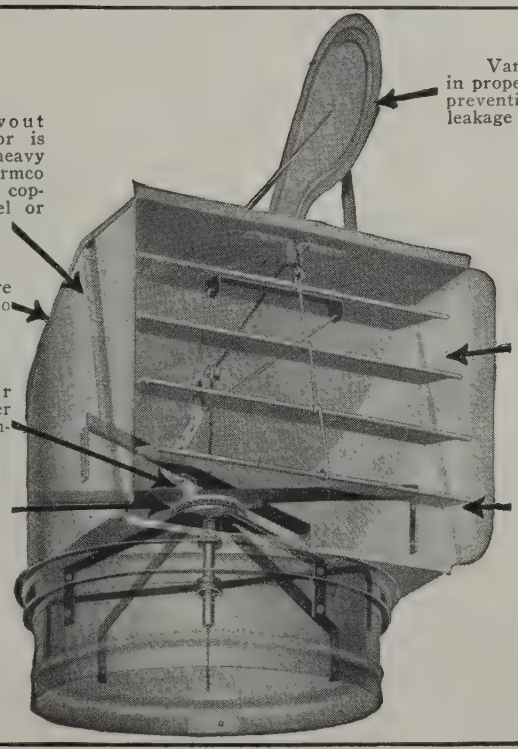
Type B



Type C

DIMENSIONS, WEIGHTS AND GAUGES OF SWARTWOUT BASES

A	B	C	D	E	F	Gauge iron	Wt. copper, oz.	Aver. Net Wt., lb.	Aver. Crated Wt., lb.
10	18	14	5	5	Required dimension slope per ft.	22	24	13	15
12	18	16	5	5		22	24	18	20
14	18	18	5	5		22	24	26	28
16	18	20	5	5		22	24	35	37
18	18	22	5	5		22	24	38	40
20	22	24	5	5		22	24	45	50
24	22	28	5	5		22	24	55	65
30	22	34	5	5		20	28	80	95
36	22	40	5	5		20	28	95	110
42	22	46	5	5		18	32	105	125
48	22	52	5	5		18	32	115	135
54	22	58	5	5		18	32	125	150
60	22	64	5	5		18	32	140	165
66	22	70	5	5		18	32	155	185
72	22	76	5	5		18	32	170	200



The Swartwout Standard Ventilator is constructed of heavy gauge galvanized armco ingot iron. Also copper, lead clad steel or special materials

All joints are double seamed. No bolts used

All interior members coated after forming and punching

Accurately machined bronze bearings revolving on bell-metal balls. No oiling necessary

Vane keeps ventilator in proper direction to wind, preventing back-draft and leakage of snow and rain

Full area opening; no restrictions

Adjustable louver damper with ratchet attachment and chain

CONSERVATIVE AIR RATING OF SWARTWOUT ROTARY BALL BEARING VENTILATORS

Size of vent, in.	Cu. ft. per min.	Size of vent, in.	Cu. ft. per min.
12	275	36	2550
14	370	42	3400
16	490	48	4450
18	650	54	5500
20	800	60	6850
24	1100	66	8250
30	1700	72	9850

Drafting Room and Specification Helps

"The Gospel of Fresh Air," a 40-page ventilation handbook with air-requirement tables, ventilator capacities, complete drawings, specifications, photographs, etc.

Ventilation Data Card, 8½x11 in., heavy card reference. Covers air requirements, capacities, ventilator and base specifications and drawings. Widely used for instant reference.

Both sent on request.

Swartwout Survey Service

Our engineering department, with many years of practical experience in mechanical ventilation, will gladly study ventilation problems and make suggestions absolutely without obligation.

Write us today.

THE V-W VENTILATOR COMPANY

Manufacturers of Roof and Window Ventilators

2834 A. I. U. Building, COLUMBUS, OHIO

REPRESENTATIVES

BOSTON, MASS., Ernest W. Lowell, 11 Beacon Street — PITTSBURGH, PA., B. A. Geier, 507 Larimer Avenue

DETROIT, MICH., F. T. Schreiner, Jr., 3772 West Euclid Avenue

V-W Siphon Roof Ventilator

Type "A" Ventilator—V-W Ventilators are designed on true siphon principle. They are effective in all buildings where it is necessary to draw out gases, such as foul air, fuels, steam and odors. Regardless of the direction or the velocity of the wind, they exhaust the air continuously.

There can be no back-pressure or down-draft. They have no moving parts; nothing to wear out, stick, rattle or get out of order. The first cost is the only cost.

It is significant that in certain places where the building codes prescribe fan or mechanical ventilation, some building inspectors will accept V-W Ventilators, stating that the latter are always effective, whereas the former are only effective when put into operation by the owner.

These ventilators are being installed on many prominent buildings, including schools, colleges, auditoriums, gymnasiums, libraries, factories, and industrial buildings of every kind.

V-W Ventilators are furnished separately or with the bases.

"WHICHEVER WAY THE WIND DOTH BLOW, SOME HEART IS GLAD TO HAVE IT SO."

Type "B" Ventilator—The regular type of V-W Ventilator has been modified somewhat to meet the requirements for paper and pulp manufacturers. This special type is designed to draw out steam and vapor without permitting condensation inside the building.

CAPACITIES OF V-W ROOF VENTILATORS

From tests performed by A. I. Brown, Professor of Heating and Ventilating Engineering, Ohio State University, and confirmed at Mellon Institute, Pittsburgh, Pa.

Size, in.	*Capacities at given wind velocities					Gauge of galv. iron
	5 m.p.h.			10 m.p.h.	15 m.p.h.	
	(1)	(2)	(3)	(1)	(1)	
10	80	175	290	180	290	24
12	110	255	425	255	420	24
14	150	355	595	350	570	24
16	190	450	770	455	745	24
18	240	575	975	575	940	24
20	300	715	1210	705	1155	22
24	430	1025	1750	1010	1660	22
30	670	1600	2730	1580	2595	22
36	960	2300	3975	2270	3730	20
42	1310	3140	5355	3090	5070	20
48	1710	4085	6960	4040	6640	18
54	2160	5180	8840	5110	8400	18
60	2670	6400	10915	6310	10380	16
66	3230	7745	13205	7420	12190	16
72	3850	9220	15715	9120	14500	16

*Capacity: (1) is cu. ft. exhaust per min. without chimney action being considered. (2) is exhaust at 15° temperature change, ventilator 20 ft. above floor. (3) is exhaust at 30° temperature change, ventilator 50 ft. above floor.

We specialize in the elimination of objectionable gases which arise in manufacturing processes.

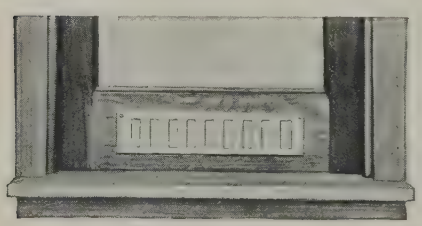
Some V-W Roof Ventilator Installations

Neil House, Columbus, Ohio
Olds Motor Works, Lansing, Mich.
Sheridan High School, Sheridan, Wyo.
Diamond Match Co., Morristown, N. J.
Ohio State University, Columbus, Ohio
Portland Cement Factory, Osborn, Ohio
Mead Pulp & Paper Company, Chilcothe, Ohio
Dayton Engineering Laboratories Co., Dayton, Ohio

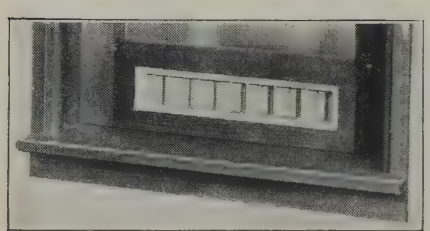
V-W Built-in Sash-rail and V-W Removable Window Ventilators

The V-W Built-in Sash-rail Ventilator—Is built into the lower or upper, or both, sash-rails of the window, with stationary ventilator outside and a sliding shutter on the inside. The ventilator is constructed of V-W patented R-shaped louvers mounted vertically in a frame. These louvers are designed to admit fresh air, without draught, and to keep out dirt, rain and snow.

Ventilation in the room can be controlled by a slight movement of the horizontal sliding shutter on inside of window.



Interior View



Exterior View

Horizontal Section

These ventilators have been found highly efficient in hospitals, hotels, schools, colleges, libraries and office buildings.

Opening sizes: 2 in. x 12 in. and 2 in. x 18 in.

Other sizes can be furnished when ordered in quantities.

The V-W Removable Window Ventilator—The same principle applies in the V-W Removable Type Ventilator as in the Built-in Sash-rail Type.

Palmer Memorial Hospital of the New England Deaconess Association
V-W Sash-rail Ventilators used throughout

This type is made 8 in. high and of various lengths to fit any window opening. Strong springs hold the ventilator in the window channel. The window operates independently of the ventilator.

Sold in hardware, department and office supply stores throughout the country.

ESTABLISHED 1873

E. VAN NOORDEN COMPANY

Roof Ventilators

TELEPHONE
HIGHLANDS 3040, 3041, 3042

100 Magazine Street, near Massachusetts Avenue
BOSTON, MASS.

Products

VAN NOORDEN VANCO-SYPHON VENTILATORS.
VANCO STEEL DOOR BUCK.
For "Anchor-Bar" Rolled Steel, Puttyless Skylights, see page A602.

Van Noorden Vanco-Syphon Ventilator (Pat. Applied for)

The Van Noorden Vanco-Syphon Ventilator is a stationary type roof ventilator. It has an inner cone at the head and a group of scientifically designed syphons around the upper part of shaft. Air currents striking the shaft are sucked into the syphons, and due to the diminishing area of same are compressed so that a rapid syphonage is created. These currents do not enter the shaft. Their movement is up and out, causing a powerful acceleration around the mouth of the shaft. Other currents striking the flaring surface of the inner cone, are similarly compressed and cause an updraft in the center of the shaft.

The Vanco-Syphon Ventilator is stormproof and is equipped with a hinged damper.

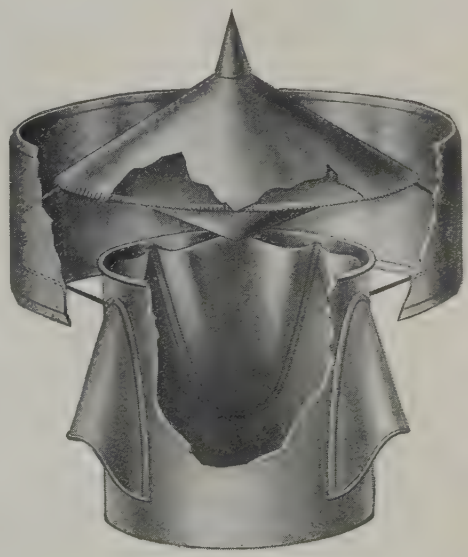
Bases — Bases are provided with ventilators only when so required and stated.

Material — Made of sheet copper or genuine galvanized rust-resisting iron.

***CAPACITIES**

Size, in.	Cu. ft. exhaust per hr.	Size, in.	Cu. ft. exhaust per hr.	Size, in.	Cu. ft. exhaust per hr.
12	28,121	18	66,810	36	249,118
14	38,405	24	111,215	48	436,170
16	49,062	30	163,421	..	.....

*Based on an average wind velocity of 5 miles per hour.

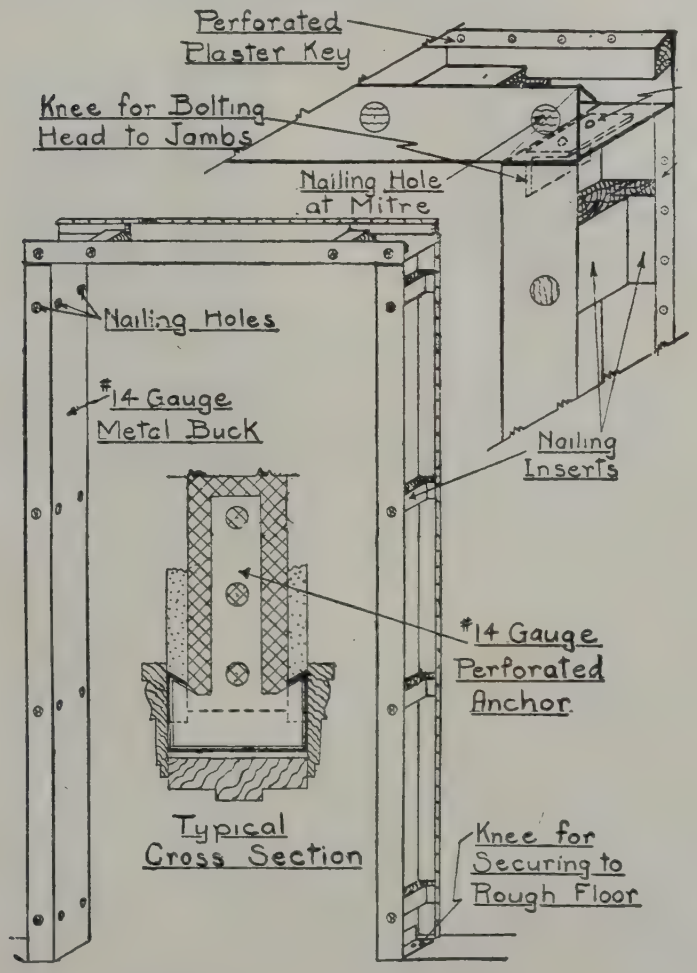


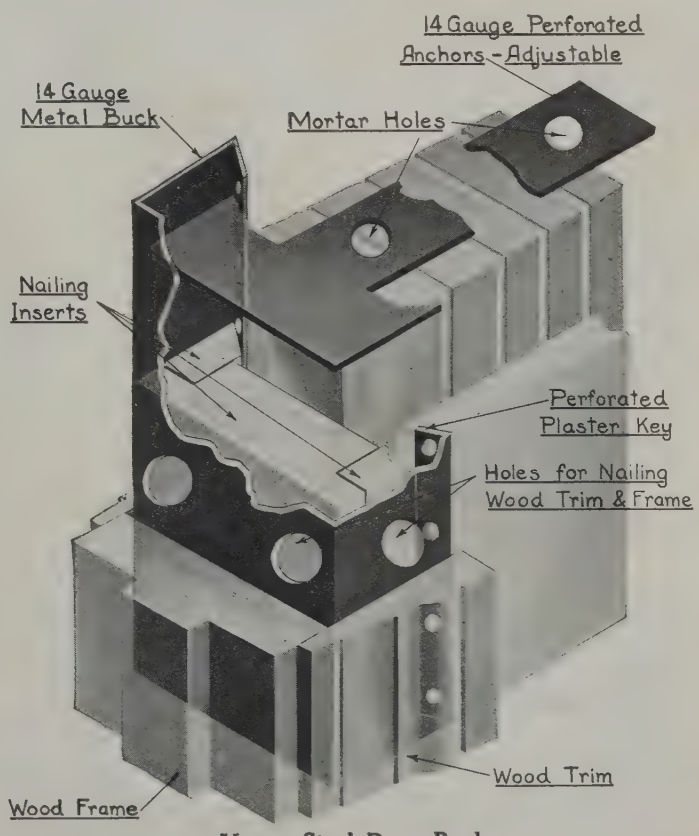
Vanco Steel Nail-To Buck (Pat. Applied for)

These new, time-saving steel bucks can be handled exactly as though they were wooden bucks. Wood frames and trim can be nailed in the same manner as wood buck. No drilling, tapping or bolting necessary. No shimming of trim.

Another feature is the movable lock anchors and perforated plaster flanges.

They do away with loose frames and wavy plaster lines and, what is very important, they minimize erection labor.





Vanco Steel Door Buck
The buck you can nail to

WESTERN ROTARY VENTILATOR CO., INC.

1328 Channing Street, LOS ANGELES, CALIF.

DISTRIBUTORS

SAN FRANCISCO, CALIF., Cookson-Cromwell Co., 447 Hampshire Street
SAN DIEGO, CALIF., Perry-Christensen-Campbell Co., Inc., 742 First Street
PORTLAND, ORE., Ray F. Becker Co., Inc., 144 Page Street
DENVER, COLO., H. W. Dawson, 850 Santa Fe Drive
PHOENIX, ARIZ., Southwestern Mfg. & Supply Co., 1217 W. Jefferson Street
SEATTLE, WASH., Puget Sound Sheet Metal Works, 3631 Marginal Way
VANCOUVER, B. C., W. G. Stephens, 305 Dominion Building

Western Rotary Ball Bearing Ventilators

Western Rotary Ventilators operate on windpower and are designed to revolve at an *effective* speed in a wind of two miles per hour. This means constant, effective operation twenty-four hours per day, as the average wind movement is about six miles per hour. These ventilators furnish a continual change of air, uninterrupted service, *without attention or operating costs.*

Operation—The centrifugal action of the revolving ventilator head, with its scientifically designed louvres, gives the Western Rotary Ventilator a positive, perpetual lift. Foul, hot air is constantly being drawn out, to be replaced through infiltration by cool, fresh air. As a result, there is set up a steady circulation, through which natural action is aided by the mechanical lift of the ventilator head. This produces a venting efficiency that cannot be secured by any stationary device.

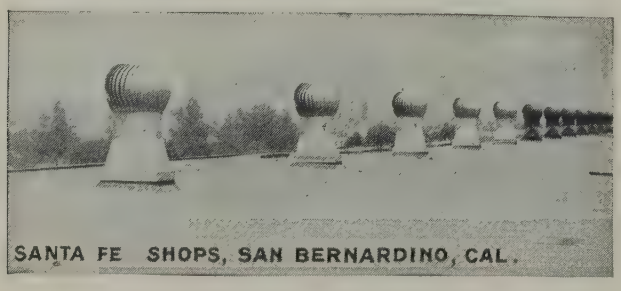
Noiseless—There are no whirring fans or buzzing motors; the moving parts of the ventilator revolve on ball bearings, bathed in oil.

Stormproof—Western Rotary Ventilators are so designed that air, rain, sleet, snow and mist cannot enter the ventilator head.

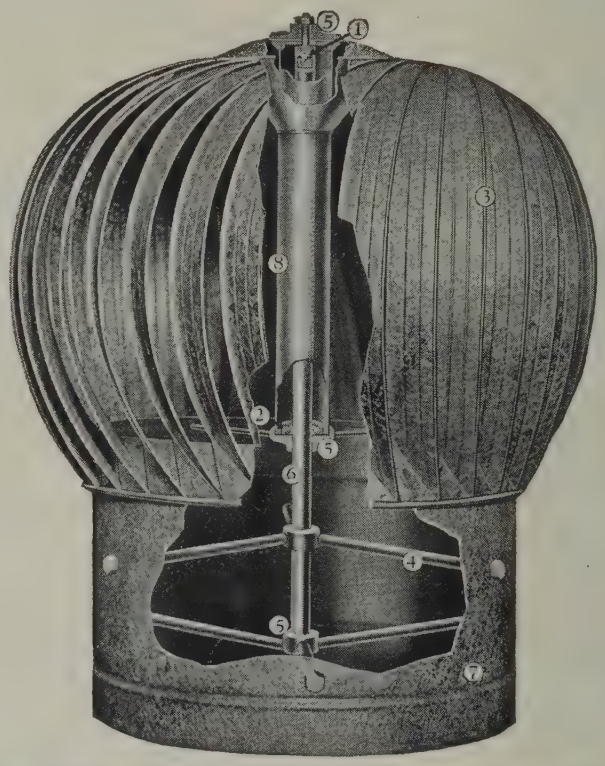
Before installing Western Ventilators on its substation to cool most expensive automatic power equipment, the Pacific Electric Railway Co. made this exacting test: Blue print paper, which is most responsive to moisture, was placed in the base of a Western Rotary Ventilator. It was then left exposed to a driving rain for twelve hours. At the end of that period, not a trace of moisture was visible on the blue print paper.

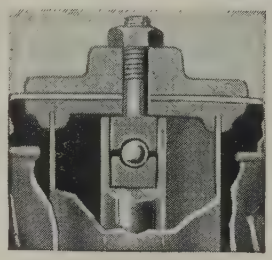
Partial List of Users

Grauman's Egyptian Theater Building
Hollywood Theaters, Inc.
Paramount-Famous-Lasky Corp. Studios
Hal E. Roach Studios
Los Angeles Board of Education Schools
F. W. Woolworth Co. Stores
Santa Fe Railroad Buildings
Union Pacific Ry. Buildings
Pacific Gas & Electric Corp. Plants
Great Western Power Company Plants
Standard Oil Company Plants
B. P. O. E. Temple, Redondo and Long Beach
Pacific Coast Club, Long Beach
Los Angeles Brewing Co. Plant

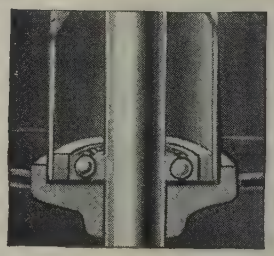


Roof of the Santa Fe Railway Shops
A battery of Western Rotary Ventilators keeps the air cool





Reg. U. S. Pat. Off.



Western Rotary Ventilator Construction

(1) Specially designed ball thrust bearing at top
(2) Radial ball bearing (Nice type)
(3) Multo-vane head construction
(4) Galvanized bracing
(5) Brass castings
(6) Steel support shaft
(7) Rust-resisting metals used throughout
(8) Bearings positively sealed against dust, soot and dampness

Unlimited Guarantee

Western Rotary Ventilators are guaranteed to give uninterrupted service as long as the life of galvanized steel or copper.

DIMENSIONS, DISPLACEMENT AND WEIGHTS

Stock sizes, in.	Diam. of head, in.	Height, in.	Gage of iron	Air displacement, cu. ft. per hr.		Weight, lb.	
				Velocity 4 m.p.h.	Velocity 8 m.p.h.	Net	Crate
6	9½	13	26	14,360	19,900	7	12
8	11½	16	26	17,400	22,800	9	15
10	14½	20	26	26,100	33,110	12	20
12	16½	23	26	38,300	41,000	17	26
14	19	27	26	41,100	50,000	22	31
16	22	31	24	50,000	61,500	30	45
18	25	32	24	76,310	85,000	35	53
20	28	36	24	109,200	120,300	42	63
24	35	42	24	149,000	165,000	70	105
30	42	48	24	230,000	255,000	94	150
36	50	64	22	310,000	360,100	161	210
42	60	72	20	420,000	480,000	200	250

Note: Wire, our expense, for prices f.o.b. your city.

THE VENTILOUVRE COMPANY

Manufacturers of Gabelouvres for Attic Ventilation

First National Bank Building, BRIDGEPORT, CONN.

NEW YORK OFFICE, 280 Madison Avenue—Telephone, Caledonia 6644

For Panelouvres, see pages B1474-1476

Gabelouvre—The New Attic Ventilator

The Gabelouvre is a complete ventilating unit, ready for installation, used in the gable ends of any residence or building and assuring easily controlled ventilation for the attic. It admits light and air but excludes rain, snow, birds, insects, etc. The Gabelouvre is also extensively used for ventilating garages, sleeping porches, storage rooms, restaurants, kitchens, and similar places. It makes an ideal adjustable fresh air intake for hot air furnaces. Can be installed by any ordinary workman.

A Gabelouvre in the Gable Ends of a Cottage

The louvres are so designed and built that they pass ventilation equal *to eighty per cent* free area of opening, admit light, but exclude the elements. Is equipped with copper screening to prevent insects from passing through.

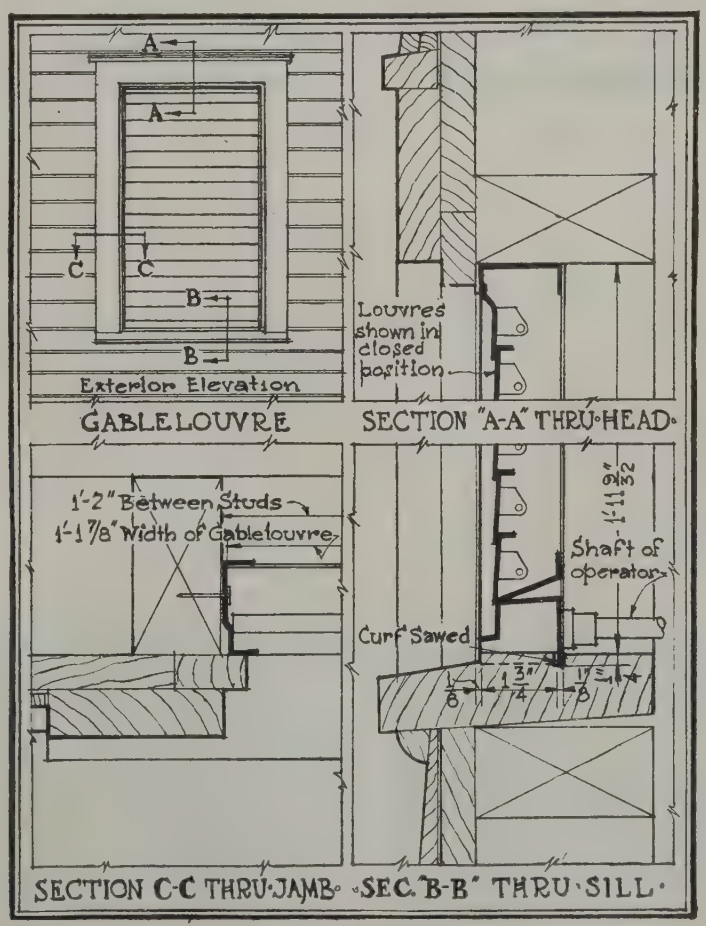
It is adjusted for opening and closing by means of pull chains. Standard chain length is 2 ft., but extension chains can be furnished for operation from the floor below.

Construction — The Gabelouvre is made of .050 gauge cold rolled steel with all corners spot-welded and flush. The unit is finished in a special rust preventive which is guaranteed to keep the device from rusting. Then two coats of baked enamel are applied over this, all of which guarantees that the Gabelouvre will last as long as the building.

Sizes—Gabelouvres are manufactured in one standard width, namely 13⅞ in. and in three standard heights, 23 11/32, 17 11/32 and 12 27/32 in.

Cost—The cost is less than an old-fashioned wood ventilator.

Interior View (Open)



Exterior View (Closed)

THE BERGER MANUFACTURING CO.

Steel Ceilings and Sidewalls

CANTON, OHIO

BRANCHES

BOSTON, MASS., 307-315 Dorchester Avenue
NEW YORK, N. Y., 514-524 West 25th Street
PHILADELPHIA, PA., 16th Street and Washington Avenue
CHICAGO, ILL., 228 North La Salle Street
ST. LOUIS, MO., Third Street and Russell Avenue
NORTH KANSAS CITY, MO., 14th and Iron Streets
MINNEAPOLIS, MINN., 1701-1729 Broadway N. E.
SAN FRANCISCO, CAL., 1120 Mission Street
ROCHESTER, N. Y., 212 Wilder Building
LOS ANGELES, CAL., 405 East Second Street
DALLAS, TEX., Corinth and Pearl Streets
ROANOKE, VA.
JACKSONVILLE, FLA.

EXPORT DEPARTMENT: 514-524 West 25th Street, NEW YORK, N. Y.

Products

BERLOY STEEL CEILINGS and SIDEWALLS in wide variety of attractive designs to harmonize with various styles of architecture and furnishings.

For Floor Cores, see page A122; for Metal Building Material, see pages B1685-1689; for Lockers and Shelving, see pages C3798-3799.

Steel Ceiling Advantages

Briefly stated, the advantages of Berloy steel ceilings are beauty, safety, permanence, fire resistance, bacteriological cleanliness and ultimate economy.

Berloy steel ceilings offer the architect a wide range of styles and period designs suitable for use in residences, churches, theaters, schools, offices, restaurants, stores, lodge rooms, factories, showrooms, markets and other locations where ceilings and walls offering the above advantages are required.

By means of a special type of bead and button construction Berloy plates fit snugly and with absolute accuracy. As illustrated, the top of the nailing button is depressed or countersunk, and forms a self-centering and self-guiding nailing point that directs the nail to its proper position and prevents slipping while being driven. This is a feature of Berloy construction that gives extra strength and rigidity to the entire plate.

Berloy Bead and Button Construction

Berloy Modern Steel Ceilings

Berloy facilities and equipment for the production of steel ceilings are unsurpassed. The finest type of presses and other mechanical equipment contribute to the excellence of Berloy ceilings, and complete control of every manufacturing process from the time the iron ore enters the blast furnace to shipment of the finished product is in Berloy hands.

All Berloy ceiling units are produced on special draw-presses, each possessing a 900-ton pressure capacity. These presses give an accuracy, depth and sharpness of detail impossible to achieve with the ordinary drop hammer method of production. Each unit is an exact facsimile of all other units of the same style and design.

Back of the presses and other equipment that reproduce the beauty and character of Berloy designs are Berloy's own furnaces and rolling mills that aid in making the Berger plant one of the largest sheet metal works in the world.

This control of all steps in production enables Berloy to regulate its output according to market conditions and, further, serves as a guarantee of economical operation and the prompt filling of all orders, either from the main plant at Canton or the numerous branch warehouses throughout the country.

Berloy Designs

Berloy steel ceilings are made in beautiful and practical modern designs. These designs are made in wide variety to offer a range of choice for every service.

Various types of cornice border and field plates can be combined to form an endless variation of finished effects. Many of the best combinations are clearly illustrated in the big Berloy Catalogue D27 which will be sent to any architect on request to the nearest Berger Office.

Berloy Steel Sidewalls

Steel sidewalls are sometimes desirable and a variety of practical and attractive modern Berloy designs are available for the purpose.

Popular Priced Plates

For garages, lofts, basements, factory rooms and similar places where the more artistic designs are not required, Berloy popular priced ceiling and sidewall plates can be used with a considerable economy both in cost of ceiling material and in erection costs.

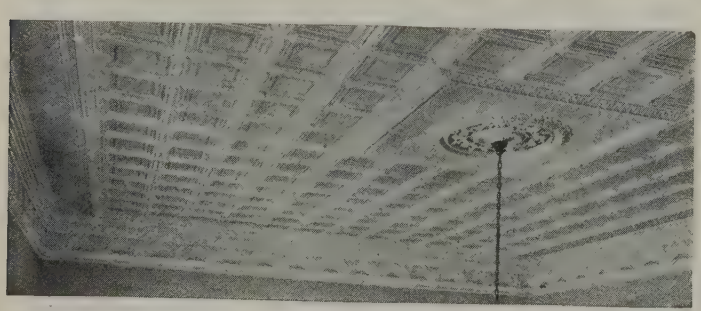
Directions for Applying Berloy Steel Ceiling and Sidewall

Before commencing the application of material, verify all measurements and study carefully the working plans.

Working Plans—Proper working plans are supplied, which are prepared from information and measurements furnished.

Our plans will show in detail the exact location of every piece of material. It is very important that the constructor carefully study the working drawings, and same should be thoroughly understood before commencing the work.

Leveling of Joists—With a straightedge it can be determined whether furring down or leveling is necessary. This may be accomplished by nailing to the side of joists a strip of necessary thickness, or by setting wedges, as may be required, after ceiling furring strips have been leveled.



Berloy Metal Ceiling in Masonic Temple, Wilmington, Ohio

Berloy Ceiling in St. Clement's Church, Minneapolis, Minn.

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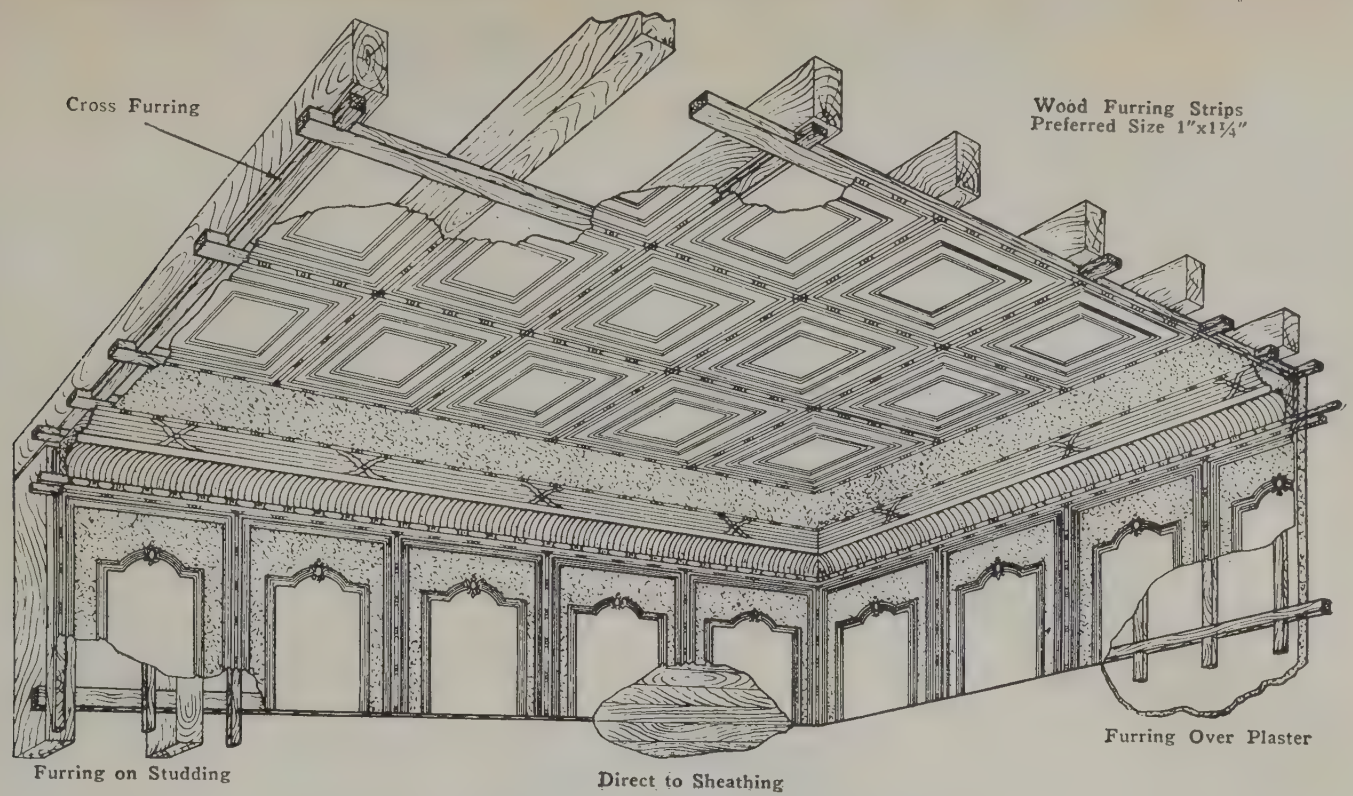


Details of Application for Berloy Modern Steel Ceilings

It is absolutely essential that furring strips lengthwise and crosswise of the room are centered exactly to the center of nailing points on ceiling plates.

From both ends of the room at points indicated on working plan as "starting line," strike a chalk line; this establishes a starting line from which to work.

For Continuous Ceilings—Use the following rule for placing of wood furring strips: Place the first wood strip on starting line, and parallel to the same place additional strips 12 in. on centers for plates of 6 or 12-in. multiple, and for such 24-in. multiple plates which are not sufficiently rigid to carry their own weight without buckling or sagging. For all 24-in. multiple plates place strip 24 in. on centers. Cross furring or headers must be inserted at the end of each plate whether same be furnished in 2, 4, or 8-ft. lengths. This method of furring excels methods formerly practiced, because it provides a solid foundation or backing for all nailing points and requires a smaller quantity of strips; also reduces to a minimum the labor required in the application of the materials.

Furring should always be placed at right angle with joists; cross furring or headers parallel with joists.

Should wood strips be furnished in connection with metal ceilings, the necessary amount required will be based on the above method of construction.

For Panel Ceilings (Sunken Panels)—Parallel to the first strip placed on starting line through the room, place additional strips according to the width of panels used. Cross furring strips or headers must be placed at the end of each panel or last multiple thereof. For example, if the panels are in sheets 4 or 8 ft. long, cross furring is necessary at the end of sheet only. Furring strips lengthwise and crosswise the room are to be centered exactly on the center of nailing points in ceiling panels or plates.

Cornices and mouldings are to be applied with the use of wood brackets furnished for that purpose, as shown by working drawings; one wood bracket to every 4-ft. section of cornice or moulding, and extra brackets for miters and connections. Brackets are used under laps only.

All cornices and mouldings should be applied to a chalk line so that the finished work may be absolutely straight and accurate.

Nail the foot of the cornice in position before nailing the top edge, so as to provide for the underlapping of filler if necessary. Stamped miters for inside and outside corners are furnished for certain coves and cornices, and can be used for right-angle miters only. Stamped miter leaves for inside and outside corners are furnished for certain coves and cornices, and may be used for irregular-angle miters.

For certain coves and cornices both stamped miters and leaves are furnished. For all other coves and cornices the ceiling constructor will make or cope the necessary miters as the work proceeds. Working plans always indicate width of border, moulding, filler, and projection of cornice, and this will guide the constructor in spacing furring strips to receive same.

Strike a chalk line in center of strip or starting line for guidance in placing the plates or panels perfectly straight and true.

Always commence the application of material at rear of room and work forward, when possible.

Steel Sidewalls—The foregoing rules also govern in the application of steel sidewall material, for which furring strips are required when the work is done over plaster or studding; we, however, recommend the use of close sheathing for all continuous plates. When sunken panels are used, furring strips must be used of a size to carry the depth of panel.

If metal wainscoting is used, this should be applied first, then such other material as working plan calls for to make the finish above wainscoting.

Care should be taken to keep the work straight and true.

Sufficient allowance for cutting, underlapping, and wastage will be provided for.

Wood Furring Strips—Furring strips of ⅞x⅞-in. size are very satisfactory when working over plaster, but experienced ceiling constructors, when working over joists or studding, prefer ⅞x1¼-in. size; they are less liable to split, and provide a rigid foundation for the nailing of metal; especially is this true when toenailing headers or cross furring in position.

Wood furring strips are never provided for unless specifically ordered; then same are charged for extra, because users of this class of material can usually purchase in their own city or vicinity the necessary furring strips at satisfactory prices and save freight charges.

Wood furring strips of ⅞x1¼ in. weigh about 18 lb. per 100 lin. ft.

Estimates, Drawings and Literature

The corps of experienced Berloy Ceiling Draftsmen is at the service of any architect in planning the use of Berloy steel ceilings and sidewalls, with estimates of cost.

This service is free to architects. Send sketch and exact dimensions of room, state height of ceiling, indicate preference as to style or design of ornamentation desired, with any other information which will assist our ceiling experts in meeting your desires. Address nearest Berger Office for catalogues and any information desired.

Steel Ceiling Users

Following is a list of representative buildings in which Berloy steel ceilings have been used:

Plaza Theater, White Sulphur Springs, W. Va.
Regent Hotel, St. Louis, Mo.
American Athletic Club, Chicago, Ill.
Dance Hall, 308 West 52nd Street, New York, N. Y.
Manhattan State Hospital, Ward's Island, New York, N. Y.
Citizens National Bank, Covington, Ky.
High School, Athens, Ohio
General Motors Corporation, Muncie, Ind.
Knoxville Power & Light Co., Knoxville, Tenn.
Kissam Hall, Vanderbilt University, Nashville, Tenn.

BENJAMIN RIESNER, INC.

TELEPHONE
BUTTERFIELD 8580

Roofers and Sheet Metal Contractors

260 East 78th Street, NEW YORK, N. Y.

Product

RIESNER VENTILATING BRICK. (Pat. Jan. 5, 1926.)

Riesner Ventilating Brick

Description—A ventilating brick, made of cast iron or bronze with galvanized iron flue, the size of a standard brick, having a louvered face with waterdrip at top and bottom.

Three Types—*"Type A"* transforms to a 3-in. diameter flue and has a 3-in. brass collar as inside of wall.

"Type B" carries through wall with a 2x8-in. duct and has a register face at inside of wall.

"Type C" transforms to a 6-in. diameter flue and has a 6-in. brass collar at inside of wall.

All types are 13 in. from louvered face to inside of wall. Ventilating bricks required longer or shorter than 13 in. can be made specially.

Construction—Made of cast iron with galvanized iron flue or bronze with copper flue.

Where Used—These ventilating bricks are especially suited for use in kitchens, kitchenettes, pantries, closets, hung ceilings, attics, cellars, mausoleums, bathrooms, utility rooms and clothes closets for schools.

Advantages—Does not take up any room, *it is bricked into the wall.*

Particularly useful in kitchens to remove gas fumes, steam cooking odors and foul air, where there is no room for vertical vent shafts and bulky ventilators.

When kitchens are properly ventilated and gas fumes, steam and cooking odors removed, the walls do not discolor and kitchens do not require painting as often.

Weatherproof, Durable, Economical—Riesner Ventilating Bricks are absolutely weatherproof by their design, durable because of the material used, and economical—for the first cost is the only cost.

Installation—The ventilating brick is "bricked" into the wall by the mason as the wall goes up, 6 in. below the ceiling line with the louvered face to the outer air and flue or register face in the room.

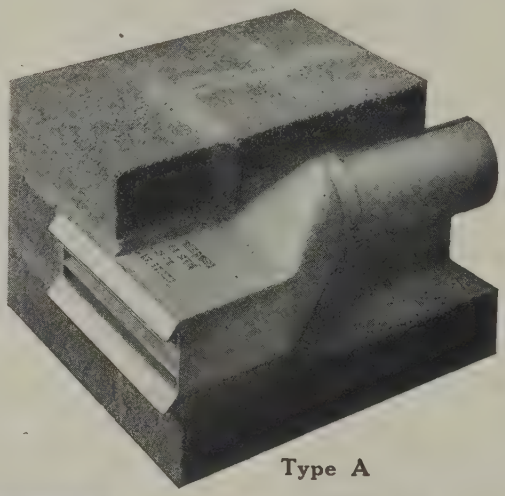
Specifications—Specify under masonry heading: "Install Ventilating Bricks as manufactured by BENJAMIN RIESNER, INC., 260 East 78th Street, New York, N. Y., in the wall 6 in. below bottom of ceiling beam." (Specify type, where brick is to be installed, and whether cast iron or bronze.)

Prices—***"Type A"***—Cast iron 13 in. long with 3-in. diameter brass collar, $5.50 each, net f.o.b. New York, N. Y.

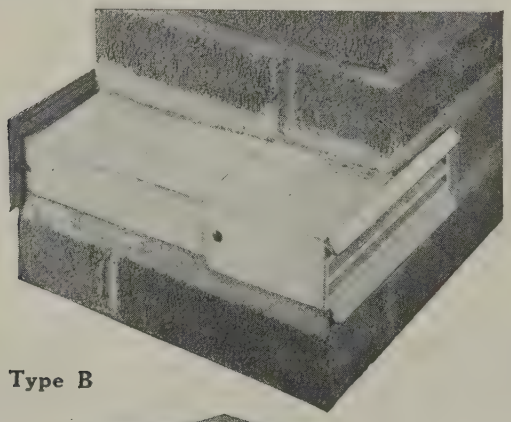
"Type B"—Cast iron 13 in. long with 2x8-in. register face, $6.50 each, net f.o.b. New York, N. Y.

"Type C"—Cast iron 13 in. long with 6-in. diameter brass collar, $11.50 each, net f.o.b. New York, N. Y.

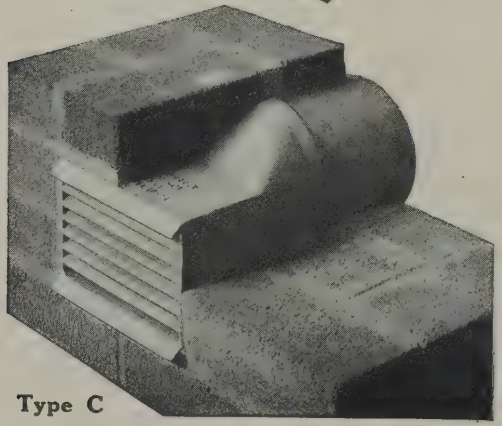
Note: Cast bronze prices on application.



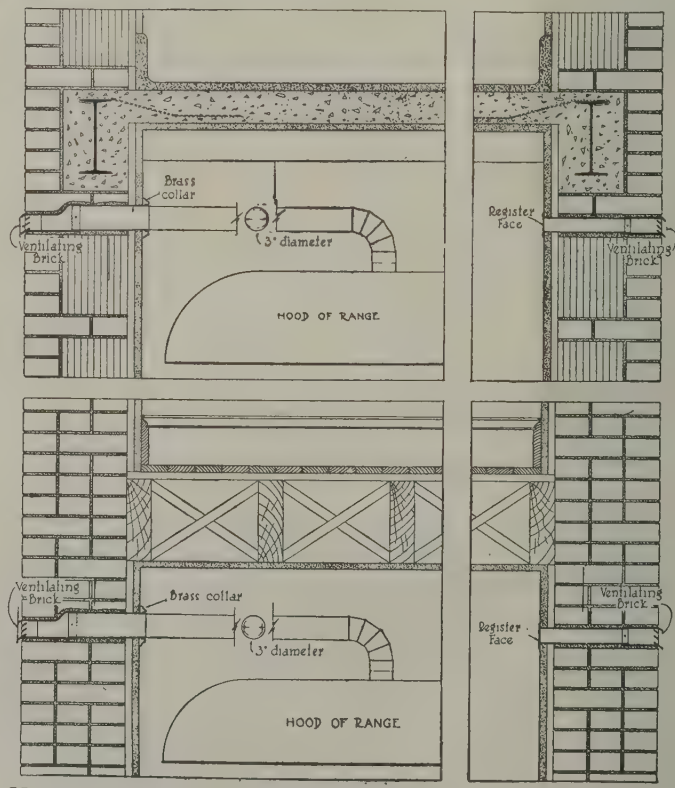
Type A



Type B



Type C



Ventilating Brick in Walls of Fireproof and Non-fireproof Construction

BETHLEHEM STEEL COMPANY

GENERAL OFFICES
BETHLEHEM, PA.

DISTRICT OFFICES

NEW YORK	BALTIMORE	BUFFALO	CINCINNATI	ST. LOUIS	SEATTLE
BOSTON	WASHINGTON	PITTSBURGH	CHICAGO	SAN FRANCISCO	PORTLAND
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BETHLEHEM STEEL EXPORT CORPORATION, 25 BROADWAY, NEW YORK, N. Y.
Sole Exporter of our Commercial Products

Products

BETHLEHEM WIDE-FLANGE STRUCTURAL SHAPES, including GIRDER BEAMS, I-BEAMS and H-COLUMNS; BETHLEHEM JOISTS and STANCHIONS.

Uses

Bethlehem Girder Beams and I-beams are used in buildings, short-span bridges and as bridge floor beams; H-columns, in all sizes of buildings and bridges; joists are used especially for floor construction in buildings designed for lighter floor loads; also in the roof construction of all types of buildings; stanchions are used as columns or posts in connection with Bethlehem Joists.

Advantages

Bethlehem Wide-Flange Structural Shapes, commonly known as Bethlehem Sections, are rolled on Bethlehem's Patented Grey Mills. These sections combine the advantages of economy in weight and cost of fabrication.

PROPERTIES OF BETHLEHEM GIRDER BEAMS

Section No.	Weight per ft., lb.	Section modulus, in.³	Section No.	Weight per ft., lb.	Section modulus, in.³	Section No.	Weight per ft., lb.	Section modulus, in.³
	260.0	949.5	G24	113.0	281.7	G15b	127.0	191.9
G36	250.0	911.2		107.0	266.9			
	240.0	872.0					111.0	174.5
	231.0	835.0		124.0	293.2	G15a	105.0	164.2
			G22	116.0	273.2		99.0	154.3
	230.0	778.0		108.0	254.9		94.0	147.3
G33	220.0	741.4		101.0	236.8			
	210.0	707.3					80.5	129.3
	202.0	676.0		149.0	311.6	G15	74.0	119.0
			G20a	142.0	296.1		69.0	109.6
	200.0	617.8		135.0	280.6		64.5	104.1
G30	190.0	585.5		127.0	264.0			
	180.0	556.2					76.5	98.1
	173.0	528.5		120.0	251.3	G12a	70.5	90.6
			G20	113.0	236.3		66.0	83.7
	175.0	499.7		107.0	222.0			
G28	165.0	473.2		99.0	206.0		61.0	79.8
	156.0	446.1				G12	55.5	72.6
	145.0	416.0		99.0	193.7		51.5	67.3
			G18	92.0	179.8			
	160.0	431.0		86.0	167.1		50.0	54.8
G26	151.0	406.9		80.0	154.4	G10	44.5	49.3
	144.0	385.1					41.5	45.6
	138.0	370.4		94.0	165.1			
			G16	87.0	152.7		43.5	42.8
	148.0	371.3		81.0	141.4	G 9	38.5	38.2
G24a	140.0	350.1		74.5	130.2		36.0	35.9
	132.0	329.9						
				147.0	222.9		36.5	32.6
G24	128.0	320.7	G15b	141.0	212.9	G 8	33.0	29.0
	120.0	300.6		135.0	202.9		29.5	25.6

PROPERTIES OF BETHLEHEM I-BEAMS

Section No.	Weight per ft., lb.	Section modulus, in.³	Section No.	Weight per ft., lb.	Section modulus, in.³	Section No.	Weight per ft., lb.	Section modulus, in.³
	173.0	595.0		89.0	197.9	B15b	71.5	106.6
B36	164.0	561.1	B22a	83.0	184.2			
	155.0	530.4		77.0	170.6		59.5	89.4
	147.0	500.9				B15a	54.5	82.3
				73.0	161.5		50.5	75.7
	152.0	478.4	B22	67.5	148.1		46.0	68.9
B33	143.0	449.4		62.5	135.9			
	135.0	422.3		58.0	124.7		42.5	65.2
	125.0	394.3				B15	40.0	61.6
				78.0	157.8		38.5	59.7
	129.0	373.4	B20a	73.0	148.5		36.0	55.1
B30	121.0	351.3		68.5	137.4			
	115.0	330.8					42.0	61.3
	110.0	314.8		64.5	128.7	B14	37.5	54.3
			B20	62.0	123.6		33.0	47.8
	112.0	306.4		59.5	118.2		30.0	42.5
B28	104.0	284.7		56.0	109.3			
	97.0	265.1					48.5	60.9
	91.0	246.9		74.0	137.9	B12a	44.0	55.3
			B18a	69.0	128.2		40.0	50.2
	98.0	247.4		64.5	118.5			
B26	91.0	230.2		59.0	108.2		36.0	46.0
	85.5	214.3				B12	31.5	40.5
	81.0	201.7		54.5	98.9		28.0	35.6
			B18	52.0	94.3		25.0	31.2
	104.5	248.8		49.0	89.2			
B24b	99.5	236.8		47.0	85.2		28.5	30.2
	95.5	225.2				B10	26.0	27.3
				71.5	119.8		23.5	24.6
B24a	90.5	214.6	B16a	66.0	110.2		21.0	21.8
	84.5	200.5		60.5	101.5			
				56.5	93.5	B 9	22.0	20.7
	79.5	188.2					20.5	19.2
B24	73.5	175.7		50.0	82.3			
	70.0	163.7	B16	45.0	73.8	B 8	19.0	15.8
				40.0	65.8		17.5	14.4
B22a	96.5	213.4		35.0	55.1			

PROPERTIES OF BETHLEHEM H-COLUMNS

Section No.	Weight per ft., lb.	Least radius of gyration	Section No.	Weight per ft., lb.	Least radius of gyration	Section No.	Weight per ft., lb.	Least radius of gyration
	143.0	3.90		131.5	3.55	H12	190.0	3.22
	151.0	3.92		139.0	3.57			
	160.0	3.93		147.0	3.58		33.5	1.93
	169.0	3.95		155.0	3.60	10	38.0	1.96
						H—	42.5	1.97
	177.0	3.96		161.0	3.80	8	47.5	1.99
	186.0	3.98		168.0	3.82			
	195.0	4.00		177.0	3.83		49.5	2.47
	203.0	4.01		185.0	3.84			
	212.0	4.02		194.0	3.86		55.0	2.50
	221.0	4.04	H14	202.0	3.87		60.5	2.51
	230.0	4.05		210.0	3.88		66.0	2.53
	238.0	4.07		219.0	3.89		72.0	2.54
				227.0	3.91		77.5	2.56
H16	247.0	4.08					83.5	2.57
	256.0	4.10		236.0	3.92		89.0	2.59
	265.0	4.11		245.0	3.93	H10	95.0	2.60
	274.0	4.12		254.0	3.94			
	288.0	4.14		262.0	3.96		100.5	2.61
	301.0	4.16		271.0	3.97		106.5	2.63
	314.0	4.18		280.0	3.98		112.0	2.64
				289.0	3.99		118.0	2.65
	328.0	4.20		298.0	4.01		124.0	2.66
	342.0	4.22					130.0	2.68
	356.0	4.24	12	40.5	1.90		136.5	2.69
	370.0	4.26	H—	45.5	1.92			
	384.0	4.27	8	50.5	1.93		23.5	1.57
				55.0	1.94	8	27.0	1.59
	399.0	4.29				H—	30.5	1.61
	413.0	4.31		52.5	2.44	6.5	34.5	1.62
	427.0	4.33	12	58.0	2.45			
			H—	64.0	2.47		32.0	1.96
	43.0	1.86	10	70.0	2.49			
14	48.0	1.88					35.0	2.00
H—	53.5	1.89		65.5	2.96		39.5	2.01
8	58.5	1.90		72.5	2.98		44.0	2.03
							48.5	2.04
14	55.0	2.39		79.0	2.99		53.0	2.06
H—	61.5	2.41		85.5	3.01		58.0	2.07
10	67.5	2.43		92.5	3.03	H 8	62.5	2.09
	73.5	2.44		99.5	3.04		67.5	2.10
				106.0	3.06			
	69.0	2.93		113.0	3.07		72.0	2.11
14	76.0	2.95	H12	119.5	3.09		77.0	2.12
H—	83.0	2.97		126.5	3.10		81.5	2.14
12	90.0	2.98					86.0	2.15
				133.5	3.11		91.0	2.16
	84.0	3.45		140.5	3.13			
	92.0	3.47		147.5	3.14		20.0	1.49
				154.5	3.15		23.0	1.51
H14	100.0	3.49		162.0	3.17		26.5	1.53
	107.5	3.50		169.0	3.18	H 6	30.0	1.54
	115.5	3.52		176.0	3.19		33.5	1.55
	123.5	3.54		183.0	3.20		37.0	1.57
							40.5	1.58

PROPERTIES OF BETHLEHEM STEEL JOISTS AND STANCHIONS

Joists			Stanchions		
Section No.	Weight per ft., lb.	Section modulus, in.³	Section No.	Weight per ft., lb.	Least radius of gyration
BJ12	18.5	20.2		15.5	1.41
BJ10	16.5	15.5	BS6	18.0	1.43
BJ 8	14.5	11.2		20.5	1.45
BJ 6	11.0	6.43			

AMERICAN ROOF TRUSS COMPANY

WM. H. WADDINGTON, President

TELEPHONE
FRANKLIN 1720, 1721

Engineers and Constructors of Roof Trusses

5 North La Salle Street, CHICAGO, ILL.

NEW YORK OFFICE: 101 Park Avenue

Products

Manufacturers and erectors of AMERICAN WOOD BOWSTRING TRUSSES for public garages, service stations, machineshops, warehouses, schools, banks, gymnasiums, bowling alleys, aeroplane hangars, grandstands, dance halls, and other buildings requiring clear floor space.

Span and Spacing

Trusses designed for 25 to 150-foot spans. Spacing is usually 16 to 20 feet on centers, depending on length of building.

Height at Center and Ends

The standard height at the center on all spans is one-eighth of the length of the truss. The height of the ends is governed by the size of the lower chord timbers varying from 6 to 12 inches according to span and loading.

Service, Strength and Safety

Trusses are built on the job by us and erected in place as soon as pilasters are up, completely installed, ready for roof joists, anywhere in the United States. Designed according to local building requirements, material No. 1 yellow pine or structural fir of highest grade assuring strength and safety. All trusses guaranteed.

Information Required for Estimates

(1) Number of trusses required.
(2) Span out to out of walls or center of columns.
(3) Spacing between trusses.
(4) Loads. Regular roof load in pounds per square foot. State if any ceiling load. For unusual loading conditions send plan or photostat.
(5) Address of job, nature of building, owner's and architect's names.

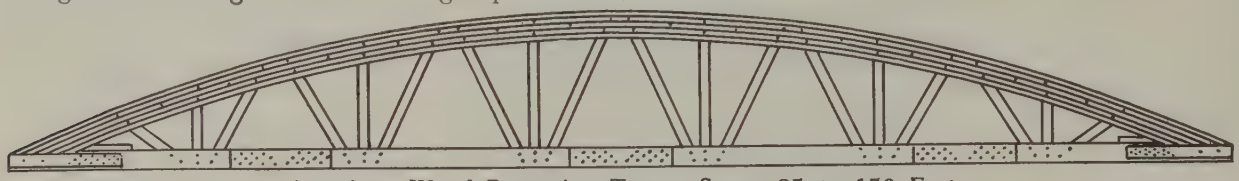
Specifications

Roof trusses shall be American Wood Bowstring trusses furnished by AMERICAN ROOF TRUSS COMPANY, 5 North La Salle Street, Chicago.

Literature

Send for illustrated folder and valuable suggestions covering economical layout and brick saving features.

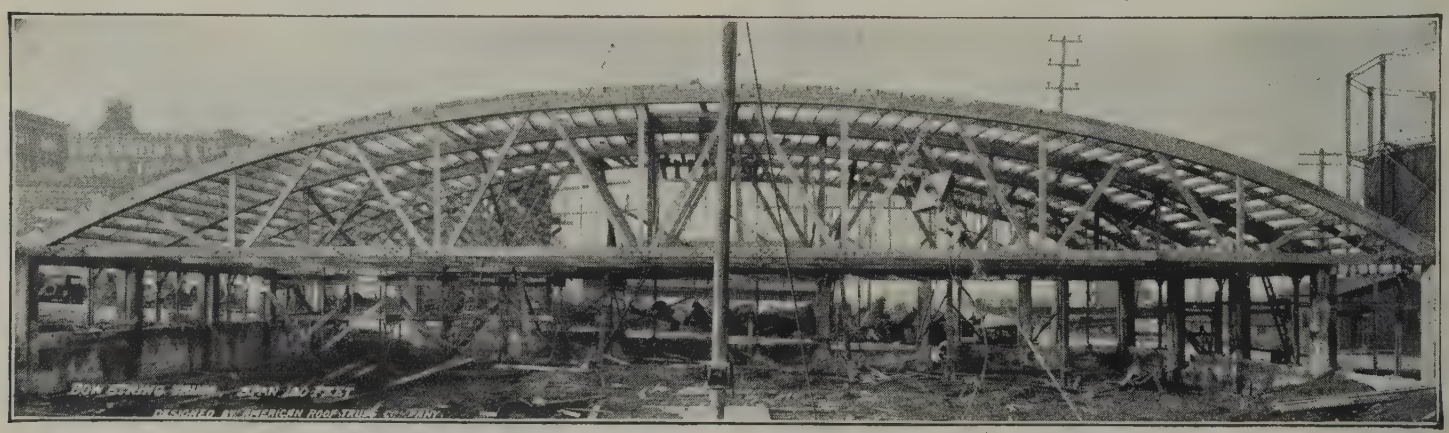
Our engineers will give fullest co-operation to architects.



American Wood Bowstring Truss—Spans 25 to 150 Feet

60-foot Span Trusses, Huntington, L. I., N. Y.
D. M. DUSENBERRY, Architect

Typical Factory Installation Using Over 400 American Roof Trusses for Clearing Land Assn.
F. C. FOLTZ & Co., Architects



American Roof Trusses 120 Feet Long, Hickey Motor Co., Tacoma, Wash.
HILL & MOCK, Architects, A. I. A.

ARCH ROOF CONSTRUCTION CO., INC.

TELEPHONE
WISCONSIN 5845

Engineers and Contractors
104 West 42nd Street, NEW YORK, N. Y.

Products and Service

Design, Construction and Erection of LONG SPAN ROOF ARCHES for public garages, auditoriums, convention, exhibition and fair buildings, warehouses, theaters, factories, airplane hangars, gymnasiums, bowling alleys, skating rinks, and all buildings where unobstructed space, maximum light and ventilation are desired.

ARCH ROOF CONSTRUCTION CO., INC., will design the arches, supply all materials and do the erection, or ordinary materials can be supplied and erection done by local contractors.

Construction and Materials

By using straight lengths of the usual structural materials combined with special connections, a practical way has been evolved of applying the arch principle with its beauty and great strength to the economical construction of buildings having spans up to *300 ft.* or more, where unobstructed space is desired.

Columns, posts and trusses are eliminated with this construction, and a clear interior giving a maximum amount of light and ventilation obtained.

Strength

Arch roof construction can be of timber or steel or a combination of both. Standard structural shapes and sizes are employed in a patented design with patented connections to produce a roof of unusual strength. It may be fireproof, fire-retarded or non-fireproof.

While designed for ordinary roof loads of 40 lb. per sq. ft., in a test by Columbia University it successfully carried a uniform load of 80 lb. per sq. ft. and then, for an unsymmetrical test, half of the sand on one-half of the arch was removed. This loading was considerably increased when the sand absorbed about 2 in. of rain, and also by the effect of wind at velocities from 48 to 70 miles per hour on this open structure. This test was made while building was in course of construction, unenclosed, with only part of roof in position.

Advantages of Arch Roof Construction

Maximum strength and long life. Unobstructed light and ventilation. Sidewalls of brick, wood sheathing, sheet iron, canvas, or folding or rolling doors. Full use of all floor space. Economy of material and labor. Temperature economically warm in winter and cool in summer. Reduced fire hazards, ease of controlling fires and low insurance rates. Added dignity, distinction and character to all long span buildings. Can be dismantled and erected with 100% salvage. Adaptable to practically every type, style and size of building.

Queens County Motor Vehicle Dealers' Association Exhibit
Arch roof construction permitted free use of all space for exhibition purposes and provided a place large enough for the complete display

Airplane Hangars

Arch Roof Construction is particularly suitable for use in airplane and dirigible hangars. We are in a position to design and/or construct hangars of all kinds.

Engineering Service

ARCH ROOF CONSTRUCTION CO., INC., will co-operate with architects, engineers and contractors in planning the most economical and efficient design for particular buildings.

A request will bring additional information.

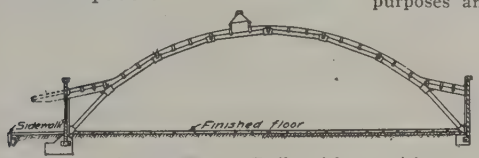


Fig. A. Simplest Type, Built with or without Sidewalk Overhang
Sidewalls may be replaced by doors, rolling shutters or canvas. Unusually high salvage value

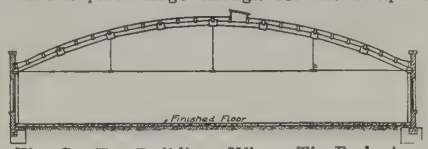


Fig. C. For Buildings Where Tie Rods Are Required
Offers maximum light, air and attractive appearance at minimum cost

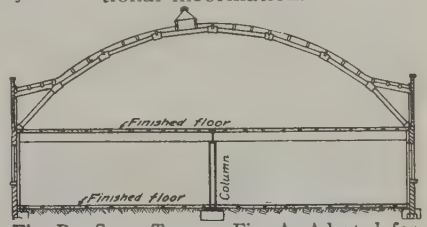


Fig. B. Same Type as Fig. A, Adapted for Two or More Stories
Unobstructed top floor and minimum number of columns below

Auditorium, Spans to 300 ft. or Over
Balcony at ends if desired

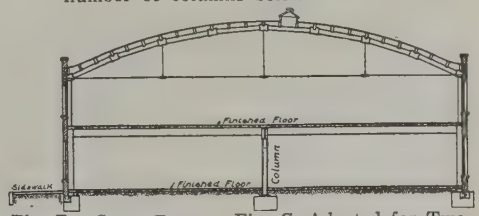
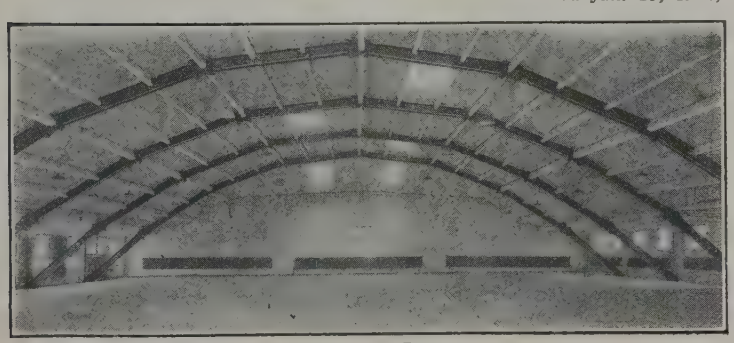
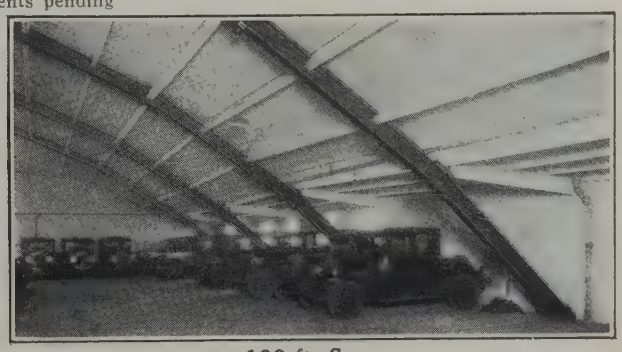


Fig. D. Same Type as Fig. C, Adapted for Two or More Stories
Unobstructed top floor and as many floors below as desired

Types of Arch Roof Construction
Patented Jan. 15, 1924, other patents pending



100-ft. Span



100-ft. Span

LAMELLA ROOF SYNDICATE, INC.

TELEPHONE
BRYANT 2533

45 West 45th Street, NEW YORK, N. Y.

(Holding Company for Lamella Patents in United States, Canada and Mexico)

AUTHORIZED LICENSEES

NEW YORK, N. Y., LAMELLA ROOF COMPANY, 45 West 45th Street, for New England, Pennsylvania, New Jersey, New York, Maryland, Delaware, District of Columbia

ATLANTA, GA., LAMELLA CONSTRUCTIONS, INC., 801 Norris Building, for Florida, Georgia, Alabama, North and South Carolina, Mississippi, Tennessee

HOUSTON, TEX., LAMELLA TRUSSLESS ROOF COMPANY, 801 Kirby Building, for Texas, Oklahoma, Louisiana, Arkansas

LOS ANGELES, CAL., THE TRUSSLESS ROOF COMPANY, 1007 South Harvard Boulevard, for California, Utah, Arizona, Nevada, Oregon, Washington

ST. LOUIS, MO., MISSOURI LAMELLA ROOF COMPANY, 904 Bank of Commerce Building, for Upper Indiana, Illinois, Missouri, Wisconsin, Michigan, Minnesota

MONTREAL, QUE., A. F. BYERS & CO., LTD., 1226 University Street, for Province of Quebec

Lamella Roof Construction

The Lamella unit system of roof construction has been developed to meet the widespread demand for a simple and reliable type of long span roof construction. which can be built at a reasonable price. It is especially suitable for garages, theaters, exhibition and fair buildings, churches, hangars, armories, and similar enclosures where high clearance or large areas of uninterrupted floor space must be housed. Single spans run as wide as 130 ft. and in any length desired.

Lamella Unit

The Lamella unit is an especially designed timber unit, with beveled ends, bored for bolted connections, and a top curve to suit the radius of the finished roof.

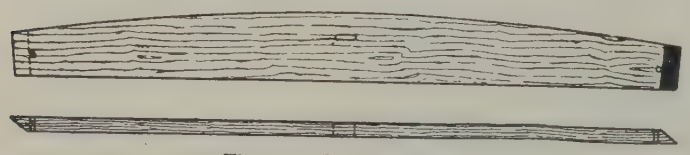


Fig. 1. Lamella Unit

Material

The quality of lumber used for Lamellas is No. 1 common. The strength and the price of the lumber control the kind to be selected, such as long leaf yellow pine, short leaf yellow pine, Douglas fir (Oregon pine) and others. The Lamellas can be manufactured at any planing mill equipped with a circular saw, a band saw and a boring machine.

Assembly

These units are assembled by bolting together, using standard machine bolts and nuts and special washers. It will be observed that lateral shrinkage of the timber after erection has no effect on the alignment of the joints. A netlike construction results, which may be developed into four principal types of arch roofs as follows:

(a) *The Flat Segmental Arch Roof, Fig. 2,* the thrust of which is taken up by tie rods. This is used largely for garages, factories, car barns, hangars and various kinds of industrial buildings. The rise of the arch is about one-sixth of its span.

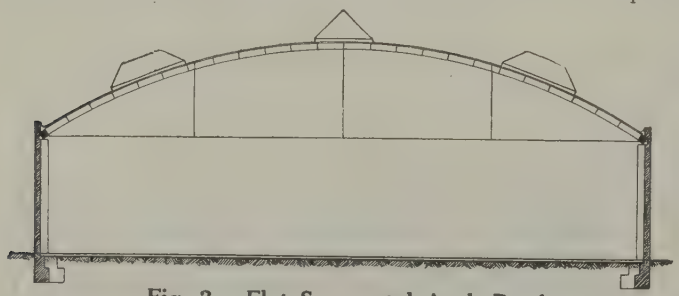


Fig. 2. Flat Segmental Arch Roof

(b) *The Segmental Arch Roof,* the thrust of which is taken up by buttresses, concrete piers or wooden bents (Fig. 3). This is especially suitable for warehouses and exhibition buildings.

(c) *The Gothic Arch,* especially suitable for churches, residences, barns and warehouses where goods are stored in bulk, such as grain, ore, etc. The Lamella roof construction may start at the ground.

(d) *The Broach or Circular Roof,* used principally for exhibition buildings where a particularly architectural design is desired.

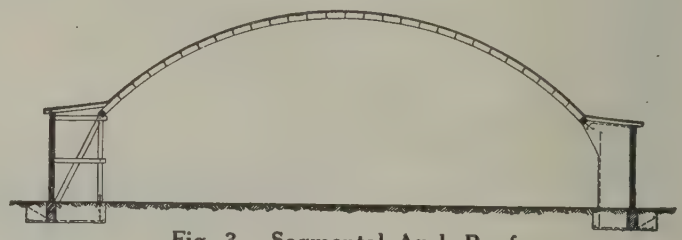


Fig. 3. Segmental Arch Roof

Economy

Lamella construction is built up from short length timber which can easily be obtained and handled. Due to its unique arrangement it takes care of all engineering requirements in an ingenious but simple manner. On account of its highly standardized nature the erection itself is merely an assembly proposition. All these factors co-operate in reducing the costs and inaccuracies of erection.

Safety

Accidental damage to Lamella members can readily be repaired, and even if units are destroyed the stresses will be carried by the surrounding network. The great flexibility of the system results in a particularly tenacious and enduring structure, which will absorb and distribute severe concentrations of loading.

Safe Loads

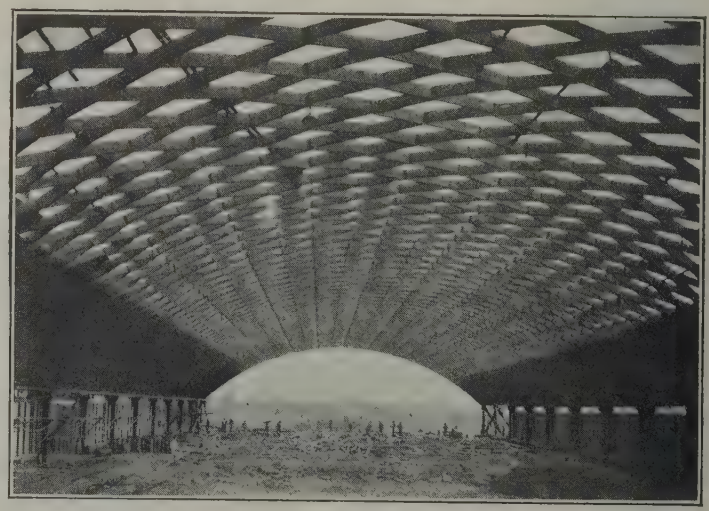
The safe loading of Lamella systems has been very carefully worked out, checked and confirmed by tests and practical construction throughout the United States and abroad. Any licensee of the company will make recommendations as to sizes and types of construction for any loading at any factor of safety. Extremely high wind loading may be carried and we have built structures carrying a 6-ft. snow load.

Fire Resisting Qualities

In Lamella construction there are no trusses, girders or columns to carry fire from the floor and distribute it along the roof. There are no trusses or ribs under concentrated load, the failure of which by fire might cause the collapse of the entire structure. The load carrying members are spread over a great area and are correspondingly hard to destroy.

Architectural Qualities

Lamella roofs allow a maximum utilization of the enclosed space. Distribution of light is not impeded by purlins and trusses. When sheathed on both sides a remarkable insulating



Riding Academy, St. Louis, Mo., 120-ft. Span

Continued on next page

Interior of National Democratic Convention Hall, Erected in Record Time to House More Than 20,000 People

When the city of Houston secured the National Democratic Convention, there were no facilities to house such a large audience. The problem the architects had to solve was to build a huge auditorium within a short time, which would provide a large floor area unobstructed by columns, of best acoustical qualities and pleasing appearance at a reasonable cost. They selected Lamella and twenty-seven days after receipt of the order, this construction was finished. The measurements are, center span 120 ft., side spans 76 ft. each, total height at center 60 ft., and spacing of columns 40 ft. 9 in.
Architects: Kenneth Franzheim, New York, and W. A. Dowdy, City Architect, Houston

quality results, as the air spaces are small in area and entirely separated, preventing the excessive heat transfer in the long channels between double sheathed purlins and joists.

Lamella roofs are symmetrical and of sweeping graceful design. They lend themselves to a wide range of architectural treatment.

Salvage Value

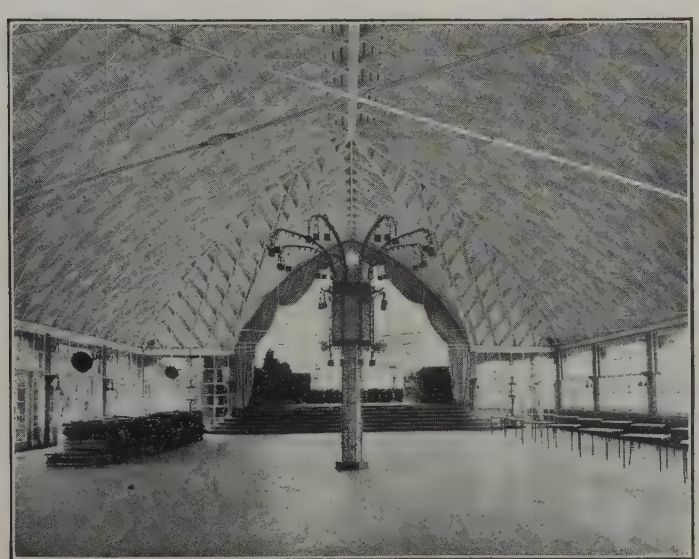
Unit construction of this type has unexcelled salvage value. Temporary buildings may be dismantled and re-erected with a minimum of loss—an unusual and most valuable feature for timber construction.

Data Required for Estimates

(1) Type of roof (a, b, c, or d).
(2) Outside measurements of building and exact information in case building is not rectangular.
(3) Height of springing line above ground or upper floor and rise of arch desired.
(4) Loading required in pounds per square foot; give required live and dead roof load (exclusive of Lamella construction); ceiling load if any. If roof carries any concentrated loads such as balconies or cranes, submit plans.
(5) Sizes and locations of skylights.
(6) Location of job.
(7) For roofs *without* tie rods (Types b, c, and d) give the following additional information:
(a) Kind of supports (buttresses, wooden or steel bents).
(b) Height, width and spacing of supports.
(c) Bearing capacity of soil and whether building is on property line.

Specifications

Roof construction shall be "Lamella Roof" to be built and erected or furnished by the Lamella Roof Syndicate, Inc., 45 West 45th Street, New York, N. Y., or a licensed agency.



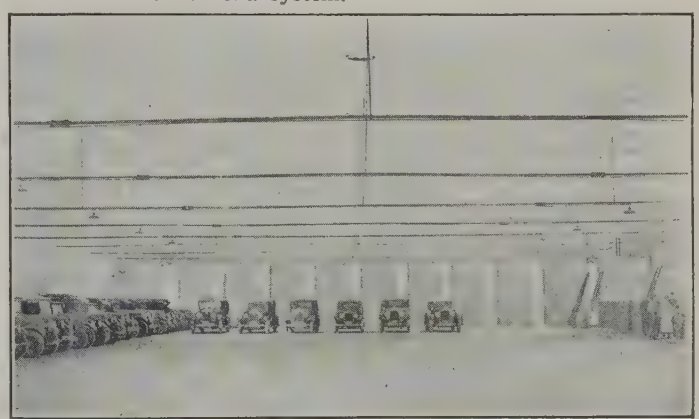
Lamella Roof for Breakfast Club, Los Angeles, Cal.

Engineering Service

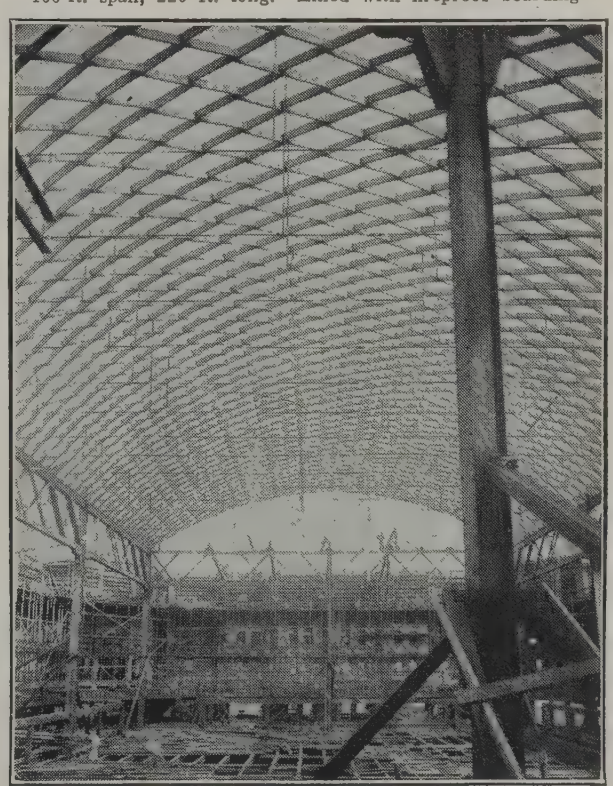
Our engineers will gladly co-operate with architects in securing an efficient and economical layout.

Literature

Write for pamphlets and illustrations describing buildings erected on the Lamella system.



Lamella Roof of the Packard Nash Garage, Hackensack, N. J.
100-ft. span, 220 ft. long. Lined with fireproof boarding



University of Oregon Gymnasium, Eugene, Ore.
110-ft. span

THE MACOMBER STEEL COMPANY

Massillon Steel Building Products

901 Belden Avenue, CANTON, OHIO

Products

MASSILLON ROOF TRUSSES and TRUSS BRACING.
"H" COLUMNS and STEEL FRAMING.
STEEL DOORS and STEEL WINDOWS.
STRUCTURAL and REINFORCING STEEL.

For Massillon Bar Joists and Massillon Nailer Joists, see pages A672-673; for Massillon Vault Reinforcing, see page A1342.

Type of Products

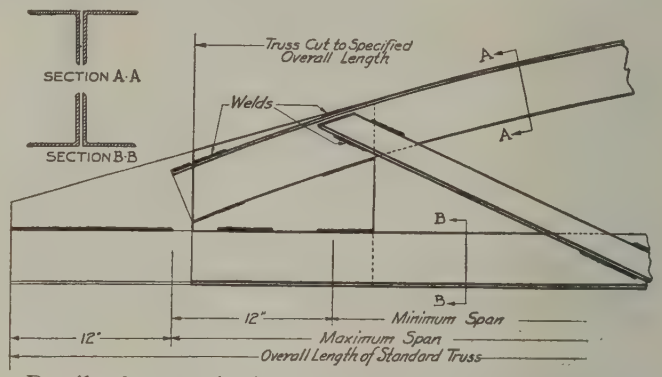
Through the use of patented Massillon features, structural building products are manufactured in standard stock sizes for prompt shipment on all orders. These products are readily designed into buildings by architects or engineers. Complete structural layouts for erection purposes are furnished as a part of the service and submitted for approval to the architect or engineer designing the building. Complete stocks of steel windows, metal lath and structural and reinforcing steel round out this service.

Bar Joists for fireproof floor and roof construction; Nailer Joists for semi-fireproof construction; and Vault Reinforcing for banks and financial institutions are covered in separate pages as noted. These products and the products covered here are widely used and specified as component parts of practically all types of buildings.

The full use of Massillon Service permits the architect to plan and design industrial buildings to meet the individual needs of his clients at costs competitive with the less desirable "Standard Buildings." Prompt shipment of Massillon materials and ease in designing with any type of wall and roof construction has resulted in an ever increasing demand for Massillon Products for this field.

Massillon Roof Trusses

The Massillon Roof Truss (U. S. Patent No. 1678738) is essentially a steel roof truss built up with double angle top and bottom chords and fabricated with modern electric arc welding. Loading Tables (A.I.S.C. Specifications) and overall dimensions for stock size curve chord trusses are listed in adjoining tables. "A" type trusses are handled in the same manner. These stock size trusses are designed into buildings as easily as simple beams. The trusses should be spaced to develop their full carrying capacity for maximum efficiency.



Detail of a standard truss end is shown above. Trusses may be cut to specified overall length to suit the framing conditions. Shorter trusses are shipped in one piece. Longer trusses are fabricated, match marked, and knocked down for shipment in sections for ease in handling and erecting on the job. Holes for field connections are reamed to $\frac{1}{64}$ in. clearance in fabricating and fitted with turned bolts. No metal less than $\frac{1}{4}$ in. in thickness is used.

SAFE LOADING TABLES, STOCK SIZES CL AND CH TRUSSES

A.I.S.C. Specifications

Overall Height— Approx. $\frac{1}{10}$ Max. Span

CL SERIES

Truss Symbol	Overall Length	Range of Spans		Safe Load in Pounds	
		Min. Span	Max. Span	@ Min. Span	@ Max. Span
38-CL	40′ 0″	36′ 0″	38′ 0″	37,900	35,500
40-CL	42′ 0″	38′ 0″	40′ 0″	37,700	35,400
42-CL	44′ 0″	40′ 0″	42′ 0″	37,500	35,300
44-CL	46′ 0″	42′ 0″	44′ 0″	44,700	42,600
46-CL	48′ 0″	44′ 0″	46′ 0″	44,400	42,500
48-CL	50′ 0″	46′ 0″	48′ 0″	43,700	41,700
50-CL	52′ 0″	48′ 0″	50′ 0″	44,200	42,300
52-CL	54′ 0″	50′ 0″	52′ 0″	44,300	43,400
54-CL	56′ 0″	52′ 0″	54′ 0″	49,500	48,300
56-CL	58′ 0″	54′ 0″	56′ 0″	49,400	47,600
58-CL	60′ 0″	56′ 0″	58′ 0″	48,900	48,100
60-CL	62′ 0″	58′ 0″	60′ 0″	48,800	47,900
62-CL	64′ 0″	60′ 0″	62′ 0″	50,300	48,700
64-CL	66′ 0″	62′ 0″	64′ 0″	50,200	48,600
66-CL	68′ 0″	64′ 0″	66′ 0″	50,100	48,500
68-CL	70′ 0″	66′ 0″	68′ 0″	50,000	48,500
70-CL	72′ 0″	68′ 0″	70′ 0″	65,900	64,000
72-CL	74′ 0″	70′ 0″	72′ 0″	65,800	63,900
74-CL	76′ 0″	72′ 0″	74′ 0″	65,700	63,800
76-CL	78′ 0″	74′ 0″	76′ 0″	65,600	63,800
78-CL	80′ 0″	76′ 0″	78′ 0″	65,500	63,700
80-CL	82′ 0″	78′ 0″	80′ 0″	73,600	71,800
82-CL	84′ 0″	80′ 0″	82′ 0″	73,500	71,700
84-CL	86′ 0″	82′ 0″	84′ 0″	73,400	71,600
86-CL	88′ 0″	84′ 0″	86′ 0″	92,100	90,000
88-CL	90′ 0″	86′ 0″	88′ 0″	92,000	89,900
90-CL	92′ 0″	88′ 0″	90′ 0″	91,800	89,800
92-CL	94′ 0″	90′ 0″	92′ 0″	91,700	89,700
94-CL	96′ 0″	92′ 0″	94′ 0″	91,600	89,600
96-CL	98′ 0″	94′ 0″	96′ 0″	91,500	89,600
98-CL	100′ 0″	96′ 0″	98′ 0″	91,400	89,500
100-CL	102′ 0″	98′ 0″	100′ 0″	91,300	89,400

CH SERIES

Truss Symbol	Overall Length	Range of Spans		Safe Load in Pounds	
		Min. Span	Max. Span	@ Min. Span	@ Max. Span
38-CH	40′ 0″	36′ 0″	38′ 0″	44,800	42,500
40-CH	42′ 0″	38′ 0″	40′ 0″	44,600	42,400
42-CH	44′ 0″	40′ 0″	42′ 0″	44,400	42,200
44-CH	46′ 0″	42′ 0″	44′ 0″	51,300	48,900
46-CH	48′ 0″	44′ 0″	46′ 0″	51,000	48,700
48-CH	50′ 0″	46′ 0″	48′ 0″	50,300	47,900
50-CH	52′ 0″	48′ 0″	50′ 0″	50,800	48,700
52-CH	54′ 0″	50′ 0″	52′ 0″	65,100	63,800
54-CH	56′ 0″	52′ 0″	54′ 0″	65,000	63,700
56-CH	58′ 0″	54′ 0″	56′ 0″	64,800	63,600
58-CH	60′ 0″	56′ 0″	58′ 0″	64,600	63,500
60-CH	62′ 0″	58′ 0″	60′ 0″	64,400	63,300
62-CH	64′ 0″	60′ 0″	62′ 0″	74,700	72,400
64-CH	66′ 0″	62′ 0″	64′ 0″	74,500	72,300
66-CH	68′ 0″	64′ 0″	66′ 0″	74,300	72,200
68-CH	70′ 0″	66′ 0″	68′ 0″	74,100	72,000
70-CH	72′ 0″	68′ 0″	70′ 0″	92,900	90,100
72-CH	74′ 0″	70′ 0″	72′ 0″	92,800	90,000
74-CH	76′ 0″	72′ 0″	74′ 0″	92,700	89,900
76-CH	78′ 0″	74′ 0″	76′ 0″	92,500	89,800
78-CH	80′ 0″	76′ 0″	78′ 0″	92,300	89,700
80-CH	82′ 0″	78′ 0″	80′ 0″	92,500	90,200
82-CH	84′ 0″	80′ 0″	82′ 0″	92,300	90,000
84-CH	86′ 0″	82′ 0″	84′ 0″	92,200	90,000
86-CH	88′ 0″	84′ 0″	86′ 0″	121,200	118,400
88-CH	90′ 0″	86′ 0″	88′ 0″	121,100	118,300
90-CH	92′ 0″	88′ 0″	90′ 0″	120,800	118,100
92-CH	94′ 0″	90′ 0″	92′ 0″	120,700	118,000
94-CH	96′ 0″	92′ 0″	94′ 0″	120,600	118,000
96-CH	98′ 0″	94′ 0″	96′ 0″	120,400	118,000
98-CH	100′ 0″	96′ 0″	98′ 0″	120,300	117,900
100-CH	102′ 0″	98′ 0″	100′ 0″	120,200	117,800

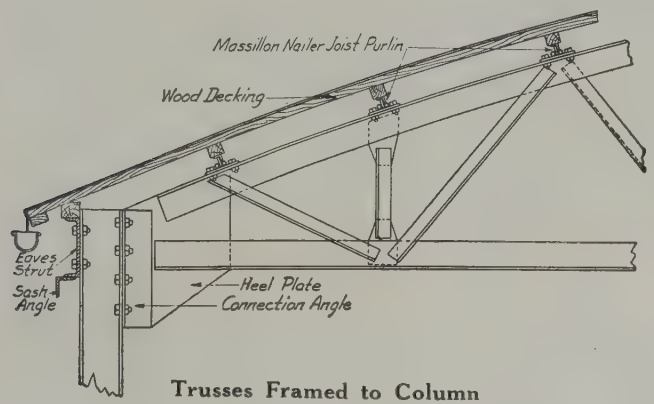
Continued on next page

Truss Bracing

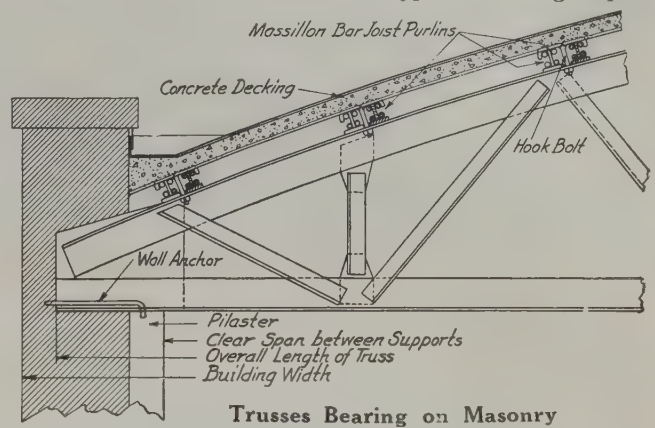
Good practice calls for truss bracing to line up and hold the trusses in place during the erection period. Trusses in buildings with longer spans should be braced to transmit and transfer wind stresses. Three standard forms of Massillon Bracing are provided to take care of practically every condition. Special bracing is provided for special conditions not covered by standard designs.

Truss Framing Details

Trusses may be framed into steel columns, or rest on steel columns or masonry pilasters. Where they are framed into steel columns, the trusses are cut to the clear span between columns and provided with special heel plates and connection angles. Trusses that rest on steel columns are punched for bolting or riveting to the column cap. Knee bracing is often required to stiffen the columns and the trusses are punched for this detail where specified. Trusses bearing on masonry pilasters are punched for insertion of wall anchors. Truss bracing connections are detailed to suit the type of bracing required.



Trusses Framed to Column

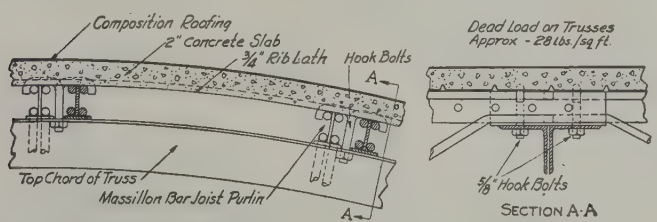


Trusses Bearing on Masonry

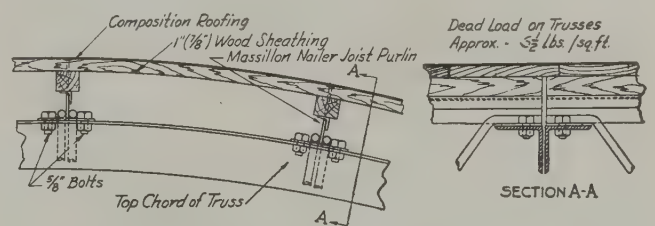
Roof Purlin Framing

Any type of purlin construction such as channels, wood rafters or Massillon Type Purlins may be framed to the trusses. The top chord angles of the trusses are punched standard with $\frac{11}{16}$ in. holes 2-6 in. on centers for attaching wood nailing strips where wood purlins are used. The exact punching of top chord angles for bolting other types of purlins is detailed to suit the spacing of the purlins.

Massillon Bar Joists are recommended where concrete or steel roof decking is specified. Massillon Nailer Joists provide an economical construction with 1-in. wood decking for all spacings of trusses. Massillon Roof Purlin Sections are Nailer Joists in a heavier and deeper form for efficiently carrying 2-in. wood decking. All of these products are bolted to the trusses. Where specified for roofs with steep pitch, sag rod plates and sag rod bracing are provided. Wire cross bridging is used on flat or curved roofs.



Concrete on Bar Joists



Wood on Roof Purlins

"H" Columns and Steel Framing

Steel, masonry or concrete columns may be used in the side wall construction for supporting the trusses. Massillon "H" Columns are built up from standard "H" sections with standard cap and base details. They take up less room and usually prove more economical. The proper size "H" section may be taken from any structural handbook. Standard details are provided for wall framing such as eave struts, girts, lintels and column bracing for skelton frame buildings. All are detailed to meet the requirements of the building.

Steel Doors and Steel Windows

Heavy type steel doors are built in standard sizes for airplane hangars and industrial buildings. This includes all hardware, guides and supporting frame work.

Steel windows are carried in stock sizes for prompt shipment. This includes all standard commercial, industrial and residential types.

Structural and Reinforcing Steel

Complete shop facilities are maintained for fabricating structural and reinforcing steel. This service is used to advantage in consolidating the responsibility and orders for requirements to be shipped with Massillon Trusses, Columns, Joists, Windows and our other standard products.

Metal Lath and Lath Accessories

All types and sizes of metal lath, lath accessories and reinforcing fabrics are carried in stock for prompt shipments for all requirements.

Typical Installations

Massillon Bar Joists are widely used for fireproof floor and roof construction; Nailer Joist for semi-fireproof floors and roofs.

Roof Trusses over school gymnasiums, in auditoriums, theatres, garages, etc.

The complete steel requirements, including the doors, are furnished for airplane hangars, garages and industrial buildings.

Scope of Service Available

A.I.A. designing data catalogues are printed on all standardized products. The products are marketed through engineering representatives in all principal cities. Recognizing the tax on an architect's time, no general sales calls are made except on invitation. However, Massillon Representatives are available in or near principal building centers to co-operate in preparing definite recommendations and estimates. Complete erection plans are regularly furnished on all orders as a part of our service.

ESTABLISHED 1894

McKEOWN BROS. COMPANY

Builders of Wooden Roof Trusses for All Types of Buildings

5235 South Keeler Avenue
CHICAGO, ILL.
TELEPHONE, VIRGINIA 2010

21 East Fortieth Street
NEW YORK, N. Y.
TELEPHONE, LEXINGTON 10400

Products

Builders of WOODEN ROOF TRUSSES and ARCHES of all types.

Experience

MCKEOWN BROS. COMPANY has been in continuous operation since 1894 designing and building roof trusses of wood.

Service

This company is not an architectural organization, but desires to assist architects, engineers, owners, builders and manufacturers in all matters related to the use of wooden roof trusses. Although we do not furnish building plans, we will gladly co-operate in securing economical and efficient layouts for all projects.

Our work in this line has given us experience in solving practically all questions attendant to the use of trusses. We invite inquiries of all kinds relative to their use and related problems, which will be promptly answered by our engineers. On special trusses we would be glad to furnish the architect with sketches of trusses upon receipt of information which would be required for making a design.

Construction

We contract for the construction and erection of trusses to be built upon the site of the job. In this case all material and labor is local, but one of our experienced superintendents directs the work.

We contract for the furnishing of trusses f.o.b. site of job. These trusses, after fabrication in the shop, are shipped in sections easily handled and assembled. Each section is marked to conform with markings on detailed drawing furnished so that they can be assembled by unskilled labor.

Data Required for Estimates

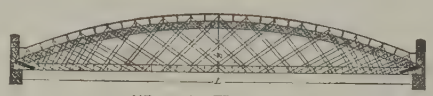
As all trusses are built to exact measurements, it is necessary that we be furnished with:

(1) Number of trusses required.
(2) Over-all length of trusses.
(3) Distance between trusses.
(4) Loading conditions, regular roof load, and ceiling load.

The above is all of the information needed to submit estimates on roof trusses for ordinary buildings. If the project requires trusses which are to serve a decorative, as well as a structural purpose, it is advisable that we be furnished with plans or sketches of the building showing the type of truss and the ornamental features desired.

Bowstring Trusses

Built to span from 25 to 150 ft. for any spacing and any loading. The material used is never less than 3 in. System of webbing is optional

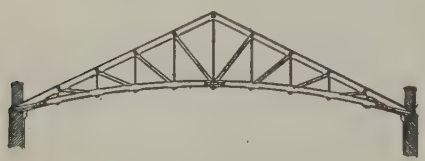


"Lattis-Trusses"

Built of materials having a minimum thickness of 2 in. The interlacing web system furnishes unusual strength and provides for stress reversals

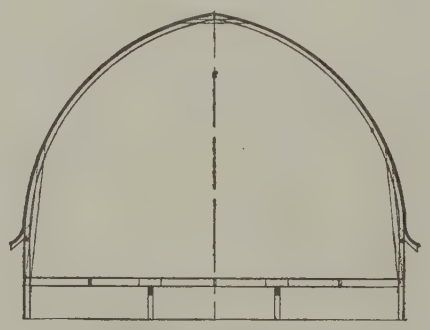
Crescent Trusses

Have a curved upper and lower chord, and are economical trusses for use in buildings where additional headroom is required without increasing wall height



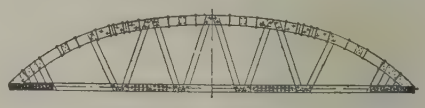
Howe Trusses

For buildings requiring mill type construction roofs, flat or pitched, can be had in ordinary construction, or mill sections



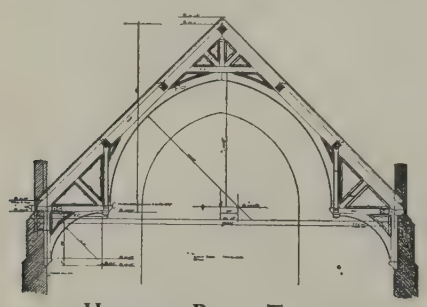
Ribs for Gothic Barns

Furnished with solid sections and built to exact curvatures



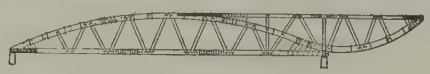
Multi-Radii Trusses

For centering of concrete arch bridges and similar structures, highly adaptable where it is not economical to use ordinary centering. Can be knocked down and saved for further use after they have served their purpose as centering



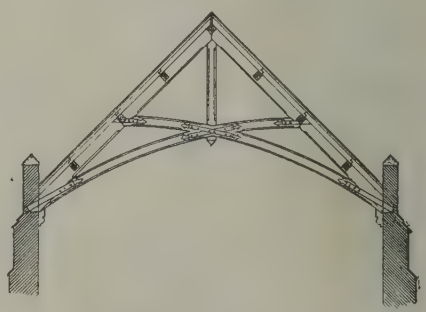
Hammer Beam Trusses with Gothic Arch

This type of truss is used extensively in churches. Can be furnished plain or paneled to suit



Grandstand Trusses

Have a cantilever portion which is the part of the truss projecting over the supporting columns, offering additional protection for the grandstand seats proper and covering the front row boxes. Especially attractive in appearance



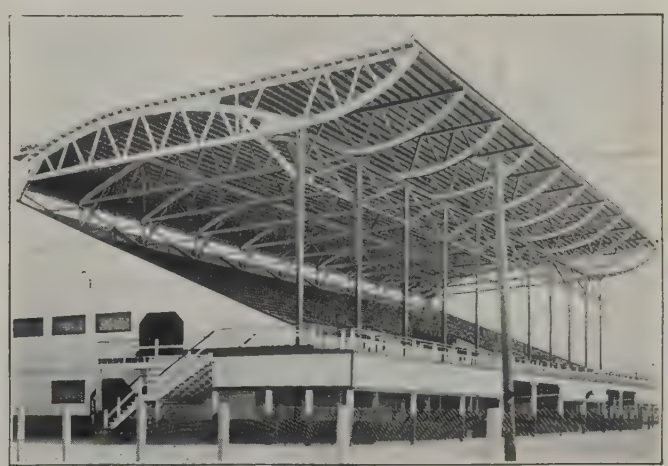
Scissors Trusses

With straight or curved braces makes a simple, economical and attractive roof truss for churches, clubs, and residences

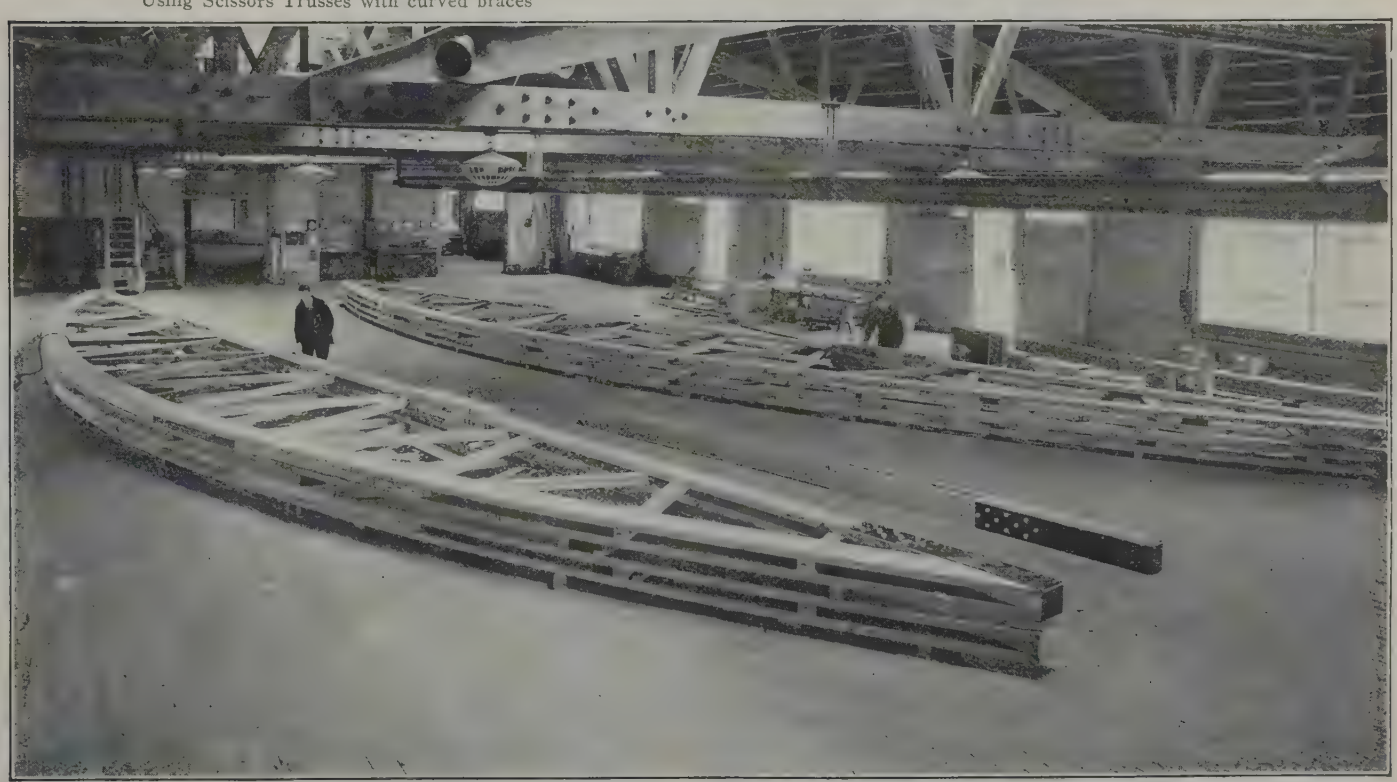
Continued on next page

High Bridge Over Harlem River, New York, N. Y.
Using Multi-Radii Trusses as centers while wrecking

Swedish-Finnish Baptist Church, Chicago, Ill.
S. M. Seator, Architect, Chicago, Ill.
Using Scissors Trusses with curved braces



Grandstand, Lyons, Ill.
Bowstring Trusses with cantilever portion



Fabricating Shop, Chicago, Ill.
On the floor are 82 ft. Bowstring Trusses being fabricated for the International Exposition Building, Seville, Spain
Dwight P. Robinson Co., Engineers

SUMMERBELL TRUSS COMPANY

Wood Roof Trusses

TELEPHONE
FRANKLIN 0590

30 North La Salle Street
CHICAGO, ILL.

Products

Manufacturers and erectors of WOOD ROOF TRUSSES.

Wood Roof Trusses

Spans designed from 30 to 125 ft. in accordance with best standard engineering practice and to comply with various local ordinances.

Trusses can be erected at the building site anywhere. No delays due to inability in obtaining materials; local lumber yards carry in stock all sizes of materials used in the construction of this truss.

Information Required for Estimates

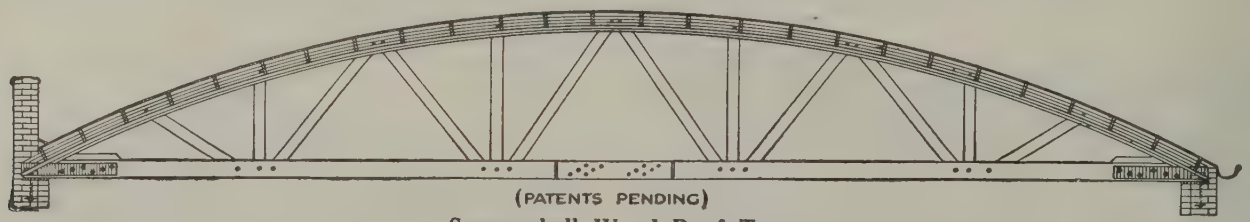
In requesting quotations the following information is necessary:

(1) Number of trusses required. (2) Span out-to-out of building walls. (3) Spacing of trusses. (4) Loads: roof, ceiling or special loadings. (5) Location of building, name of architect and owner's name.

Service

Estimates and details furnished on request.

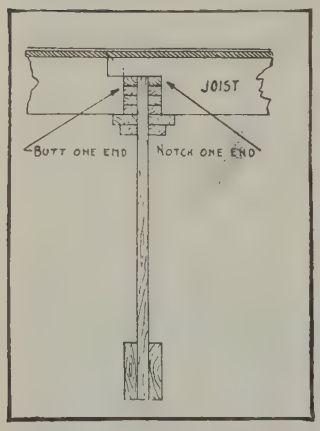
It is suggested that architects avail themselves of our engineering service in any design calling for special types of roof trusses.



(PATENTS PENDING)

Summerbell Wood Roof Truss

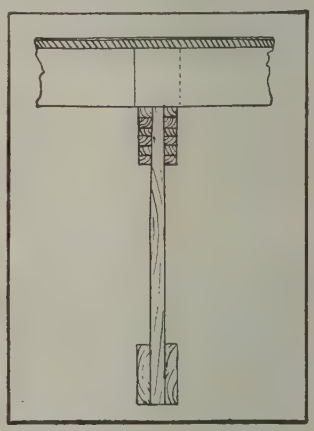
Large solid section web members spaced far apart assure maximum light distribution. Heavy laminated top chord and bottom chord of two large solid sections reduce fire hazard. Note that the arch of the top chord is uniform from end to end and that there are no sharp breaks which cause rain to carry gravel to the gutters, or allow tar melted by the sun to run down



Section Standard Summerbell "Rigid-roof" Construction

Summerbell trusses save several courses of brick wall on all sides of the building in addition to making a rigid roof

80-ft. Span Trusses at Chicago Airport



Section of Ordinary Construction

Roof joists set on top of top chord.

Trusses of this type can be furnished, if desired

100-ft. Span Trusses in Garage

100-ft. Span Trusses Carrying Shafting Load in Factory Building

BATES EXPANDED STEEL TRUSS CO.

Bates-Truss Joists

EAST CHICAGO, IND.

Product

BATES-TRUSS EXPANDED STEEL JOISTS.

Description

The Bates-Truss Joist is an expanded one-piece steel truss. In the expansion process, no material is cut from the web of the original section; the web is simply slitted and expanded. The expansion process transforms the web of the I-beam section into an open lattice truss web. The act of expanding increases the depth of the beam and materially increases its strength.

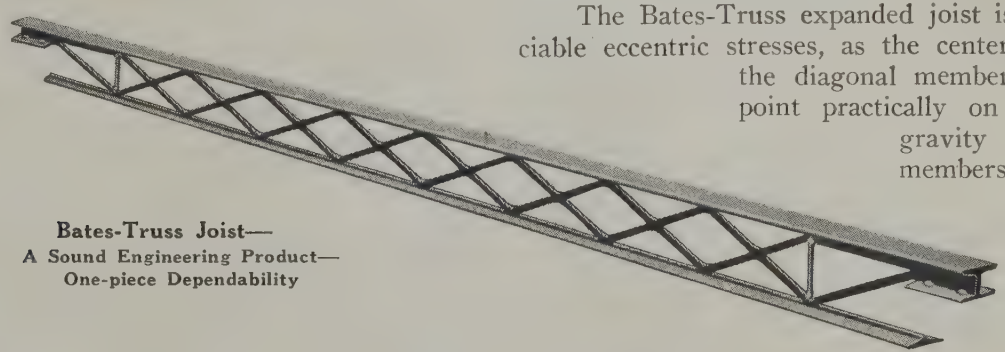
The Bates-Truss Joist functions as a steel truss. Its properties are readily calculable by standard formulae. Its strength is uniform. The process of manufacture automatically tests every joist for any possible defect in either material or workmanship. The human equation is eliminated.

Advantages

The Bates-Truss Joist lends itself readily to all types of joist floor construction. The open web of the expanded truss is an obvious advantage over a solid web, because it permits piping to be run easily through the joists.

The Bates-Truss expanded joist is a one-piece steel truss—neither rivets nor welds are relied upon in stress of shear or tension.

The Bates-Truss expanded joist is without appreciable eccentric stresses, as the centers of gravity of the diagonal members intersect at a point practically on the centers of gravity of the chord members.



Bates-Truss Joist—
A Sound Engineering Product—
One-piece Dependability

Specifications

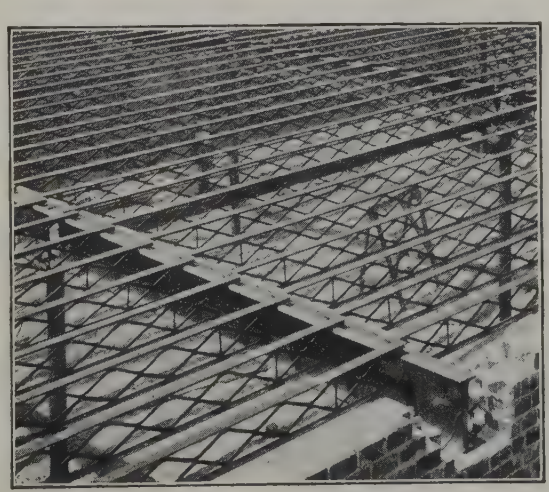
General Description—The system of floor construction will use Bates-Truss Joists of the sizes detailed. The joists shall be placed parallel to each other on spacings as detailed, and shall be supported at their ends on either structural beams or on masonry. Concrete shall be poured over the joists to form a slab .... inches thick, supported by .... *(either mesh lath or forms)* .... Diamond mesh lath is to be attached to the ceiling side of the joists, and .... inches of ceiling plaster applied.

Bates-Truss Joists—The joists shall conform to the standards established by the BATES EXPANDED STEEL TRUSS CO. and shall be made from structural grade steel expanded. All joists are to be of sizes specified on the plans. Where the sizes of the joists are not indicated, they shall be in accordance with the manufacturer's tables of safe loads.

Bearings—At least 4 inches of bearing shall be provided where the joists rest on masonry, and at least 3 inches of bearing shall be provided where the joists rest on steel supports.

Bridging—Bridging wire is to be placed at suitable intervals in the length of the joists. The wire is to be secured to the flanges of the joists, connecting each joist to its adjacent joist by a system of crisscross bracing. The end joists of each panel are to be suitably side anchored to the structural steel member or masonry.

Steel Lath—The steel lath for the floor shall be ... *(plain or rib)* ... lath weighing .... pounds per square yard. The steel lath for the ceiling shall be .... *(plain or rib, depth of rib)* .... weighing .... pounds per square yard. The lath is to be securely fastened to the joists with Bates lath clips. Rib lath is to be attached with the ribs up.



Temperature Rods—Temperature rods .... inches in diameter are to be placed on .... inch centers.

Note: The use of temperature rods or mesh reinforcing is not universally specified. It is, however, a valuable insurance in certain types of floor finishes to prevent cracks due to expansion and contraction.

Nailing Strips—Where wood floors are called for over the concrete, screed or nailing strips shall be embedded in the concrete slab. The nailing strips shall be 2 in. wide by 1 in. deep (or of greater depth) and shall be held in position by screed chairs, or by other suitable means, while the concrete is being poured. Screed strips shall be run (preferably at right angles) to the joists on .... inch spacings.

Concrete—Concrete for the floor slabs shall be *(usually 1)* part cement, *(usually 2)* parts sand and *(usually 4)* parts gravel. A comparatively dry mix is recommended to minimize dripping.

Loading Tables

Complete loading tables for Bates-Truss Joists are included in the Bates-Truss Joist general catalogue. The tables are prepared in both 16,000 and 18,000-pound stress values.

CONCRETE STEEL COMPANY

Havemeyer Truss

42 Broadway, NEW YORK, N. Y.

For Sales Offices, Warehouses and Fabricating Works, see page A144
For Havemeyer Concrete Reinforcement Bars, Devices, etc., see pages A144-146

Havemeyer Truss

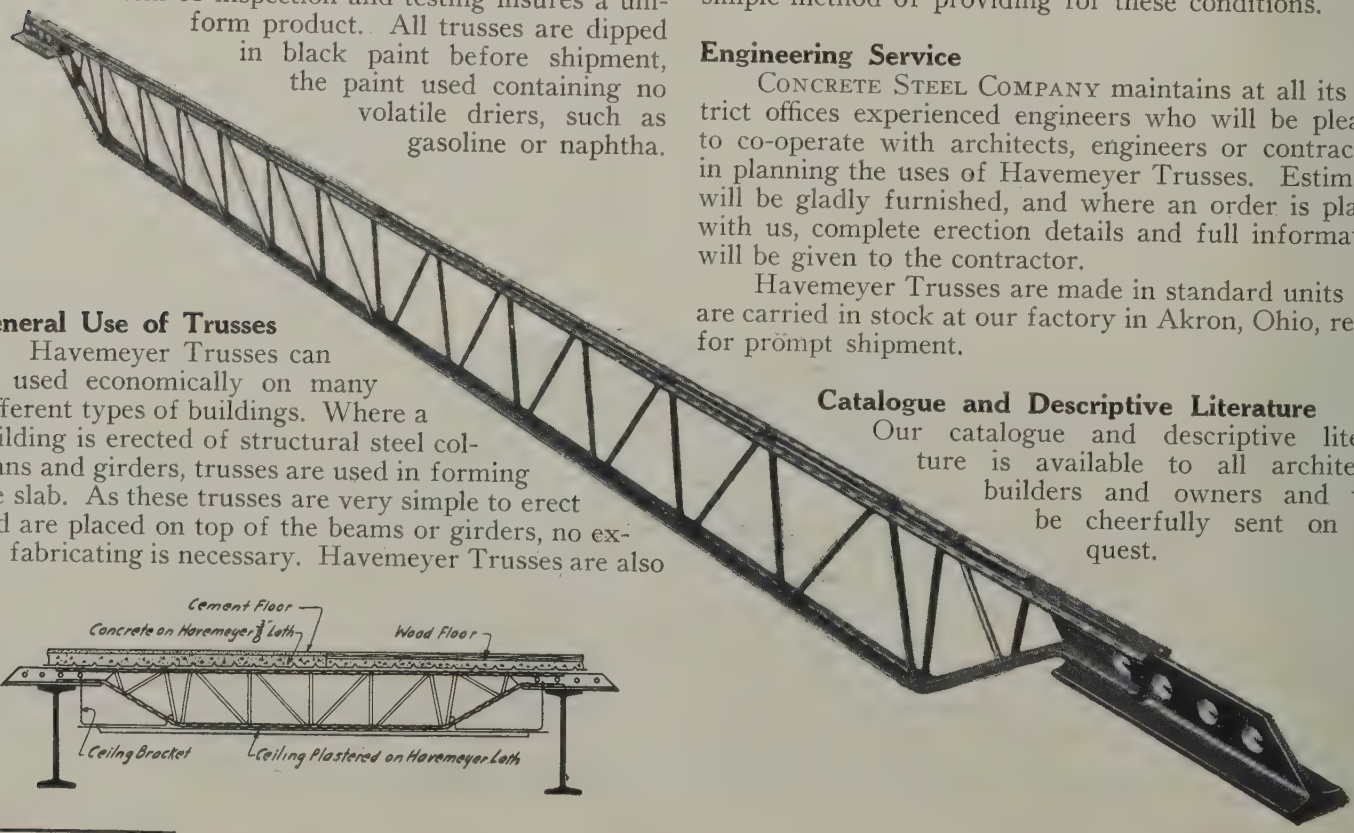
The Havemeyer Truss is a scientifically designed truss, of the Pratt type, electrically arc-welded, and when used in connection with a concrete floor slab and metal lath ceiling, makes an economical fireproof construction which can be erected quickly and requires no form work.

General Description

Havemeyer Trusses are made up of five bars, four being chord members and one being used as a web member. The upper and lower chords consist of two steel bars of structural grade joined together with struts made of similar bar stock. These five bars are formed in the shape of a Pratt truss and electrically arc-welded at all intersections. The ends of the truss are connected by welding to a tee section, which acts as a bearing plate for the truss. Actual tests made have shown that the Pratt type of truss is particularly well adapted for this construction. Special attention has been given to the design and arrangement of end web members, which are so arranged as to provide for additional stresses at that point—the result of extensive laboratory tests.

The holes in the web of the Tee at each end provide best means of anchorage when used on masonry or concrete walls.

All steel used is made from highest quality open hearth structural grade steel, with a minimum ultimate tensile strength of 55,000 lb. All welds are carefully made by experienced welders and a rigid system of inspection and testing insures a uniform product. All trusses are dipped in black paint before shipment, the paint used containing no volatile driers, such as gasoline or naphtha.



General Use of Trusses

Havemeyer Trusses can be used economically on many different types of buildings. Where a building is erected of structural steel columns and girders, trusses are used in forming the slab. As these trusses are very simple to erect and are placed on top of the beams or girders, no extra fabricating is necessary. Havemeyer Trusses are also used on structural concrete buildings for carrying the floor slabs, the columns and girders being reinforced concrete. They are used on residence work and are particularly recommended for the first floor even if the house is to be built of frame, and when properly put in place in connection with concrete slabs, they form an effective fire-stop for fires originating in the basement or cellar. The trusses are particularly suited for use in such buildings as hospitals, schools, apartment houses, hotels, institutions, garages, etc., built for light loads.

Havemeyer Trusses, with open webs, allow space for running pipes, electrical conduits, etc. This has been found of great advantage in most types of buildings.

These trusses are made to fit all spans from 4 to 31 ft.

Where a truss is laid on steel beams or girders, a clip is driven over the end of the truss and the upper flange of the structural support to hold the truss firmly in place.

A metal lath ceiling can be readily attached to the underside of the truss.

Metal Lath and Specialties

In making bids, our estimate includes furnishing of trusses, rib lath for floor slabs, ceiling brackets, anchors, clips for fastening trusses to girders in the case of steel buildings, sleeper clips, lath wedges, and annealed wire for bridging, also metal lath for ceilings when it is required.

Where small openings are required in the floor, we furnish headers which are easily attached and form a simple method of providing for these conditions.

Engineering Service

Concrete Steel Company maintains at all its district offices experienced engineers who will be pleased to co-operate with architects, engineers or contractors in planning the uses of Havemeyer Trusses. Estimates will be gladly furnished, and where an order is placed with us, complete erection details and full information will be given to the contractor.

Havemeyer Trusses are made in standard units and are carried in stock at our factory in Akron, Ohio, ready for prompt shipment.

Catalogue and Descriptive Literature

Our catalogue and descriptive literature is available to all architects, builders and owners and will be cheerfully sent on request.

GABRIEL STEEL COMPANY

Manufacturers of Steel Joists

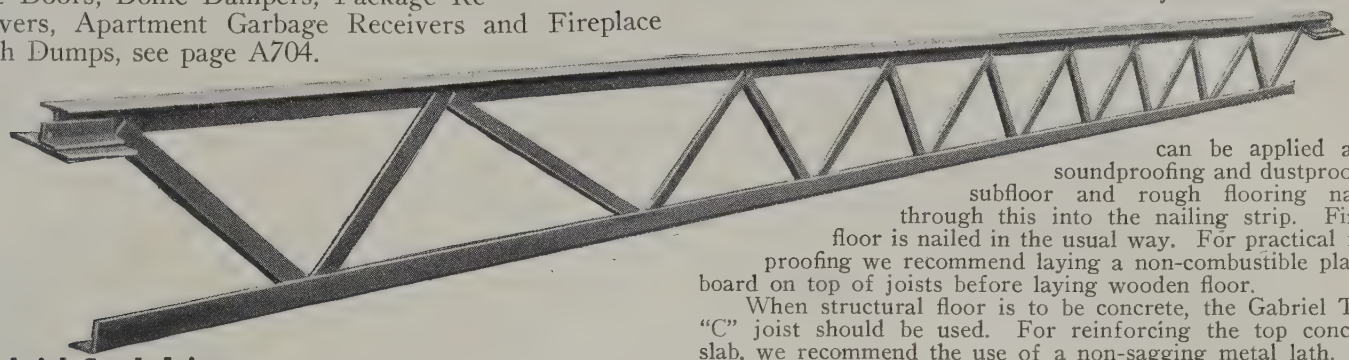
2441 Bellevue Avenue, DETROIT, MICH.

Products

GABRIEL STEEL TRUSS JOISTS.

Also Scaffold Brackets, Horse Legs, Reinforcing Bars and Chairs.

For Rolled Steel Coal Chutes, Ash Pit Doors, Dome Dampers, Package Receivers, Apartment Garbage Receivers and Fireplace Ash Dumps, see page A704.



Gabriel Steel Joists

Gabriel steel joists are designed especially for floor construction in all types of light occupancy buildings. They are adaptable to either wood or concrete flooring and insure practical fireproof construction without the delays coincident with reinforced concrete construction. Fabricated from rolled steel sections, they are really steel trusses in miniature. They weigh approximately only half as much per foot as wooden joists of equal strength. Top chord of specially designed section affords maximum rigidity both vertically and horizontally.

Advantages of Use

Their advantages of usage, aside from their natural reduction of fire hazard, lie in their strength and the ease, speed and economy with which they can be installed. Framing of openings is properly taken care of. Individual joist capacity warrants a comparatively wide spacing which gives economy in installation of plumbing, heating and electrical work. No cutting is necessary. Plaster cracks due to wood joist shrinkage are entirely eliminated.

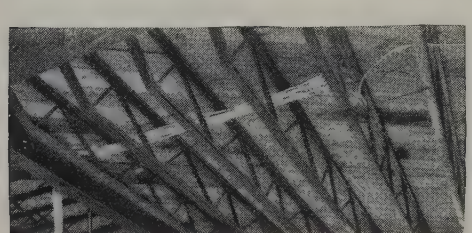
Sizes and Capacities

Gabriel steel truss joists are furnished in two types: Type "W" joist for use with wood floors, Type "C" joist for use with concrete floors. Gabriel Type "W" joists have a capacity of from 100 to 130 lb. per ft. of joist. Gabriel Type "C" joists, 170 to 200 lb. per ft. of joist. Variations in length of both "W" and "C" type joists are closely graded. A bearing plate is attached to all joists.

In design a complete analysis of all main and secondary stresses has been made. In the case of each joist, all stresses in every joist member have been carefully computed by analytical methods, and checked by graphical solution. We will gladly send loading tables upon request.

Joist Installation

Gabriel steel truss joists are adequately supported on wide plates rigidly attached and of sufficient length to assure safe bearing conditions. Since the joists are built to fit the span for which they are used, the truss is carried—full length—to the bearings, thus insuring maximum rigidity. The center of gravity of the joist is below the bearing plate. This greatly simplifies the work of erection, since it is merely necessary to place the joist in position, and it will automatically remain in a vertical position. This low center of gravity, together with the wide bearing plates used, makes the joist very stable during the erection operation, eliminating any danger of joist rotation.



Lateral bracing of the top chord and diagonal bridging are of great importance. Special fittings are furnished for these two purposes.

Floor Construction

Gabriel Type "W" joists are designed to replace wood joists where a wood floor is desired. A wood nailing strip, rigidly attached to the side of the top chord, permits nailing the rough subfloor directly to the joist in the same manner as to a wooden joist. Plaster board can be applied as a soundproofing and dustproofing subfloor and rough flooring nailed through this into the nailing strip. Finish floor is nailed in the usual way. For practical fireproofing we recommend laying a non-combustible plaster board on top of joists before laying wooden floor.

When structural floor is to be concrete, the Gabriel Type "C" joist should be used. For reinforcing the top concrete slab, we recommend the use of a non-sagging metal lath. An important Gabriel feature is the ease and economy of attaching top lath rigidly to steel joist. Note from the illustration above that no separate furring channel is required at the end of the joist for the support of ceiling lath.

Metal Lath Quickly Attached

Metal top lath is easily and quickly attached by wire clips, which are furnished with each shipment of joists. Illustration shows how lath is securely held in position. Short pieces of standard pipe are furnished as a tool for attaching lath clips.

Pipe and Conduit Installations

Because of the design of the top chord member, it has been possible to provide a relatively wide spacing of panel points and give ample space for the installation of pipes, conduit, etc., concealed between the floor and the ceiling. The illustrations below show this factor clearly.

Erection Drawings

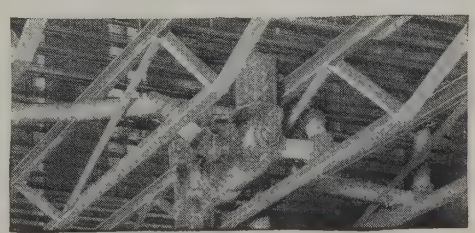
A steel joist layout showing location and mark of all joists is made by our engineering department. In preparing architectural or structural drawings, it is only necessary to specify the type of Gabriel joist required and the center to center spacing. The Gabriel nomenclature gives the depth of the joist, the type of joist and the over-all length. Mark numbers simplify the spotting and placing of joists on the job. Indestructible metal tags upon which the mark is clearly stamped are attached to every joist.

Shipping

Gabriel joists are always carefully loaded and securely braced against movement in transit. The number of joists, joist mark and over-all length are carefully checked. Every care is taken to insure joists being delivered to the building site in perfect condition.

Send for Catalogue

Complete catalogue containing typical details, properties and calculations; safe load tables for both Types "W" and "C" joists; and other information will be sent upon request.



Illustrations Show How Easily Conduit and Pipes Can Be Installed

INGALLS STEEL PRODUCTS COMPANY

BIRMINGHAM, ALA.

SALES REPRESENTATIVES AT PRINCIPAL CENTERS

The Ingalls Electrically Welded Pratt Type Deck Truss

The Ingalls Truss is not just another steel joist or truss, but is the result of accumulated knowledge and experience with all that has gone before. The type is the conventional Pratt deck truss, designed in strict accordance with accepted standards of truss analysis. The eccentric and bending stresses at the ends are fully resisted by properly proportioned and solidly welded end panels and seats which act as a single unit at each end.

The joints are fastened by metallic arc welding process. This method of welding is recognized by authorities as the only efficient and certain means of fastening joints of this character. No tack welds or butt welds are used. The number of welds is the minimum that can be used, thus reducing the possibility of faulty joints. Each weld is formed of continuous beading of proper length and cross section to adequately resist the imposed stress. Each joint is reinforced with additional metal from the electrode and, being fully fused with the parent metal, produces a section stronger than the bars. Each weld of each truss is rigidly inspected and tested so that broken welds or joints are avoided.

The *anchorage,* an Ingalls development, insures a rigid fastening for the truss, a positive lateral support for the carrying beams, and a thorough tie for the floor system as a whole. This anchorage results in a rigid floor without spring, and by thus relieving the concrete slab of undue stress, prevents excessive cracking.

Specifications for Ingalls Trusses

Floor and Roof Construction—(1) The floor system shall consist of steel trusses or joists as hereinafter specified, over which a 2-in. concrete slab will be placed. The ceiling under these trusses or joists will be installed by others. The trusses or joists as manufactured by the INGALLS STEEL PRODUCTS COMPANY of Birmingham, Ala., have been taken as the standard and are approved for this work.

Materials—(2) All steel shall conform strictly to the standard specifications of the American Society for Testing Materials, Serial Designation A-15-14 of medium grade.

Design—(3) All steel floor trusses or joists must be of conventional design and subject to a rational analysis as applied to trusses. Complete details and calculations for these members shall be submitted to the architect, and his approval obtained, before bidding on the work.

(4) The unit stresses shall not exceed those given in the specifications of the American Institute of Steel Construction adopted June 1923. The sections to resist bending at the ends shall be taken as the areas of the top and bottom chords and the gusset plate, where bending exists due to multiple points of support. The areas of the bearing plate shall be neglected.

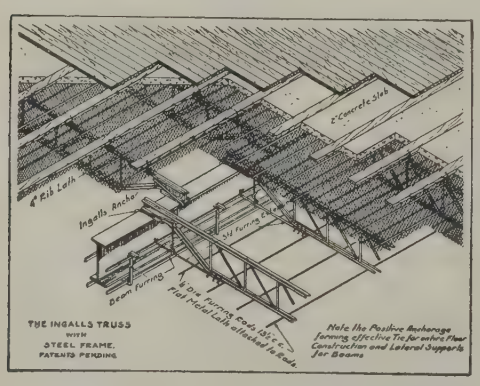
Calculations of stress submitted shall show the resistance to bending for each inch of length of the end seat and the resistance of the chord members to eccentricity due to the heel joint.

Welding—(5) Only metallic arc welding shall be used in the fastening of the joints of this truss. This welding shall be in the form of continuous beads of sufficient length and cross section to develop the strength of the joint or section. The end seat section shall be welded with beads of sufficient length and cross section to develop the full strength of the section and to insure that it will act as a unit. All welding shall be such that proper penetration is secured without burning, the parent and the deposited metal shall be fully fused. All welded joints shall be free from indents and cut-outs caused by the arc and the full section of the parent metal maintained.

Details—(6) The spacing and depth of these trusses or joists as shown on the drawings are the maximum allowable for this work. Bearing on masonry walls shall be not less than 4 in. Bearing on steel beams or girders shall not be less than 3 in., measured parallel to the long axis of the joist. Chord members shall be of uniform cross section for entire length. Splices to increase the size or length of any member, will not be permitted. Welding web members to a single chord member producing an eccentric joint will not be permitted.

Painting—(7) Each truss shall be painted before shipment with a standard paint acceptable to the architect. This paint shall contain no volatile dryers such as naphtha or gasoline.

Testing—(8) Each joint of each truss shall be fully tested by methods as approved by the architect and a certificate of such tests furnished with each shipment. If deemed advisable, a loading test shall be made at the site of the work. This loading test shall consist of a uniform load applied to two or more of these trusses or joists, selected from those shipped to the job, and set to a span equal to that used. The load applied shall equal twice the total designed load and the trusses or joists shall have a deflection not exceeding 1/360 of the clear span.



Anchorage—(9) All trusses shall be properly anchored as outlined herein. Where these trusses are supported by masonry walls these anchors shall be placed at each end of every second truss, or not more than 4 ft. apart and shall consist of a horizontal steel rod or bar with tee end and extending at least 8 in. into the wall.

These anchors shall be firmly attached to the truss by means of a proper hook or bolted thereto.

(10) With concrete tee beams, having an effective depth from the top of the slab, these trusses or joists shall have anchorage formed by the extension of the section into the concrete. The end of the chord section shall project a distance of not less than 3 in. inside of the vertical face of the stem of the beam. The ends of this extension shall be joined by welding an anchor as shown or approved to form the anchorage for the truss. The gusset or bearing plate shall project not more than 3 in. into the concrete. This anchorage shall be such that it will not separate the concrete mass composing the beam and must provide positive and combined action of the beam and the truss.

(11) Where these trusses bear on steel beams or girders, they shall be effectively fastened to the beams as shown or approved. The anchors provided must be fastened to the trusses and the beams in a manner that will anchor the truss end, provide lateral support for the beams and tie the floor system through as a whole. The use of friction or spring clips or loose anchors as anchorage will not be permitted.

Lateral Bracing—(12) The lateral bracing for these trusses shall consist of a crossed bracing or bridging consisting of not less than 14 gauge galvanized wire firmly attached to the top and bottom chord members, crossed and twisted tight at the center point between the trusses. This bridging must be tight and hold the trusses in a truly vertical plane. This bridging shall extend the full length of the panel. The trusses at the ends of the panels must be laterally braced or tied to the wall or beams by means of a continuation of the wire bridging, or a special rod or bar anchor fastened to both the top and bottom chords. This bridging shall be spaced not less than 4 ft. apart.

Erection—(13) The trusses are to be set on the supports and spaced in accordance with the setting plans. Immediately after setting in place, the bridging and anchors are to be installed. The reinforcing for the floor should not be placed until ready for concrete. Lath placed on the top of the trusses shall have the ribs up and securely fastened to the trusses at sufficient intervals to prevent undue sag.

Spacing of Trusses—(14) No truss or joint shall be spaced a distance exceeding 24 in. center to center for any floor panel, and not exceeding 30 in. center to center for any roof panel.

Note: The following should be specified under concrete work:

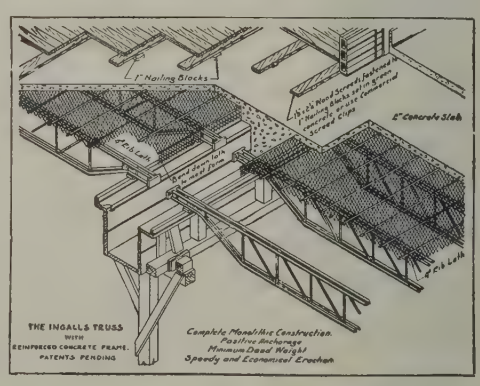
Floor and Roof Construction—(15) The floor (and roof) construction will consist of steel trusses or joists, over which this contractor shall pour a 2-in. concrete slab reinforced with.....

Note: Either a metal lath or a combined steel fabric reinforcement and form should be specified. If metal lath is specified it should be as follows:

(a) For a truss spacing not exceeding 18¾ in. use metal lath having not less than ⅜-in. ribs and weighing not less than 3.4 lb. per sq. yd. For a truss spacing of 19 to 24 in. use a metal lath having not less than ⅜-in. ribs and weighing not less than 4.0 lb. per sq. yd. For a truss spacing exceeding 24 in. use a metal lath having not less than ¾-in. ribs weighing not less than 5.4 lb. per sq. yd.

(b) In lieu of metal lath as reinforcing for this slab, a combined form and reinforcing, consisting of wire mesh having a paper backing as a form, of not less than 12 gauge wires, spaced not exceeding 3 in. center to center at right angles to the trusses and 4 in. center to center parallel thereto and electrically welded at their intersections. The area of this reinforcement shall not be less than .034 sq. in. per ft. width of span.

(c) The metal lath or fabric reinforcement should be stretched tight over the top of the trusses and fastened securely in an approved manner to the top chord member of the truss.



FOUNDED 1850

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

Jones & Laughlin Building, PITTSBURGH, PA.

DISTRICT SALES OFFICES

BOSTON, MASS., 131 State Street
Telephone, Hubbard 5151
BUFFALO, N. Y., White Building
Telephone, Seneca 0268
CHICAGO, ILL., 111 W. Washington Street
Telephone, Franklin 2522
CINCINNATI, OHIO, Union Trust Co. Building
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CLEVELAND, OHIO, Union Trust Building
Telephone, Main 7866
DALLAS, TEXAS, Construction Industries Building
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MILWAUKEE, WIS., First National Bank Building
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NEW YORK, N. Y., 165 Broadway
Telephone, Cortlandt 7513
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SAN FRANCISCO, CAL., Standard Oil Building
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CHICAGO, ILL.—Telephone, Virginia 1600
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Products

J & L Junior Beams.

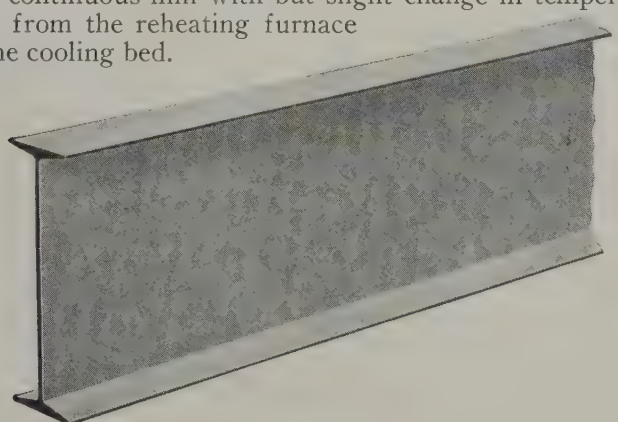
Also J & L Structural Shapes and Fabricated Structural Work, Columns, Girders, Trusses, Plate Work, Tanks, Mill and Factory Buildings; J & L Steel Piling; J & L Wire Products.

For J & L Bars for Concrete Reinforcement, see page A148, for J & L Light Weight Channels for Stair Stringers and Other Uses, see page A739; for J & L Tubular Products, see pages C2720-2721.

J&L JUNIOR BEAMS

Junior Beams—Description

The J & L Junior Beam is a structural steel section made from structural grade basic open hearth, copper-bearing steel, rolled from the billet to the full I-section, in a continuous mill with but slight change in temperature from the reheating furnace to the cooling bed.



The process by which it is possible to obtain a section having the dimensions of the J & L Junior Beam, combined with its very light weight, is of recent development—the result of advanced engineering and mill practice. After leaving the finishing rolls no straightening is required. There is no warping during cooling and tests show that the internal structure of the Junior Beam is free from stresses.

The function of the J & L Junior Beam as a floor beam is to carry the live and dead floor loads and transfer them to the heavier main carrying members of the framework or to the supporting walls. The success of the Junior Beam is based upon its simplicity of design and ease of installation; its adaptability, durability, light weight, rapidity of erection, and economy.

Rust Resistance

All J & L Junior Beams are rolled of copper-bearing steel, a positive defense against atmospheric corrosion.

Weathering tests made through many years by American Society for Testing Materials have proved the surprising resistance of copper-bearing steel to the inroads of corrosion. The results have indicated that the addition of copper even in small proportions will more than double the useful life of a roofing sheet. Experiments with structural shapes in which the content conforms to standard mill practice for copper-bearing steel have fully confirmed this conclusion.

Corrosion is arrested, and if the surface is painted the paint sticks and does not flake off.

Originators of Junior Beams have been forward looking in supplying the need for light structural shapes. They have also taken care to make them out of the most durable metal, by adding copper content to the steel in the proportions called for by the American Society of Testing Materials.

J & L Service

Jones & Laughlin District Sales Offices are located in all important centers. J & L Engineers familiar with J & L Junior Beams and their uses are available in these offices for advice and assistance.

When you desire to have detailed information in connection with the design of J & L Junior Beams, please ask the nearest office for Bulletin which contains all such data. (See addresses and telephone numbers above.)

The Jones & Laughlin Steel Corporation offers also, the aid of skilled field engineers to service any particular building operation in which Junior Beams are used.

Official Classification of Junior Beams

Junior Beams are extensively used throughout the United States and Canada in floor systems, the carrying capacity of the Junior Beams being based on the same fiber stress as that of standard weight structural steel sections. They have been thoroughly tested for the building commissioners of the larger cities of the country by eminent engineering authorities. As a result of rigid tests conducted by Prof. W. J. Krefeld in the Columbia University Testing Laboratories, Junior Beams were granted structural steel rating in the five boroughs composing New York City. A similar rating was accorded the Junior Beam in Boston in consequence of tests conducted by Prof. H. W. Hayward of the Massachusetts Institute of Technology.

These, together with other tests, have served to confirm and substantiate the conclusion reached by Prof. Milo S. Ketchum after his tests at the University of Illinois that Junior Beams should be classed as structural steel and they are so classified throughout the United States and Canada.

J & L Junior Beams are rated as structural steel by the American Institute of Steel Construction and their properties and dimensions are included in the handbook of information published by the Institute, pages 298-299.

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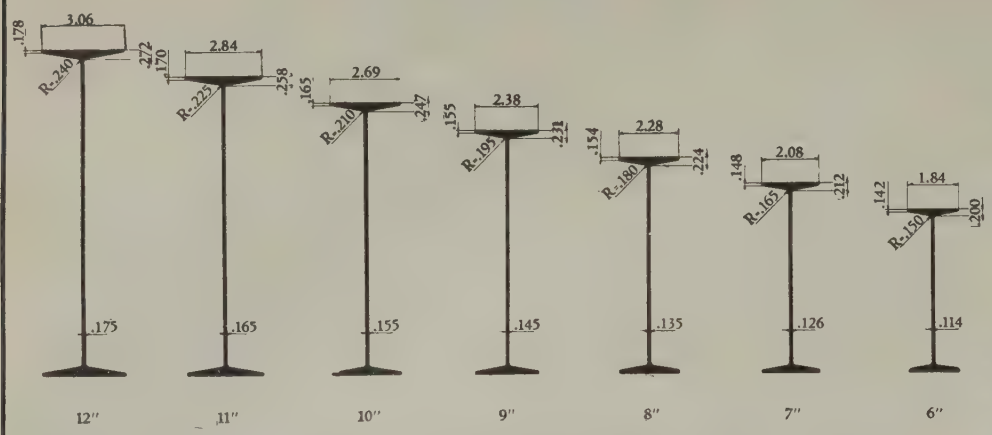
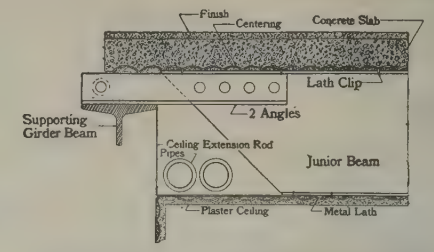
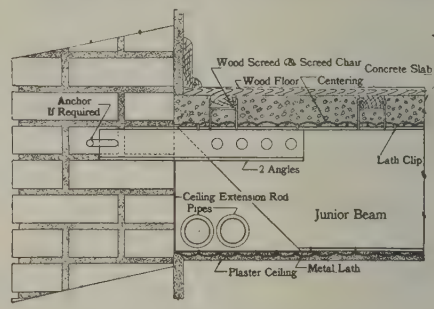


SIZES, WEIGHTS AND PROPERTIES OF JUNIOR BEAMS

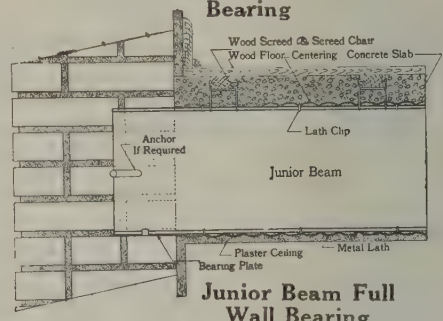
Depth, in.	Weight, lbs. per ft.	Flange width, in.	Web thickness, in.	Area, sq. in.	Radius of gyration		Moment of inertia		Section modulus	
					Hor. axis	Vert. axis	Hor. axis	Vert. axis	Hor. axis	Vert. axis
12	11.74	3.06	0.175	3.45	4.573	0.532	72.21	0.978	12.01	0.638
11	10.23	2.84	.165	3.01	4.200	.498	53.08	.746	9.63	.525
10	8.96	2.69	.155	2.64	3.847	.480	39.01	.608	7.78	.452
9	7.48	2.38	.145	2.20	3.450	.423	26.20	.394	5.81	.332
8	6.54	2.28	.135	1.92	3.116	.423	18.67	.343	4.65	.301
7	5.48	2.08	.126	1.61	2.744	.393	12.13	.248	3.45	.239
6	4.41	1.84	.114	1.30	2.372	.357	7.30	.165	2.42	.179



Standard End Connection on Steel



Standard End Connection Wall Bearing



Junior Beam Full Wall Bearing

Uses for Junior Beams

Since Junior Beams are essentially hot rolled structural shapes, they afford the building public additional sections for various uses.

Their chief use is as secondary members in floor and roof panels in all classes of buildings. They are being adapted in constantly increasing quantities as purlins and girts for mill buildings, hangars for airplanes and dirigibles, in protection sheds over side walks used during building construction, as monorails, supports for mechanical and conveying equipment.

Junior Beams should not be confused with the various types and designs of steel joists which are now on the market. Occasionally Junior Beams are specified by architects with steel joist alternates and vice versa. This practice is not recommended due to the inherent dissimilarity of the products.

Junior Beams are homogeneous steel I-beams in their original symmetrical form as rolled, and as such can be used in structural design up to their full value, by employing the simplest of engineering formulae and without empirical assumptions.

The adaptability of Junior Beams in floors materially increases the economy of the many systems now used, chiefly due to their simplicity of fabrication, lightness and ease in erection, efficiency and dependability.

Floor and roof systems in which the carrying members consist of rolled steel intermediate beams, or secondary members, are limited in their use only by the character and disposition of the fireproofing.

Due to the fact that building codes vary in their fireproofing requirements, the relative arrangement of steel and fireproofing materials must of necessity vary in different parts of the country.

On the following page will be found certain suggested floor designs which will meet any building code fireproofing requirements.

Erecting J & L Junior Beams with Standard End Connections

Specifications

Architects and engineers should include Junior Beams in the structural steel section of specifications, as they are an integral part of the structural framework of the building, to be supplied by the structural steel contractor. This procedure insures proper co-ordination of design and detail under one engineering control, and also proper timing of arrival of all structural material to the site and erection by the same erector.

The following specifications have been developed with the idea that they will aid designers in properly specifying J & L Junior Beams. Specifications may be used either in whole or in part with absolute confidence; they represent the best thought and standard practice at the present time.

Description—The floor system shall consist of Jones & Laughlin Junior Beams, serving as secondary floor beams, of the sizes and at the spacings shown on drawings. The J & L Junior Beams shall be supported (by standard end connections), (by hangers), (by shelf angles), (on top of structural beams), (on bearing walls). Before shipment all J & L Junior Beams shall be given a coat of oxide paint. Paint with a coal tar base shall not be permitted. If a second coat of paint is to be applied by the erector in the field, mention of it should be made here. Paint that will flow at high temperatures should be barred.

LIVE LOADS

	Corridors	Rooms	Loads
First floor			
Second floor			
Intermediate floors			
Roof			

Additional Pieces—An additional J & L Junior Beam shall be used under each partition running parallel with the Junior Beams. For cross partitions, where necessary, due allowance should be made in figuring dead loads.

Bridging—The J & L Junior Beams shall be bridged where lateral support is not otherwise provided continuously at distances not to exceed 6 ft. with No. 12½ galvanized wire. The end Junior Beam in each panel shall be fastened to bridging anchors set in outside wall, or to parallel structural steel and bridging twisted taut. Tie rods or other types of bridging may be substituted for continuous wire bridging if required to meet special conditions.

Continued on next page

Coping—Where tops of Junior Beams are to be level with tops of supporting structural steel, and supported on shelf angles, the tops of Junior Beams shall be coped to allow full bearing on shelf angle.

Clamps—Clamp shall be used to fasten bottoms of Junior Beams to top of structural steel when the Junior Beams bear on top of flange of the main carrying members. When tops of Junior Beams are coped, a special clamp shall be used to attach Junior Beams to top flange of main beam.

Wall Plates—Plates shall be used under the ends of Junior Beams resting on bearing walls.

Hangers—Where it is desired to support the Junior Beams by hangers, these hangers shall provide a bearing for the Junior Beams not less than 3 in. and be supported over top flange of main beam by at least 1½x1½x$\frac{3}{16}$-in. angles.

Anchors—Where Junior Beams rest on masonry walls, a ½x8 in. round anchor shall be used in (such Junior Beams as the local building code requires) or wall ties ¾x12 in. corrugated and galvanized, laid on lath before concreting and anchored in wall.

Screeds—Where wood floors on top of concrete slabs are specified, they shall be nailed to screed or nailing strips, preferably of hardwood, imbedded in the slab. Screed strips shall be 2 in. wide by 1½ in. deep (or greater depth) nominal dimensions, and shall be attached to the top of Junior Beams by means of proper chairs. Screed strips shall run (at right angles to the Junior Beams and be spaced .... in. apart) (parallel and on same centers with the Junior Beams), (diagonally to the Junior Beams). Substitution may be made for the following dependent upon the type of floor system under consideration.

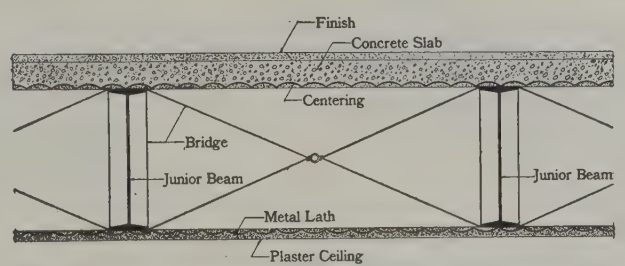
Centering—For specifications for centering on top of the J & L Junior Beams, the designer should refer to details covering same as found in the Junior Beam Bulletin obtainable on request. Lath shall be applied with sheets running at right angles to the Junior Beams. Metal lath shall be securely fastened to the tops of the Junior Beams with lath clips at 12-in. centers, except at ends of sheets where lath clips shall be at 6-in. centers, and applied with a special tool furnished by the manufacturers of the J & L Junior Beams. Lath sheets shall be securely wired together along the side laps midway between Junior Beams. Any approved form of metal lath or backed floor fabric may be used. Any and all clips, ties, or other accessories necessary for the proper application of each particular type of centering shall be used in accordance with these specifications or the specifications of the manufacturer of the respective centering materials. *The writer of the specifications shall define the type and quality of the centering to meet the particular requirements.*

Floor Slabs—Concrete for floor slabs shall be composed of one part cement and a graded mixture consisting of not more than seven parts of fine and coarse aggregate, mixed sufficiently dry to prevent dripping through the metal lath or wire mesh. Where the spacing of Junior Beams is greater than 30 in. a proper reinforcing shall be provided to conform to local building code requirements.

Temperature Rods—When finished floors are made of composition, terrazzo or materials other than wood, temperature rods shall be used, spaced not over 18 in. apart.

Ceiling Lath—Ceiling lath (covered elsewhere under the plastering specifications) shall be firmly wired to pencil rods, which shall be, in turn, securely fastened by means of approved clips, to the lower flanges of the Junior Beams. Where the spacings of the Junior Beams are narrow, flat or ribbed lath may be fastened directly, by means of an approved clip, to the lower flanges of the Junior Beams. Ribbed lath shall be applied so that the ribs are at right angles to the direction of the pencil rods, or, when pencil rods are omitted, to the Junior Beams.

The J & L Lath Clips and Lath Clip Tool can be obtained directly from the manufacturers, fabricators and hardware dealers.

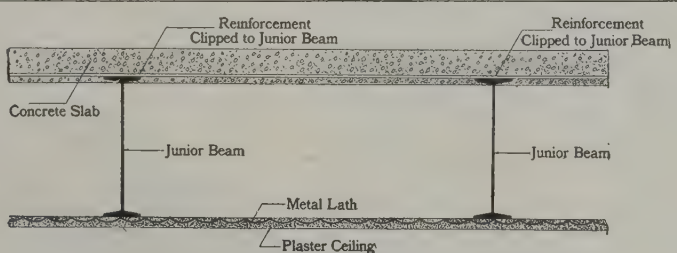


Concrete Slab on Permanent Centering

This is the most common and cheapest arrangement of Junior Beams and companion materials. The top slab consists of concrete poured in place on permanent centering.

The ceiling consists of gypsum or Portland cement plaster on metal lath.

In order to insure ease in application, pencil rods and flat ceiling lath are recommended.

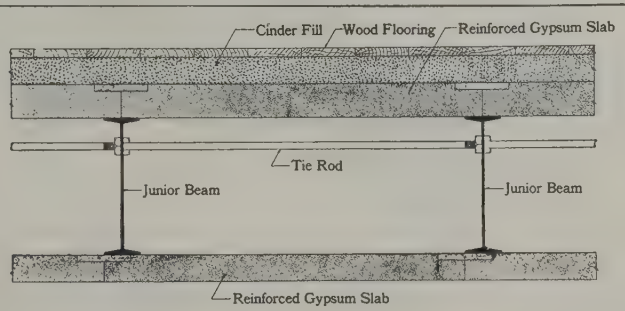


Concrete Slab on Removable Forms

Additional stiffness is obtainable by this method which is adaptable to tall slender buildings. The top slab is poured in place on wood or metal forms.

The ceiling consists of gypsum or Portland cement plaster on metal lath.

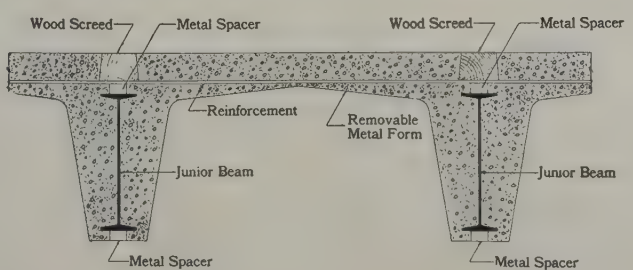
In order to insure ease in application, pencil rods and flat ceiling lath are recommended.



Gypsum Slabs

The lightest common type of floor providing four hour fire protection to the room above, or below, is obtained by means of precast reinforced gypsum floor and ceiling slabs securely fastened, by various types of clips or hangers, to the Junior Beams.

An alternative method to the above is the pouring in place of similar slabs, on removable or permanent centering.



Junior Beams Totally Incased

By the use of removable "tin pans" and various types of clips and hangers, four hour fire protection is secured and is permissible under the strictest building codes.

KALMAN STEEL COMPANY

Manufacturers of Kalmantruss Joists

CHICAGO, ILL.

For Offices, see page B1698

Products

KALMANTRUSS JOISTS.

Also Wall Anchors, Beam Anchors, Masonry Bearing Plates, Bridging Anchors, Sleeper Anchors, Furring Extension Rods, Adjustable Floor Lath Clips, Header Angles.

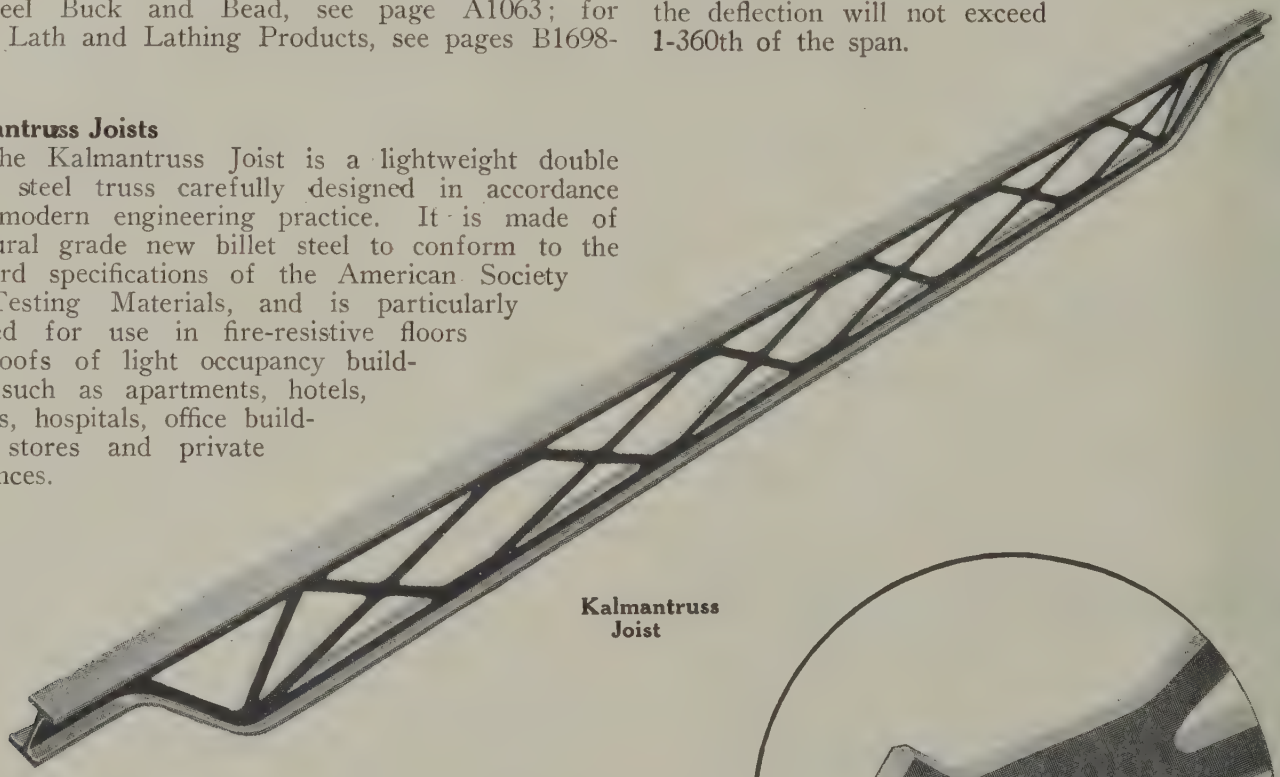
For Concrete Reinforcement, see page A149; for Steel Buck and Bead, see page A1063; for Metal Lath and Lathing Products, see pages B1698-1699.

Kalmantruss Joists

The Kalmantruss Joist is a lightweight double lattice steel truss carefully designed in accordance with modern engineering practice. It is made of structural grade new billet steel to conform to the standard specifications of the American Society for Testing Materials, and is particularly adapted for use in fire-resistive floors and roofs of light occupancy buildings, such as apartments, hotels, schools, hospitals, office buildings, stores and private residences.

Safety Insured

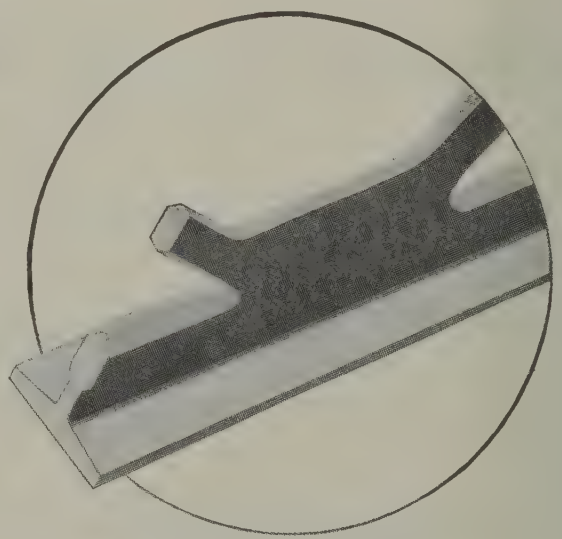
When the Kalmantruss Joist is properly installed and braced as in standard floor construction, it will in all cases carry a uniformly distributed live load greater than twice its rated live load capacity. And when subjected to a load equal to its rated capacity, the deflection will not exceed 1-360th of the span.



Kalmantruss Joist

One-piece Joints

The Kalmantruss Joist is not an assembly of individual parts. It does not depend upon welds, rivets or bolts to hold it together. The chords and inclined web members are formed from the same piece of steel. These members are so designed that their center of gravity lines meet at a point, thereby eliminating eccentricity at the joints. The joints are in all cases capable of developing the ultimate strength of the web members.



Kalmantruss Joist Formation

Uniform Strength Throughout

The chords and web members are continuous and are of constant cross-section throughout the length of the joist. Because the members do not change in size, the joist is equally strong at every point. This feature enables Kalmantruss Joists to carry safely partition or other concentrated loads that may occur at any point in the span. The ends of the truss are additionally strengthened by means of vertical compression members electrically arc welded in place.

Catalogue

Complete catalogue and descriptive literature is available, showing details of joist construction, specifications, and safe loading tables. With the Kalmantruss Joist, Kalman offers a newly-designed, and most efficient line of anchors and accessories. Kalman also offers a specially designed metal lath for floors and ceilings in joist construction. Write for catalogues to cover these products.

THE RIVET-GRIP STEEL CO.

Manufacturers of Rivet-Grip Steel Joist

MAIN OFFICE

2404 Prospect Avenue, CLEVELAND, OHIO

WAREHOUSES AND FABRICATING PLANTS AT CLEVELAND, OHIO AND CANONSBURG, PA.

LIST OF REPRESENTATIVES IN PRINCIPAL CITIES

ATLANTA, GA., Hugh J. Baker & Co.
BUFFALO, N. Y., Kenmore Builders' Supply Co.
CHARLESTON, W. VA., Concrete Engineering Products Co.
CHICAGO, ILL., Hugh J. Baker & Co.
CINCINNATI, OHIO, Hugh J. Baker & Co.
DALLAS, TEX., R. J. DeWees Company
DAYTON, OHIO, Hugh J. Baker & Co.
DECATUR, ILL., Hugh J. Baker & Co.
DETROIT, MICH., Capitol Steel Corp.
FORT WAYNE, IND., Hugh J. Baker & Co.
HELENA, MONT., Raymond C. Grant
INDIANAPOLIS, IND., Hugh J. Baker & Co.
LANSING, MICH., Capitol Steel Corp.
LOUISVILLE, KY., Louisville Builders' Supply Co.
MILWAUKEE, WIS., A. F. Wagner Architectural Iron Works
MINNEAPOLIS, MINN., The Hustad Co.
NEW YORK, N. Y., Ferro Building Products Co.
OMAHA, NEB., Gate City Iron Works
PHILADELPHIA, PA., American Steel Engineering Co.
PITTSBURGH, PA., American Steel Engineering Co.
ST. LOUIS, MO., Harry C. Uhlenhaut
SALT LAKE CITY, UTAH, Chas. F. Porter Co.
SAN FRANCISCO, CAL., J. A. Kinkead
WHEELING, W. VA., Tyler Iron Works

Products

Rivet-Gr'p Steel Joists.
Rivet-Grip Rigid Shop Fabricated Trusses.
Bridge Roadway Reinforcement (description on request).
For Rivet-Grip Bank Vault Reinforcement, see pages A1340-1341.

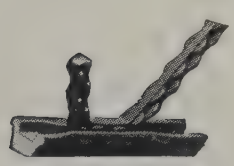
Literature

Folder giving complete details and loading tables will be mailed upon request.

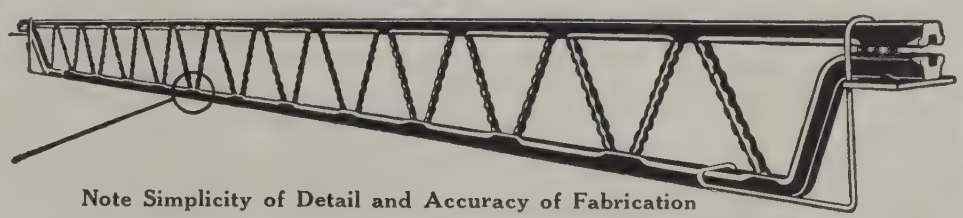
Uses

Rivet-Grip Steel Joists are used for fire-safe floor and roof construction, or wherever a rigid, permanent, fire resisting and economical type of construction is desired in light occupancy buildings.

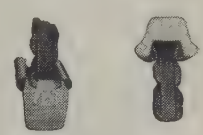
Rivet-Grip Steel Joists have been in the market for five years and have been used in several hundred buildings, which include apartment houses, banks, office buildings, schools, churches, libraries, theaters, hotels, garages, stores and residences.



Patent No. 1013608
Other patents pending



Note Simplicity of Detail and Accuracy of Fabrication



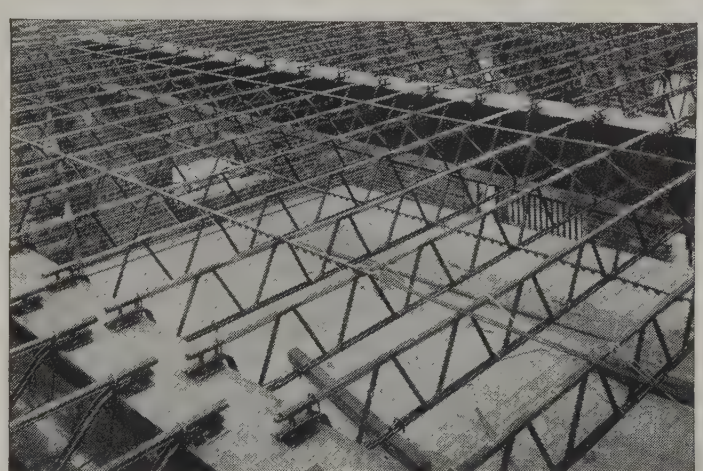
Section through the Rivet-Grip

Design

Rivet-Grip Steel Joists are fabricated from specially rolled, heavy steel sections. The truss construction gives light weight with the greatest possible carrying strength. The top and bottom chords consist of heavy rolled flange sections and the lightest web members are ⅜ in. thick. The web members are joined to the chord members by the Rivet-Grip process, which produces a uniform and positive mechanical connection and develops the full strength of component members of the truss.

These joints are so rugged and completely encased by the chord sections, that they are positively protected from damage in shipment or rough handling in the field. There are no welded connections except on bearing plates and no thin metal members subject to corrosion. All joists are painted with rustproof paint before shipment.

Our special continuous notched angle and double diagonal galvanized wire bridging is always furnished with our Rivet-Grip Steel Joists. This bridging not only serves to hold the joists in place before concreting, but also acts as a series of transverse trusses for distributing concentrated loads, which come on the completed floor.



Rivet-Grip Steel Joists in Place Ready for Top Lath

Note that joists are simply dropped into position with ends resting on top of beams or walls. Also note the two rows of notched angle and double diagonal bridging at the third points of the joists

Advantages

Rivet-Grip Steel Joists are lighter, unit for unit, than ordinary structural members of equal strength. They are easily handled by workmen, as individual units or in bundles by cranes, as they allow chains or ropes to be inserted through the open webs, eliminating all danger of individual joists slipping out.

The open webs of the joists allow ample space for the running of pipes and conduits, and eliminate cutting and boring of webs and the expense of excessive fills, raised floors or special furred ceilings to conceal pipes.

Less concrete or plaster is required with Rivet-Grip Joists because the lath is held so rigidly, when attached by wiring, that it will not deflect excessively when concrete is poured on top or plaster is applied from below.

Rivet-Grip Steel Joists are fabricated for each individual job, insuring joists with adequate end bearing and enabling the designer to select uniform depth of joists for varying spans, thus eliminating furring in order to obtain uniform ceiling heights. They are delivered complete with erection marks on metal tags fastened to each joist.

Designing and Estimating Service

The Rivet-Grip Steel Co. or nearest representative will gladly submit estimates upon request. The following items can be included in the estimate: Rib lath for floor slabs, temperature steel, furring rods, beam clips for fastening joists to steel beams and screed or sleeper clips and metal lath for ceilings, in addition to our standard notched angles and galvanized wire bridging.

Assistance in preparing the most efficient and economical layout for any building will be given without incurring any obligation.

THE MACOMBER STEEL COMPANY

Massillon Bar Joists and Massillon Nailer Joists

901 Belden Avenue, CANTON, OHIO

For Massillon Steel Building Products, see pages A658-659; for Massillon Vault Reinforcing, see pages A1342

Steel Joist Products

Two distinct types of steel joists (U. S. Patents No. 1651032, No. 1614248, No. 1614247, No. 1614249) are manufactured. The Massillon Bar Joist is built up from steel bars and steel plates. It is designed to carry concrete floor decking, and concrete or steel roof decking. The Massillon Nailer Joist is built up from steel bars and steel plates, with a steel angle and wood strip forming the top member of the joist. It is designed for nailing wood flooring and wood roof decking directly to this top member.

Characteristics of Massillon Joists

Both joists are manufactured in a series of standard stock sizes for all spans met with in building construction. Accessories for all framing conditions are handled in the same manner. Prompt shipment is made on all orders. Each joist is fabricated with structural arc welding into a solid structural unit that will withstand the abuse of rough handling. Detailed dimensions of all joists are printed in A. I. A. Catalogs.

The illustrations below show typical details of both joists. Those on the opposite page illustrate construction details and joist accessories. The A. I. A. Catalogs contain safe loading tables, complete specifications and designing data. The loading tables show total safe loads in pounds per square foot for various center to center spacings of joists.

Bar Joist Floor and Roof Construction

Concrete Decking—Two to three inches of concrete is poured on ribbed metal lath secured to the top bars of the joists. Any type of finish flooring or roofing is laid on top of this slab.

Steel Roof Decking—Corrugated sheets or manufactured steel decking may be used in place of the concrete slab for roof construction. This is secured to the top bars with straps riveted to the sheets or with clips furnished by the decking manufacturer.

Ceiling Construction—A cement or hard finish plaster on metal lath ceiling completes the construction. A ⅜-in. rib lath is usually used with the ribs turned up to act as furring. A metal lath suspended ceiling is used below joists in panels pitched for roof slope or where shallower joists are used for short spans in irregular panels.

Massillon Bar Joists provide a decidedly economical, fireproof floor and roof construction.

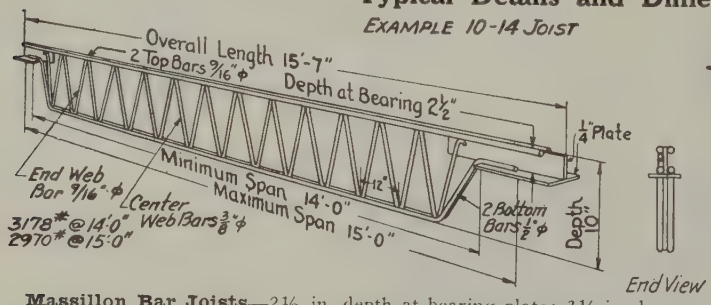
Evidence of the quality of the construction may be found in thousands of fine buildings in all parts of the United States and Canada.

Massillon Nailer Joist Construction

Nailer Joists eliminate the concrete slab that is a component part of bar joist construction. Wood flooring or roof decking is nailed directly to the top member of the joists. In other respects the construction is identical with bar joist construction.

Nailer Joists provide a floor or roof with a high degree of fire resistance when built with metal lath and plaster ceiling. This results in a construction that is firesafe for many conditions at a cost that closely approaches that of ordinary construction. Nailer Joists are frequently used for roofs of otherwise strictly fireproof buildings.

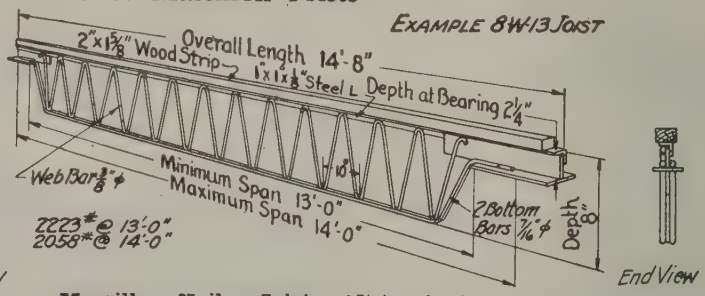
Typical Details and Dimensions of Massillon Joists



Massillon Bar Joists—2½ in. depth at bearing plate; 3½-in. bearing along joist at maximum span; maximum span one foot more than minimum span; standard joists available in following depths:

8-in. depth for spans of	4 to 16 ft.
10-in. depth for spans of	14 to 20 ft.
12-in. depth for spans of	18 to 24 ft.
14-in. depth for spans of	21 to 27 ft.
16-in. depth for spans of	25 to 31 ft.

Note: The deeper joist is more efficient for any given span.



Massillon Nailer Joists—3⅞-in. depth (including 1⅝-in. wood strip) at bearing plate; 4-in. bearing along joist at maximum span; maximum span one foot more than minimum span; standard joists available in following depths:

8-in. depth for spans of	4 to 18 ft.
10-in. depth for spans of	15 to 22 ft.
12-in. depth for spans of	18 to 26 ft.

Note: Nailer type roof purlin sections are provided in 12, 14 and 16-in. depths for spans up to 26 ft. for wide spacings of purlins with 2-in. wood decking.

Joist Specifications for Floors and Roofs

Note: The following specifications will fully protect the client's interests and insure good construction. The responsibility for preparing detailed erection plans is properly placed on the manufacturer.

Where indicated in the drawings the floors (and roof) shall be constructed with Massillon Bar Joists (Massillon Nailer Joists) as manufactured by the MACOMBER STEEL COMPANY, Canton, Ohio. Joists shall be provided of the proper size and spacing to carry the specified floor (and roof) loads. The depth of joists shall not exceed the depths indicated for the various floor (or roof) panels. In no case shall joists be spaced over ..... inches c-c in the floor construction (or over ..... inches c-c in the roof construction). Joists shall be provided alongside and parallel to the end walls in the floor (and roof) panels. Extra joists shall be provided as specified under partitions running parallel to and over the joists. Detailed erection plans shall be furnished by the manufacturer showing the location and placing of joists. The American Institute of Steel Construction Specifications shall govern.

The joists shall be placed on the supporting walls and beams in accordance with the erection plans. At least 3½ in. of bearing measured along the length of the joists shall be provided on masonry walls and every third joist end anchored to the wall with Massillon End Anchors. At least 2 in. of bearing shall be provided on steel framing and the joist ends clipped to the framing with Massillon Beam Clips.

The end joists in each panel shall be anchored to the parallel wall or beam and all joists braced laterally as indicated in the plans. The anchors and bridging shall be placed at the center, third or quarter points to provide lines of bridging approximately 6 ft. on centers.

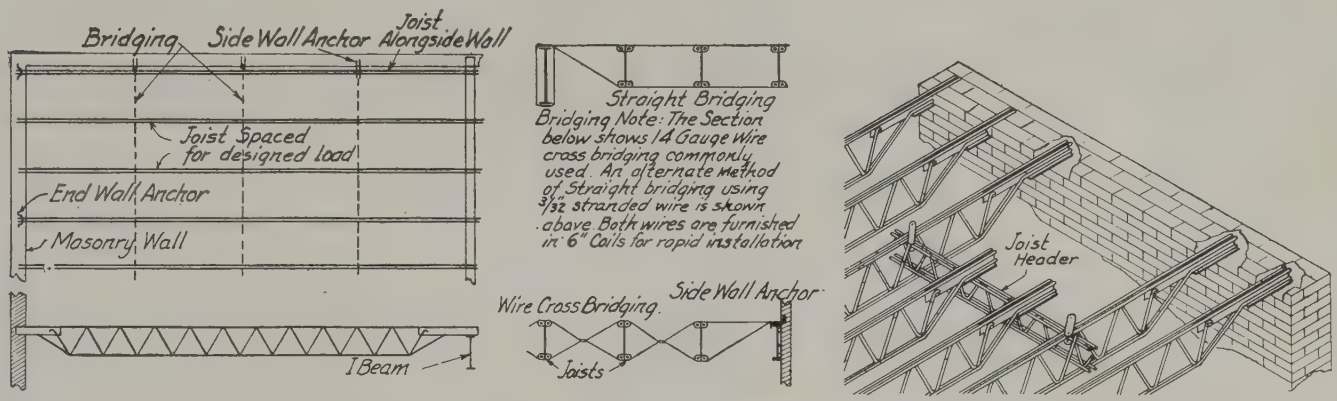
Where concrete slabs are specified the slab shall be poured on rib lath secured to the top bars of the joists with Massillon Lath Wedges. A ⅜-in rib lath weighing not less than 4 lb. per sq. yd. shall be used for all floor slabs. (A ¾-in. rib lath weighing not less than 4.5 lb. per sq. yd. shall be used for roof slabs with joists spacing over 25 in.)

Where plastered ceilings are specified a three coat ¾-in. cement or gypsum (hard wall) plaster shall be applied on ⅜-in. rib lath. The lath shall be wired to the bottom bars of the joists with the ribs turned up to act as furring. The lath shall be suspended on furring channels to provide a level ceiling where different depth joists are used in irregular panels and under pitched roof panels.

Note: Where bar joists are to carry a concrete slab, the spacing of joists should not exceed 19 in. for garage floors, 25 in. for office, hotel and residential floors or 32 in. for roofs. The spacing of bar joists for steel roof decking depends on the strength of the decking and should not exceed 5 ft. Nailer joist spacings should not exceed 18 in. in floors or 32 in. in roofs.

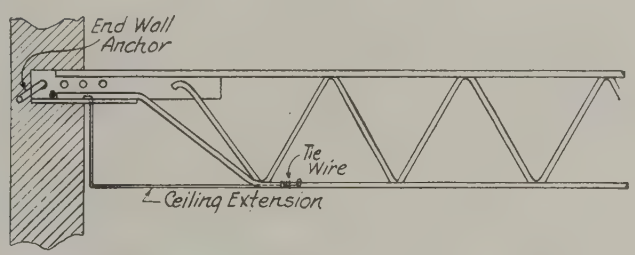
Continued on next page

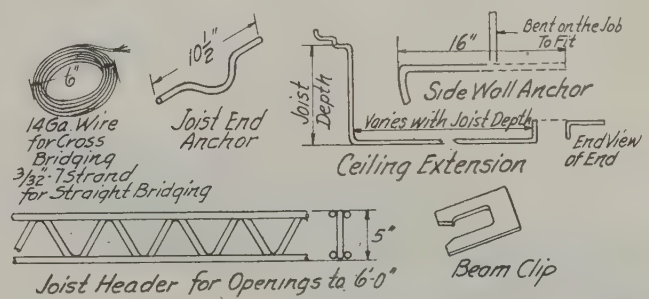
Floor & Roof Construction Details



Framing Massillon Bar Joists—Massillon Nailer Joists

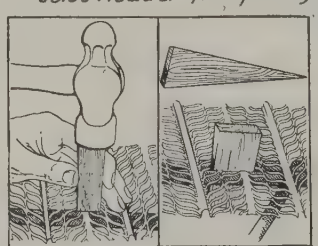
The joists are placed on supporting beams or walls in accordance with erection drawings. These drawings show the joist symbol numbers and exact spacing of joists to carry the designed floor load. Simple beam clips hold the joists in position on steel beams. An end wall anchor is inserted through every third joist end to serve as a tie where the joists bear on masonry. The joists are bridged with one or more lines of bridging. Where the end joist in a panel is alongside a masonry wall, this joist is anchored at the points of bridging with side wall anchors. Where the end joist is parallel to a beam the bridging wire is wrapped around the beam. Either straight or cross bridging may be used as illustrated above. Rough 2-in. planks can then be laid on the joists to carry construction loads equal to the designed floor loads. Smaller openings are framed with joist headers as illustrated. Larger openings such as stair wells are usually framed with structural steel.



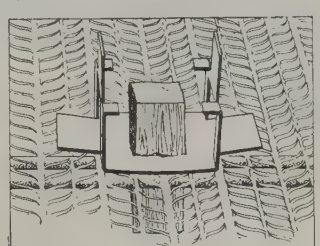


Massillon Joist Accessories

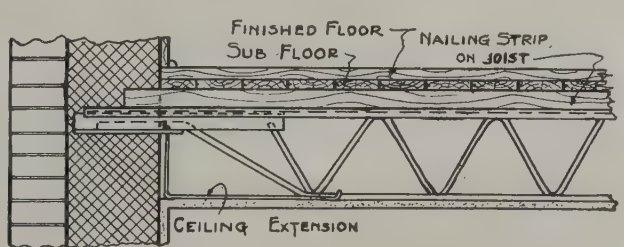
Every detail in the accessories for Massillon Joists has been proven through years of experience. The Massillon Lath Wedge and Screed Clip illustrated at the right are used only with a concrete slab on bar joists. The lath wedge is the most rapid positive and economical method of securing floor lath to the top members of the joists. The screed clip is a positive method of lining up and holding wood nailing strips above the joists. It provides for one inch of concrete fireproofing below the strip.



Massillon Lath Wedge

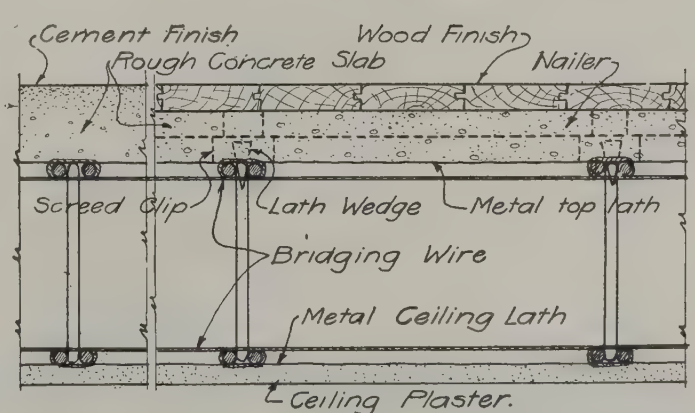


Massillon Screed Clip



Typical Floor Sections

A typical section of a Nailer Joist Floor is shown above. A typical section of a Bar Joist Floor taken through the joists is shown to the right. A cement floor finish such as is used in garage or porch floor is shown on top of the bar joist at the left. A wood floor finish nailed to a wood strip embedded in the slab is shown on top of the bar joists at the right. A plaster or metal lath ceiling is shown in both sections.



TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Steel Joists

EXECUTIVE OFFICES AND PLANT

YOUNGSTOWN, OHIO

For Branch Offices, see Local Telephone Directory

Products

P-G (Plate Girder) TYPE STEEL JOISTS.

O-T (Open Truss) TYPE STEEL JOISTS.

For other Truscon Products, see pages in this edition as follows: Concrete Reinforcement, page A151; Steeldeck Roofs, page A213; Steel Door, pages A986-987; Steel Windows, pages A1299-1303; Metal Lath, pages B1704-1705.

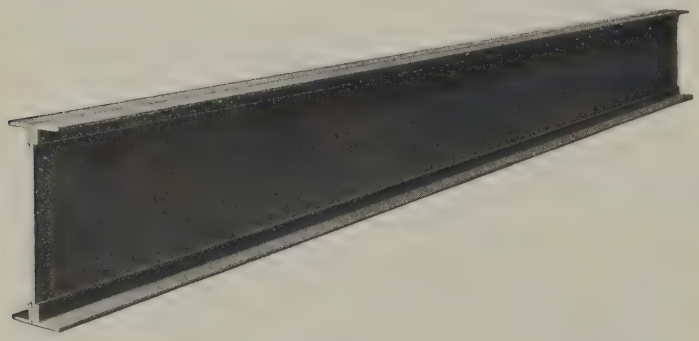
TRADE-MARK

Truscon Service

Truscon's organization of Sales Offices completely covers the country. Through any of these offices you can obtain the services of a competent engineering force thoroughly acquainted with the most economical practice in the application of Truscon Steel Joists.

Truscon P-G (Plate Girder) Type Steel Joists

The Truscon P-G (Plate Girder) Joist is made of structural shapes, combining utmost efficiency of design with economy of material. This joist is a combination of the most perfect grade of structural steel angles welded by the high pressure electric welding method to a rolled strip, the whole forming a plate girder of great strength. Being made in depths from 6 to 14 in., inclusive, they give the engineer considerable leeway in arriving at the most efficient design.



CONDENSED LOAD TABLE TRUSCON P-G JOISTS

Type	Depth, in.	*Total safe load in lb. for various clear spans				
		10 ft.	14 ft.	18 ft.	22 ft.	26 ft.
PG 62½	6	3270	2040	.....	.....	.....
PG 72½	7	4020	2880	.....	.....	.....
PG 82½	8	.....	3420	2380	.....	.....
PG 92½	9	.....	4085	3180	.....	.....
PG 93	9	.....	.....	3500	.....	.....
PG 102½	10	.....	4845	3765	.....	.....
PG 103	10	.....	5032	4130	3086	.....
PG 103½	10	.....	.....	4500	3365	.....
PG 113	11	.....	6225	4845	3965	.....
PG 113½	11	.....	6404	5240	4290	.....
PG 123½	12	.....	.....	6030	4935	3855
PG 144	14	.....	.....	8850	7240	6120

*Maximum stresses used 16,000 lb. per sq. in.

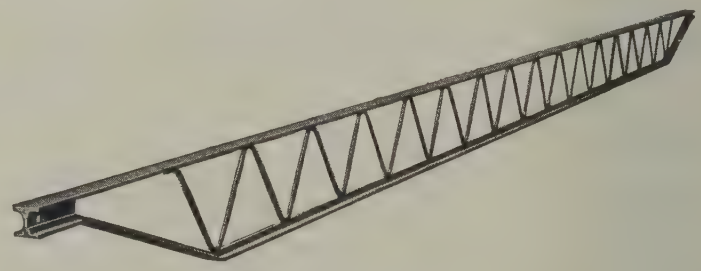
Truscon O-T (Open Truss) Type Steel Joists

The Truscon O-T (Open Truss) Steel Joist is a Warren truss in which the top and bottom chords are specially rolled "tee-shaped" members providing the greatest resistance to buckling strains.

The web member is continuous from end to end to positively transmit the stresses, and is carefully welded to the top and bottom chords.

The entire design is efficient and exceptionally economical of materials.

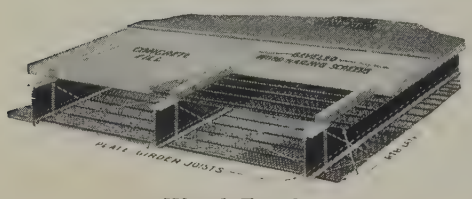
These joists can be furnished in depths varying from 8 to 16 in., inclusive.



CONDENSED LOAD TABLE TRUSCON O-T JOISTS

Type	Depth, in.	*Total safe load in lb. for various clear spans				
		10 ft.	14 ft.	18 ft.	22 ft.	26 ft.
800	8	4070	3380	.....	.....	.....
1000	10	5330	4270	3320	.....	.....
1011	10	5330	4780	4520	.....	.....
1200	12	.....	4150	3860	3280	.....
1211	12	.....	5950	5470	4470	.....
1411	14	.....	7500	6260	5120	4340
1433	14	.....	10000	8450	6920	5850
1611	16	.....	.....	7160	5850	4960
1633	16	.....	.....	9650	7880	6680

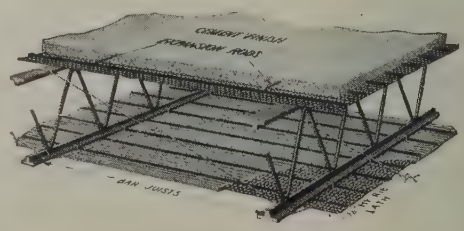
*Maximum stresses used 16,000 lb. per sq. in.



Wood Finish

Floor Finishes

Truscon Steel Joist Construction adapts itself readily to any type of floor finish. Wood nailing screeds, embedded in the concrete fill, simplify the laying of wood floors; while a cement topping over the concrete fill makes an ideal base for linoleum, carpets, or composition floors.



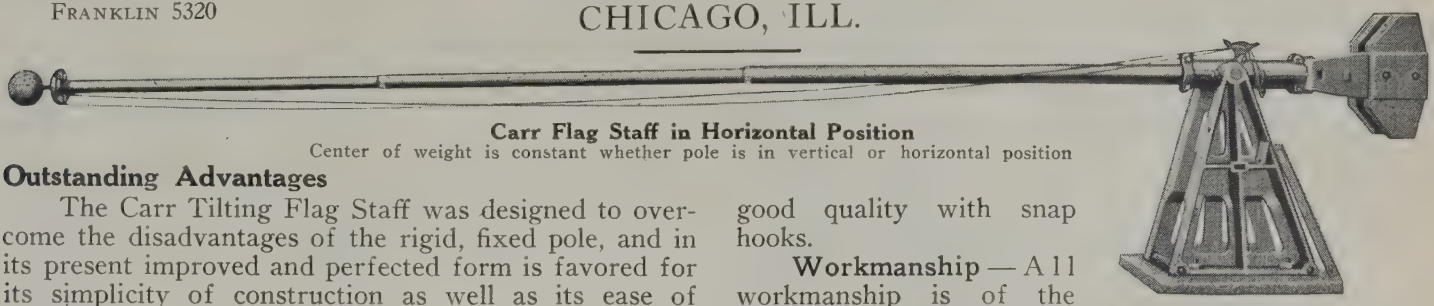
Cement Finish

ELMER E. CARR

Manufacturer of the Carr Tilting Flag Staff

TELEPHONE
FRANKLIN 5320

228 North La Salle Street
CHICAGO, ILL.



Carr Flag Staff in Horizontal Position
Center of weight is constant whether pole is in vertical or horizontal position

Outstanding Advantages

The Carr Tilting Flag Staff was designed to overcome the disadvantages of the rigid, fixed pole, and in its present improved and perfected form is favored for its simplicity of construction as well as its ease of operation and maintenance.

Counterbalanced—Each unit is provided with adequate counterweight to balance the pole proper, which is secured in a substantial socket provided with steel trunnions to engage in the standard or supporting brackets, the brackets being permanently attached to the roof or foundation. When the pole is lowered or raised the roof load is unchanged.

Repainting, inserting new halyards, etc., are accomplished with the utmost ease and economy. There are no mechanical parts, no gearing or levers to fail. One man can lower the pole by removing the key and locking bar, exerting slight pressure against the counterweight, and bringing the pole (always under control) with little effort to the horizontal. It is returned to the vertical with equal facility.

Simple Pole Support Construction—Due to the low point of gravity, only an ordinary foundation to receive the anchor bolts is necessary and a roof construction adequate to carry the weight of the unit. The supporting castings provide a rigid and sturdy anchorage without the usual "pull and tug" effect of an ordinary pole attached to the roof with structural shapes.

Economy of Erection—Erection is simply and inexpensively accomplished. After the supporting castings are set on the foundation bolts and the pole socket castings in place and shored in a horizontal position, the pole is inserted and bolted in the socket, the counterweights are then bolted in position and the trimmings attached to the top of the pole; the shoring is then removed and the counterweighted pole is easily raised to a vertical position and the locking bar inserted and keyed in place.

The parts are raised to the roof with the usual facilities provided for construction work. Once on the roof, the unit, according to size, can be erected complete by two or three men in one and one-half to three hours.

Construction

Base—The supporting structure is of cast iron, which is recognized as better able to withstand the elements than structural shapes.

Socket—The pole socket is of cast iron, with steel trunnions cast in position, and the counterweights also are of cast iron.

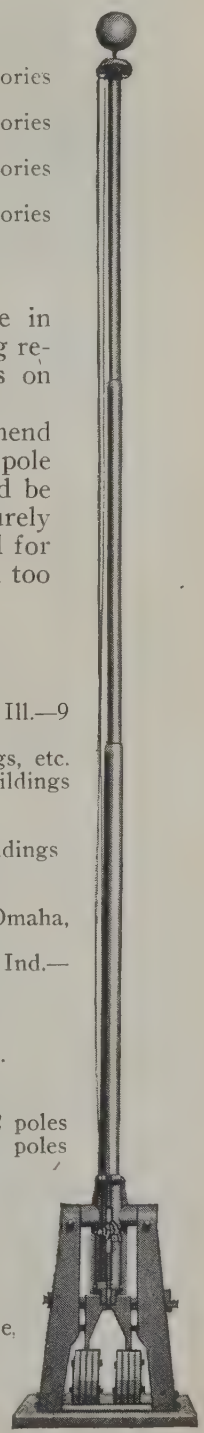
Locking Bar—The locking bar and key are of heavy steel.

Pole—The pole is made up of suitable lengths of steel tubing with lap joints welded.

Pole Trimmings—The pole trimmings consist of a seamless copper ball covered with gold leaf; a truck with two bronze pulleys; a brass nipple for connecting ball to truck; a cleat; and a halyard of good quality with snap hooks.

Workmanship — All workmanship is of the highest character. The castings are clean and free of defects.

Painting—All steel and cast iron are given one shop coat of paint.



Sizes

No. 0—20 ft.—for buildings 1 to 3 stories high.

No. 1—25 ft.—for buildings up to 10 stories high.

No. 2—32½ ft.—for buildings up to 16 stories high.

No. 3—40 ft.—for buildings up to 24 stories and higher.

Service

The manufacturer will co-operate in planning settings to suit various building requirements and will furnish drawings on request.

The manufacturer does not recommend extending roof pole over the street. A pole to extend over the thoroughfare should be attached to the face of the wall, securely anchored. A pole on the roof, designed for the height of the building, is considered too long for such a purpose.

Representative Installations

West Side Savings Bank, New York, N. Y.
Commonwealth Edison Co., Chicago, Ill.—9 buildings
City of Chicago, fire stations, office buildings, etc.
William H. Malone, Park Ridge, Ill.—2 buildings
Emil J. Dirks, Chicago, Ill.—2 buildings
Lawyers Building, Chicago, Ill.
Westinghouse Electric & Mfg. Co.—3 buildings
Park Bank Building, Baltimore, Md.
Nash Motors Co., Chicago, Ill.
Federal Reserve Banks, Detroit, Denver, Omaha, San Antonio
Kaufman & Wolf Dep't Store, Hammond, Ind.—4 poles
Englewood Masonic Temple, Chicago, Ill.
L. Bamberger & Co., Newark, N. J.
Waukegan Filtration Plant, Waukegan, Ill.
Paramount Theater, Brooklyn, N. Y.
Russakov Can Co., Chicago, Ill.
DePaul University Building, Chicago, Ill.—2 poles
Holy Trinity High School, Chicago, Ill.—2 poles
Old State Bank, Evansville, Ind.
Breslin Building, Louisville, Ky.
Fox Theater, Detroit, Mich.
Bell Telephone Co.—9 buildings
Montefiore Hospital, Pittsburgh, Pa.
Bank of Saginaw, Saginaw, Mich.
Insurance Exchange Building, Chicago, Ill.
Syracuse Herald Printing Plant, Syracuse, N. Y.
National Press Club, Washington, D. C.
J. H. Freeman Grade School, Aurora, Ill.
Bell Storage Warehouse, Camden, N. J.

ESTABLISHED 1909

BABCOCK-DAVIS CORPORATION

Manufacturers of Steel Flagpoles

474 Dorchester Avenue, BOSTON, MASS.

Product

B-D Easy Access Pole, Tubular Steel or Wood as preferred (patented).

For Precast Concrete Stairs, see page A728.

Design

Can be used for either flag or antenna pole.

Eliminates the expense and difficulty of repairing and replacing fouled or broken halyards. The B-D pole has many advantages. It is easy to erect, paint and inspect at all times. One man can raise or lower the pole in a few minutes. Every pole should be thoroughly inspected at least once a year. No steeplejack is required to do this with B-D Easy Access pole.

A notable feature is that the base and braces are integral. The base is drilled to be bolted to roof beams and is galvanized so that the roofer can easily solder his flashing to it. This will, in all cases, give an absolutely *tight roof* and does away with all slip-shod bracing ordinarily used, and leaky roofs. All poles can be equipped so that the flag can be flown over the parapet at any angle desired at a slight increase in cost. This advantage is appreciated on high buildings on narrow streets.

Construction

Poles are constructed of steel tubing, in graduating sizes shrunk and welded to make *watertight joints.*

Stock Lengths

Stock lengths of poles are 20, 25, 30, 35, 40 and 50 ft. Other lengths are made to order.

Erection on Building

Erection is very simple, pole is hoisted in place by building derrick, base bolted and pole raised.

Grade Installation

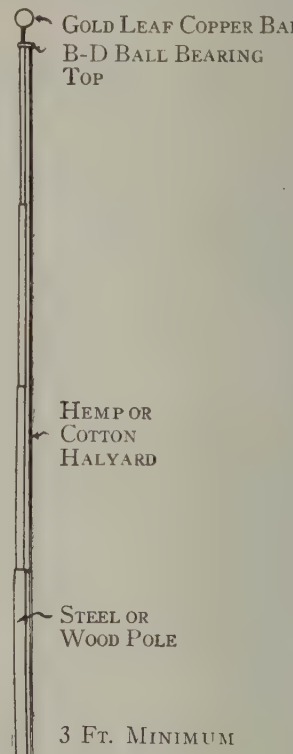
Base is bolted to concrete foundation furnished by others.

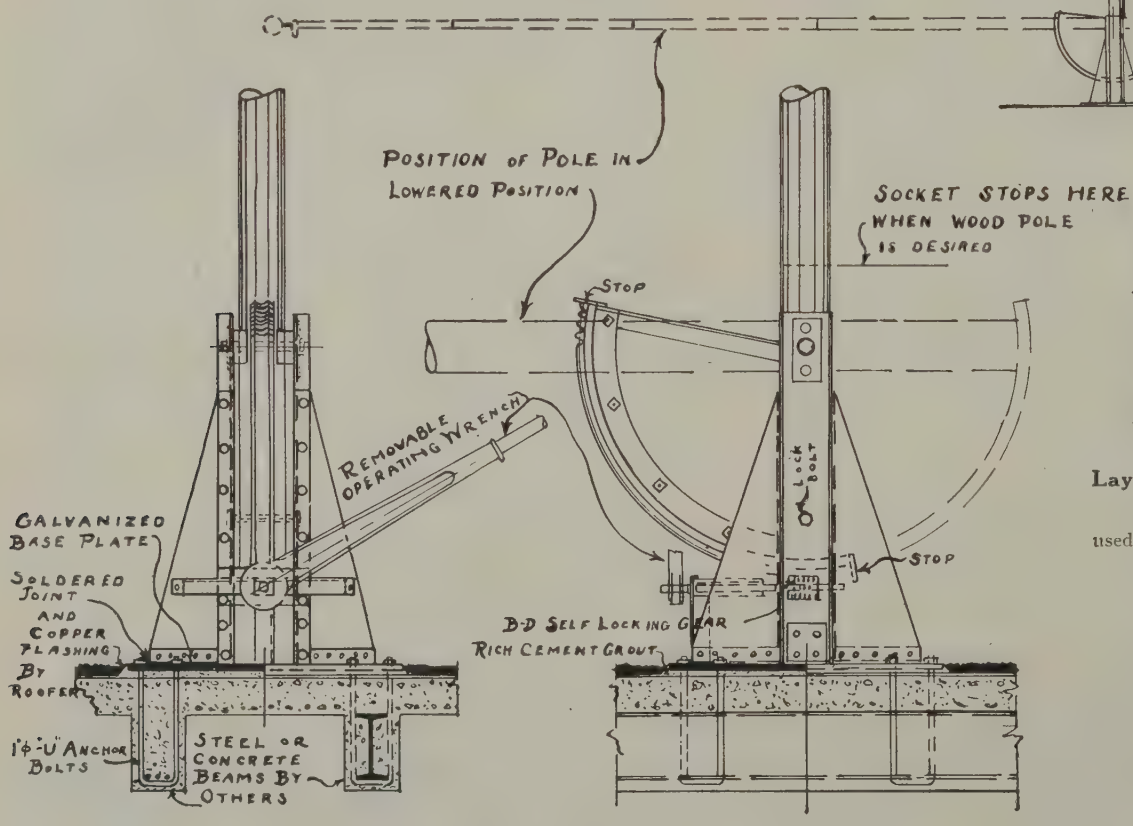
Economy

The saving in erection and one yearly inspection or painting will offset the additional cost of the B-D pole over the plainest type of pole that can be purchased.

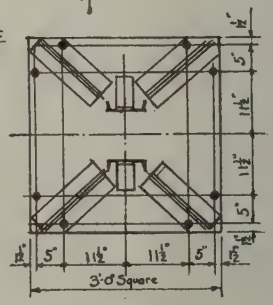
Specification Form

Furnish and erect B-D Easy Access Vertical [canted .... degrees] Steel Flagpole .... high, equipped with 6-in. or 8-in. Gold Leaf Copper Ball and Ball Bearing Swivel Top, Halyards, Cleat and Hoisting Wrench, manufactured by Babcock-Davis Corporation, 474 Dorchester Avenue, Boston, Mass.

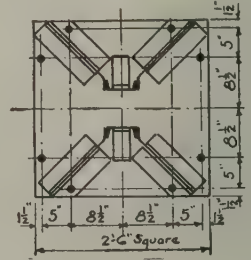




Details of Base
Scale ½"=1'-0"

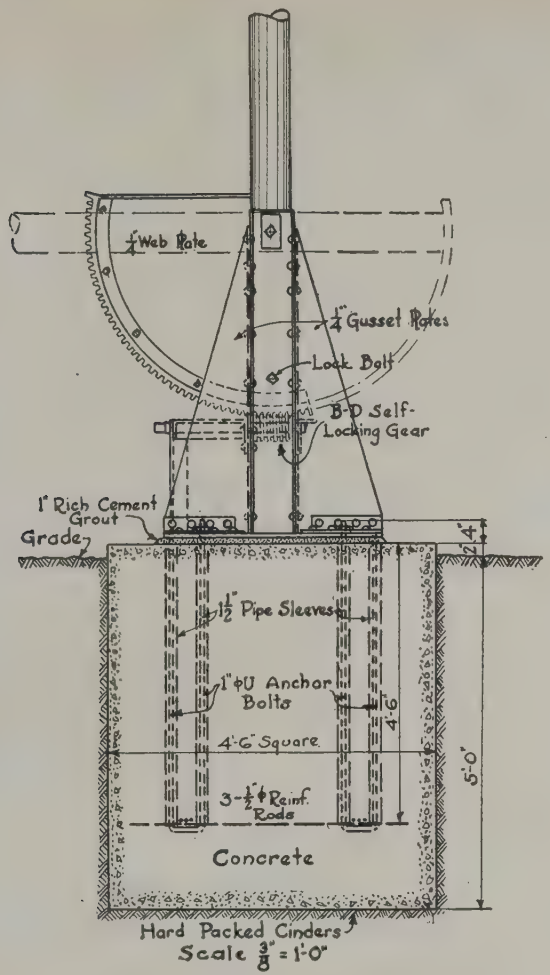


Layout of Base for the Location of Anchor Bolts
Scale ⅜ in. = 1 ft. 0 in. To be used on 35 to 60 ft. poles

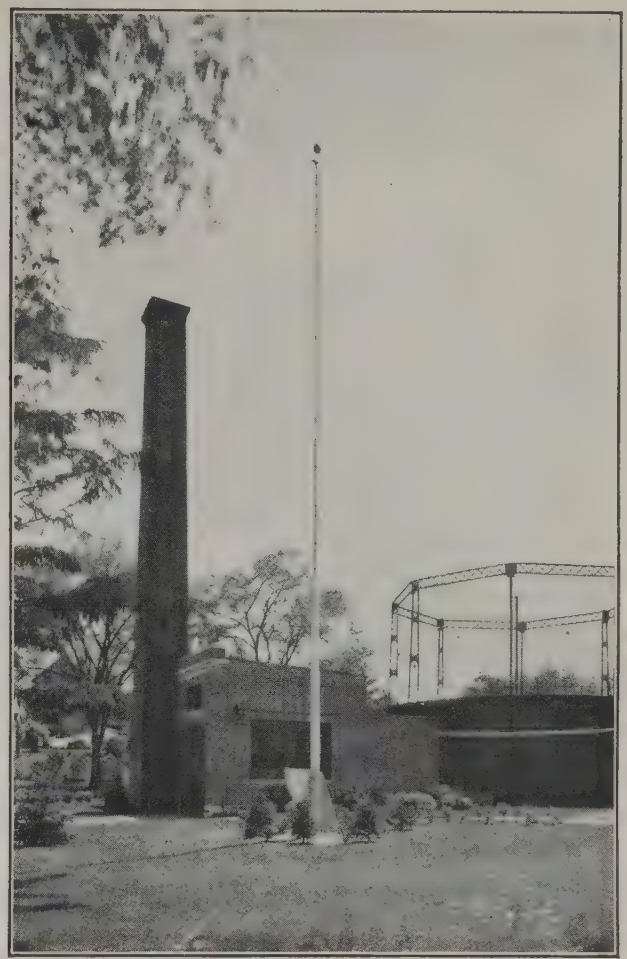


Layout of Base for the Location of Anchor Bolts
Scale ⅜ in. = 1 ft. 0 in. To be used on 15 to 30 ft. poles

Continued on next page



Foundation Details of Grade Installation



50-ft. Grade Installation of B-D Easy Access Pole, Malden & Melrose Gas Co., Stoneham, Mass.

Two 35-Ft. B-D Easy Access Poles on Cadillac Building, Boston, Mass.
Albert Kahn, Architect, Detroit, Mich.

Partial List of Recent Flagpole Installations

Jewelry Building, Providence, R. I.
Malden Electric Co. Building, Malden. Mass.
High School, Brownsville, Texas
Edison Electric Building, Boston, Mass.
A. G. Spaulding Building, Chicopee, Mass.
Granite Trust Co., Wollaston, Mass.
Cadillac Building, Boston, Mass. (2 poles)
Montgomery Ward Building, Fort Worth, Texas (4 poles)
Malden & Melrose Gas Light Co., Stoneham, Mass.
Salvation Army Building, Springfield, Mass. (2 poles)
San Angelo Junior College, San Angelo, Texas
Buffalo Ammonia Building, Brooklyn, N. Y.
Public Service Building, Boston, Mass.

CONTINUOUS TAPERED FLAGPOLES FOR GROUND SETTING OR ROOF SETTING

Several prominent architects in preparing plans for memorials, monuments, plazas and buildings of exceptional architectural value have given thought to a flagpole installation which would properly harmonize with the architectural design of the project and have considered our continuous tapered poles which meet these requirements. Continuous tapered flagpoles are of an entirely different construction from the swaged sectional poles and are more costly. These poles are produced in either steel or bronze and may be tapered conically or with entasis. They have a smooth uninterrupted exterior surface throughout without visible joints or offsets and resemble in contour the obsolete wood flagpoles.

Continuous tapered flagpoles are not carried in stock and are made to order only. They are, however, now standardized in accordance with the accompanying table of dimensions but may also be proportioned to the architect's individual conception. The lower one-third of the visible height of these poles is cylindrical, the diameter of which corresponds to a standard pipe size and the tapered section is confined to the remaining visible height.

When continuous tapered poles are used as flagpole monuments or memorials, the architect generally designs a special bronze base and special stonework. We gladly offer our services to architects by assisting them in properly designing the necessary foundation, so that no damage may result from vibration, water or by the water freezing.

Continuous tapered flagpoles, regardless of length, are usually shipped in one piece each, without field joints, but where handling and shipping will not permit, the poles are shipped in two sections each and assembled at the erection site by means of a special field joint. This assembling, however, cannot be accomplished by inexperienced men and we will not ship continuous tapered poles in sections unless the assembling in the field is accomplished by our own men. This tends to enhance the cost slightly but insures the purchaser a first class installation which might be marred through the neglect and inexperience of others doing this work.

We respectfully request architects to consult us before specifying continuous tapered flagpoles for any of their major projects.

DIMENSIONS, STANDARD CONTINUOUS TAPERED FLAGPOLES FOR GROUND SETTING OR ROOF SETTING

Visible height, ft.	20	25	30	35	40	45	50	60	65	70	75	80	90	100
Wall thickness, in.	¼	¼	5/16	5/16	5/16	5/16	3/8x5/16	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Diameter at top, in.	3	3	3½	3½	4	4	4½	4½	5	5	5	5	5	5
Diameter at butt, in.	5	6	6⅝	7⅝	8⅝	9⅝	10¾	11¾	12¾	14	15	16	18	20
Weight, lb.	240	350	540	735	920	1216	1785	2400	2545	3390	4180	4315	5418	6670

Partial List of Installations of "Lingo" Continuous Tapered Flagpoles

Building and Location	Number of Installations
The White House, Washington, D. C.	1
Indiana War Memorial, Indianapolis, Ind.	10
Bank of New York & Trust Co. Building, New York, N. Y.	4
North Station, Boston & Maine R. R., Boston, Mass.	2
Fidelity-Philadelphia Trust Co. Building, Philadelphia, Pa.	2
Civic Center, Pasadena, Calif.	2
University of North Carolina Stadium, Chapel Hill, N. C.	2
Essex County Hall of Records, Newark, N. J.	2
State Bank, Albany, N. Y.	2
Explorers Club, New York, N. Y.	2
12th St. Bell Telephone Building, Washington, D. C.	1
War Memorial, Bloomington, Ill.	1
Provident Life Insurance & Trust Co. Building, Philadelphia, Pa.	1
Municipal Pier, Ventnor City, N. J.	1
National Biscuit Co. Building, Buffalo, N. Y.	1
Masonic Temple, Portsmouth, Ohio	2
Bank Building, 1500 Walnut Street, Philadelphia, Pa.	1
Delaware River Bridge, Philadelphia, Pa., and Camden, N. J.	4
Masonic Temple, St. Louis, Mo.	2
Harriman Building, New York, N. Y. (bronze poles)	2
Southern New England Telephone Building, Stamford, Conn.	1
Music Pavilion, Ocean City, N. J.	4

Catalogue

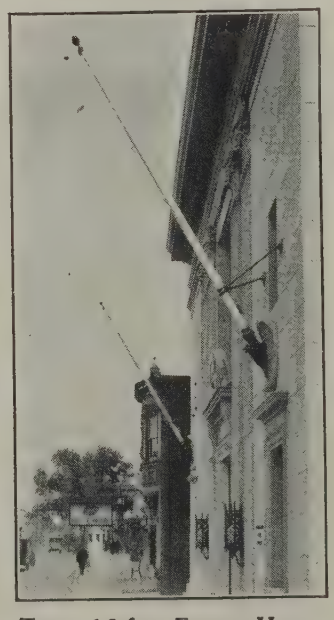
Architects will be interested in our complete illustrated catalogue, which we will be pleased to mail promptly upon request.

90x99-ft. Swaged Sectional Heavy Pattern Flagpole

One of the 195 manufactured and erected for the Philadelphia School Board

81x91-ft. Swaged Sectional Special Extra Heavy Pattern Flagpole

Strong Memorial Hospital, Rochester, N. Y.



Two 16-ft. Extra Heavy Continuous Tapered Outrigger Poles

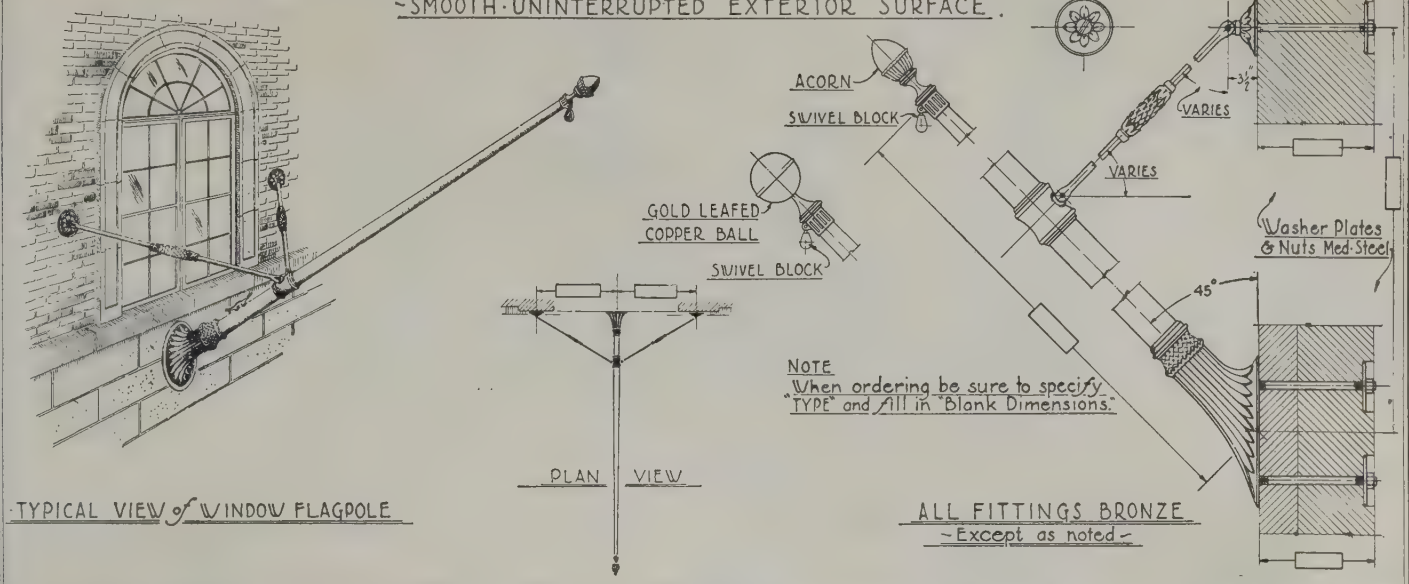
4-in. butt x 2-in. top. Collingswood Trust Co., Collingswood, N. J.

80-ft. Over-all Continuous Tapered Pole

14-in. butt x 5-in. top. Massachusetts Mutual Life Insurance Building, Springfield, Mass.

Continued on next page

CONTINUOUS TAPERED · COPPER BEARING TUBULAR STEEL FLAG POLES — WITH ENTASIS
— SMOOTH · UNINTERRUPTED EXTERIOR SURFACE.



TYPICAL VIEW of WINDOW FLAGPOLE

ALL FITTINGS BRONZE
— Except as noted —

TYPE	LIGHT						HEAVY						EXTRA·HEAVY						DRAWING NUMBER
LENGTH in FEET	16	18	20	22	25	30	16	18	20	22	25	30	16	18	20	22	25	30	B-12
DIAMETER at TOP	1½"	1½"	1½"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2½"	
DIAMETER at BUTT	2⅞"	2⅞"	2⅞"	3½"	4½"	4½"	3½"	3½"	3½"	4"	4½"	5"	4"	4"	4"	4½"	5"	5 9/16"	

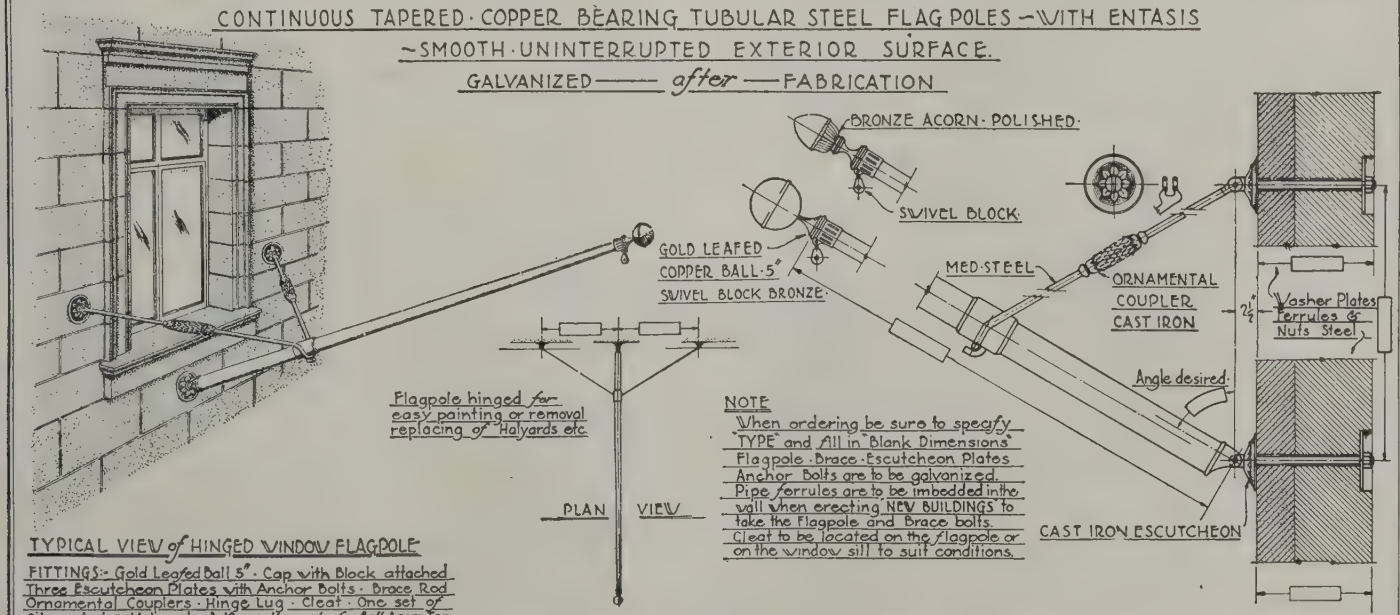
SMALL CONTINUOUS TAPERED OUTRIGGER FLAGPOLES

Metal flagpoles of the continuous tapered construction are being used as outrigger or window poles in place of the frequently unsafe wood poles. Continuous tapered outrigger poles are made in either steel or *bronze* and are suitable for banks, office buildings, etc., where it is desirable to fly a flag at lower levels than a flagpole located on the roof. These poles are extended out from the face of the building at an angle of 45 degrees above the horizontal plane and vary in length from 16 to 30 ft. The minimum top diameter is 1½ in. with a wall thickness of approximately $\frac{8}{16}$ in. increasing downward to the butt. They can be tapered conically or with entasis as selected by the architect. For details of these poles see drawing B-12 above.

Continuous tapered outrigger flagpoles are also constructed with *hinged* arrangement, as shown on drawing B-14 below, which permits righting the poles for repainting or repairs at a minimum cost. The *hinged* arrangement eliminates the risky and expensive operation with a boatswain's chair from the roof and saves the expense of scaffolding or dismantling.

However, poles with the *hinged* arrangement do not have the dignified appearance of the fixed outrigger poles shown on drawing B-12 above, but for economical maintenance and easy accessibility, we recommend the outrigger poles with the *hinged* arrangement shown on drawing B-14 below.

CONTINUOUS TAPERED · COPPER BEARING TUBULAR STEEL FLAG POLES — WITH ENTASIS
— SMOOTH · UNINTERRUPTED EXTERIOR SURFACE.
GALVANIZED —— *after* —— FABRICATION



TYPICAL VIEW of HINGED WINDOW FLAGPOLE

FITTINGS:- Gold Leafed Ball 5" · Cap with Block attached Three Escutcheon Plates with Anchor Bolts · Brace Rod Ornamental Couplers · Hinge Lug · Cleat · One set of Silver Lake Halyards A-10. *alternate for Ball* · Acorn Top.

TYPE	LIGHT						HEAVY						EXTRA·HEAVY						DRAWING NUMBER
LENGTH in FEET	16	18	20	22	25	30	16	18	20	22	25	30	16	18	20	22	25	30	B-14
DIAMETER at TOP	1½"	1½"	1½"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2½"	
DIAMETER at BUTT	2⅞"	2⅞"	2⅞"	3½"	4½"	4½"	3½"	3½"	3½"	4"	4½"	5"	4"	4"	4"	4½"	5"	5 9/16"	

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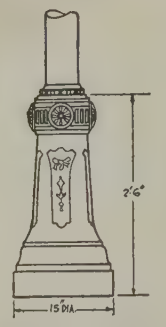
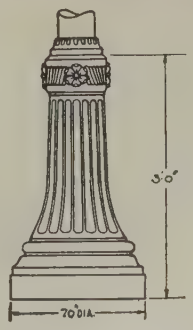
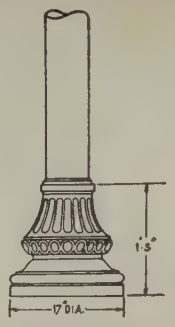


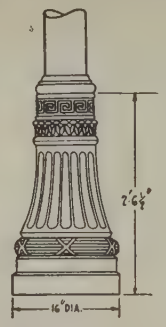
Design No. 2106
Suitable for:
Light Pattern
17'x20' 25'x28½'
33'x37' 41'x45½'
Heavy Pattern
20'x23' 25'x28½'
30'x33½'
Extra Heavy Pattern
25'x28½'



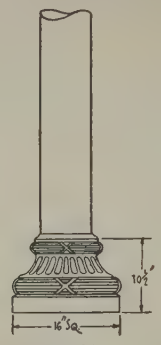
Design No. 2105
Suitable for:
Light Pattern
25'x28½' 33'x37'
41'x45½'
Heavy Pattern
25'x28½' 30'x33½'
Extra Heavy Pattern
25'x28½'



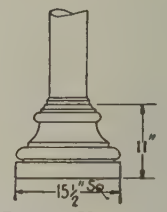
Design No. 2107
Suitable for:
Light Pattern
33'x37' 41'x45½'
49½'x54' 57½'x62½'
Heavy Pattern
30'x33½' 40'x44'
50'x55'
Extra Heavy Pattern
25'x28½' 30'x33½'
35'x39'



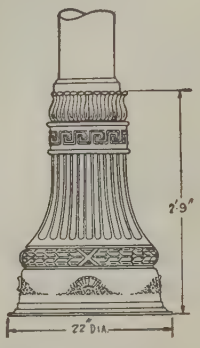
Design No. 2104
Suitable for:
Light Pattern
33'x37' 41'x45½'
49½'x54' 57½'x62½'
Heavy Pattern
30'x33½' 40'x44'
50'x55'
Extra Heavy Pattern
25'x28½' 30'x33½'
35'x39'



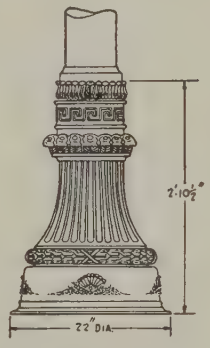
Design No. 2108
Suitable for:
Light Pattern
41'x45½' 49½'x54'
57½'x62½' 65½'x71½'
Heavy Pattern
40'x44' 50'x55'
60'x66'
Extra Heavy Pattern
30'x33½' 35'x39'
40'x45'



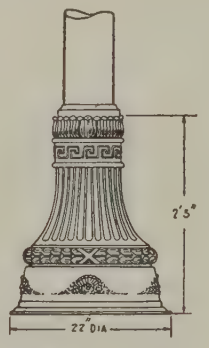
Design No. 1970
Suitable for:
Light Pattern
41'x45½' 49½'x54'
Heavy Pattern
30'x33½' 40'x44'
Extra Heavy Pattern
25'x28½' 30'x33½'



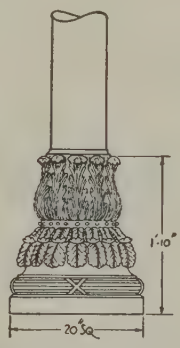
Design No. 2101
Suitable for:
Light Pattern
57½'x62½' 65½'x71½'
73'x79' 80'x87'
Heavy Pattern
50'x55' 60'x66'
70'x77'
Extra Heavy Pattern
35'x39' 40'x45'
47'x53'



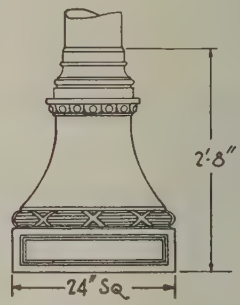
Design No. 2103
Suitable for:
Light Pattern
41'x45½' 49½'x54'
57½'x62½' 65½'x71½'
Heavy Pattern
40'x44' 50'x55'
60'x66'
Extra Heavy Pattern
30'x33½' 35'x39'
40'x45'



Design No. 2102
Suitable for:
Light Pattern
41'x45½' 49½'x54'
57½'x62½' 65½'x71½'
Heavy Pattern
40'x44' 50'x55'
60'x66'
Extra Heavy Pattern
30'x33½' 35'x39'
40'x45'

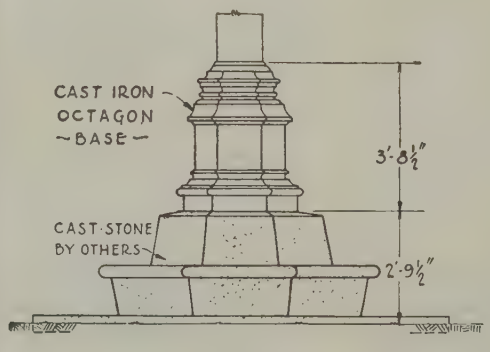


Design No. 2109
Suitable for:
Light Pattern
57½'x62½' 65½'x71½'
73'x79' 80'x87'
Heavy Pattern
50'x55' 60'x66'
70'x77'
Extra Heavy Pattern
35'x39' 40'x45'
47'x53'

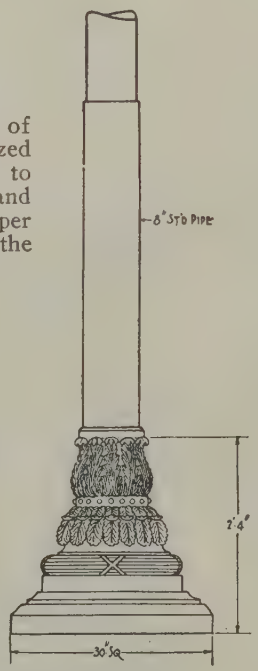


Design No. 1902
Suitable for:
Light Pattern
73'x79' 80'x87'
90'x98'
Heavy Pattern
60'x66' 70'x77'
75'x82½'
Extra Heavy Pattern
40'x45' 47'x53'
55'x61'

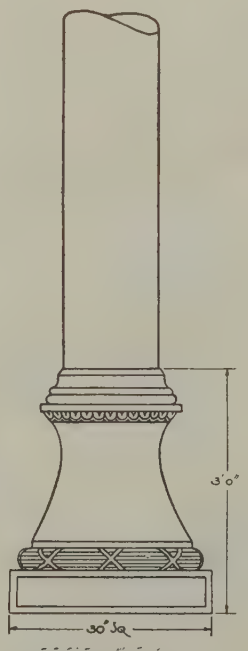
We carry in stock a complete line of flagpole bases in painted and galvanized cast iron. Bronze flagpole bases to order. A ring collar is cast separate and furnished with the base to make a proper "joint" between the flagpole and the collar for hot lead calking.



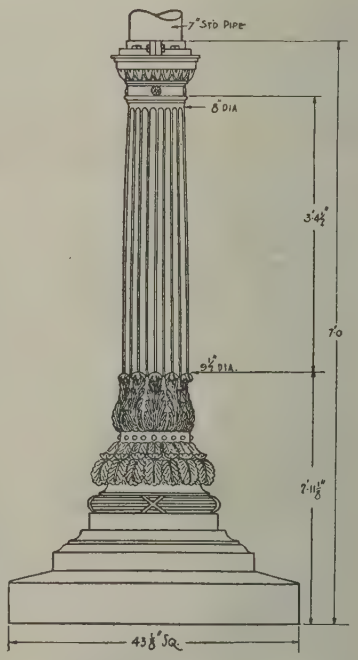
Design No. 1990
Suitable for poles with butt diameters from 12¾ in. to 15 in.



Design No. 2110
Suitable for:
Light Pattern
65½'x71½' 73'x79'
80'x87'
Heavy Pattern
60'x66' 70'x77'
Extra Heavy Pattern
47'x53'



Design No. 1999
Suitable for:
Light Pattern
90'x98' 100'x108'
Heavy Pattern
75'x82½' 80'x88'
90'x99' 100'x110'
125'x137'
Extra Heavy Pattern
85'x93'



Design No. 2121
Suitable for:
Light Pattern
73'x79'
Heavy Pattern
60'x66'
Extra Heavy Pattern
40'x45'

NO SCALE	JOHN E. LINGO & SON TUBULAR STEEL FLAG POLES CAMDEN, NEW JERSEY	DRAWING NO. B-6

THE POLE & TUBE WORKS, INC.

SUCCESSORS TO "POLE DEPARTMENT" JOHN SIMMONS COMPANY, NEW YORK CITY

TELEPHONE
WAVERLY 3808

Avenue D and Murray Street
NEWARK, N. J.

CABLE
"POLETUBE"

OUR PRODUCT DISTRIBUTED BY
CALIFORNIA: SAN FRANCISCO—H. M. HOLWAY, Agent
DISTRICT OF COLUMBIA: WASHINGTON—JOHN B. BARRETT, Agent, Rust Building

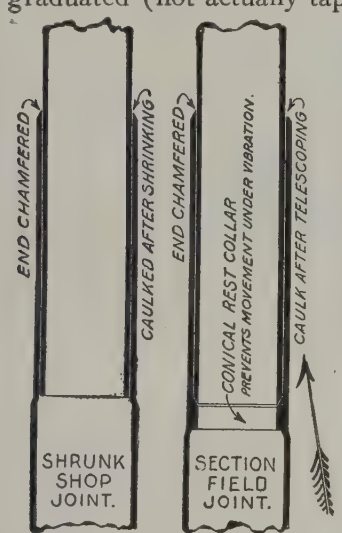
Two Types of Poles

Two distinct types of poles, dissimilar in construction and greatly varying in cost, are available. To avoid confusion and unfair bidding they should be distinctly specified as either Steel Tubular Poles or as Taper Welded Poles as may be the case. Terms such as Taper Poles with Welded Joints or Taper Welded Steel are ambiguous.

(Taper Welded Poles are described under separate heading further on).

Steel Tubular Poles

The usual, commercial Steel Tubular Poles are graduated (not actually tapered) by joining consecutive, diminishing diameters of standard steel pipe; the joints being either *shop* type, swaged, telescoped and shrunk, or of the *field* type, similarly swaged; to be telescoped in the field. Field joints are inevitable for transportation of poles in excess of railroad car lengths and for economical trucking. The field joints are self-aligning (conical rest collar), without pins, bolts, lead, cements and calked steel to steel with only a hand hammer and a common plumber's calking tool.



In all our steel tubular poles the following *outside diameters* of pipe in consecutive rotation (without skipping any one size) are employed as follows:

TABLE "A." OUTSIDE DIAMETERS OF PIPE

16, 15, 14, 12¾, 11¾, 10¾, 9⅝, 8⅝, 7⅝, 6⅝, 5⅛, 5, 4½, 4, 3½, 2⅞, 2⅜, and 1⅞ in.

Standard Poles—For ground or roof setting.

The bending resistance at the uppermost support (brace collar or roof tube or ground line) is calculated to a formula accepted in conservative engineering and all building departments.

The following table gives the safe diameter (bend-resistance) for standard tubular poles at their *uppermost* support:

TABLE "B." SIZES OF STANDARD POLES

Exposed or unsupported height of pole—ft.	15	20	25	30	40	50	60	70	75	80	90	100	125
Standard diameter at uppermost support—in.	3½	4	4½	5	5⅝	6⅝	7⅝	8⅝	9⅝	10¾	11¾	12¾	14
Tip diameter—in.	2⅜	2⅜	2⅜	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞

Light Pattern Poles—Lighter than Standard and designed for ground setting *only,* therefore subject to lesser stresses of handling.

TABLE "C." LIGHT PATTERN POLES

*Height above ground—ft.	17	25	33	41	49½	57½	65½	73	80	90	100
Light Pattern diameter at ground—in.	3½	4	4½	5	5⅝	6⅝	7⅝	7⅝	8⅝	9⅝	10¾
Diameter at tip—in.	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜	2⅜

*Not alterable in this type.

For full specification of light pattern and standard poles fully trimmed for ground setting see catalogue page two in A.I.A.14F folder in your file or sent on request.

Extra Heavy Poles—Made to meet the demand for poles of larger than Standard diameter to resemble proportions of wooden poles.

TABLE "D." EXTRA HEAVY POLES

*Unsupported or exposed height—not **less** than—ft.	20	25	30	35	43	51	59	67	75
Extra Heavy pole, diameter—in.	5	5⅝	6⅝	7⅝	8⅝	9⅝	10¾	11¾	12¾
Practical tip, diameter—in.	2⅞	2⅞	3½	3½	3½	3½	3½	3½	3½

*Keep above this minimum height to avoid an unreasonable multitude of joints.

Additional Butts—All steel tubular poles are standardized on the basis of their exposed or unsupported height, to which we add necessary *additional butt* to meet requirements. Thus a pole 45 ft. above roof braced 5 ft. up should be specified as a standard steel tubular pole 40x45 ft. (5$\frac{9}{16}$-in. diameter). A pole 70 ft. above roof and set on top floor 10 ft. below roof should be specified as 70x80 ft. (8⅝-in. diameter). A call for a 30-ft. pole would result in a 5-in. diameter, but if braced above roof can be specified as 25x30 ft. (4½ in. diameter).

Taper Welded Poles

These are an artcraft product, welded up from rolled plates; are actually *tapered* either conically or with the Venetian entasis, have a perfectly smooth exterior surface unbroken by visible joints.

The tip diameter is limited to a minimum of 4¾ in. while the largest visible diameter can be chosen from any of these given for steel tubular poles (see Table "A"); but must be proportionate to the selected tip and the visible height by assuming a taper of from ⅛ to ¼ in. per foot of exposure and then compromising to the nearest Table "A" diameter.

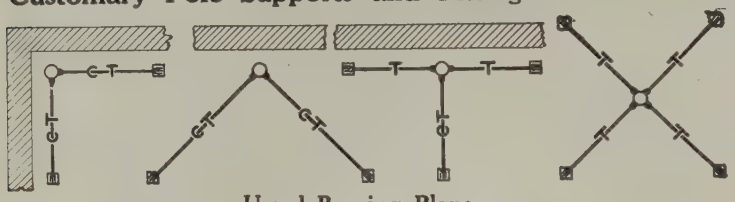
The majority of architects prefer the Venetian entasis. This curve leaves the lower one-fifth to two-fifths of the visible height almost cylindrical, therefore we employ pipe for this portion, and the more costly taper construction to the balance of the height. We suggest that architects so visualize this type of pole and preferably consult us before specifying.

Taper welded poles have been used occasionally on roofs of buildings of outstanding prominence (Morrison Hotel; Chicago Tribune Tower; A. T. & T. Building, New York; Newark Chamber of Commerce; and twenty or more others) but are more usually accepted for flag pole monuments. The taper portion of these poles in steel costs approximately $16.00 to $20.00 per running foot.

Continued on next page

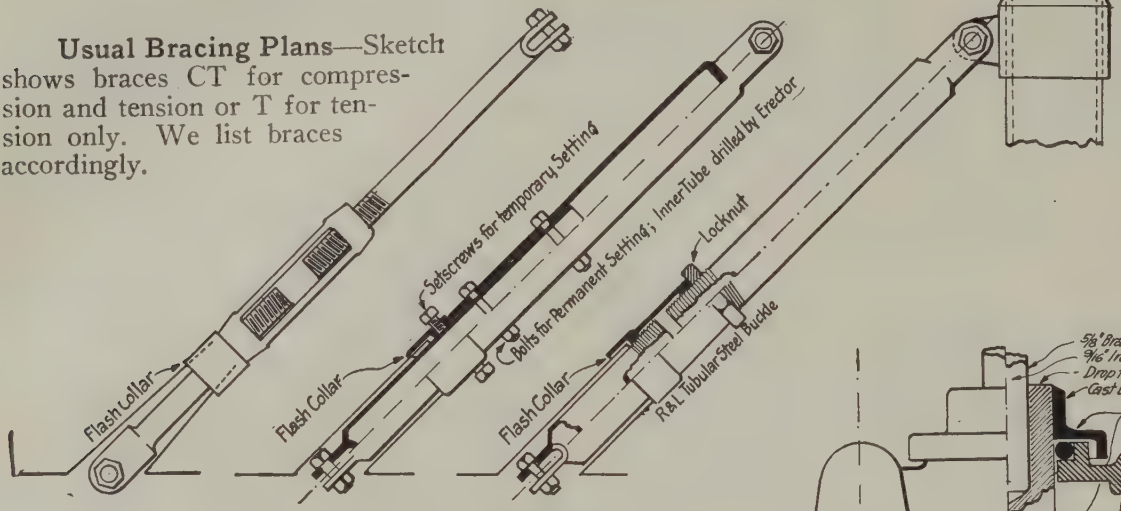
Bronze Poles—Taper welded poles are also produced by us now in *bronze* at reasonable prices, considering their evident imperishability without painting.

Customary Pole Supports and Fittings



Usual Bracing Plans

Usual Bracing Plans—Sketch shows braces CT for compression and tension or T for tension only. We list braces accordingly.



Tension Brace | Telescope Brace | Standard Brace

Braces—Three types of braces are available as illustrated.

Typical Brace Collar—Calked to pole prevents corrosion unavoidable with the old style of forged and bolted clamp bands.

Bottom Forks—Bottom forks of all braces fitted to various brace anchors, as shown in illustrations.

Suggestion—In the interest of efficiency, installation and simplicity of specification we suggest that you call upon us for proposal of "Standard Construction" which we will gladly submit *without obligation on your part.*

We will invariably suggest bracing best suited to your individual project and yet the least costly. Injudicious selection of braces frequently causes unreasonable costs without adequate superiority of installation. Ask us first—then specify, and avoid costly, sometimes irreparable errors.

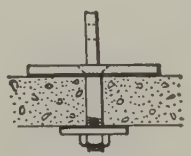


Fig. C-20-4
For Concrete Roof in Place

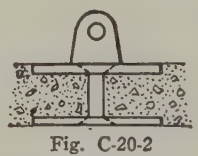


Fig. C-20-2
Moulded into New Concrete Roof

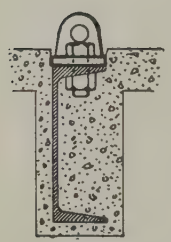


Fig. S-11-2
For Steel or Steel-Concrete Roof

Fig. C-20-1
Moulded into New Concrete Roof

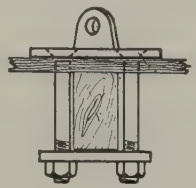
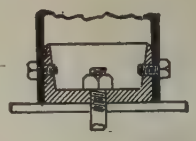


Fig. W-2-4
Bolted in Wood Roof Rafter

Brace Anchors

Pole Socket and Rest Plate—See Brace Anchors for various forms of securing to various types of roof structures.



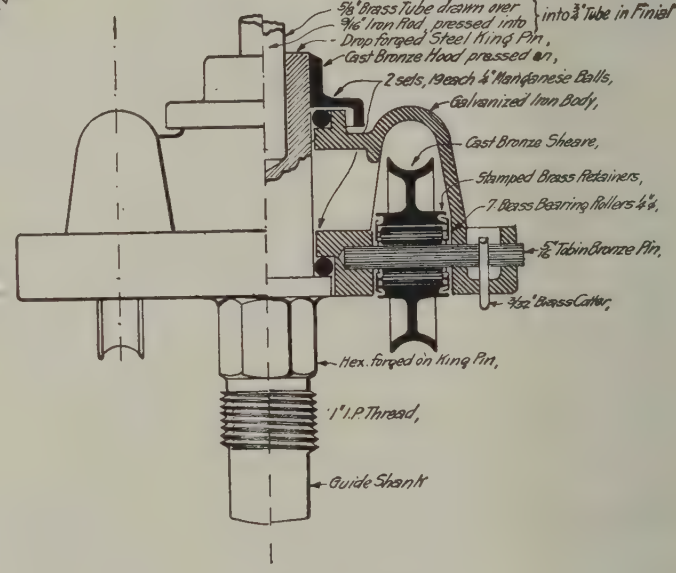
Customary Pole Trimmings

Gilt Ball Finials—20-oz. spun copper and finished in 23-kt. gold leaf over weatherproof sizing, mounted on ¾-in. brass tube. Stock sizes: 4, 5, 6, 8, 10, 12, 14, 16, 18 and 24 in.

Trucks—Poletube truck for poles up to 3½-in. tip (not applicable to taper welded poles.)

Similar Simmons truck for poles up to 5½-in. tip. Similar Giant truck for poles up to 10-in. tip.

Weathervanes—See catalogue page 5 in A.I.A.14F folder.



Poletube Truck

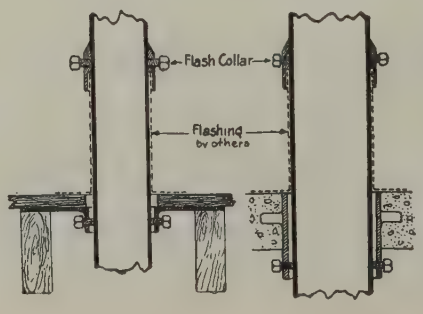
Cleats—9-in. galvanized, attached to poles with two $\frac{5}{16}$-in. cap screws.

Halyards—⅜-in. diameter bolt rope or Silver Lake No. 10. We furnish no metallic (wire rope or chain) halyards under any circumstances, because they are impractical, dangerous and injurious to the pole.

Cleat Covers, Flash Collars—See catalogue page 5 and 8, in your folder A.I.A.14F.

Guide Flange

For wood or steel roof construction. Can be screwed either to bottom or top of rafters.



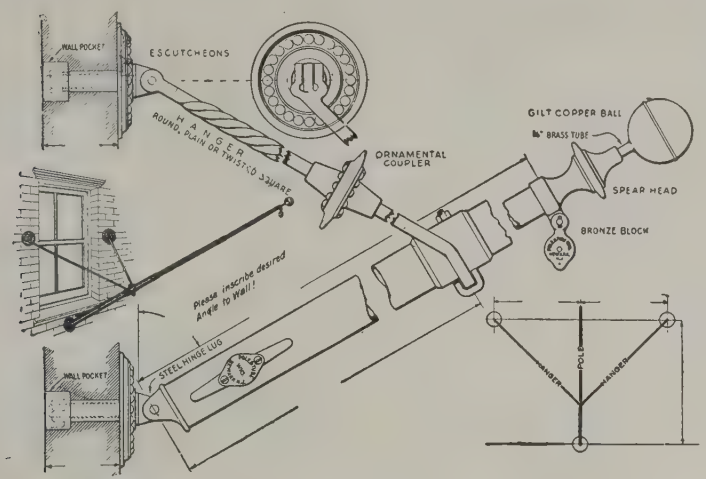
Roof Tube

For concrete roof construction. Can be moulded into new concrete roofs or grouted into existing ones. One inch larger than pole diameter.

Continued on next page

Window and Outrigger Poles

Steel poles of tubular construction, as well as Continuous Taper Welded poles, have been largely adopted as window or outrigger poles. They offer the advantages of our *hinged* construction, which permits righting the poles for repainting or repairs at a minimum cost. It avoids the risk of climbing out and saves the expense



WINDOW POLES—TUBULAR STEEL CONSTRUCTION (TELESCOPED JOINTS)

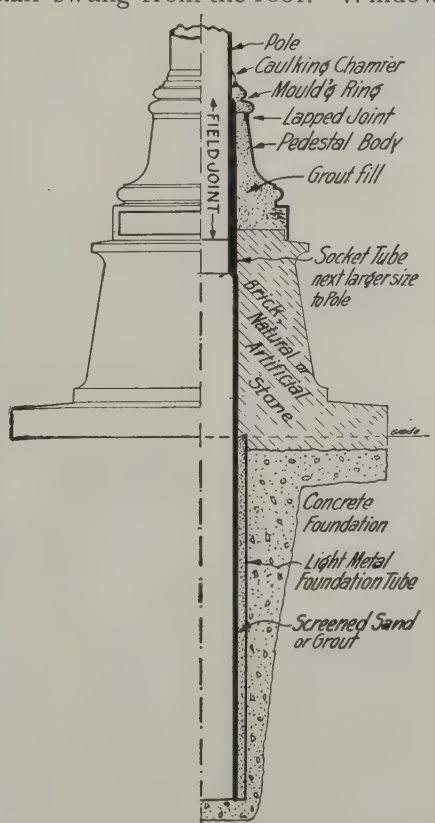
Length, ft.	Light diameters	Medium diameters, in.	Heavy diameter, in.
12	2⅜x1⅞	.....	2⅞x2⅜
14	2⅞x1⅞	.....	3½x2⅜
16	2⅞x1⅞	3½x2⅜	4 x2⅞
18	2⅞x1⅞	3½x2⅜	4 x2⅞
20	2⅞x1⅞	3½x2⅜	4 x2⅜
22	3½x2⅜	4 x2⅞	4½x2⅞
25	4½x2⅜	4½x2⅞	5 x2⅞
30	4½x2⅜	5 x2⅞	5 9/16 x2⅞

of scaffolding or dismantling, or the expensive operation with a boatswain's chair swung from the roof. Window poles are fitted with a special shackled, heavy cast bronze block (the usual truck is impracticable).

These poles are *galvanized* all over after fabrication.

Ask for plates WP-50*a* and WP-5*a*.

Monument Flag Pole Construction—Practical for flag pole monuments facilitating erection and protecting against corrosion and damage by freezing, vibration, etc.



Pole Pedestals

We have patterns for a variety of iron or bronze castings; ask for circular.

Taper Welded Steel Flag Pole—War Memorial at Plainfield, N. J.

HELMLE & CORBETT, Architects — L. L. MANNING & SON, Contractors
GAETANO CECERE, Sculptor — MOREHOUSE CO., Bronze Founders
80 ft. above grade, 16-in. butt x 5-in. tip, entasis taper

Typical Installation Plates

Consult "Typical Installation Plates" in your folder A.I.A.14F sent (or yours for the asking).

Service

If you will send us a rough sketch showing setting conditions we will gladly submit suggestions for installations, saving your time and assuring first class work and lowest consistent prices.

CREX PATENT COLUMN CO.

GENERAL OFFICE AND WORKS
2300-2310 South Springfield Avenue
CHICAGO, ILL.

TELEPHONE
LAWNDALE 2634, 2635

BRANCHES
MILWAUKEE, WIS., 951-53 Thirtieth Street
DECATUR, ILL., Box 299
LOUISVILLE, KY., 151 So. 5th Street
TOLEDO, OHIO, Summit and Sandusky Streets

Product

Manufacturers of CREX PATENT COLUMNS.

Construction

Crex Patent columns consist of an outer shell of steel filled with concrete, and only the best materials are employed in their manufacture.

Especial care is taken in filling these columns so that the concrete filling shall be perfectly solid and uniform throughout, thus obtaining the full strength of a solid concrete interior.

The caps and connections are made of steel, of sufficient strength to receive the superimposed loads.

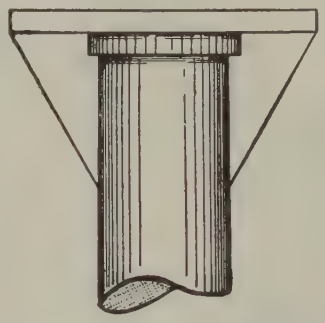
CREX PATENT COLUMN CO. holds the original patent for an all-steel cap. The cap being entirely of steel, its strength can be reliably computed.

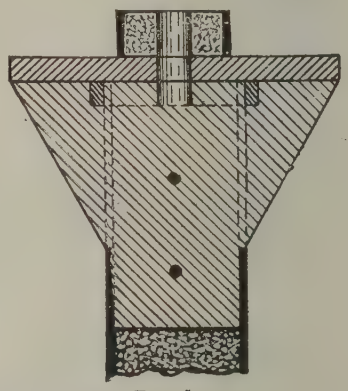
The connections are made in such a manner that only a steel plate separates the shaft of the lower column from the one above, securing the full strength of the column at the connection. Crex columns can be furnished in about one-fifth the time required for other columns.

CREX PATENT COLUMN CO. was formed for the purpose of supplying the increased demand for this class of columns with the best that can be made, both as regards strength and appearance.

Safe Loads

Tables of safe loads in thousands of pounds for Crex light weight and heavy weight Patent columns are shown below.





Crex Patent All-steel Two-way Brackets

LIGHT WEIGHT CREX COLUMNS

Outside diam. pipe, in.	Radius of gyration, in.	Thickness of steel shell, in.	Area of steel shell, sq. in.	Wgt. of steel shell, per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe load in thousands of pounds for unbraced length of column, ft.								Maximum length of column
							6	8	10	12	14	16	18	20	
3½	.875	.120	1.27	4.33	8.34	13.02	26.0	22.1	18.3						11′-8″
4	1.00	.134	1.63	5.53	10.94	16.9	35.6	31.2	26.8	22.4					13′-4″
4½	1.125	.134	1.84	6.25	14.06	20.89	43.9	39.3	34.7	30.1	25.5				15′-0″
5	1.25	.148	2.26	7.67	17.38	25.87	55.8	50.7	45.6	40.5	35.3	30.2			16′-8″
6	1.5	.165	3.02	10.28	25.25	36.58	80.6	74.7	68.8	62.9	57.0	51.1	45.2	39.3	20′-0″

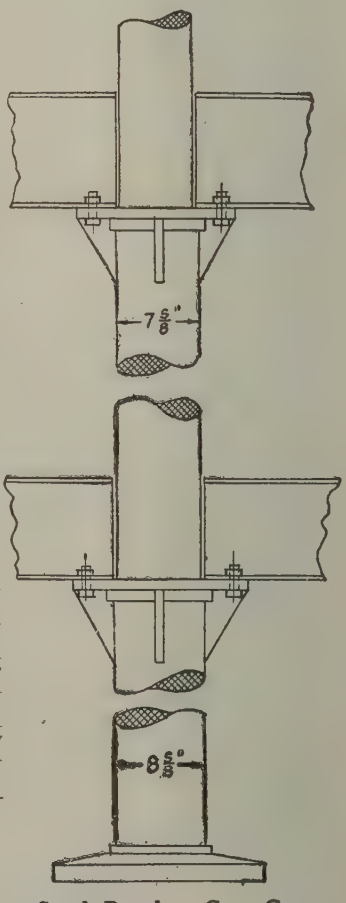
HEAVY WEIGHT CREX COLUMNS

Outside diam. pipe, in.	Radius of gyration, in.	Thickness of steel shell, in.	Area of steel shell, sq. in.	Wgt. of steel shell, per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe load in thousands of pounds for unbraced length of column, ft.								Maximum length of column
							6	8	10	12	14	16	18	20	
3½	.875	.216	2.23	7.58	7.39	15.27	37.8	32.2	26.5						11′-8″
4	1.00	.226	2.68	9.11	9.88	19.40	49.1	43.1	37.0	30.9					13′-4″
4½	1.125	.237	3.17	10.79	12.73	24.05	61.7	55.2	48.7	42.3	35.8				15′-0″
5	1.25	.247	3.69	12.54	15.95	29.15	75.6	68.6	61.7	54.8	47.8	40.9			16′-8″
5½	1.39	.258	4.30	14.62	20.00	35.45	92.2	84.8	77.4	70.0	62.6	55.2	47.7		18′-6″
6⅝	1.656	.280	5.58	18.97	28.89	49.07	128.4	120.0	111.7	103.4	95.0	86.7	78.3	70.0	22′-0″
7⅝	1.906	.301	6.92	23.54	38.74	63.89	167.3	158.0	148.8	139.6	130.5	121.4	112.1	102.8	25′-5″
8⅝	2.156	.322	8.40	28.55	50.02	80.65	211.1	201.1	191.0	180.9	170.8	160.8	150.7	140.6	27′-11″
9⅝	2.406	.342	9.97	33.91	62.79	99.31	259.2	248.2	237.3	226.4	215.4	204.5	193.5	182.6	31′-3″
10¾	2.687	.366	11.94	40.59	78.82	122.69	319.7	307.8	296.0	284.0	272.1	260.2	248.2	236.4	35′-10″
12¾	3.187	.375	14.58	49.56	113.10	167.36	421.7	408.7	396.0	382.8	369.8	356.9	343.9	330.7	42′-6″

Safe loads shown above are derived from the formula:

$$\text{Safe Load} = \left(\frac{Ac}{12} + As\right)\left(19200 - 72\frac{L}{R}\right)$$

Where Ac = Sectional area of concrete in sq. ins.
As = Sectional area of steel pipe in sq. ins.
L = Length of column in ins.
R = Radius of gyration of combined sections
$\frac{L}{R}$ is never to be greater than 160
Weight of concrete to be 150 lb. cu. ft.



Steel Bracket Cap Construction

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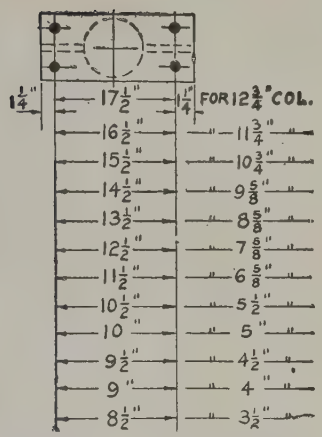
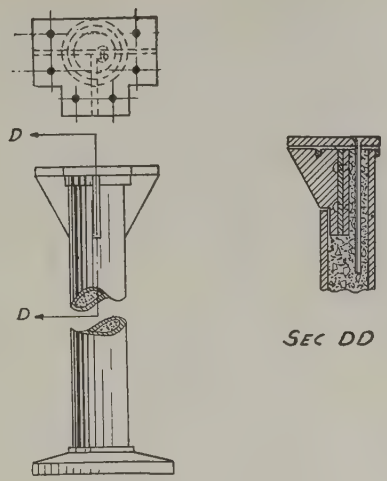
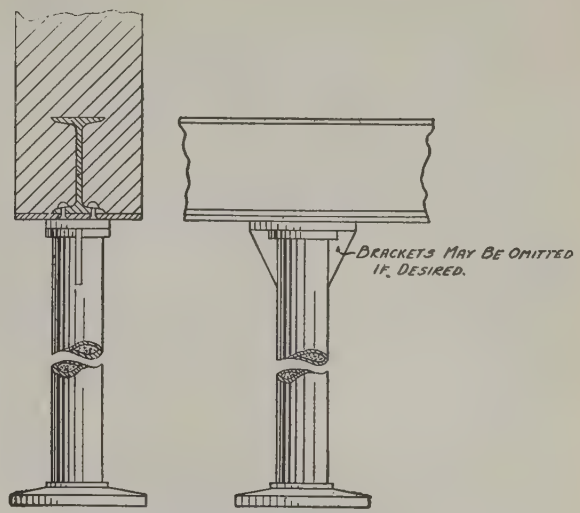


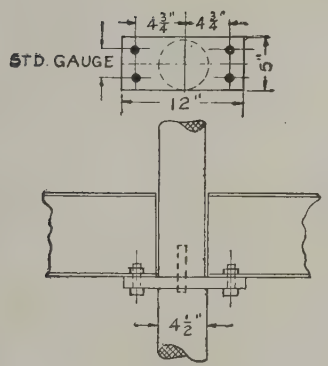
Spacing of Holes in Plates for Bracket Caps

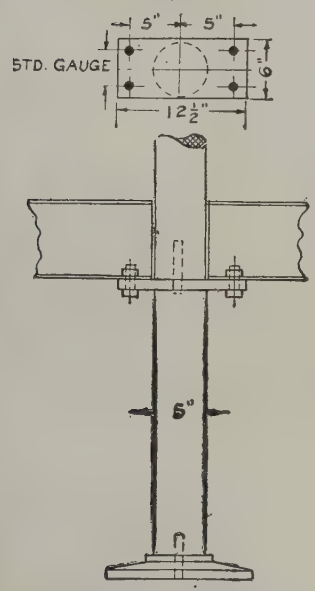


Three-way Bracket

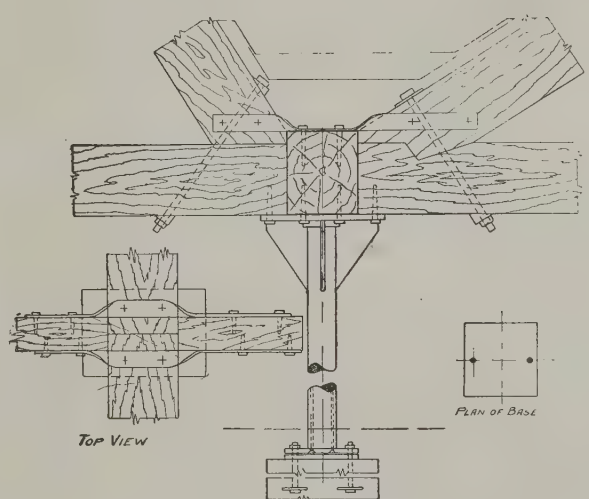


Details Showing Crex Columns in Store Front Construction

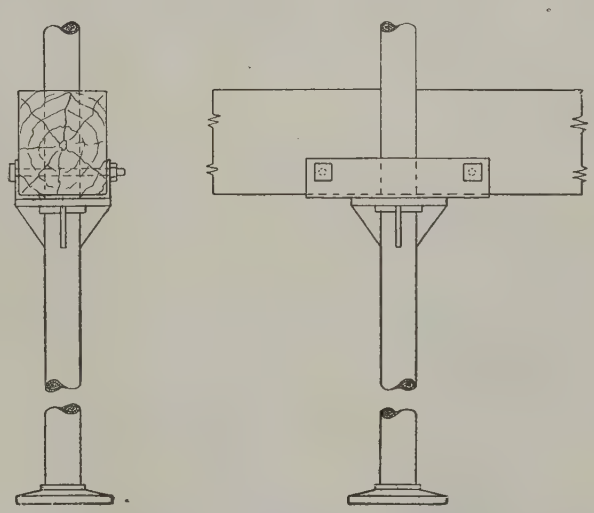




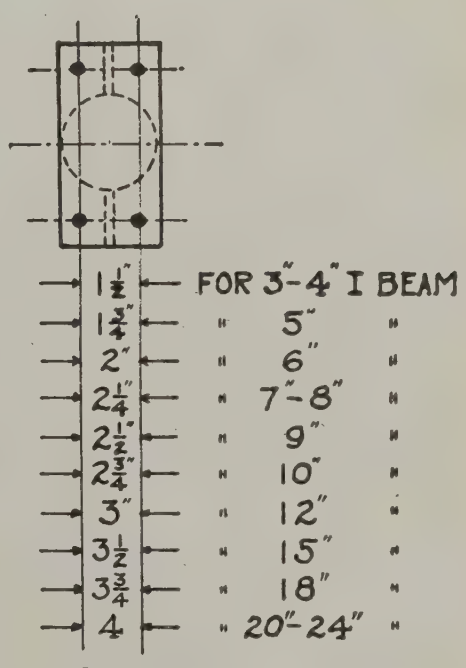
Stack for Partitions, Apartment Buildings



Details Showing Crex Columns in Sawtooth Construction



Elevation of Crex Columns Showing Steel Corbel Used in Mill Construction



Standard Gauge for I-Beams

Approval

Crex Patent columns are approved by the building departments of all large cities.

Adaptability

Crex Patent columns are used extensively in factories, apartment buildings, stores, etc.

Prices, etc.

Quotations and any additional information furnished on request.

Installations

Crex columns have been installed in thousands of buildings in various parts of the United States. This fact gives proof of the economy, reliability and fine appearance of Crex columns.

ESTABLISHED 1897

LALLY COLUMN CO.

Manufacturers of Concrete Filled Columns

CAMBRIDGE, MASS.

FACTORIES

CHICAGO, ILL., 4001 Wentworth Avenue CAMBRIDGE, MASS., Erie and Albany Streets BROOKLYN, N. Y., 211-249 Lombardy Street

Products

LALLY COLUMNS with patented Steel Connections and Bracketed Caps securely fastened, making a rigid tie between beams and columns.

Patents

Various improvements on Lally columns are covered by numerous patents under different dates extending from 1898 to the present time.

Infringements will be prosecuted.

Manufacturing Process

LALLY COLUMNS are manufactured by the LALLY COLUMN CO., INC., of New York, the LALLY COLUMN CO., Cambridge, Mass,, and the LALLY COLUMN CO. of Chicago, representing an annual production of hundreds of thousands of columns.

The column is a *shop-made* unit manufactured under the most thorough and careful supervision and inspection, and is shipped to the job ready for erection.

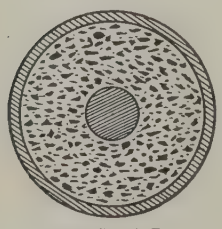
Standard tested mild steel pipes, 3½ to 12¾ inches outside diameter, are cut to the lengths required by plans and specifications, slotted to receive beam connections and splice plates, set up perpendicular on level bases and held in a vertical position by lateral supports. A machine-mixed stone concrete fill is deposited in the shell and, to insure dense concrete, shaft is agitated before initial set takes place by an electric hammer operated on exterior of pipe. The vibration compacts the concrete, liberates the confined air and eliminates all air holes and cavities in the aggregate. The resulting material is of considerably greater compressive strength than ordinary cast-in-the-field concrete. When seasoned, the column is lifted out of position, sandpapered on the exterior surface to remove all cement, and then painted.

Reinforcements for Lally Columns

To meet various requirements, including the amount of load to be carried, Lally columns can be reinforced as shown in the accompanying illustrations.

In all cases the concrete is *compressed,* eliminating all air voids (Fig. 1).

Outer Shell Filled with Compressed Concrete



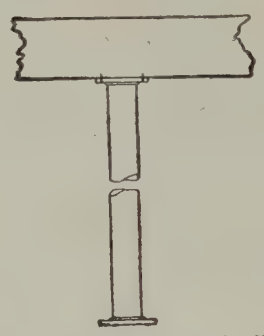
Single Steel Bar Reinforcement

Pipe Reinforcement

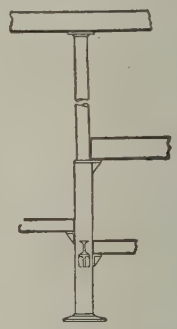
Four Angle Iron Reinforcement

Fig. 1. Sectional Views Showing Manner of Reinforcement of Lally Columns

Note: The angle iron reinforcement above makes a compact fireproof column; column is designed so that load is carried by the four angle irons and concrete within radius of same; outer shell and outer concrete act as fireproofing, making a column practically indestructible



Plain, with Ordinary Plate for Wood Beam Connection



With Beam Supports at Different Elevations

Fig. 2. Types of Lally Columns

Bracket and Beam Support

Where one column sets over the other, our latest construction of bracket and beam support is used, as shown in Fig. 3. This style of cap consists of crown plate and steel bracket inserted through slots in column shaft and firmly affixed thereto.

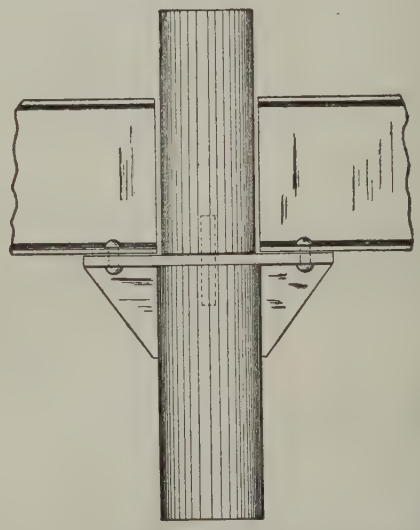


Fig. 3. Steel Bracket and Beam Support

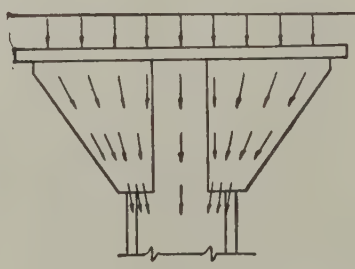


Fig. 4. Steel

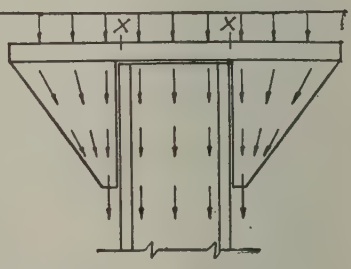


Fig. 5. Cast Iron

Bracket Caps

Fig. 4. Cross section of a typical Lally steel bracket cap showing diagrammatically with arrows how all the load on the cap plate is distributed to the column, eliminating the chance of failure due to improper distribution of the load

Fig. 5. Cross section of a typical loose cast iron cap showing by means of arrows that only part of the load is distributed directly to the column, thereby causing failure by shear at the points marked "x." Load between points "x—x" is the only load carried by the column

Continued on next page

Approvals

The Lally column is endorsed by engineers throughout the country, and approvals have been granted for its use by all the leading city building departments after extensive tests and investigations. Its adaptability to all forms of building construction, its economy in first cost and in floor space occupied, its speed of erection, as well as its strength, durability and practical performance, have been demonstrated by successful and uniformly satisfactory use under especially severe conditions.

Fire Resistance

The value of the Lally column in fire resisting construction has been frequently demonstrated both in actual fires and scientifically conducted fire tests. This type of column section, without additional exterior protection, has withstood the flames and high temperatures of some of the greatest fires; such as the Chelsea conflagration in April, 1908, the Salem fire in June, 1914, the Standard Oil fire at Greenpoint, N. Y., in September, 1919, and the fire in the Edison Phonograph Works at West Orange, N. J., in December, 1914. In this latter fire, large pieces of steel and cast iron melted in the same building in which concrete-filled pipe columns were used and there were evidences of exposed concrete having been fused. The defect produced on the concrete-filled steel pipe columns was a slight lateral bend which was generally less than 1 inch. A complete report on the fire in the Edison Phonograph Works was prepared under the joint auspices of the National Fire Protection Association and the National Board of Fire Underwriters and gives in detail the effects of fire on the various materials which entered into the construction.

In the Underwriters' Laboratories at Chicago, Ill., 1917-1919, two types of Lally columns were tested in a series of fire tests of structural steel, reinforced concrete, steel pipe and cast iron columns. The Lally columns were unprotected on the exterior surface. These columns were tested under Standard time-temperature fire curve conditions while supporting loads in excess of the recommended design loads. As a result of the tests, the comparative fire resisting ratings of Lally columns were determined as 25 minutes for the unreinforced, which was 11% overloaded during the test, and 45 minutes for the reinforced section, which was 3% overloaded during the test. Actual test runs were 36 minutes and 1 hour 11¾ minutes, respectively. Compared to these ratings, unprotected structural steel and round cast iron columns were granted tentative ratings of only 10 and 20 minutes, respectively. Lally column ratings would probably have been still further increased if the test loads had not exceeded the safe working values recommended.

Safe Loads

We call attention to a material change in the safe loads, as shown in the table below, increasing the accepted safe loads for Lally columns. Please bear in mind that when a project is designed for Lally columns according to this strength list *they* should be specified, and no other concrete filled column substituted unless the sizes are increased to a diameter that will be equal in carrying capacity to the genuine Lally columns.

References

The names and addresses of the principal purchasers and satisfied users of Lally columns will be furnished on request.

SAFE LOADS FOR LALLY CONCRETE FILLED COLUMNS IN THOUSANDS OF POUNDS

Limit of Length=40 Diameters (l/r=120) $P=(A_c+12\,A_s)\ (1600-24^{l}/_{d})$

	Diam. of col., in.	Weight per ft., lb.	Area of steel, sq. in.	Area of concrete, sq. in.	Unbraced length of column in feet															*Max. length, ft.
					6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Light weight	3½	13	1.27	8.35	26.1	24.2	22.2	20.3	18.3	16.4	14.5									11.91
	4	17	1.63	10.94	35.6	33.4	31.2	29.0	26.8	24.6	22.4	20.2								13.71
Heavy weight	3½	15	2.23	7.39	37.9	35.1	32.3	29.4	26.7	24.0										11.64
	4	20	2.68	9.89	49.2	46.1	43.1	40.1	37.0	33.9	30.9	27.9								13.37
	4½	24	3.17	12.73	61.8	58.5	55.3	52.0	48.8	45.5	42.3	39.0	35.8	32.5						15.10
	5	29	3.69	15.95	75.6	72.0	68.6	65.2	61.7	58.2	54.7	51.3	47.8	44.3	40.9	37.4				16.83
	5½	36	4.30	20.01	92.1	88.3	84.6	80.8	77.1	73.3	69.6	65.8	62.1	58.3	54.6	50.8	47.1	43.3		18.78
	6⅝	49	5.58	28.89	128.3	124.2	120.0	115.8	111.7	107.5	103.4	99.2	95.0	90.9	86.7	82.6	78.4	74.2	70.1	22.45
	7⅝	64	6.92	38.74	166.0	161.4	156.9	152.3	147.8	143.2	138.6	134.1	129.7	125.0	120.5	115.9	111.4	106.8	102.3	25.92
	8⅝	81	8.40	50.03	211.1	206.1	201.1	196.1	191.0	186.0	181.0	175.9	170.9	165.9	160.8	155.8	150.8	145.8	140.7	29.38
	9⅝	100	9.97	62.79	259.2	253.8	248.3	242.8	237.4	231.9	226.5	221.0	215.6	210.1	204.6	199.2	193.7	188.3	182.8	32.84
	10¾	123	11.91	78.86	319.1	313.1	307.2	301.3	295.4	289.4	283.5	277.6	271.6	265.7	259.7	253.8	247.9	241.9	236.0	36.74
	12¾	169	14.58	113.10	421.9	415.4	408.8	402.3	395.8	389.2	382.8	376.2	369.7	363.2	356.7	350.1	343.6	337.1	330.6	43.77

*Radius of gyration equals $\frac{1}{\sqrt{6}}$ quantity in this column.

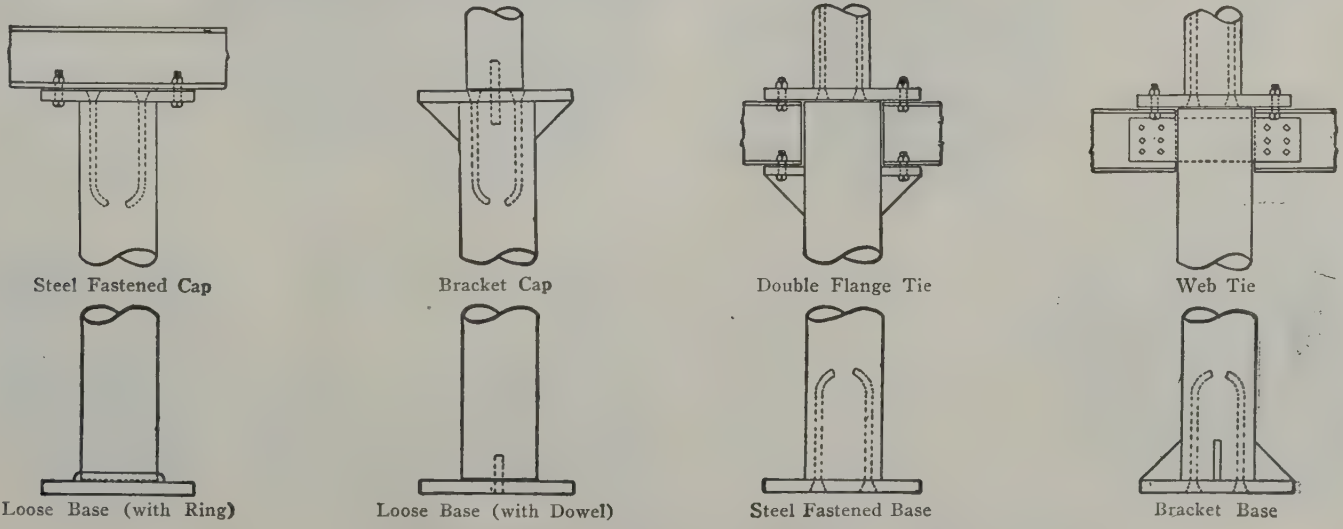


Fig. 6. Various Types of Lally Steel Caps and Bases

Specify Lally columns complete with steel caps and bases as manufactured by Lally Column Co.

THE DUPLEX HANGER CO.

East 53rd Street and Lakeside Avenue

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 16 Warren Street
PHILADELPHIA, PA., 2216 W. Columbia Avenue
NEW ORLEANS, LA., 1508 Masonic Temple Building
BOSTON, MASS., 88 Broad Street

Products

"DUPLEX" JOIST, WALL, CONCRETE BLOCK and I-BEAM HANGER; "DUPLEX" POST CAPS, POST BASES, WALL PLATES and WALL BOXES, for warehouses, factories, heavy mill construction and all other wood constructed buildings.

For Incinerators, see page C4085.

Specifications

"Duplex" hangers and post caps are designed with a large factor of safety to carry the timbers for which they are intended. If architects and engineers will, when using hangers and post caps, specify "Duplex," the proper hangers and post caps for the timbers will be furnished.

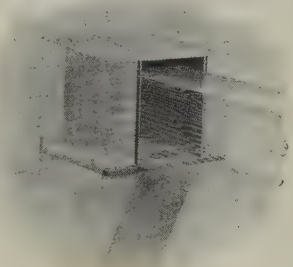
"Duplex" Hangers

"Duplex" Joist Hanger

Single Joist Hangers—Are made of malleable iron and every hanger is thoroughly tested.

The best and most economical hangers for timber framing.

"Duplex" Joist Hangers reduce the shrinkage of joists to a minimum.



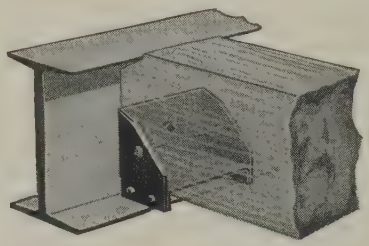
"Duplex" Wall Joist Box

"Duplex" Concrete Block Joist Hanger—The best hanger for concrete block construction. It is made with a larger bearing plate than our ordinary wall hangers so as to distribute the load over a greater area of the concrete block. Very practical where it becomes necessary to frame joists into old brick walls or party walls. Avoids the cutting of a large hole.

"Duplex" Concrete Block Wall Joist Hanger

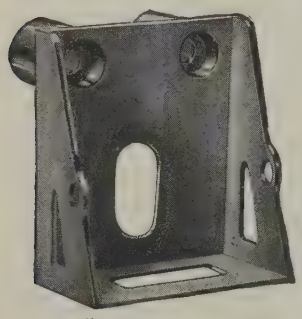
R & L Joist Hangers—The best hangers for the heaviest type of mill construction. By using this type of hanger, the entire building is tied together laterally. No other method of construction does this. Made in two parts and can be adjusted to fit the various timbers for which they are intended.

R & L Joist Hanger



"Duplex" I-beam Shelf Hanger

I-beam Box and I-beam Shelf Hangers—Are noted for being one of the most economical devices for framing wood joists to I-beams. All of the load is carried on the lower flange of the I-beam, this being the only correct method.



For Very Heavy Mill Construction

Heavy Duty R & L Joist Hangers—This hanger combines all the features of the R & L hangers, but is made in one piece, instead of pairs.

Wall Hangers—Embody every established requirement for good construction. Superior in design. Do not break the bond in masonry walls. Self-releasing in case of fire.

"Duplex" Wall Joist Hanger

"Duplex" Steel Post Caps

The "Duplex" Post Caps are made of mild, open hearth steel and consist of three pieces; a bearing bracket and two side plates bolted together with four heavy bolts. All engineers who have investigated and used this cap are unanimous in declaring it to be the best design for rigid construction. Tests have fully proven the great strength of this design and that it is not possible to break the cap when even more than six times the ultimate safe load of the timber is applied.

These caps are furnished for 1-way, 2-way, 3-way and 4-way construction and may be had for timbers larger than the post.

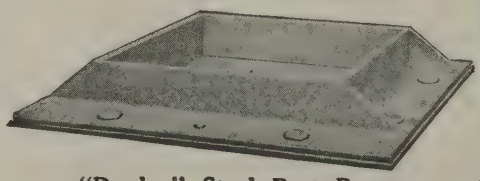
Four-way Construction

"Duplex" Wall Hanger, Extra Heavy
"Underwriters' Type." For heavy mill construction

Steel Wall Hangers—Have no equal in carrying timbers clear of the wall. Distribute the load perfectly over the bearing surface of the masonry. Furnished for standard and extra heavy construction.

"Duplex" Steel Post Bases

Are made of steel plates and angles to fit the post. More economical than cast iron plates.



"Duplex" Steel Post Base

Girder Same Size as Post Below

THE IDEAL HANGER COMPANY

1270 East 53d Street
CLEVELAND, OHIO

Products

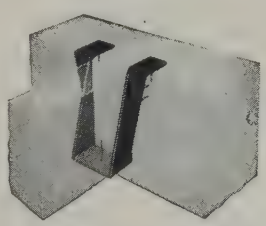
IDEAL JOIST HANGERS (Wall Hangers, Wall Boxes and Metal Lumber Hangers); POST CAPS; POST BASES.

Also Barn Framing Fittings.

Ideal Joist Hangers

Introduction—Ideal hangers are made of the best grade open hearth steel bars and are formed so the hanger fits flat against the timber, increasing the carrying capacity of the hanger. This hanger fitting close on all sides does not interfere with furring and permits the use of spikes or lag screws to fasten the hanger to the girder.

No costly framing. Easily applied and neat in appearance. The same section of bar is used throughout, giving the strongest construction at an economical cost.



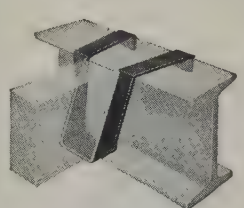
Ideal Single Hanger, Style "A"

Single Hanger, Style "A"—These hangers are standard construction and are carried in stock for every size timber.

Ideal Double Hanger, Style "B"

Double Hanger, Style "B"—For use where joists frame opposite each other on wood or I-beam girders. The double hanger consists of two single hangers, each riveted to strap connections to hang over the wood or I-beam girder. Unquestionably, the strongest construction.

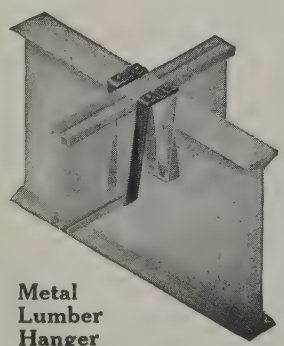
Directions for Ordering—Give size of joists and also width of girder over which hanger must span, or, in case of an I-beam, exact width of flange, or if more convenient, height of I-beam and weight per foot, so that flange width can be obtained.



Ideal Single Hanger, Style "C"

Single Hanger, Style "C"—Used where a single joist frames against an I-beam channel or wood girder, the arms of the joist hanger running over the top.

Directions for Ordering—Give size of joist and dimensions over which hanger arms must go, namely: width of timber header, or, in case of I-beams or channels, width of flange or height and weight per foot so flange width can be obtained.



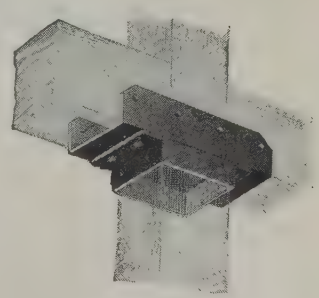
Metal Lumber Hanger

Metal Lumber Hangers—Are the most economical and satisfactory method of framing steel I-joists and save from 60 to 75% of the cost of shelf angles. Being a shop-fabricated product of known strength and integrity, the use of Ideal metal lumber hangers follows the simplest possible design. Easily placed, safe, strong and secure. Send plans for estimate.

Ideal Steel Post Caps

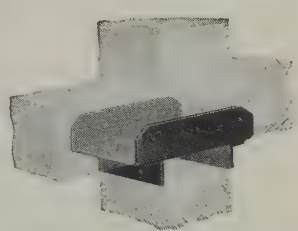
Cap No. 2—Combines all the features necessary to strength in construction. Easily installed, no framing being necessary. The angles on the bottom of the cap are bent to form a socket into which the post fits, preventing any twisting of the cap. Channel is of open hearth plate steel riveted to the socket. Brackets are riveted to channel to carry beams framing on the side. Girders and beams will be flush unless otherwise noted.

Directions for Ordering—In ordering 3 or 4-way construction, give the following information: size post below; size post above; width and height of main girder; width and height of beams on side of cap.



Ideal Steel Post Cap No. 2

Cap No. 3—Forms a complete bearing channel for the girder. Heavy angles underneath give necessary strength for lighter type of construction. Holes are punched in the cap for tying the girders and post to the cap. This cap permits the use of wider or smaller girders than the post. Furnished in any size from warehouse stock.

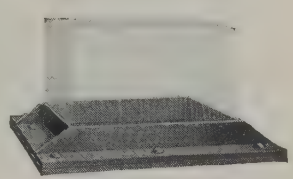


Ideal Steel Post Cap No. 3

Directions for Ordering—Always give size of post on which cap is placed, size of post which rests on top of cap and size of girder.

Ideal Post Bases

Made of heavy steel plates with angles riveted on to form a socket for the post, providing necessary spread for standard construction.



Ideal Post Base

Service

Ideal post caps, Ideal hangers and other Ideal products are made of the best material obtainable by competent workmen on modern machines. Prompt shipments are made from stock. Estimates and quotations cheerfully furnished and designs submitted by engineers who are specialists in timber construction.

THE CANTON FOUNDRY & MACHINE CO.

Manufacturers of Building Specialties

CANTON, OHIO

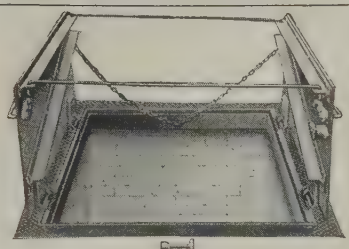
NEW YORK OFFICE: 101 West 31st Street
Telephone, Pennsylvania 6727, 6728

CHICAGO OFFICE: 10 South La Salle Street
Telephone, Franklin 4724

Products

SIDEWALK DOORS; COALHOLE COVERS; SIDEWALK VENTILATORS; AREA GRATINGS; ILLUMINATING IRON SIDEWALK PLATES; SIDEWALK GUTTER BOXES; CONDUCTOR CONNECTIONS; CONDUCTOR BOOTS; ASH PIT DOORS; STACK DOORS; COAL CHUTES (Foundation); COAL DOORS; WHEEL GUARDS; VALVE COVERS; DRAIN COVERS; WATER METER COVERS; LAMPHOLE COVERS; CATCHBASIN COVERS; MANHOLE COVERS; STREET DRAIN BOXES; STREET CASTINGS.

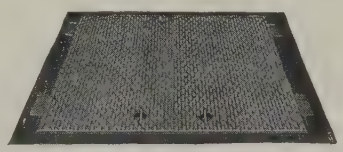
For Automobile Turntables, see page C3908.



All our Sidewalk Doors are flush and comply with city laws.

OPEN WITH STAY ROD AND CHAIN

Furnished in sizes shown by the three tables on this page



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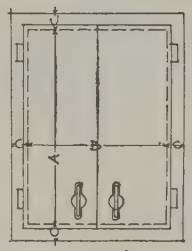
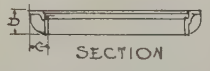


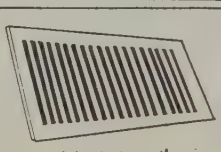
PLAN



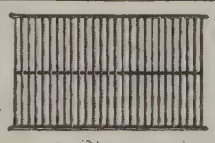
SECTION

A	B	C	D	A	B	C	D
in	in	in	in	in	in	in	in
30	42	4½	4	48	60	4½	4
30	48	4½	4	48	66	4½	4
30	54	4½	4	48	72	4½	4
33	58	4½	4	50	38	4½	4
33	72	4½	4	52	45	4½	4
36	36	4½	4	52	52	4½	4
36	44	4½	4	52	60	4½	4
36	48	4½	4	52	72	4½	4
36	60	4½	4	54	36	4½	4
36	72	4½	4	54	48	4½	4
40	48	4½	4	56	26	4½	4
40	54	4½	4	60	36	4½	4
40	60	4½	4	60	48	4½	4
40	72	4½	4	60	76	4½	4
42	30	4½	4	64	52	4½	4
43	41	4½	4	65	59	4½	4
44	36	4½	4	66	36	4½	4
44	44	4½	4	66	48	4½	4
44	48	4½	4	66	54	4½	4
44	60	4½	4	70	32	4½	4
44	72	4½	4	72	44	4½	4
48	30	4½	4	72	48	4½	4
48	36	4½	4	72	52	4½	4
48	48	4½	4	72	60	4½	4
48	54	4½	4	76	42	4½	4

FLUSH SIDEWALK DOOR DOUBLE LEAF



CAST IRON

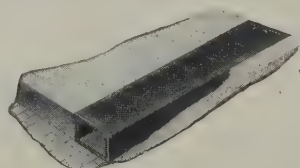


WROUGHT IRON

Cast iron area gratings furnished 12, 14, 16, 18 & 20 ins wide. All 48 ins long

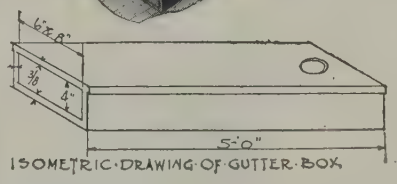
Wrought iron gratings to order in various rectangular shapes and sizes

AREA-GRATING



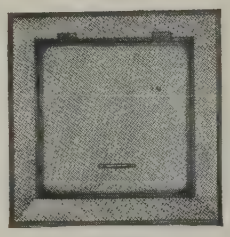
4x6 in for 2.3 x 4 in conductor pipe

4x8 in for 5 & 6 in. conductor pipe.



ISOMETRIC DRAWING OF GUTTER BOX

SIDEWALK GUTTER BOX



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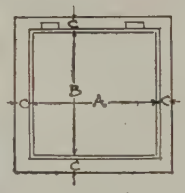
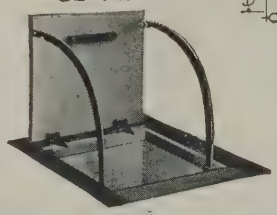


PLAN

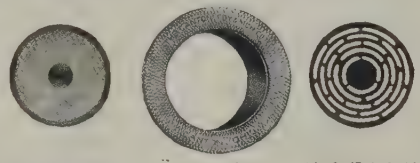
SECTION



OPEN

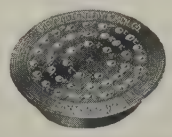
A	B	C	D
in	in	in	in
20	18	4½	4
24	18	4½	4
24	24	4½	4
30	24	4½	4
30	30	4½	4
36	30	4½	4

FLUSH SIDEWALK DOOR SINGLE LEAF

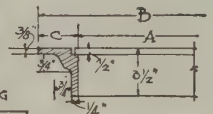


SOLID CHECKERED COVER COAL HOLE RING

VENTILATED COVER



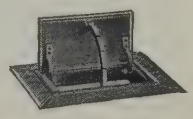
ILLUMINATED COVER & RING



SECTION THROUGH RING

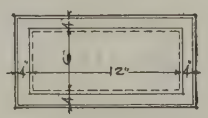
SIZES							
A	14	16	18	20	24	30	36
B	20	22	24	26	30	36	42
C	3	3	3	3	3	3	3

COAL HOLE COVERS & RINGS



OPEN

CLOSED



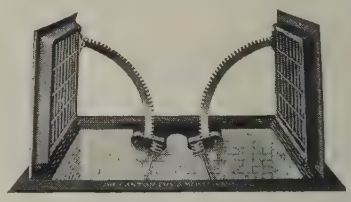
PLAN

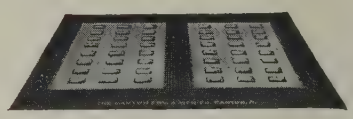
SECTION

This sidewalk ventilator is flush and water proof it locks and unlocks on the inside only.

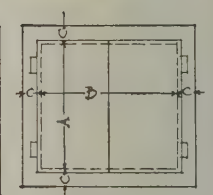
SIDEWALK VENTILATOR

All our Sidewalk Doors are flushend comply with City laws.

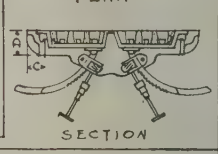




A	B	C	D	A	B	C	D
in	in	in	in	in	in	in	in
30	42	4½	4	48	54	4½	4
30	48	4½	4	48	60	4½	4
30	54	4½	4	48	66	4½	4
33	58	4½	4	48	72	4½	4
33	72	4½	4	52	45	4½	4
36	36	4½	4	52	52	4½	4
36	44	4½	4	52	60	4½	4
36	48	4½	4	52	72	4½	4
36	60	4½	4	54	36	4½	4
36	72	4½	4	54	48	4½	4
40	48	4½	4	56	26	4½	4
40	54	4½	4	60	36	4½	4
40	60	4½	4	60	48	4½	4
40	72	4½	4	64	52	4½	4
43	41	4½	4	65	59	4½	4
44	36	4½	4	66	36	4½	4
44	44	4½	4	66	48	4½	4
44	48	4½	4	66	54	4½	4
44	60	4½	4	72	44	4½	4
44	72	4½	4	72	48	4½	4
48	36	4½	4	72	60	4½	4
48	48	4½	4	76	42	4½	4



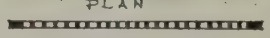
PLAN



SECTION

ILLUMINATED SIDEWALK DOOR DOUBLE LEAF

PLAN

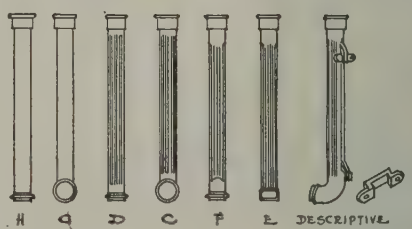


SECTION

Standard sizes 24x48 ins.

Special sizes upon specification

ILLUMINATING IRON SIDE WALK LIGHT



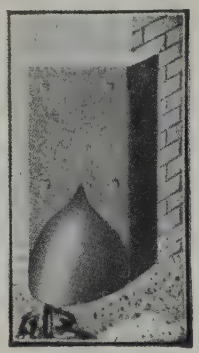
H	G	D	C	F	E	DESCRIPTIVE

Made to fit standard conductor and soil pipe 3, 4, 5 and 6 inch Standard length 4½ ft Special lengths upon specifications.

"UNIVERSAL" CAST IRON CONDUCTOR CONNECTIONS AND BOOTS.

Continued on next page

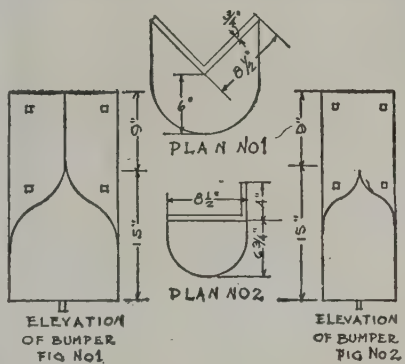
CORNER GUARD FIG. 1

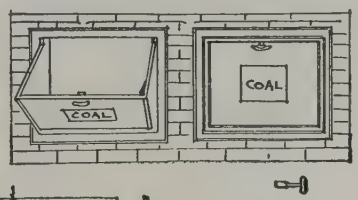


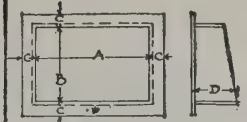
JAMB GUARD FIG. 2

NOTE- Jamb Guards are made in rights and lefts for entrance ways

CAST IRON WHEEL GUARDS



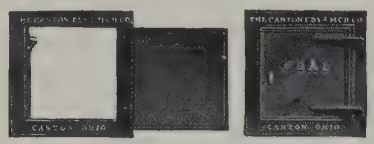


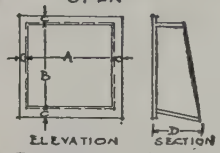


SIZE	A	B	C	D
A	21	15	1½	6
D	25	21	1½	6
G	31	23	1½	6

Has automatic inside lock and an independent outside lock.

SELF-LOCKING. BURGLAR-PROOF COAL CHUTE.

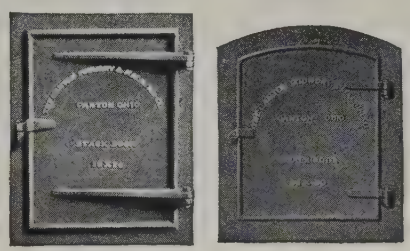


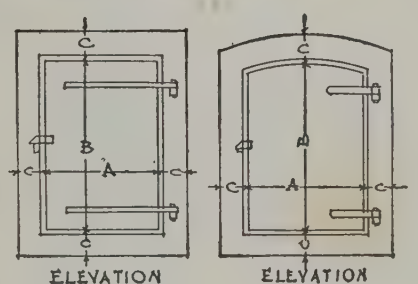


No	A	B	C	D
1	16	16	2½	8
2	24	20	2½	8

Self locking substantial and durable.

SELF LOCKING BURGLAR-PROOF COAL DOOR





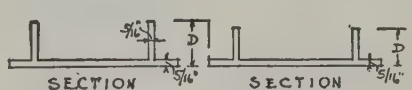
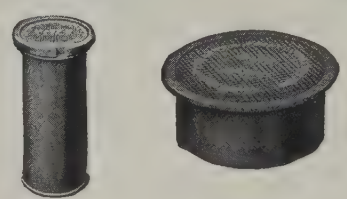
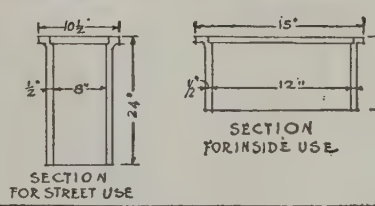


TABLE OF SIZES SQUARE TOP			
A	B	C	D
18	24	2½	4
24	30	3	4

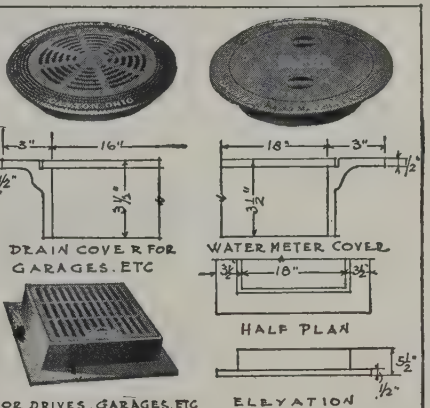
TABLE OF SIZES ARCH TOP			
A	B	C	D
24	30	3½	3

STACK DOORS





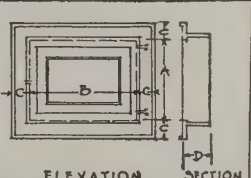
VALVE COVERS

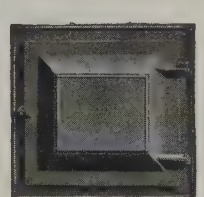


CAST IRON COVERS

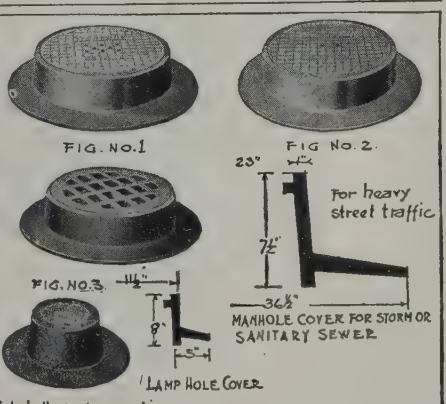
DIMENSIONS

A	B	C	D
6	8	2	2½
8	10	2	2½
10	12	2	2½
12	14	2	2½
14	16	2	2½
16	18	2	2½
18	20	2	2½
20	24	2	2½

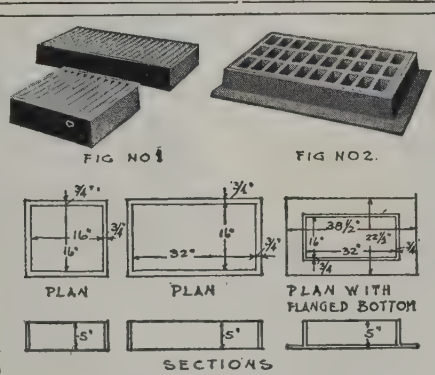




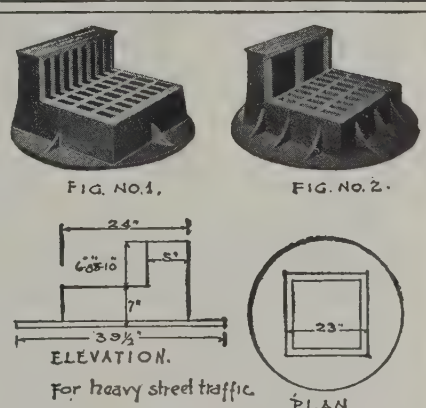
ASH PIT DOORS



MANHOLE COVER & LAMP HOLE COVER



CHANNEL DRAIN BOXES



CATCH BASIN COVER

THE SAMUEL J. CRESWELL IRON WORKS

Twenty-third and Cherry Streets
PHILADELPHIA, PA.

Products

ARCHITECTURAL WROUGHT and CAST IRON WORK, and GENERAL FOUNDRY WORK, including Columns, Stairways (straight and spiral), Wheel Guards, Standards, Manhole Doors and Frames, Fenders, Roadway Drain Grates and Frames, Vault Plates and Frames, Ash Pit Doors and Frames, Cleanout Doors and Frames, Trench Covers and Frames, Cesspools, Drain Gutters, Pavement Doors, Gates and Grilles, Post Caps, Railings, etc.

Facilities

THE SAMUEL J. CRESWELL IRON WORKS is one of the largest and best equipped plants in the vicinity of Philadelphia for the production of the various kinds of architectural wrought and cast iron work mentioned above. Further, this company is prepared to submit estimates, or designs and estimates, for any ornamental work for large or small buildings, etc., on short notice.

General Foundry Work

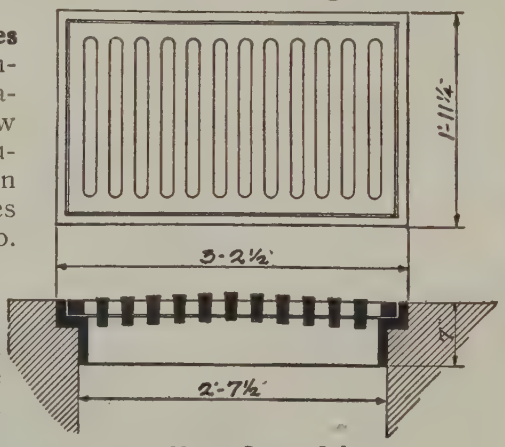
In addition to architectural work, a fully equipped foundry is prepared to produce special castings and do general foundry work, including cast iron ornamental or plain columns from stock designs (sent on request) or to architects' designs.

Stock Specialties

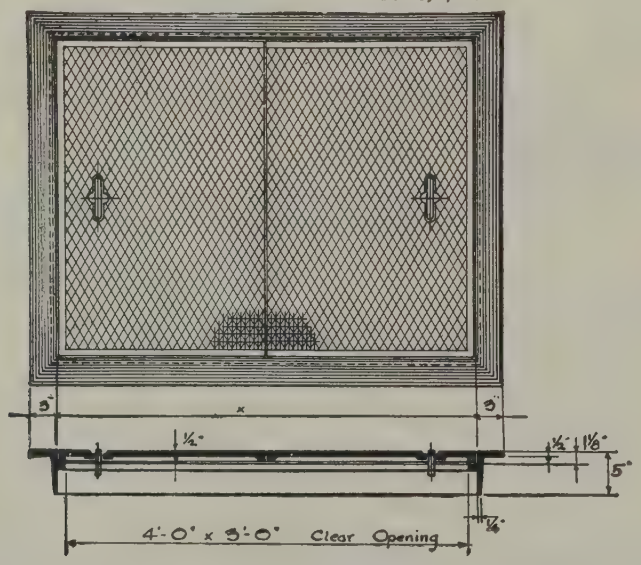
The accompanying illustrations show a few specialties regularly carried in stock. The prices quoted are f. o. b. Philadelphia.

Catalogue

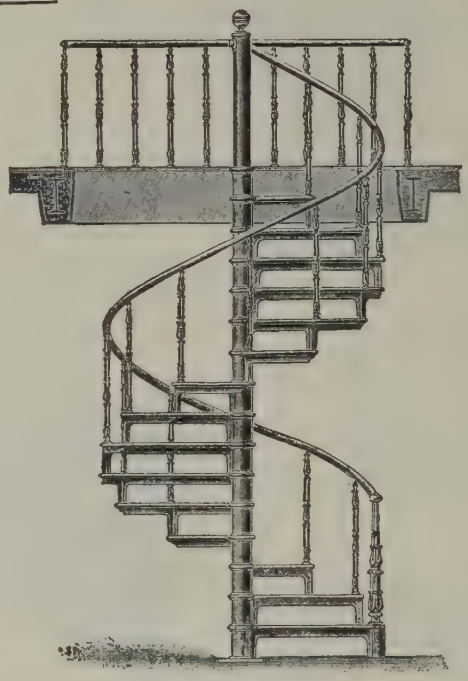
A catalogue illustrating the entire line, and discounts, will be sent on request.



No. 3 Sewer Inlet
Price, $22.00



No. 34 Manhole Cover
Price, $45.00. Extra heavy pattern, price, $54.00

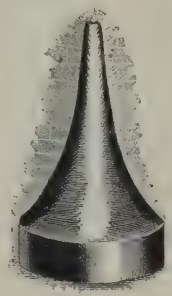


Spiral Stairway
Following sizes stock pattern, 3'6", 4', 4'6", 5', 5'6" and 6' diameters. Any height

No. 15 Fender
9" projection
3' 5" high

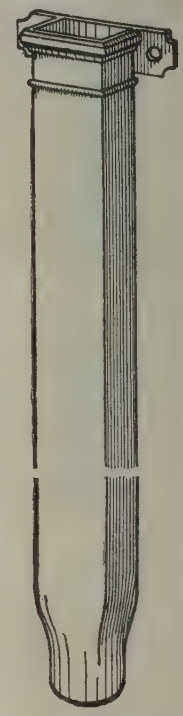
Wall	Price
9"	$25.00
13"	25.50
18"	27.50
22"	30.00
24"	35.00

Can be made for walls to 36" thick.



Nos. 16 and 17 Corner Fenders

Design No.	Projection	Height	Price
16	9"	3' 5"	$10.00
17	9"	2' 8"	9.00
17A	14"	3' 0"	25.00
17B	8⅜"	2' 0"	9.00



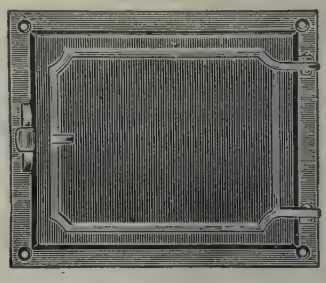
No. 4 Rain Conductor Shoes
3"x4"

Length	Price
5'0"	$10.00
4'0"	9.00
3'0"	7.00
2'0"	5.00
1'6"	4.00
1'0"	3.00

We have patterns for other sizes. Prices on application.

No. 9 Ash Dump for Fireplaces

Opening	Price
6" x 6"	$1.25
6" x 8"	1.50



No. 8 Cleanout Doors and Frames

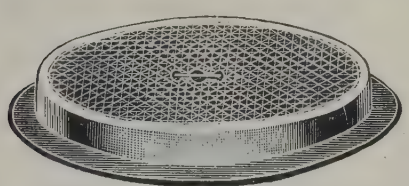
Width	Height	Price
20"	16"	$5.00
16"	24"	7.00
16"	12"	3.50
12"	12"	2.25
12"	10"	2.00
10"	8"	1.75
9"	7"	1.25
8"	6"	1.25
7"	5"	1.25

Continued on next page

No. 1 Manhole Door and Frame

Width	Height	Price	Width	Height	Price
36″	36″	$42.00	24″	30″	$17.00
33″	49″	42.00	24″	24″	15.50
24″	48″	28.00	20″	24″	14.00
24″	36″	19.00	18″	24″	12.00

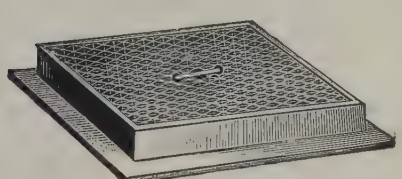
All manhole doors and frames have return flanges 4″ deep.



No. 3 Vault Plate and Frame; No. 4 Vault Grating and Frame

Size	Price	Size	Price
12″	$3.00	20″	$7.00
14″	4.00	24″	9.50
16″	5.00	30″	15.00
18″	6.00	34″	22.50

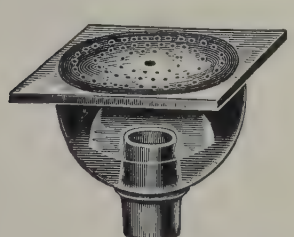
Depth of frame, 3″.



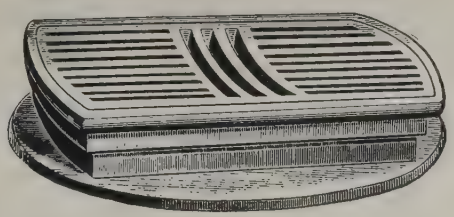
No. 7 Vault Plate and Frame; No. 8 Vault Grating and Frame

Size	Price	Size	Price
36″x36″	$32.50	7½″x7½″	$2.50
30″x30″	21.50	14″x24″	8.50
24″x24″	12.00	18″x24″	10.00
20″x20″	10.25	18″x30″	12.00
18″x18″	9.00	18″x36″	15.00
16″x16″	7.50	24″x30″	16.00
14″x14″	6.00	24″x36″	21.00
12″x12″	3.75	24″x42″	24.00
		24″x48″	30.00

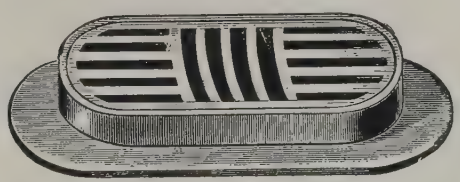
Depth of frame, 3″.
All sizes can be made extra heavy at additional cost.



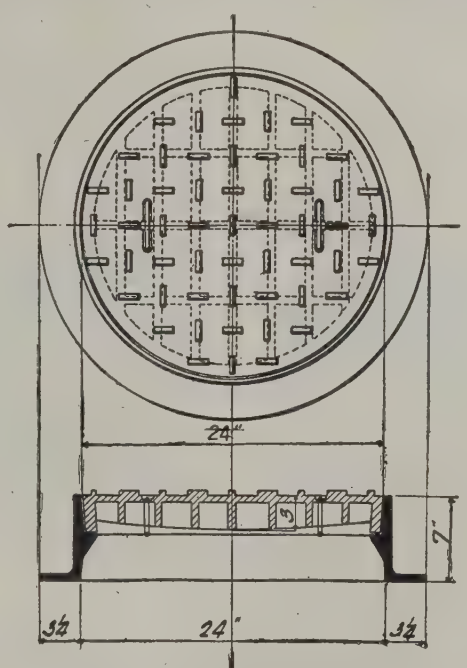
No. 21 Bell Trap
12″x12″, 4″ outlet.
Price, painted.....$3.00



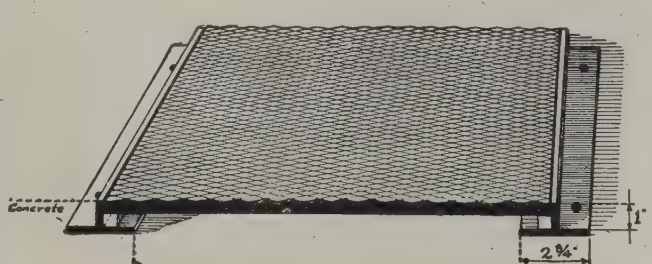
No. 10 Roadway Drain Grate and Frame
13¼″x24½″ grating.....$9.00
12 ″x18 ″ grating..... 8.00



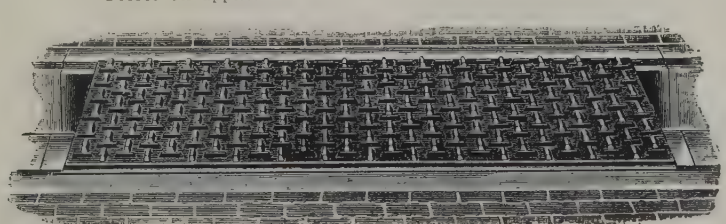
No. 11 Roadway Drain Grate and Frame
11 ″x22½″ grating.....$6.00
8¼″x17¼″ grating..... 4.00



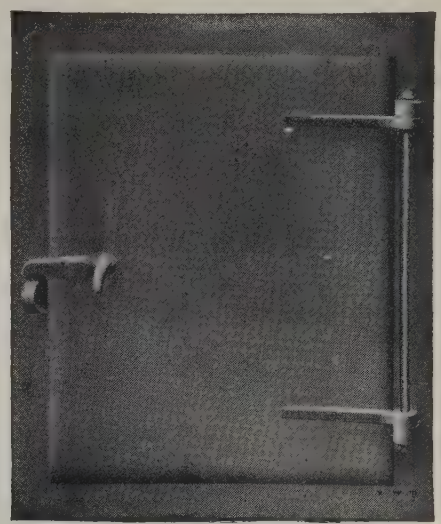
No. 19 Manhole Cover
Extra heavy for city use.....$17.00
With concrete or asphalt filled cover..... 22.00



Cover and Curbing for Ducts or Trenches
Plates made to suit conditions. Curbing carried in stock. Prices on application.

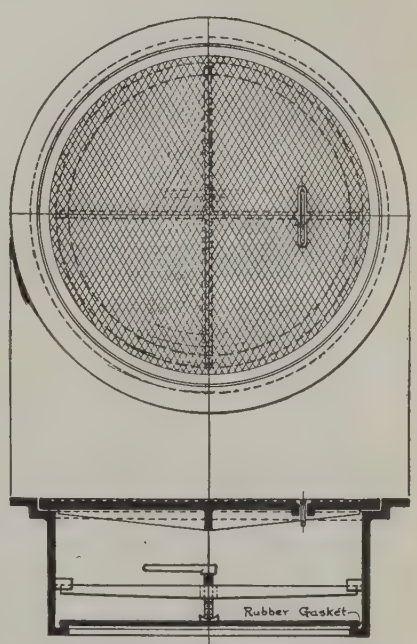


No. 28 Gutter Cover Plate
18″ wide, 1″ thick, $3.00 per lineal ft.
24″ wide, 1½″ thick, $6.00 per lineal ft.



No. 3 Manhole Door and Frame

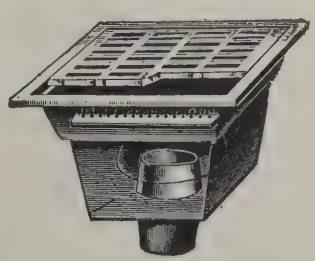
Width	Height	Price	Width	Height	Price
24″	36″	$19.00	16″	24″	$12.00
24″	24″	15.50	18″	18″	10.50
18″	24″	12.00			



No. 23 Manhole Cover with Inside Lid
Lock bar with brass screw

Size	Price
36″	$60.00
30″	42.50
24″	29.00
20″	26.50
18″	21.50

Depth of frame, 9″.



No. 22 Bell Trap Cesspool
16″x16″, 4″ outlet.
Price $6.00
12″x12″, 4″ outlet.
Price 4.50

ESTABLISHED 1882

FLOCKHART FOUNDRY CO.

Engineers and Manufacturers of Standardized Constructors' Castings

MAIN OFFICE

87 Polk Street, NEWARK, N. J.

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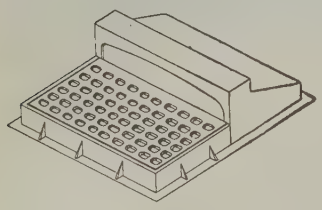
A complete line of CONTRACTORS' CASTINGS adapted for construction of highways, water works, storm and sanitary sewers, sewage disposal works, docks, gas and electric plants, etc.

Engineering Service

We maintain a specialized engineering service for the solution of particular problems. Service is rendered without charge to customers.

Data Sheets

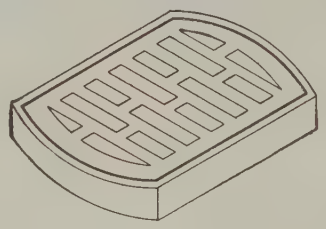
Data sheets are issued for all our products. These show all detail dimensions and other necessary information for ordering and installing. Write for them by number and description of product.



No. 25128

Large Curb Inlet

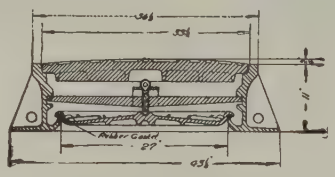
Strong design with heavily reinforced grating. Curb piece any height or radius. Grating, 48x22 in. Same type with grating 34½x21 and 29½x49 in.



No. 25277

Frame and Grating for Park Use

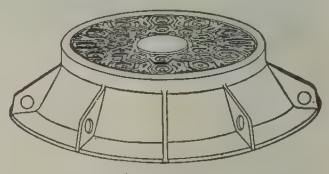
Size, 25x18 in. Depth, 2 in.



No. 26287

Waterproof Type of Manhole Frame and Cover

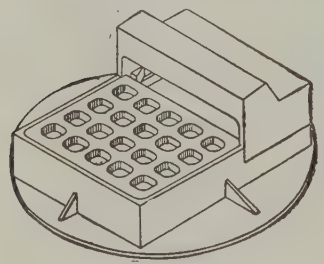
With rubber gasket and lock. Flange diameter, 46½ in. Minimum opening, 30 and 27 in. Also with high flange. Circular or square flange



No. 26293

Heavy Frame and Cover for Electrical Subways

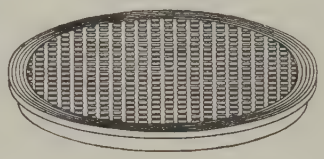
Flange diameter, 43 in. Minimum opening, 24 in. Depth, 10 in. Also 27 and 30-in. diameter openings



No. 25263

Small Curb Inlet

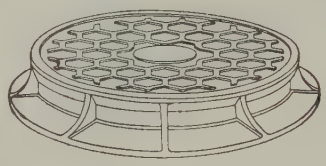
Curb piece any height or radius. Grating, 22¾x19¼ in. Plane or concave grating



No. 25054

Ring and Cover

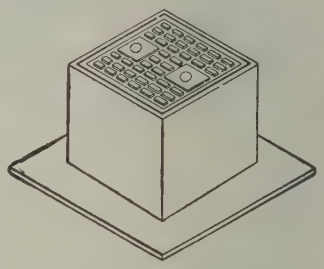
Diameter, 16, 18, 20, 22, 24, 30, 36 and 42 in. Made for light or heavy traffic



No. 25206

Heavy Manhole Frame and Cover

Flange diameter, 48⅜ in. Minimum opening, 36 in. Depth, 8 in. Also with minimum opening of 24, 30 and 42 in. The 36 and 42-in. sizes made with double concentric covers



No. 25403

Heavy Monument Box or Protection for Water or Gas Line Valves

Flange, 17 in. square. Minimum opening, 8⅝ in. Depth, 9 in. Also in light type

DATA SHEET NUMBERS

Classification	Max. opening, inches	Data sheet number
I Heavy frames and covers		
1. Circular—flange at bottom	48	134, 137
2. Circular—flange at top	48	133
3. Circular—sealed and locked	42	132, 136
4. Square	48	150, 153
5. Rectangular		151, 153
II Heavy frames and gratings		
1. Rectangular—plain surface	48x35	152
2. Rectangular—concave surface	28x48	144
III Light frames and covers		
1. Circular	48	138
2. Square	48	125
3. Rectangular		149
IV Light frames and gratings		170
V Curb inlets (Catchbasin Heads)		145
VI Catchbasin traps		146
VII Floor plates for light or heavy traffic, provided with angle seats; made also especially adapted for terrazo fill		148
VIII Wheel guards, angles, etc., for building protection		139, 155
IX Clean-out frames and doors		126
X Valves		
1. Flap		127
2. Lift		140
3. Shear		130
4. Slides		131
XI Mooring posts, bitts, chucks, cleats		171

ÆOLUS DICKINSON

INDUSTRIAL DIVISION PAUL DICKINSON, INCORPORATED

Scuppers, Exhaust Heads and Roof Drains

TELEPHONE
LAFAYETTE 1862, 1863

3324-3354 South Artesian Avenue
CHICAGO, ILL.

Products

DICKINSON CAST IRON SCUPPERS.
DICKINSON CAST IRON ROOF DRAINS
DICKINSON CAST IRON EXHAUST HEADS.

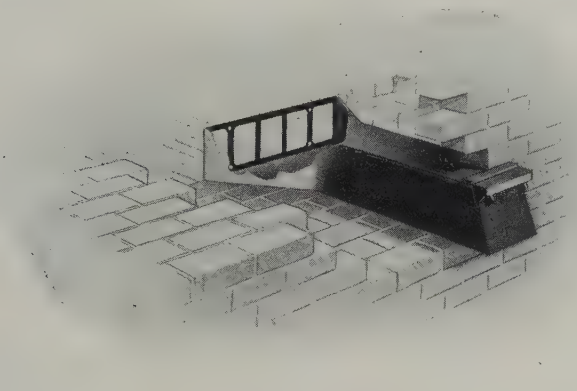
For "Æolus" Ventilators and Dickinson Floor Vents, Mushroom Type, see page A614.

Dickinson Cast Iron Scuppers

Reduce insurance rates 2% to 5% on contents of buildings to which applied.

They are constructed of light gray cast iron and are simple, effective, durable and easily installed.

The portion which protrudes beyond the wall is covered by a hinged flap which is held in place by a hinge pin of bronze to prevent corrosion and consequent sticking.



Cast Iron Scupper

Inside grating prevents clogging with papers, etc.
Outside grating prevents birds from building nests to block the purpose of the scupper

Size—Underwriters' requirements call for 15 sq. in. for each 1000 sq. ft. drained. Dickinson scuppers have a capacity of 16 sq. in. at the smallest point. The outside or smaller end is 4x4 in.

List Price—Dickinson scuppers may be had for the following thicknesses of wall:

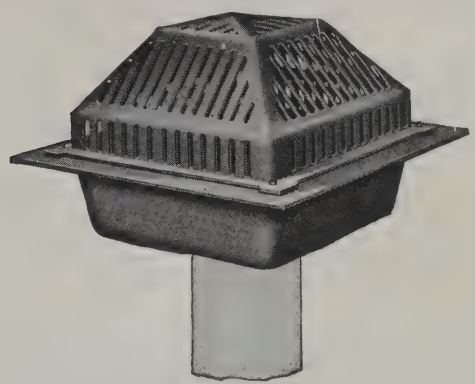
9-in. wall	$3.30
13-in. wall	4.40
17-in. wall	5.50
22-in. wall	6.60
24-in. wall	7.70

Prices are f.o.b. Chicago.

Specifications—Furnish and install where shown on plans gray cast iron scuppers which are to have outlet of 4x4 in., as manufactured by ÆOLUS DICKINSON, 3324-3354 South Artesian Ave., Chicago, Ill. Inlet to have a protective grating and outside to have a flap hinged on a bronze pin. The bottom edge of the inside end shall be set at the level of the floor or slightly below it so that water will drain clear. Scuppers must have a pitch of from 2 to 2½ in. to the foot. Upon completion of the building and before being turned over to the owners, the contractor shall see that all scuppers are clear of all material, are clean and that the hinged flap moves freely and is in perfect working order.

Dickinson Cast Iron Roof Drains

Constructed of light gray cast iron.
All sizes for threaded and cast iron pipe.

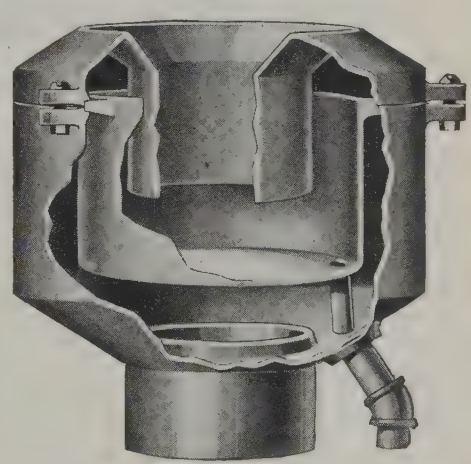


Cast Iron Roof Drain

Top: 12 in. square, 6 in. high.
Bottom section: 16½ in. square, 4 in. deep.
Roofing felt is brought over flange

Dickinson Cast Iron Exhaust Heads

Dickinson exhaust heads are the only make constructed entirely of cast iron. They are simple in design, yet none the less effective in operation. On entering the head the gradually expanding steam strikes the concave surface of an inner shell which quickly reverses its direction. Then the steam flows upward along the sides until it strikes the top, where it is again deflected and is permitted to exhaust into the outside air. Constantly impinged against these inner surfaces, the particles of oil and water are separated from the steam vapor leaving nothing but the dry vapor to escape.



Phantom View All-cast-iron Exhaust Head

DICKINSON EXHAUST HEAD

Pipe sizes, in.	Weight, lb.	Drain opening, in.	List price	Pipe sizes, in.	Weight, lb.	Drain opening, in.	List price
1 and 1½	15	¾	$20.00	8	174	1¼	$90.00
2 and 2½	21	1	25.00	10	241	2	125.00
3 and 3½	35	1	30.00	12	325	2½	150.00
4 and 4½	48	1	40.00	14	475	2½	200.00
5	100	1¼	50.00	16	650	3	250.00
6	120	1¼	60.00	18	900	3	300.00
7	154	1¼	75.00	20	1100	3½	360 00

Information

Further information, prices, etc., gladly supplied on request.

OLNEY J. DEAN & CO.

TELEPHONE
RANDOLPH 3600

Manufacturers of Scuppers and Concrete Inserts
137 South La Salle Street
CHICAGO, ILL.

BRANCH OFFICES
MILWAUKEE, WIS., 214 Mason Street
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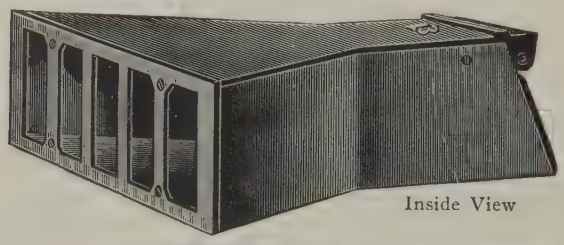
Products

DEAN'S CHICAGO TYPE SCUPPERS.
DEAN'S CONCRETE INSERTS.
Also Reinforcing Steel, Wire Mesh, Beam Wrapping, Spirals, Spacers, Griptite Sleeper Anchors.

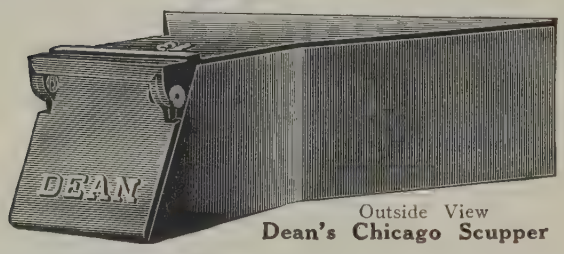
Dean's Chicago Scuppers

Advantages—Windproof and rainproof, designed to meet the requirements of the National Board of Fire Underwriters. Reduce insurance rates 3 to 5 per cent. Initial cost low in comparison to this annual saving. Reduce water losses and interruption to business in case of fire by draining the water directly to the outside of the building. Protect goods on the floor in case of breaks in water or sprinkler system. Protect wood floors from standing water.

Therefore use scuppers in every building.



Inside View



Outside View

Dean's Chicago Scupper

Construction—Our Chicago scupper has 48-sq. in. capacity at the inlet and 16-sq. in. capacity at the outlet.

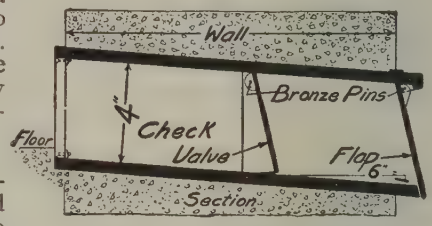
The wide inlet increases the water pressure on the flap at the outlet. This flap is hung on bronze pins at such an angle that its weight holds it snug against the walls of the scupper making it windtight and watertight, but a very small flow of water from within will open it. A small shelf projecting from the outside of the scupper protects the hinges and valve from clogging with mortar, dirt or ice. The grating within prevents clogging from the inside of the building and allows a clear inspection of the interior of the scupper at all times.

Check Valve—While the careful fitting of the outer flap makes the Chicago scupper windproof, we can, if desired, insert an additional check valve in the box.

Fender

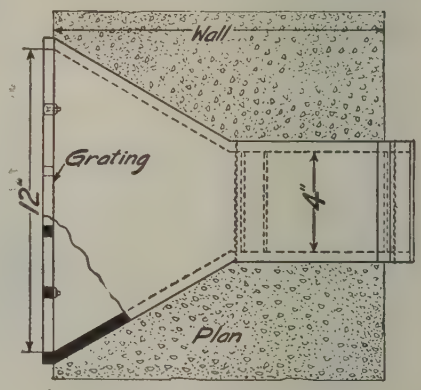
For certain building contents the Underwriters recommend a projection on the inside face of the scupper to prevent close stock piling. In such cases we equip our scupper with a grating carrying such a projection.

Installation—The National Fire Protection Association recommends under ordinary conditions, one scupper having an outlet area of 16 sq. in. to every 1000 sq. ft. of floor, or, in a building equipped with a sprinkler system, one to every 500 sq. ft. of floor. The Dean Chicago Type Scupper complies fully with this recommendation.



Specification—

The mason contractor shall furnish and set one Dean Chicago Type Scupper in each bay of the exterior wall as shown on plans. The scuppers are to meet the recommendations of the National Board of Fire Underwriters, having well fitted and non-clogging outside flaps hung on bronze pins and removable inside gratings. They shall have inlets at least 12 in. wide and outlet areas of at least 16 sq. in. Care must be taken in setting the scuppers to see that the pitch is not less than 2 in. in 12 in., that the lower inside edges of scuppers are set 1 in. below finished floor line, and that scuppers are set true to wall lines and are not sprung or broken during construction work.



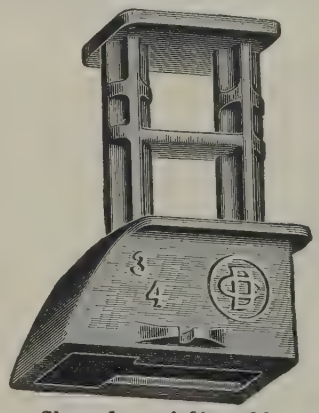
Section and Plan of Dean's Chicago Scupper

On completion of the job, flaps must be cleaned and left in perfect working order and all exposed parts of scuppers are to be cleaned and given a heavy coat of paint.

Service

A complete stock of all sizes of scuppers is kept in the Chicago warehouse.

Chicago being centrally located with exceptionally good package car service on all railroads, delivery can be made within a few days' time to all points. This is an important consideration in regard to scuppers, as they are very often forgotten until actually needed on the job.



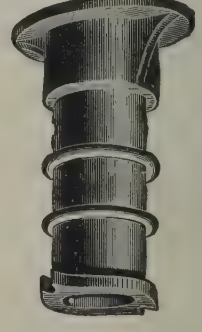
Slotted or Adjustable

DEAN'S CONCRETE INSERTS

The following sizes are stocked in Chicago warehouse for immediate shipment

Size bolt, in.	Allowable load, lb.	Height out to out, in.	Shipping wt. per 100, lb.
Slotted or Adjustable Inserts			
⅜	800	2	30
½	1500	2½	47.5
⅝	2400	3½	84
¾	3600	4¼	130
⅞	5000	4¼	190
Threaded Inserts			
⅝	1200	3⅜	75
¾	1800	3⅜	75

Drilling Holes in Your Concrete Is Expensive—Use Inserts



Threaded Insert

WATERTITE DRAIN & SCUPPER CO., INC.

Windproof Hooded Scuppers

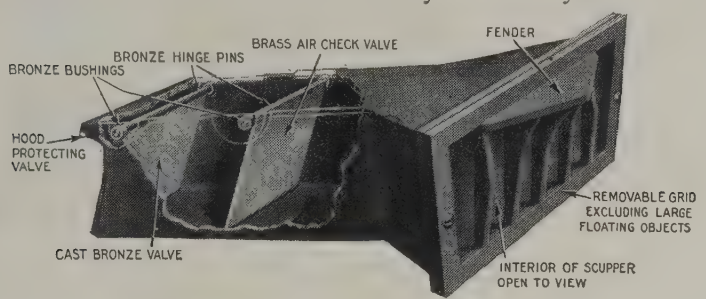
243 East 44th Street, NEW YORK, N. Y.

AGENTS IN MANY CITIES

Purpose of Scuppers

It is a well-known fact that water damage often exceeds the fire damage and also causes large losses through disruption of business. A small fire on an upper floor may cause enormous damage to goods, machinery, etc., by flooding the floors below. Scuppers allow this water to escape outside the building and save this enormous and unnecessary loss.

Underwriters recommend the use of scuppers (especially in sprinklered buildings) and the insurance rate for both owner and tenants is favorably affected by their use.



Type R Windproof Hooded Scupper with Double Air Check, Removable Grid and Fender

Underwriters' Approval Is Your Guarantee

Our scuppers have been tested, approved and listed as standard by the Chicago Laboratories of the National Board of Fire Underwriters. This secures their acceptance by all local exchanges and the maximum allowance in the rate.

The Factory Mutual Laboratories have also approved our scupper when provided with a large hood enclosing the valve on the three sides ("complete hood").

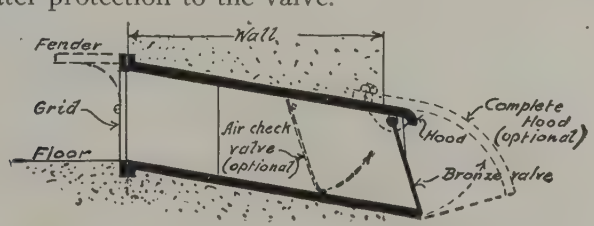
Construction of Type R Scupper

Windproof Valve—Box of cast iron, outlet 4x4 in., inlet 12 in. wide. To exclude cold air, a heavy cast bronze valve is hung in bronze bushings overlapping the outer end of the scupper.

The locating of the valve in this manner provides for its free action, which cannot be expected from a valve recessed in the scupper mouth subject to clogging by incrustations of dirt or sealing by ice or sleet. As the scupper is an emergency device it must be ready to function always, else it is useless.

The inner air check valve is not a necessity, as our outer valve is well fitted and effectively excludes cold air.

Hood—A small hood protects the valve from being clogged by mortar during construction, and from dirt and ice. If desired, we can furnish the "complete hood," enclosing the valve on three sides. This form is favored by New England Underwriters, as giving greater protection to the valve.



Section Through Type R Scupper

Grid—The grid protecting the inlet is removable, being secured by two brass setscrews.

Fender—The fender projecting 1½ in. into the room is designed to prevent storing goods against the inlet of the scupper. Fender can be omitted, if desired.

Pitch—Our scupper has a downward pitch of 2 in. to the foot, providing a good head of water to open the valve.

Discharge Capacity—Tests made by Underwriters' Laboratories developed that our scupper will discharge 60 gallons per minute under 1-in. head of water on the floor and 100 gallons per minute under 3-in. head.

Necessity of Bronze Fittings—As the scuppers may not be called into use until years after they have been installed it is necessary that the valve be of a material not subject to rust—our valve is of bronze hung in bronze bushings.

For Wood Floors on Cement

A special scupper is made for wood floors laid on sleepers bedded in the cement slab. The inlet is 7 in. high and the bottom of the scupper is set flush with the cement floor to take off any water that might seep through the wood floor.

Number Required

In sprinklered buildings, provide one scupper to every 500 sq. ft. of floor surface. In unsprinklered buildings one to every 1000 sq. ft. Scuppers are usually placed in the curtain walls below the windows.

Sizes and Prices

The scuppers are made for any thickness of wall and prices will be quoted on application. State thickness of wall and type of scupper required, also quantity.

Specification for Type R (Approved) Scuppers

Furnish and set in exterior walls, where indicated, cast iron scuppers with inlet not less than 12 in. wide, outlet to have an area of not less than 16 sq. in.; outlet to have a cast bronze gravity valve overlapping the end of the scupper (not recessed). Valve shall be hung in bronze or brass bushings. Above the inlet there shall be a cast iron fender extending 1½ in. into the room (can be omitted if floors are not for storage purposes). All iron parts shall have one coat protective paint (or be galvanized) before shipping. Scuppers shall have the approval of the National Board of Fire Underwriters and be included in their list of Approved Mechanical Devices. All as manufactured by the WATERTITE DRAIN & SCUPPER CO., INC., 243 East 44th Street, New York, N. Y.

Set the scuppers about 1 in. below the finished floor line. Grade a channel to it in the cement finish of the floor.

A Partial List of Recent Installations

Kelly Springfield Tire Co., Cumberland, Md.
American Can Co., Honolulu, T. H.
Studebaker Body Co., South Bend, Ind.
Stanley Works, New Britain, Conn.
James Butler Warehouse, Long Island City, N. Y.
Eastman Kodak Co., Rochester, N. Y.
U. S. Army Supply Base, Brooklyn, N. Y.
U. S. Army Supply Depot, New Orleans, La.
Winchester Repeating Arms Co., New Haven, Conn.
B. F. Goodrich Rubber Co., Akron, Ohio
R. H. Macy Co. Warehouse, New York, N. Y.
Illuminating Building, Cleveland, Ohio
Westinghouse Air Brake Co., Wilmerding, Pa.
American Thread Co., Dalton, Ga.
General Electric Building, Cincinnati, Ohio
Great Atlantic & Pacific Tea Co., Philadelphia, Pa.

WINDSHIELD SCUPPER COMPANY

Sole Manufacturers of Windshield Scuppers

16 Warren Street, NEW YORK, N. Y.

SALES REPRESENTATIVES

ATLANTA, GA., R. C. Lieb Co., 340 Whitehall Street
BALTIMORE, MD., Edwin Cugle, 1707 Park Avenue
BOSTON, MASS., E. A. Simpson, 143 Milk Street
CHICAGO, ILL., W. L. Harrison, Room 1148, 228 No. LaSalle Street
CLEVELAND, OHIO, Duplex Hanger Co., 1270 East 53rd Street
DETROIT, MICH., L. T. Ollesheimer, 374 Insurance Exchange Building
GREENSBORO, N. C., J. D. Wilkins, 204 West Lee Street
HARTFORD, CONN., Bidwell Hardware Co., 1293 Main Street
HOUSTON, TEX., Robert Voigtlander, 929 Electric Building
INDIANAPOLIS, IND., Hoosier Steel & Wire Co., 2230 Almont Street
KANSAS CITY, MO., C. A. Brockett Cement Co., 2035 East 19th Street
KNOXVILLE, TENN., Chas. M. Allen Co., 209 Clinch Avenue
LOS ANGELES, CAL., E. R. Kuns Co., Inc., 708 Towne Avenue
MILWAUKEE, WIS., Gross Hardware & Supply Co., 216 Third Street
NASHVILLE, TENN., Geo. W. Ruth & Co., 151 Fourth Avenue, No.
NEW ORLEANS, LA., Nachary Builders Supply Co., 802 Perdido Street
PHILADELPHIA, PA., Kahn Products Co., 2216 West Columbia Avenue
PITTSBURGH, PA., Fort Pitt Hardware Co., 807 Liberty Avenue
RICHMOND, VA., Construction Supply Co., Arlington Road at North Boulevard
ST. LOUIS, MO., F. A. Cammann Builder's Service Co., 927 Century Building
ST. PAUL, MINN., Harry A. Hansen Co., 903 Builders Exchange
SAN FRANCISCO, CAL., M. E. Hammond, Pacific Building
SEATTLE, WASH., Tourtellotte-Bradley, Inc., 314 Seneca Street

Purpose of Windshield Scuppers

To provide a quick escape for water in case of fire, defective or overheated sprinklers, bursting pipes, etc., thereby reducing damage to a minimum.

It is a well-known fact that approximately 75% of so-called fire losses are actually caused by water, and the progressive architect or engineer can not afford to omit provision for the emergency. Aside from actual water damage, five lines of fire hose, discharging 300 gal. per minute, would strain the structure to the extent of 12,000 lb. for each minute, or 30 tons every 5 minutes the fire ensued.

Every mercantile building, such as warehouses, factories, lofts and stores, should be equipped with Windshield Scuppers.

Reduced Insurance Rates

Insurance companies, recognizing their value, allow a reduction in rates applying to both building and contents when Windshield Scuppers are installed in accordance with recommendations. This saving usually pays their entire cost in a few years. Buildings so equipped will also command a higher rental and reduce vacancies on account of the insurance saving afforded tenants.

Underwriters' and Factory Mutuals' Approval

Windshield Scuppers have been tested and approved by the Underwriters' Laboratories, Inc. at Chicago, and are listed as Standard by the National Board of Fire Underwriters. This assures acceptance by all insurance exchanges throughout the country and the maximum reduction in rates.

The Associated Factory Mutual Fire Insurance Companies have also inspected and approved this device.

Value of the Improved Windshield

Being an emergency device, it is essential that it be at all times prepared for instant duty. A scupper which permits drafts to enter is not likely to be ready when called upon, as it has been found that employees, putting their own comfort ahead of any thought of the consequence, will stuff the scupper, thereby rendering it useless. The *windshield positively prevents drafts.* This also means a distinct saving in heat and fuel.

The Standard Type Windshield Scupper, as recently improved, is provided with a seat which insures a tight fit when windshield is closed and gives a positive clearance between the sides of the casing. The windshield is hung on a frame at the floor level, where it can be readily inspected and by the removal of two nuts can be replaced. This is an exclusive feature of the Standard Type. (See illustration.)

Underwriters' Approved Grate

The approved projecting grate prevents close stock piling and is so designed as to avoid possibility of tripping or injury to occupants. Its construction is such that a packing case, dropped from a hand truck, would be deflected.

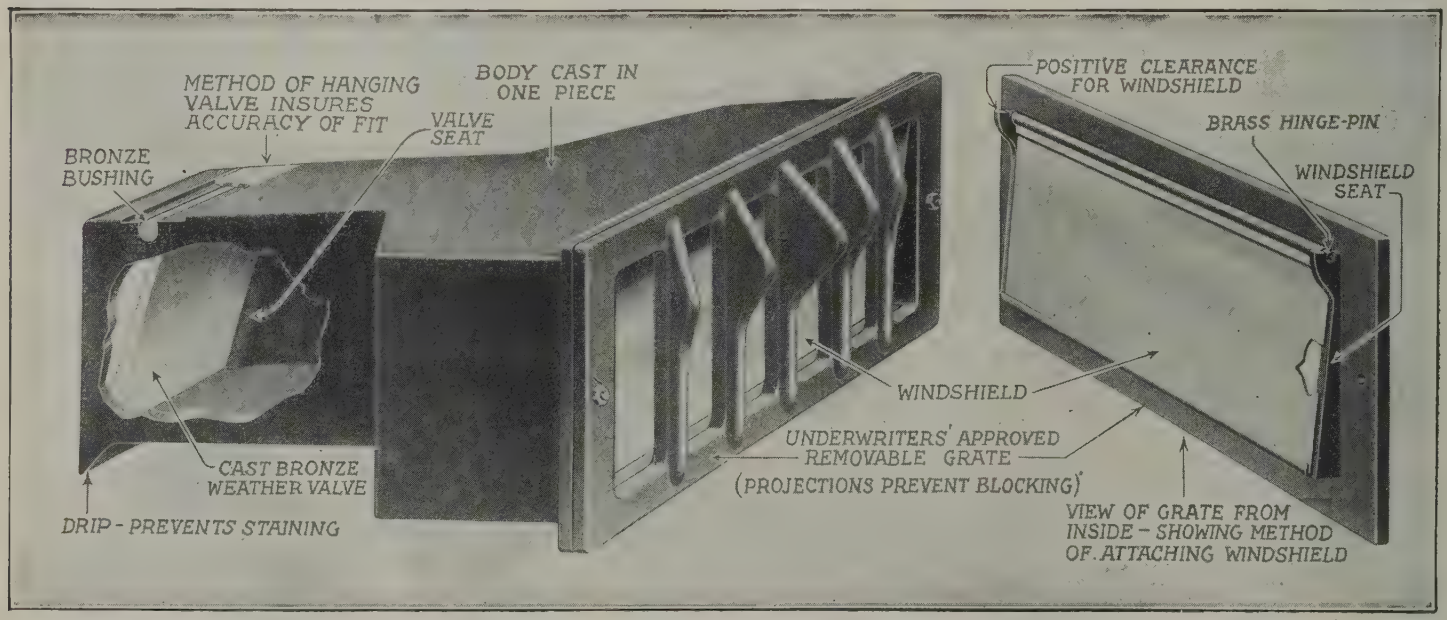
These improvements eliminate the disadvantages of the old style stock fender, which, while readily subject to breakage, can not be replaced as the attaching bolts are embedded in masonry.

Distinct Advantage of One-piece Scupper

The body of every Windshield Scupper is a solid one-piece casting. This is far superior to an assembled scupper, with the top or cover cast separately, as it is impractical to provide a tight fit, and this not infrequently permits a leakage of concrete into the scupper which clogs the valves, rendering them inoperative. The one-piece scupper assures proper setting in a complete unit, requiring no re-assembly of parts on the job by inexperienced mechanics.

Other Structural Advantages

The exterior bronze weather valve, being hung inside the housing, is afforded the maximum of protection against the elements. The method of hanging assures accuracy of fit, making it as airtight as is possible, and the bronze bushings



"Standard Type" Windshield Scupper with Underwriters' Grate, Showing How Windshield Can Be Renewed
(Patented July 28, 1914 and March 27, 1928)

Continued on next page

guarantee ease of operation. It can not be blown open, as is possible with the old type door which rests on the outer end.

The drip under the outlet gives positive assurance against water flowing back under the scupper and staining the building.

Each valve is provided with a seat. It is obvious that a valve without a seat can not be windproof and still operate freely.

Only the best grade, high-silicon iron is used, producing a soft tough casting and, being ⅜ in. thick, ample strength is provided to withstand undue strain or blow imposed by careless handling.

Appearance

Windshield Scuppers, having no unsightly hood at the exterior, harmonize with the architecture of the building. When located symmetrically, they provide a relief and aid the architectural scheme.

Location and Quantity Required

Windshield Scuppers are usually placed in each bay, and should be set in the wall so bottom of scupper will be 1 in. below the finished floor line. By keeping the face of the scupper parallel with the wall, proper incline toward outside will be maintained.

One Windshield Scupper should be provided for each 500 sq. ft. of floor space if the building is sprinklered, otherwise one for each 1000 sq. ft.

Sizes and Prices

Windshield Scuppers are made for walls of any thickness and can be furnished galvanized, if desired. Prices will be quoted on request by local sales representatives, or direct.

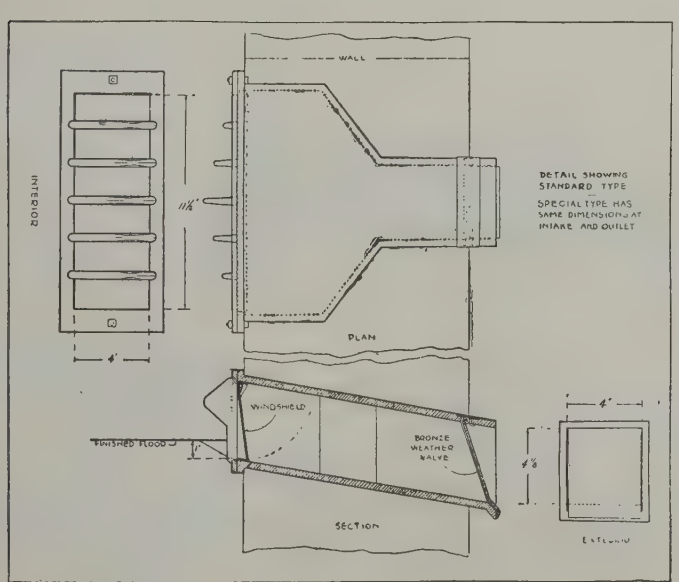
Specification for Standard Type

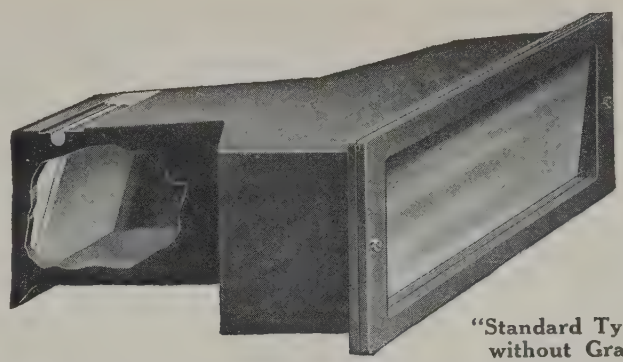
Provide and install, where shown in plans Standard Type (*SG, S, KG or K*) Windshield Scupper, of proper size for wall thickness shown. Body to be cast in one piece, ⅜ in. thick, with bronze exterior weather valve, hung with bronze hinge pins and bronze bushings. To have improved, detachable (*polished brass or galvanized iron*) windshield hung on brass hinge pin, attached to grate or frame at entrance so that it can be replaced (*and with Underwriters' Approved Projecting Grate to prevent blocking.*)

(Italics denote optional features, which should conform to type selected. See Guide below.)

SPECIFICATION DATA

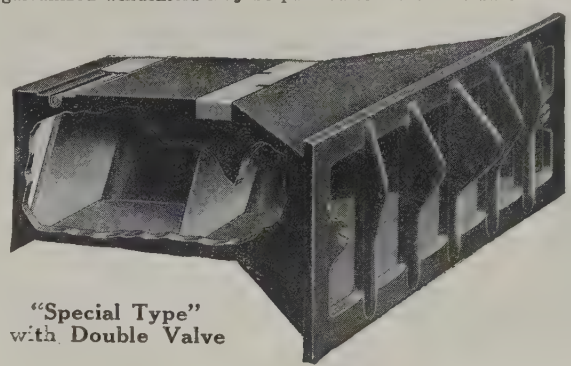
Symbol	Description	
Standard Type, Heavy ⅜ in.		
"SG" "S"	With grate Without grate	Polished, lacquered brass windshield
"KG" "K"	With grate Without grate	Galvanized windshield
Special Type ¼ in.		
"E" "M"	With grate With grate	Double valve Single valve





"Standard Type" without Grate

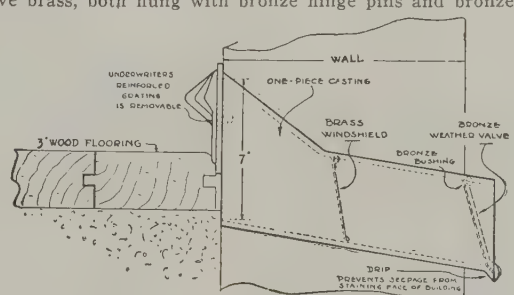
In department stores, and similar high class buildings, architects have shown a preference for the Standard type without grate, as the polished and lacquered brass windshield gives the base a finished, neat appearance, or the galvanized windshield may be painted to match the base



"Special Type" with Double Valve

While lighter than the Standard, compares favorably in weight with any other manufacture and is priced to meet competition. The following advantages place it in a preferred position:

Cast and cored in one piece; exterior drip prevents staining; every valve provided with seat; Underwriters' approved projecting grate furnished at no additional cost, flat grate optional; exterior valve cast bronze, inner valve brass, both hung with bronze hinge pins and bronze bushings.



Type "W" for Wood Floor on Concrete

Note that removability of grate is not obstructed by flooring. Can be furnished with double or single valve

Installations

Space will not permit us to list the thousands of installations, so we name but a few of the more prominent users. Write for list of those in your locality.

American Can Co., Cincinnati, Ohio, San Francisco, Calif.; Ogden City, Utah; Seattle, Wash.; Chicago, Ill.
J. C. Penney Co., New York, N. Y., St. Louis, Mo.
Standard Oil Co., Long Island City, N. Y.
B. & O. R. R. Co. Warehouses, Philadelphia and Pittsburgh, Pa.
Fisher Body Corp., Cleveland, Ohio; Detroit, Mich.
Real Silk Hosiery Co., Indianapolis, Ind.
Underwriters Building, New York, N. Y.
Cooper Dry Goods Co., Los Angeles, Calif.
Westinghouse Electric & Mfg. Co., Cincinnati, Ohio; Pittsburgh, Pa.
International Shoe Co., St. Louis, Mo.
General Electric Co., Los Angeles, Calif.; Newark, N. J.
Studebaker Buildings, South Bend, Ind.; Detroit, Mich.
Victor Talking Machine Co., Camden, N. J.
Packard Motor Co., Chicago, Ill.
Otis Elevator Co., Yonkers, N. Y.; Harrison, N. J.
Liggett & Myers Tobacco Co., Richmond, Va.
Sears, Roebuck & Co., Kansas City, Mo., Minneapolis, Minn., Boston, Mass.
Canadian Rail & Harbor Terminal, Toronto, Ont.
Eli Lilly Co., New Orleans, La.
Southern Bell Telephone & Telegraph Co., Montgomery, Ala.
R. H. Macy & Co., New York, N. Y.
American Optical Co., Southbridge, Mass.

ESTABLISHED 1895

THE DONLEY BROTHERS CO.

INCORPORATED 1911

Building Specialties

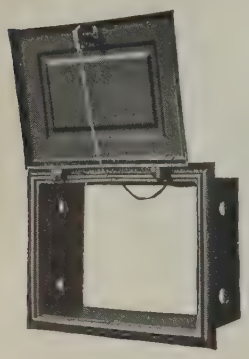
13932 Miles Avenue, CLEVELAND, OHIO

Products

Donley Package Receivers; Coal Chutes; Ash Dumps; Fireplace Dampers; Ash Pit Doors; Fire Baskets; Andirons; Meter Boxes; Garbage Receivers; Mail Receivers and other Building Specialties.

Donley Coal Chute

Replaces old-fashioned, battered coal windows. Protects foundation and siding. Locks when closed. Unlocks from within by pulling chain outside of coal bin. Burglar-proof. Frames of unbreakable, malleable iron. Solid metal doors of copper-bearing steel, close fitting and rust-resisting. Glass doors protected by steel shield when open. Body of heavy weight, rust-resisting copper-bearing steel, reinforced upper edge. Hinges and latch of malleable iron. Latch and chain attachment galvanized against rust. Entire chute has neat, attractive design.



Donley Coal Chute

The No. 19 coal chute has body and moulded frame of copper steel. The door is made of attractive paneled steel. Hinges and lock are of durable malleable iron. In appearance it is very similar to No. 29 or No. 213.

Description	Wall opening, in.	Straight body for 9-in. wall	Slanted bottom body for 13-in. wall	Slanted bottom body for 17-in. wall
Solid steel door paneled	24x17	No. 19	.....	.....
Solid door, paneled, copper-steel	24x17	No. 29	No. 213*	.....
Glass door, cast iron, wire glass panel	24x17	No. 39	No. 313*	.....
			Straight body	
Solid door, paneled, cast iron	32x22	.....	No. 613	No. 617*
Glass door, cast iron, glass panel	32x22	.....	No. 713	No. 717*

*Hopper optional. Hopper weights: small, 11 lb.; large, 19 lb.

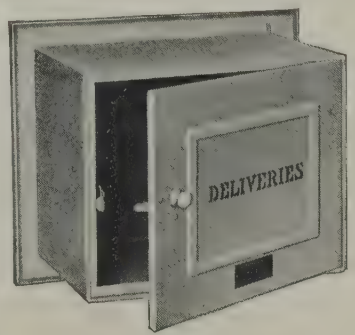
Grade Line Coal Chute—For low set and terraced residences. Also frequently used for stores. This improved chute has provision for drainage. Drain has a strainer and can be connected with sewer. Constructed with checkered steel door, malleable iron frame and reinforced steel chute. Latch and chain galvanized.

Donley Package Receiver

A steel receptacle built into the outer wall of kitchen, for delivery of groceries, etc. Outer door locks automatically when closed; released automatically when inner door is opened. Installation detail furnished with every receiver.

Facing the inside door, No. 1 has hinges on the left, No. 2 on the right and No. 3 reversible. Nos. 1 and 2 have automatic lock. No. 3 no automatic lock. See following page.

Approved by Good Housekeeping Institute.



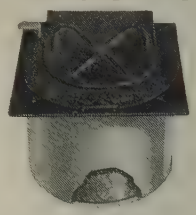
Donley Package Receiver

Size: Outside height 11⅛ in.; width, 14⅛ in.; wall depth, 9 and 6 in.

Donley Underground Garbage Receiver

Prevents nuisances arising from ordinary garbage can. Consists of outer shell and inner receptacle that can be removed for emptying. Service lid of parkerized steel operated by foot lever, which fits snugly, excluding flies. Made in 6, 10, 14, and 21-gal. capacities.

Approved by Good Housekeeping Institute.



Donley Garbage Receiver

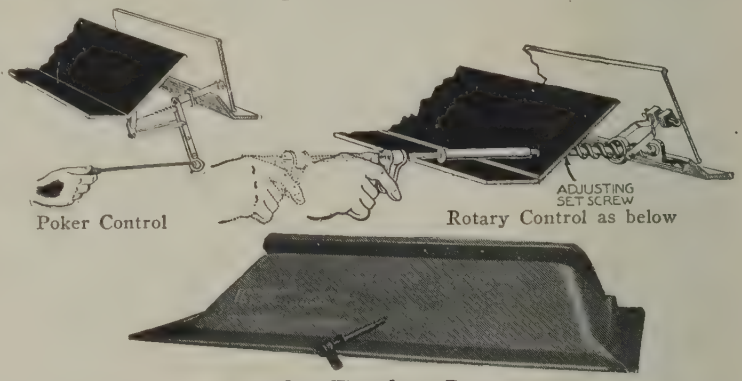
Donley Electric Meter Box

A steel cabinet built into basement wall where service wire enters. Supplied with 3-pole, 60-amp., 250-volt safety switch operated from basement. Meter read through glass pane from outside.

Large inner and outer doors. Height, 13½ in.; width, 16½ in.; wall depth, 10⅝ in.; shipping weight, 45 lbs.

Donley Fireplace Damper

A correctly formed throat and draft regulator combined, the Donley damper simplifies correct fireplace construction and promotes clean, economical fires through proper draft regulation. Two types of control, as shown. *See following page for correct damper size and table dimensions.* For intermediate size openings use next largest damper.



Poker Control

Rotary Control as below

Donley Fireplace Damper

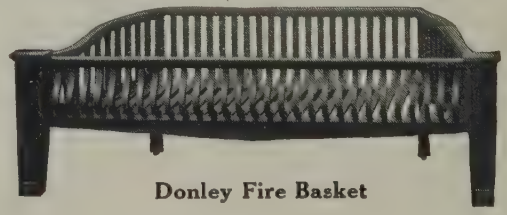
Dampers crated separately. Instructions for building fireplaces and installing dampers attached to crate.

Donley Fire Basket

Meets demand for beautiful, substantial fire basket co-ordinated to wall angle that radiates most heat, as shown in plans on following page. Basket has removable ends.

Made in 24, 28, 30, 34 and 40-in. sizes with respective shipping weights of 58, 64, 66, 73 and 86 lb.

Depth of each, 15 in.



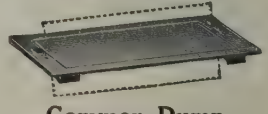
Donley Fire Basket

Donley Ash Dumps

Are iron trap doors in the hearth above the ash pit. Automatic, self-closing dumps are 5x7 in. in size. The common dumps are 5x8 and 7x10 in.

The most convenient method of ash disposal.

Automatic Dump



Common Dump

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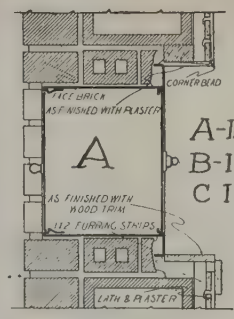
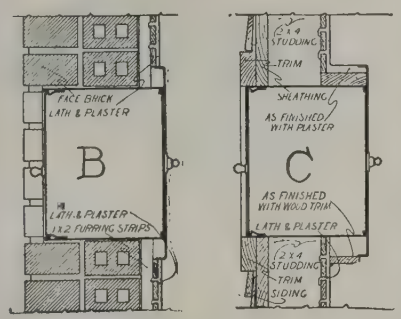


DONLEY PACKAGE RECEIVER

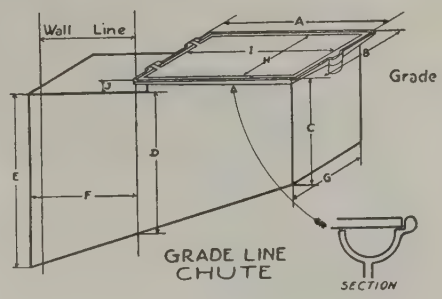
INSTALLED

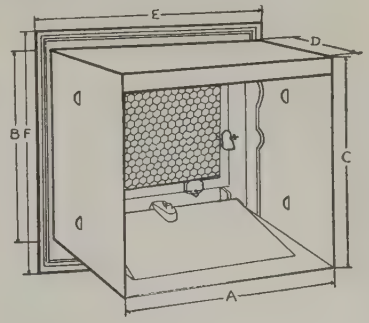
A-In 13" Brick Wall
B-In 9" Brick Wall
C In Frame Wall

Height 11½ in.
Width 14⅛ in.
Wall depth 9 in.
" " 6 in.
Shpg. wt. 23 lb.



THE DONLEY COAL CHUTE





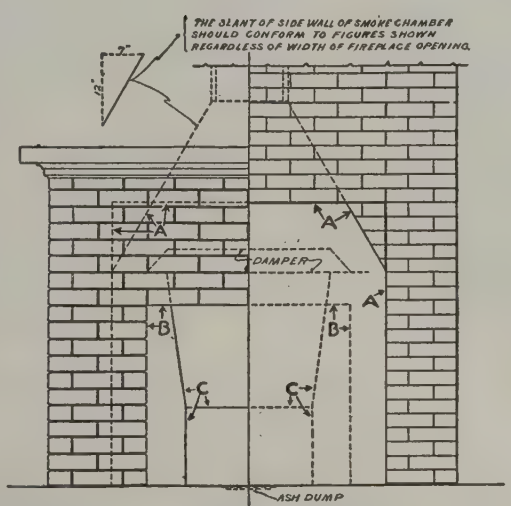
DIMENSIONS OF DONLEY GRADE LINE COAL CHUTE IN INCHES

No.	A	B	C	D	E	F	G	H	I	J
1	21	26¼	14½	19½	24½	14¼	24½	25¼	20	2½
2	27	32¼	17¾	24¾	30½	16¼	30½	31¼	26	2½

DIMENSIONS OF DONLEY STANDARD COAL CHUTE IN INCHES

Chute No.	A	B	C	D	E	F
19, 29 and 39	22	16	16	9	25	19
213 and 313	22	16	18½	12	25	19
613 and 713	30½	21	21	12	34½	24½
617 and 717.....	30½	21	24½	17	34½	24½

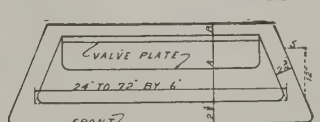
DONLEY FIREPLACE CONSTRUCTION



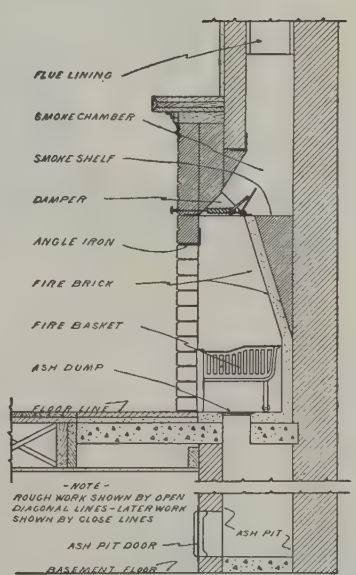
A - LINES OF ROUGH BRICK WORK, BUILT WHEN CHIMNEY IS BUILT
B - LINES OF FINISHED FIREPLACE
C - LINES OF BACK WALL OF FIREPLACE

Depth of fireplace should be 18 to 20 in. for the small size with little advantage in depth of more than 24 in. for larger fireplace.

SHOWING RADIATION OF HEAT FROM PROPERLY SLANTED SIDE WALL OF FIREPLACE

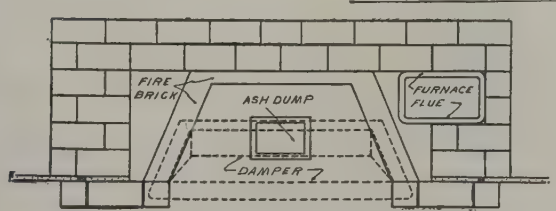


SIZE	A	B
24" TO 48" LNG	8	13
54" 72"	12	17

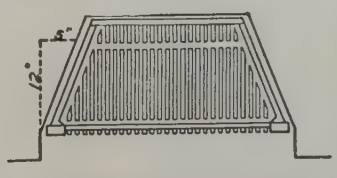


The table of dimensions at the right shows typical fireplace sizes with approved damper and flue size to use and other damper information. Measurements figured in inches.

Typical size of fireplace opening		Use damper No.		Damper measurements		Recommended flue size in standard T.C. flue lining		Shipping weight of dampers, lb.
Width	Height	If rotary control	If poker control	Throat front	Over-all length	Regular	Round (diameter)	
24	28	324	224	24	30	8½x 8½	10	34
28	28	330	230	30	36	8½x13	10	36
30	30	330	230	30	36	8½x13	12	36
34	30	336	236	36	42	8½x13	12	40
36	30	336	236	36	42	13 x13	12	40
40	30	342	242	42	48	13 x13	15	53
42	30	342	242	42	48	13 x13	15	53
48	33	348	248	48	54	13 x13	15	56
54	36	354	254	54	59	13 x18	18	98
60	39	360	260	60	65	18 x18	18	110
72	42	372	272	72	77	18 x18	18	150



Left
Hearth Plan Illustrates Correct Angle of Side Wall Splayed 5 in. per ft.



ILLUSTRATING BASKET SET IN FIREPLACE AND CORRECT SLANT OF SIDE WALLS.

GABRIEL STEEL COMPANY

Manufacturers of Rolled Steel Products

2441 Bellevue Avenue, DETROIT, MICH.

Products

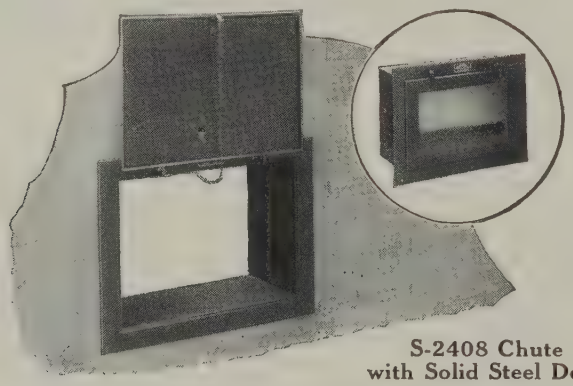
GABRIEL ROLLED STEEL COAL CHUTES; ASH PIT DOORS; DOME DAMPERS; FIREPLACE ASH DUMPS; PACKAGE RECEIVERS; APARTMENT GARBAGE RECEIVERS.

For Steel Joists, see page A665.

GABRIEL ROLLED STEEL PRODUCTS

Gabriel Rolled Steel Coal Chute

The Gabriel coal chute is neat and attractive in appearance. Made of rust resisting copper-bearing rolled steel, which entirely eliminates broken hinges, doors or frames. All fittings Parkerized to insure against rust. Joints are electrically welded throughout. Hinges are of very heavy rolled steel and designed to hold the door in a vertical position when open. Automatic spring latch is made of heavy rolled steel. Hopper is easily attached or removed, and is designed to lie perfectly flat on bottom of chute when not in use. Equipped with roller and chain attachment which permits of operation from any point desired.



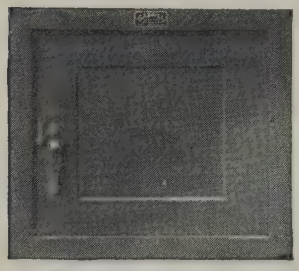
S-2408 Chute with Solid Steel Door

Insert shows G-2408 Chute with wire reinforced glass door

Furnished either with rolled steel or glazed door. In the glazed doors, ¼-in. glass is attached by means of special glazing clips. Glass is bedded and face puttied and protected on the inside by heavy wire guard.

Sizes: 16x24 and 22x32 in. for 8, 12½, and 17-in. walls.

Gabriel Package Receivers



Package Receiver Inside Door

Neat, inconspicuous and weathertight. Design and quality insure satisfactory operation year after year. Made of heavy rolled steel plate, with two latched doors —one outside and one inside. Handles designed to permit installation in an inverted position, if necessary. Made for 12x14-in. wall opening. Width permits installation between studs of standard spacing, 16 in. on centers. Body of receiver is made in three depths: 5, 9 and 13 in.

Gabriel Ash Pit Door

Made entirely of rust resisting, rolled steel. Door and frame are true fitting, insuring practically an airtight closure. Frame of door is electrically welded and door is a single piece of heavy rolled steel plate.

Ash Pit Door

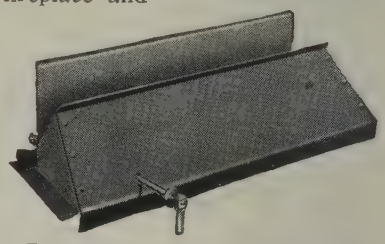
A deep lug anchor is turned up at each of the four corners to facilitate installation and insure secure anchorage in chimney.

The hinges and keeper are practically unbreakable.

Made in four sizes: 8x8, 8x10, 10x12 and 12x16 in.

Gabriel Rolled Steel Dome Damper

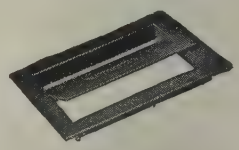
The Gabriel dome damper accurately controls the draft, promotes cleanliness, saves fuel and is conveniently operated. Its vertical front flange permits its use regardless of the construction of the fireplace and seals the joint between the rough brick and the fireplace facing. It is substantially constructed, operated with ease, stays in position and can be had with handle, poker, chain or pushrod operation. Furnished in six sizes: 24, 30, 32, 36, 42 and 48 in., with or without horizontal front angle.



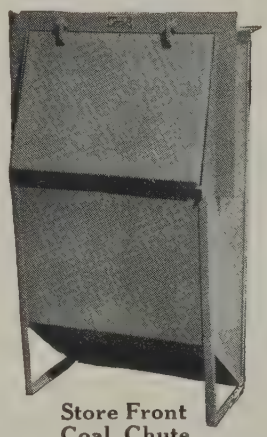
Dome Damper for Fireplaces Showing Handle Operator

Gabriel Ash Dump

The Gabriel ash dump is unbreakable, with an unremovable leaf. Frame is electrically welded, and heavy enough to withstand any usage. It is very neat in appearance and will not warp or twist with use. Made in one size only, 5x7 in.



Gabriel Ash Dump



Store Front Coal Chute

Gabriel Store Front Coal Chute

The same neat, attractive appearance which individualizes other Gabriel products has been incorporated in the construction of Gabriel store front chutes. Copper-bearing rolled steel is used throughout, and all operating parts are parkerized to insure rust prevention.

Chain operating device permits operation from any point. Burglar-proof lock securely fastens automatically when the door is closed.

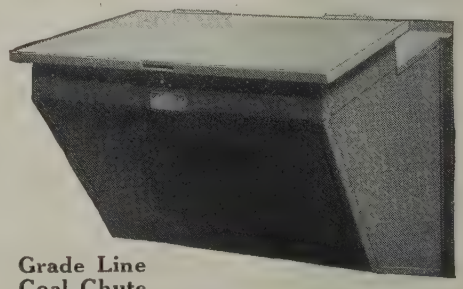
Size: 24x16-in. opening, boot 12 in. deep.

Gabriel Grade Line Coal Chute

Constructed throughout from heavy copper-bearing rolled steel, which is practically unbreakable. All joints are electrically welded. There are no bolts or rivets to work loose. Hinge pins are solid brass.

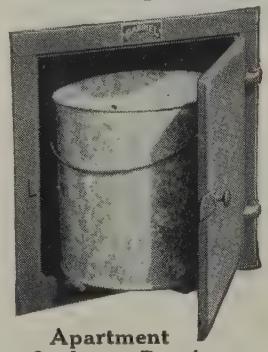
The practical design, careful workmanship and rugged strength incorporated in the construction of this chute are decidedly evident upon inspection.

Size: 27x21-in. opening, boot 16 in. deep.



Grade Line Coal Chute

Gabriel Apartment Garbage Receiver



Apartment Garbage Receiver

This garbage receiver consists of a heavy copper-steel frame and door with a boot which bricks into the wall. A heavy galvanized garbage pail having a capacity of 5 gal. is furnished. A hinged shelf, for the support of the pail, is solidly connected to the frame and swings outward when the door is opened. The entire weight of the container is carried on the rigid frame. Heavy rolled steel hinges and a rugged catch make up the hardware for this product. Size: width 15½ in., height 15½ in., depth 10 in.

W. H. TAYLOR COMPANY

Manufacturers of Copper Steel Coal Chutes

326 S. W. 11th Street
DES MOINES, IOWA

Products

TAYLOR-DES MOINES COPPER STEEL COAL CHUTES, SOLID STEEL DOOR, DAYLIGHT DOOR, COMBINATION HOPPER-DOOR, GRADE LINE and STORE.

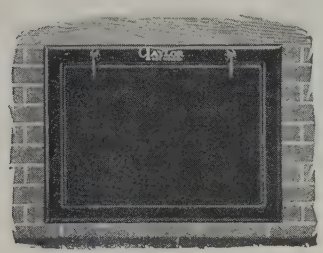
Also Flue Cleanout or Ash Pit Doors and Fireplace Ash Dumps.

For Steel Basement Windows, see page A1293.

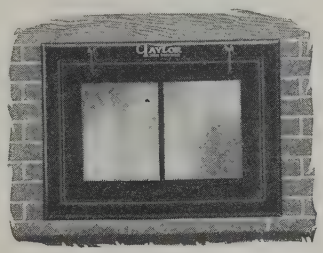
Taylor-Des Moines Coal Chutes

Rust-resisting copper steel is used in all Taylor-Des Moines Coal Chutes. All fabrication is by the electric arc welding process. The frames are welded at all corners, bodies are welded to frames and all fittings are welded on. Heavy steel is used, with frames, doors and hoppers, strongly reinforced—warranted break proof.

Chute bodies are oversize in depth to provide protection for the masonry opening. Bodies are made 8½ in. deep for 8-in. walls, 13 in. for 12-in. walls, and 18 in. for 16-in. walls. Chutes with 8½-in. bodies have flat bottoms, 13 and 18-in. sizes have sloping bottoms.



Solid Steel Door

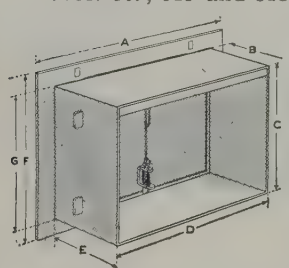


Daylight Door

Large anchor plates, 1¾x¾ in. are welded to ends of all door and hopper chutes. Hopper chutes have additional anchors on top at rear of the body to take care of the extra outward thrust.

Solid Steel Door Chutes—Used where no hopper is required. The extra deep flange around the edge of the door, ⅞ in. over all, provides ample reinforcement and improved appearance. The door is held open automatically by the slotted hinges. When closed, a strong spring latch locks it securely.

Made in 3 sizes:
Nos. 109 (9-in. depth) and 113 (13-in. depth), 24x17 in.
Nos. 209, 213 and 218 (9, 13 and 18-in. depths, respectively), 26x22 in.
Nos. 309, 313 and 318 (9, 13 and 18-in. depths) 35½x22 in.



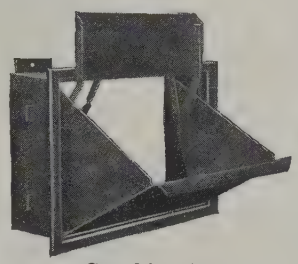
Daylight Door Chutes—Meet the double requirements of protection and light. The heavy wire glass (¼ in. thick) is protected by a steel shield when the door is open and which rests on the sill when closed. Glass is set in heavy rubber channel and may be replaced by simply removing four bolts. In all other respects it is identical with the Solid Steel Door Chute. Can be furnished with a hopper.

Made in 3 sizes similar to the solid steel door Chute:
Nos. 709 and 713, 24x17 in.
Nos. 809, 813 and 818, 26x22 in.
Nos. 909, 913 and 918, 35½x22 in.

COAL CHUTE DIMENSIONS IN INCHES

Solid Steel Door Chutes, Daylight Door Chutes, Combination Hopper-Door Chutes. (Letters refer to drawing.)
Note: Last two digits in No. refer to wall thickness.

Solid door No.	Hopper type No.	Daylight No.	A	B	C	D	E	F	G	Wall opening Width	Wall opening Height
109	409	709	25¼	8½	16	21½	8½	19¾	16	24	17
113	413	713	25¼	13	17¾	21½	13¼	19¾	16	24	17
209	509	809	29¼	8½	21¾	25½	8½	25⅜	21¾	26	22
213	513	813	29¼	13	23½	25½	13½	25⅜	21¾	26	22
218	518	818	29¼	18	23½	25½	18¼	25⅜	21¾	26	22
309	609	909	38¾	8½	21¾	35	8½	25⅜	21¾	35½	22
313	613	913	38¾	13	23½	35	13½	25⅜	21¾	35½	22
318	618	918	38¾	18	23½	35	18¼	25⅜	21¾	35½	22



Combination Hopper-Door Chute

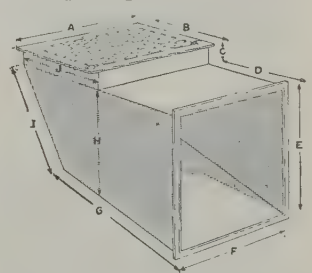
Combination Hopper-Door Chutes—Supply the demand for a hopper-chute. A steel shield provides protection above the opening and folds into the hopper when closed. The hopper bottom is No. 10 gauge steel and is arc welded to the wings. Reinforced at its upper end by a steel angle. Fastened to the frame by means of a rod welded to the lower edge of the hopper and intersecting the frame.

In hopper chutes there is an extra outward thrust at the top where the hopper is secured, which shakes the chute loose more easily. Taylor-Des Moines Hopper-Door Chutes have extra anchorage to overcome this, placed at the rear edge on top and have holes through which they may be spiked to the sill plate in frame buildings.

Made in 3 sizes:
Nos. 409 and 413, 24x17 in.
Nos. 509, 513 and 518, 26x22 in.
Nos. 609, 613 and 618, 35½x22 in.

Grade Line Chutes—*(Oversize.)* For use where floor line is low. Have the advantage over the store type, of a larger clear opening. Door is made of safety tread floor plate, wings prevent scattering of fuel, catch holds the door open and it locks automatically when closed. The heavy copper steel body is reinforced at the rear opening. Note liberal dimensions.

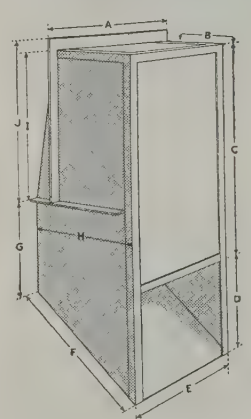
Made in two sizes:
No. 40, 24x20-in. door opening
No. 41, 30x26-in. door opening



DIMENSIONS IN INCHES

No.	Door opening Width	Door opening Depth	Wall opening Width	Wall opening Depth
40	24	20	25	28
41	30	26	31	34½

No.	A	B	C	D	E	F	G	H	I	J
40	28¼	24¼	3	16	27½	24½	29	21	20	20¾
41	34¼	30¼	3	18	34	30½	36	27½	27½	26¾



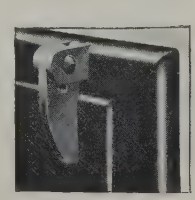
Store Chutes—*(Oversize.)* Used in business buildings, where the floor line is level with the sidewalk. Fuel is delivered to the opening at a sharp angle, therefore Taylor-Des Moines Store Chutes have larger doors than usual in this type. The door is held open automatically, and locks automatically when closed.

Made in two sizes:
No. 50, 25x21-in. door opening
No. 51, 31x25-in. door opening

STORE CHUTE DIMENSIONS IN INCHES

No.	Door opening	Wall opening	A	B	C	D	E	F	G	H	I	J
50	25x21	26x49	28¾	12	32	17	25¾	18½	18	16	21½	23½
51	31x25	32x53	34½	12	34	18	31	18¾	18	16	24	25¾

Frame, Door and Hinge Construction



All assembly is by the electric arc welding process. All joints are welded and all fittings are welded on. Hinges pass through frame and door and are welded at the back, out of sight. This method makes for better appearance as well as greater stiffness and freedom from rivet troubles. The steel frame is reinforced by a double flange, which presents a smooth curved front.

These chutes are made of heavy steel throughout, but because of greater strength of steel, the net clear opening for fuel is greater than is possible where iron is used in frames

KEWANEE MANUFACTURING COMPANY

Basement Coal Chutes, Steel Basement Windows and Building Specialties

85 North Tremont Street, KEWANEE, ILL.

Nationally distributed through Dealers in Building Material, Hardware and Structural Steel

Products

KEWANEE COPPER STEEL BASEMENT COAL CHUTES: Window, Store, and Grade Line.

For Kewanee Copper Steel Basement Windows, see page A1190.

General

Kewanee Chutes afford efficient facilities through which to deliver coal to basements of buildings. They withstand hard knocks which shatter ordinary construction, protect the building from damage and defacement, and are simple and convenient to operate. The saving in repair bills alone quickly overcomes the difference in cost between a Kewanee Coal Chute and makeshift arrangements.

All parts, even the rivets, are of heavy Keystone Copper Steel—a special alloy which is not only rust resistant but tougher than ordinary steel. Kewanee Chutes harmonize perfectly with the foundation wall, whether it be of brick, concrete, stone or other material. They can be readily installed in old as well as new buildings.

In order to meet various conditions, Kewanee Chutes are manufactured in three distinct types: Window Chutes, Store Chutes and Grade Line Chutes. Each type is furnished in two standard sizes and one or more styles.

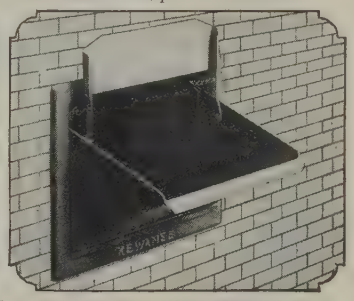
Every Kewanee Coal Chute is *guaranteed* against breakage and warranted to give satisfactory service.

Kewanee Window Coal Chutes

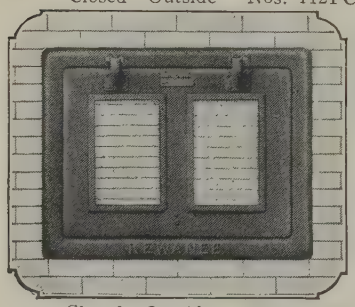
Closed—Outside

Nos. 108P and 208P Open—Outside

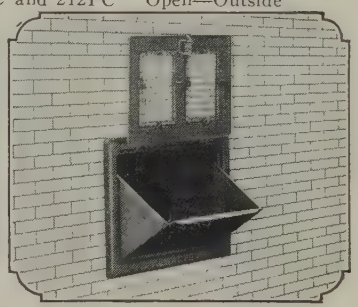
Closed—Outside



Nos. 112PC and 212PC Open—Outside



Closed—Outside



Nos. 112GI and 212GI Open—Outside

Kewanee Window Chutes are the type most commonly used, being designed to take the place of the common basement window in buildings with foundation walls extending sufficiently above the grade line. These chutes are furnished in two sizes—with plain or glass doors, with or without hoppers, and with bodies for 8, 12, 18-in., or thicker, foundation walls.

Three typical styles of Kewanee Window Chutes are illustrated at the left.

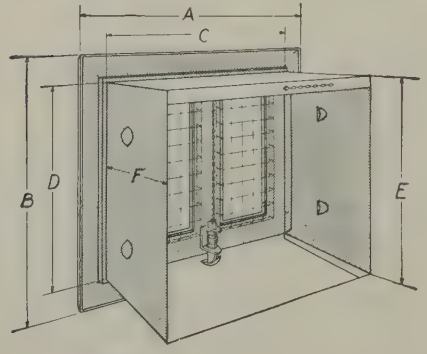
Frame—Frame and bottom of all Kewanee Window Chutes are pressed out of one piece of heavy Copper Steel. Frames of the regular size (the "100" series) chutes have a clear net opening for the delivery of coal 21 in. wide by 15½ in. high, and those of the large size (the "200" series) have a net opening 28 in. wide by 20 in. high.

Body—Kewanee Window Chutes are regularly furnished with flat bottom bodies 8 in. deep or sloping bottom bodies 12 in. deep. Sloping bottom bodies 18 in. or more deep for extra thick foundation walls will be supplied on special orders.

Door—Two styles of doors are supplied, the style P door ("Plain" door), admitting coal alone and the style G door ("Glass" door), for use where light also is required. All top hung doors have slotted hinges which automatically hold the door upright when open.

Hopper—In style PC Chutes ("Plain" door, "Combination" hopper), the door is hinged at the bottom, and in combination with wings, forms a convenient and substantial hopper for the reception of coal. The shield for protecting the wall above is automatically raised and lowered with the opening and closing of door. In style GI Chutes ("Glass" door, "Independent" hopper), the hopper is independent of the door. A chute with hopper prevents scattering and is desirable where coal will be shoveled in directly, or delivered in bag, basket or wheelbarrow.

Lock—All styles of Kewanee Window Chutes lock automatically and positively. By attaching a chain or cord the lock can be easily operated from any place in the building.



No.	Size known as	Door	Hopper	Dimensions in inches A	B	C	D	E	F	Net and ship. wt., lbs.
108-P	24x17	Plain	None	26	20½	21½	16	16	8	39
112-P	24x17	Plain	None	26	20½	21½	16	18½	12*	48
112-PC	24x17	Plain	Combination	26	20½	21½	16	18½	12*	64
208-P	33x22	Plain	None	33	25	28½	20½	20½	8	64
212-P	33x22	Plain	None	33	25	28½	20½	23	12†	75
212-PC	33x22	Plain	Combination	33	25	28½	20½	23	12†	98
108-G	24x17	Glass	None	26	20½	21½	16	16	8	42– 47
112-G	24x17	Glass	None	26	20½	21½	16	18½	12*	51– 56
112-GI	24x17	Glass	Independent	26	20½	21½	16	18½	12*	65– 70
208-G	33x22	Glass	None	33	25	28½	20½	20½	8	65– 72
212-G	33x22	Glass	None	33	25	28½	20½	23	12†	76– 83
212-GI	33x22	Glass	Independent	33	25	28½	20½	23	12†	102–109

*Also furnished with body 18 in. deep (19½ in. high at back).
†Also furnished with body 18 in. deep (24 in. high at back).

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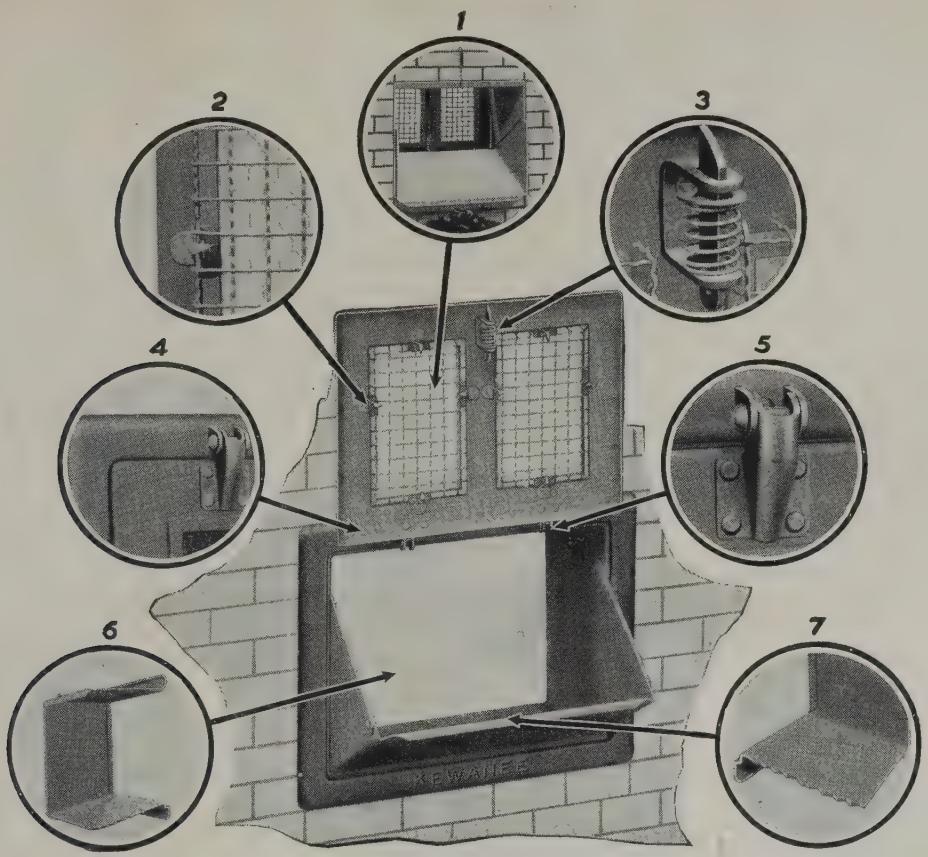


Advantages of Kewanee Window Chute Construction

(The glass door chute is chosen for reference as the style best illustrating the various features of Kewanee construction.)

(1) Stronger glass door construction—two smaller glass panels instead of a single large one. Panels simply and efficiently protected during coal delivery by heavy wire guards, readily removed for cleaning glass.

(2) Pressure on glass is evenly distributed—retaining clips bear on a steel binding angle and not directly on the panels, which are cushioned in putty.

(3) Lock is actuated positively by a strong spring, not by gravity.

(4) Appearance is clean-cut and attractive—the smooth lines of Kewanee Chutes are due to pressed steel construction.

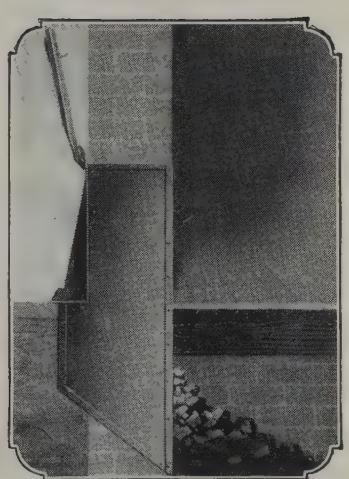
(5) The rugged, pressed steel hinges are slotted so as to automatically hold the door up when in the open position.

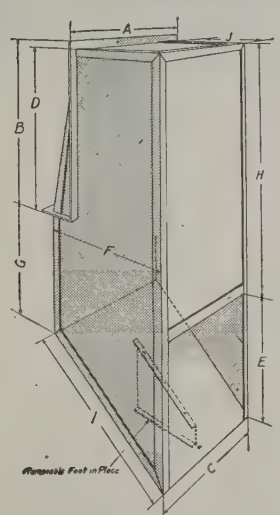
(6) Greater throw-in space for coal—the pressed steel frame is less bulky than brittle cast iron. The maximum throw-in space is particularly important in the regular size chute.

(7) Bottom of body, where wear is greatest, formed out of same piece of heavy Copper Steel as the frame. All parts, even the rivets, are made out of this rust-resistant alloy.

The Kewanee line also includes plain door chutes of exceptionally strong and simple hopper construction, *opened and closed by a simple pull or push.*

Kewanee Store Coal Chutes



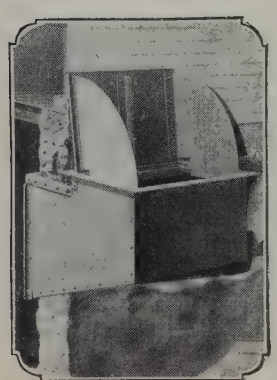


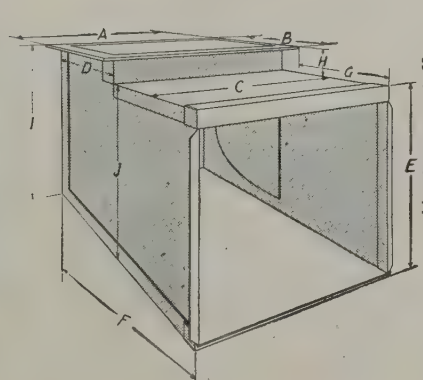
Kewanee Store Chutes are adapted for use in buildings where the first floor is too near the ground level to permit the installation of the regular window type of chute.

These chutes are provided with convenient and automatic locking arrangements same as Kewanee Window Chutes. Slotted hinges hold the door open. A foot attached to the sloping bottom supports the chute in upright position while the foundation wall is being built around it.

No.	Hopper	Dimensions in inches										Net and ship. wt., lbs.
		A	B	C	D	E	F	G	H	I	J	
31-P	None	26	22	24	21	17	16½	18	29	18	12	130
31-PI	Independent	26	22	24	21	17	16½	18	29	18	12	145
32-P	None	34½	26	31½	24	17	16½	18	34	18	12	170
32-PI	Independent	34½	26	31½	24	17	16½	18	34	18	12	190

Kewanee Grade Line Coal Chutes





Kewanee Grade Line Chutes are another type designed for buildings with low first-floor levels. An upwardly projecting lip extends around the edge of the frame opening. The door, with anti-slip surface, closes down over this lip, thus preventing the entrance of water. The door is held open by a catch, and locks automatically when closed.

No.	Hopper	Dimensions in inches										Net and ship. wt., lbs.
		A	B	C	D	E	F	G	H	I	J	
21		28½	22	25½	19	25	37½	18	3	16	18½	150
22		34½	28	31½	25	31	43½	18	3	19	24	225

THE MAJESTIC COMPANY

Manufacturers of Breakproof Coal Windows and Building Specialties

HUNTINGTON, IND.

DISTRIBUTED THROUGH 5000 HARDWARE, BUILDING SUPPLY AND LUMBER DEALERS

Majestic Building Products

Coal Windows.
Grade Line Coal Chutes.
Store Coal Chutes.
Milk and Package Receivers.
Built-in and Apartment Garbage Receivers.
Underground Garbage Receivers.
Fireplace Dampers.
Fireplace Ash Dumps.
Ash Pit Doors.
Flue Clean-out Doors.
Flue Thimbles.

Also Manhole Doors, Cellar Wall Grates, Cistern Rings and Covers, Rubbish Burners, All-metal Flower Boxes and Cast Iron Porch Column Bases.

Majestic Coal Windows

This popular, sturdy window has won universal preference because of the protection it gives to the entire opening and sidewall when coal is being deposited in the bin. It gives the greatest protection to the building *above* the window where it is most needed—thus it saves its initial cost many times over and enhances property value by its permanence, sightliness and convenience.

Built for permanent service—will withstand the most severe conditions of usage.

Backed by over 20 years' experience in building quality coal chutes.

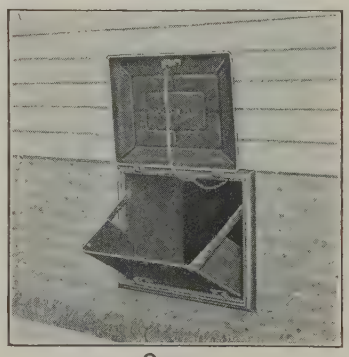
Construction

Guaranteed Breakproof Doors—The doors of Majestic coal windows are made of heavy pressed steel, electro-galvanized to resist rust. When raised, the door holds itself open automatically, protecting the building above the opening.

Breakproof Frames—Frames are made of certified malleable iron. They set true in the masonry—no installation difficulties. Frame and door fit snugly, making the window weathertight.

Breakfast Hinges—Hinges are made of certified malleable iron, making breakage at this point a practical impossibility. Hinges are flat with support on each side of the hinge pin. Neat and inconspicuous, eliminating the necessity of cutting the water table to provide hinge clearance.

Reinforced Bodies—Bodies and hoppers are made of Keystone copper steel and heavily reinforced at points of strain. Angle iron reinforcement allows masonry to be laid directly on the body without the use of a lintel.



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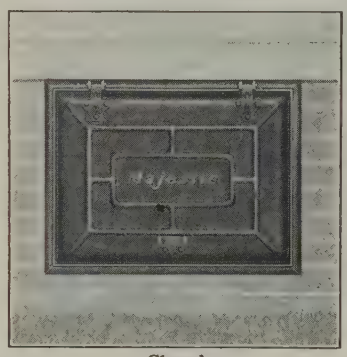

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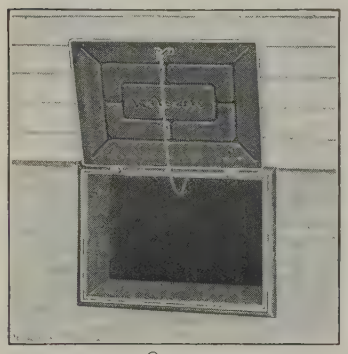
Majestic Coal Windows Nos. M101 and M203



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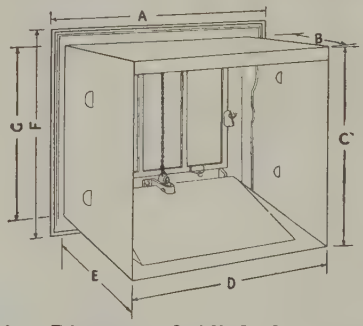
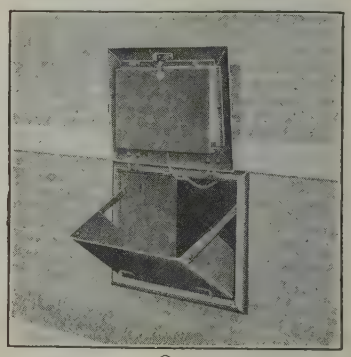


Dimension Diagram of All Styles of Majestic Coal Windows



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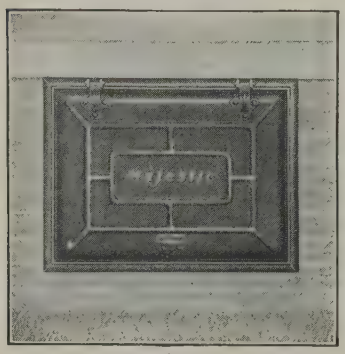


Closed

Majestic Coal Windows Nos. M500 and M520

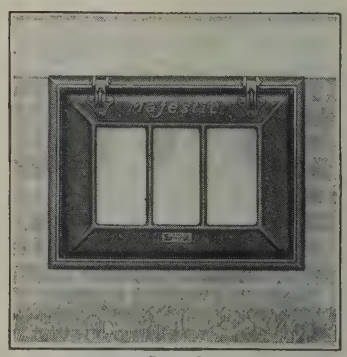
STYLES AND SIZES OF MAJESTIC COAL WINDOWS

Steel door styles		Glass panel styles		Rough wall opening, in.		
No.	Style	No.	Style	Wide	High	Deep
M101	*B	M10	*A	23	17	12
	§D		§C			
M203	*B	M20	*A	32	22	17
	§D		§C			
M500	**	M600	**	23	17	9
M520	**	M620	**	32	22	12

*Furnished with hopper. §Furnished without hopper.
**Has straight bottom body—no hopper furnished.

Dimensions in inches

No.	A	B	C	D	E	F	G
M101	24⅛	12	18¼	21¾	12½	18⅛	15½
M203	33	17	24¾	29½	17½	23½	20½
M500	24⅛	9	15½	21¾	9	18⅛	15½
M520	33	12	20½	29½	12	23½	20½
M 10	24⅛	12	18¼	21¾	12½	18⅛	15½
M 20	33	17	24¾	29½	17½	23½	20½
M600	24⅛	9	15½	21¾	9	18⅛	15½
M620	33	12	20½	29½	12	23½	20½



Closed

Majestic Coal Windows Nos. M10 and M20

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Burglarproof Automatic Locks—Unfailing burglarproof and troubleproof. Doors are unlatched (from inside only) by a chain which may be extended to any part of the house. Lock drops shut automatically when door is closed.

Styles

Majestic coal windows are made in solid steel and in glass panel styles as follows:

No. M101 (Steel Door Style)—Equipped with sloping bottom body and chain to gravity catch.

Style B has a copper steel hopper for coal delivery with bags or wheelbarrow. Style D is without hopper.

No. M203 is the same as No. M101 but larger in size.

No. M500 (Steel Door Style)—Differs only from No. M101 in that it has a 9-in. straight bottom body, without hopper.

No. M520 is the same as No. M500 but larger in size.

No. M10 (Glass Panel Style)—Used when daylight is desired in the coal bin or basement. Has three lights of ¼-in. plate glass set in a ½-in. angle iron frame with two pressed steel dividing strips to give still more strength. Rubber packing is used instead of putty. The door is heavy, electro-galvanized steel, the glass being protected by a steel shield when open. Otherwise No. M10 is the same as No. M101.

Style A has a hopper.

Style B is without hopper.

No. M20 is the same as No. M10 but is large in size.

No. M600 (Glass Panel Style)—Differs only from No. M10 in that it has a 9-in. straight bottom body, without hopper.

No. M620 is the same as No. M600 but larger in size.

Majestic Coal Chutes

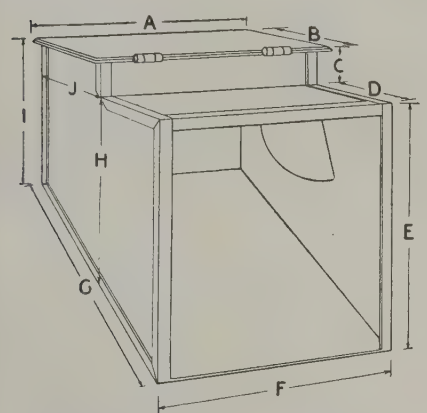
Grade Line Chute

The Majestic grade line coal chute is designed for buildings having little or no foundation above ground, as in low set or terraced homes, apartments, stores and office buildings.

Door swings upward and, when raised, forms part of the hopper and becomes a shield which protects the building when coal is delivered. When closed, the door locks automatically and is burglarproof.

Breakproof construction throughout. Frame, door and hinges are of certified malleable iron, with solid brass pins; body of keystone copper steel, reinforced with angle iron. The door fits snugly over the top of the frame when closed. This feature, with the waterproofing ridge around the inside edge of the frame, gives an absolutely watertight job.

Strong and durable — will outlast any building in which it is installed.



Dimension Diagram of Majestic Grade Line Coal Chutes

Dimensions in Inches

No.	A	B	C	D	E	F	G	H	I	J
M16	26	21	4	15½	24½	24¼	36½	19	16¾	19¼
M18	31¾	27	4	17	31	31	45	24	19½	25¼

SIZES OF MAJESTIC GRADE LINE CHUTES

No.	Door opening, in.	Rough wall opening (inches)
M16	23¼x18¼	25 x 25
M18	29x24	31 x 31

Store Chute

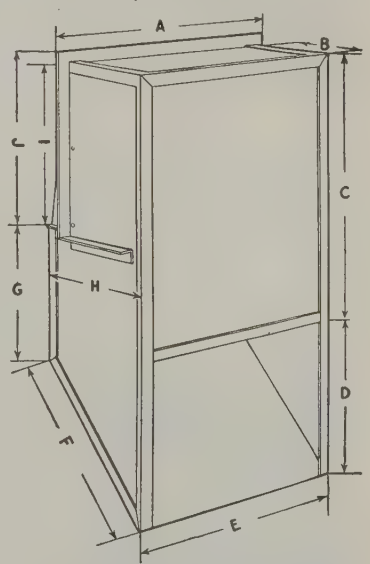
The Majestic store coal chute is designed particularly for store and office buildings, where the first floor is on a line with the sidewalk or alley.

It does away with the dangerous sidewalk coalhole and the necessity of putting up a bond for the protection of pedestrians.

Frame and hinges are certified malleable iron; doors of heavy gauge pressed steel, electro-galvanized to resist rust.

Two sizes, with or without hoppers.

On special order, the Majestic store chute can be supplied with a duplex body so that coal can be deposited either under the sidewalk or in the basement as desired.



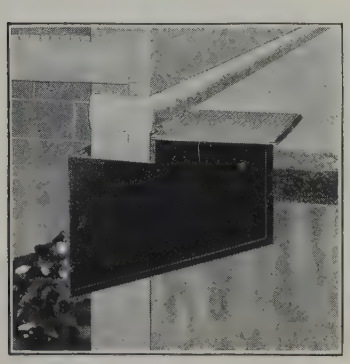
Dimension Diagram of Majestic Store Coal Chutes

Dimensions in Inches

No.	A	B	C	D	E	F	G	H	I	J
M12	25	11½	26⅜	15¼	23	19½	13	15½	17	18
M15	33½	11½	30	16	30⅞	19½	13	15½	21¼	22½

SIZES OF MAJESTIC STORE CHUTES

No.	Door opening, in.	Rough wall opening (inches)	
		Above grade	Below grade
M12	21x15	23x16¾	23x25
M15	29x19¼	31x21½	31x24½



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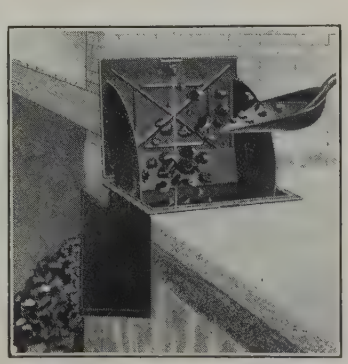

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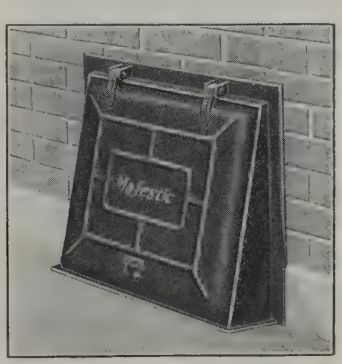
Majestic Grade Line Coal Chute



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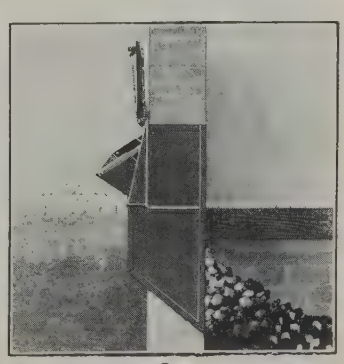

Open

Majestic Store Coal Chute

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Majestic Milk and Package Receiver

Designed to hold 6 or more quart bottles of milk, depending on the thickness of the building wall in which it is installed. It consists of two cast iron frames and doors, connected by a steel body, adjustable to the thickness of the wall in which it is placed. Castings and steel body are coated with *bitumastic solution,* the enduring protection against rust.

The burglarproof gravity latch on the outside door can be unlocked only from inside. The kitchen side door is provided with a refrigerator type latch and handle and can not be opened from outside. Doors can be reversed at time of installation—either door can be installed inside or outside to open either to right or left by simply changing the gravity latch from one door to the other.

When the outside door is opened, the chain is drawn outward and held by the friction. This leaves the gravity latch in locking position, and when the door is closed, it locks automatically.

Sizes

Made in two depths of adjustable bodies, adapting them to walls of any thickness.

No. 1 body adjustable to walls from 5 to 8 in. thick; No. 2, from 8 to 14 in. Bodies of special depths furnished at additional cost.

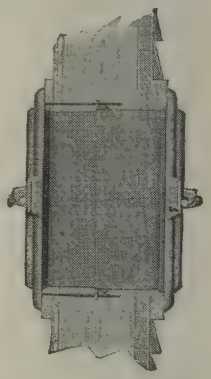
Outside dimensions of package receiver frames, 16¼ in. wide, 14 in. high; wall opening required, 14 in. wide, 12 in. high.

How Operated

A chain attached to gravity latch runs through two cast iron eyes to inside frame, where a cast iron ball is suspended. When empty bottles are placed in receiver, ball is pulled down; its weight, and friction of the chain holds the latch on outside door unlocked. Inside door is then closed and locked by the refrigerator latch.

Outside View

Inside View



Section Through Wall

Majestic Milk and Package Receiver

Majestic Garbage Receivers

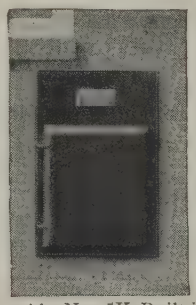
Built-in and Apartment Garbage Receivers

5K Built-in Receiver—Front opens into kitchen where garbage is deposited, and back casting opens to some accessible place outside building where garbage is removed. Doors fit closely and lock with a refrigerator type latch. Body is made of heavy gauge steel in two telescoping sections, one fastened to the front casting, the other to the back or outside casting, and body is adjustable for 8 and 12-in. walls. For narrow walls, casings may be used inside and outside.

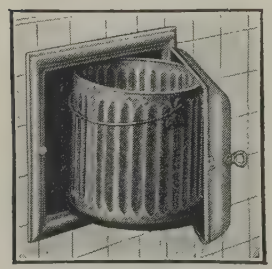
3A and 5A Apartment Receiver—Consists of a heavy cast iron frame and door, a galvanized iron body which recesses in wall, and a galvanized iron garbage pail which sets on a cast iron shelf fastened to the door. When door is opened, can is ready to receive garbage. Receiver is vented through wall by two 4x2¼-in. heavy cast iron ventilators furnished with each receiver.

9A Apartment Receiver—Has front casting only, with steel body recessed in the wall to receive the garbage can. Front is provided with a hopper garbage door and two doors below for removal of can. Doors fit closely and lock with a refrigerator type latch.

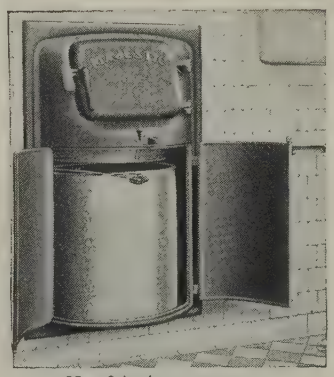
Inside No. 5K Built-in



Outside No. 5K Built-in



No. 3A and 5A Apartment



No. 9A Apartment

Majestic Built-in and Apartment Garbage Receivers

No.	*Can capacity, gal.	Wall openings, in.			Size over all, in.	
		Wide	High	Deep	Wide	High
3A (Apartment)	3	14½	12	10	16½	14
5A (Apartment)	5	14½	16½	10	16⅝	19¼
9A (Apartment)	9	18	29	10	20½	30½
5K (Built-in)	12	18	29	.....	20½	30½

*One galvanized iron garbage can furnished with each receiver.

Underground Garbage Receiver

Offers an out-of-sight, odorless, flyproof, waterproof, sanitary and convenient method of garbage disposal. Consists of a receiver shell made of keystone copper steel, and ring, lid and foot lever of cast iron. Entire receiver is treated to prevent deterioration and formation of rust. Comes complete with either a heavy Majestic corrugated can or an extra heavy Witt corrugated can.

The receiver shell is buried in the ground (in any convenient location) to the upper band. Lid is opened by a slight pressure of the foot on the trip. When foot pressure on trip is released, lid snaps tightly shut and no odors can escape. When can is full, it is easily lifted out.

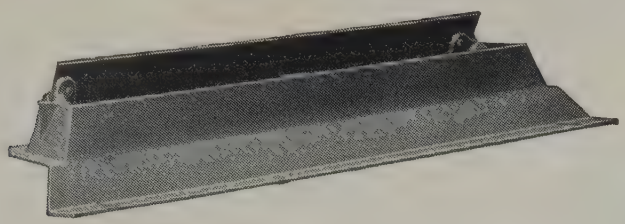
Supplied in 5, 8, 12, 15 and 20-gal. capacities.

Majestic Underground Garbage Receiver

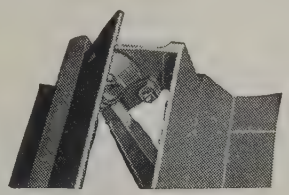
Continued on next page

Majestic Fireplace Dampers

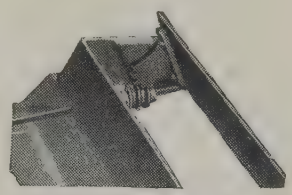
The Majestic damper is scientifically designed, simple in construction, easy to operate and gives perfect draft control. The Majestic throat is theoretically and practically correct, due to the built-in lintel, which assures the correct height of damper throat above finished opening—also correct position of damper. Installed in any reasonably well built fireplace, it insures absolute satisfaction. Smoking in the room is eliminated by the Majestic damper.



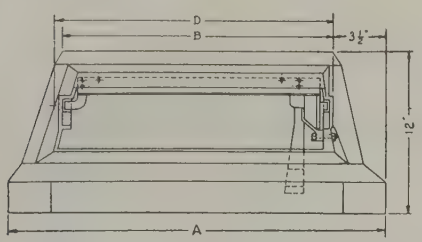
Majestic Fireplace Damper as Installed in Fireplace



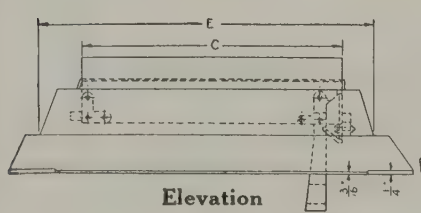
End View Showing Friction Type of Control



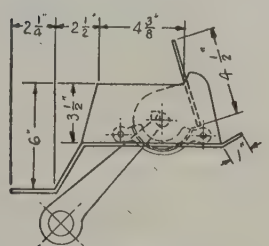
End View Showing Type "X" Control



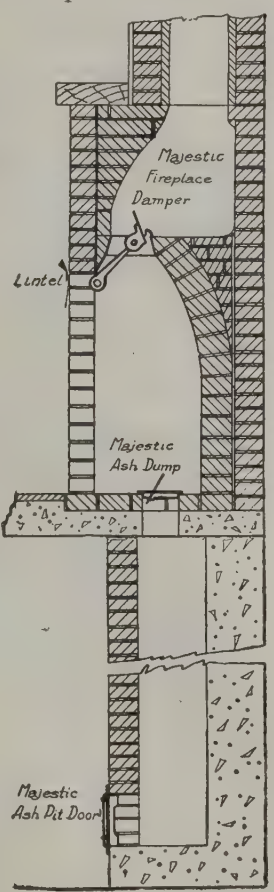
Plan



Elevation



Detail of Damper Operation



Fireplace Section Showing Application of Damper

The making of the lintel integral with the frame of the damper makes it certain that the distance from the top of the opening of the fireplace to the top of the throat is correct—and this is the most important dimension of the whole fireplace. It also makes it necessary to place the damper forward in the fireplace, thus leaving room for a smoke shelf behind.

Ease of operation is accomplished by the *trouble-proof friction principle for opening and closing the door or valve.* The operating lever is out of sight and easily moved forward or backward with a poker, and it stays in position until again adjusted. The throat opening is subject to the best minute adjustment, and there are no knobs or handles to protrude through the front of the fireplace.

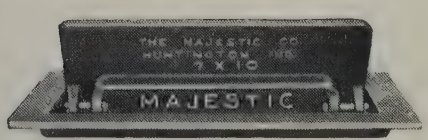
The Majestic Type X, however, is supplied for those who prefer the handle or knob control.

The valve or door is hinged at the back, which permits heat to be thrown out into the room, draws the smoke off from the nearest possible distance from the face of the fireplace, and aids the smoke shelf in turning the down-draft back up the chimney.

With the Majestic throat and damper any mason can build a perfect fireplace by following the drawings and instructions furnished with each damper.

SIZES AND DIMENSIONS OF MAJESTIC FIREPLACE DAMPERS

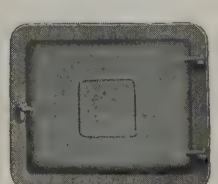
Damper No.	26	30	34	38	42	46	50	54	60
A.....in.	30½	34½	38½	42½	46½	50½	54½	58½	64½
B.....in.	23¾	27¾	31¾	35¾	39¾	43¾	47¾	51¾	60½
C.....in.	21½	25½	29½	33½	37½	41½	45½	49½	55½
D.....in.	24	28	32	36	40	44	48	52	58
E.....in.	26	30	34	38	42	46	50	54	60
Finished opening:									
Width, in.....	26	28 30	32 34	36 38	40 42	44 46	48 50	52 54	58 60
Height, in.....	28	29 30	30 30	31 31	31 31	32 32	32 32	32 32	32 32
Firebox depth, in...	16	16 17	17 18	18 19	19 20	20 21	21 22	22 23	23 24
Flue size, in.....	8x8	8x12		12x12			12x16	12x18	12x18
Shipping weight, lb.	45	52	59	66	70	75	81	89	90



Majestic Fireplace Ash Dump

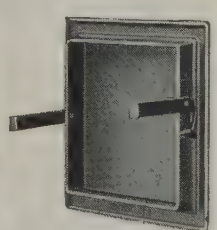
A single lid permanently hinged to the frame, as shown. Lid can not fall out—essential in any fireplace. Keeps dust and odors from room and permits ashes from fire to drop to base of chimney

No.	6	8	9	10
Outside, in.	8x8	10x10	6x9	7x10
Inside, in.	6x6	8x8	4x7	5x8



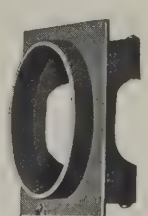
Majestic Cast Iron Ash Pit Door

Fits closely and securely. Simple and effective latch. Sturdy, smooth working hinges. Sizes: 12x15 and 15x15 in.



Majestic Cast Iron Flue Clean-out

Hand fitted. Malleable iron turn key and latch locks door tightly and securely. Anchor irons fold flat. Sizes: No. 88, 8x8 in.; No. 810, 10x8 in.; No. 812, 12x8 in.; No. 1012, 12x10 in.; Nos. 812 and 1012 are ample in size for ash pit doors



Majestic Cast Iron Flue Thimble

Made for 5, 6, 7, 8, 9 and 10-in. smoke pipe. Over-all size of thimble is ½ in. greater than smokepipe size

THE YOUNGSTOWN PRESSED STEEL COMPANY

Manufacturers of Copper Steel Coal Doors and Basement Windows

GENERAL OFFICES AND FACTORIES

WARREN, OHIO

For District Offices, see page B1707

Products

YPS Copper Steel Coal Doors.

YPS Steel Basement Windows.

For the complete YPS line including: Metal Lath, Steel Channels, Expanded Metal, Stucco Reinforcement, Corner Beads and Base Beads, see pages B1707-1709.

YPS

TRADE-MARK

Value of Copper Steel Coal Doors

Steel coal doors have become standard equipment in modern American dwellings. Home owners are demanding them both for the protection of the foundation walls and as a guard against intruders.

The YPS Copper Steel Coal Door is good looking and sturdy. It will prevent the unsightly marring of the window frame so noticeable in the foundation walls of buildings where coal is chuted through the ordinary cellar window.

Most home owners have been through the annoying and expensive experience of broken windows due to coal being chuted through the ordinary frame window. Broken windows are eliminated by the use of YPS Copper Steel Coal Doors.

YPS Coal Door

Style, in.	Wall thickness, in.	Masonry opening, in. width, height	Weight lb.
18 x 24	8	21¾ x 16	46

Details of Construction—All the skill in design which has made an enviable reputation for the YPS designers is brought out in the YPS Coal Door and the quality of materials is up to the high standard which builders all over the country have come to expect in every product of this great YPS plant.

The frame of the YPS Coal Door is one solid piece of deep drawn, heavy copper steel tank plate ⅛ in. thick. The same material is used throughout the door's construction.

The self-closing lock is exceptionally strong, with a heavy spring which insures positive locking when the door is closed. Locks may be equipped with a chain in order to release catch from the floor above.

Unbreakable hinges automatically hold the door, when open, against the foundation to give perfect protection to the wall when the coal is being put in.

Heavily coated with black asphaltum base paint at the factory, the YPS Coal Door comes ready to go into the foundation with the least effort and the greatest amount of satisfaction possible.

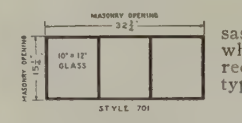
YPS Copper Steel Basement Windows

Heavy one-piece frames of YPS basement sash are the stiffest on the market. Hanger hinges, an exclusive feature, permit ready removal or placing of ventilators, though ventilator comes out only when lifted to horizontal. Ventilators and frames are interchangeable; detachable jamb bar strips, new design, can be supplied for brick or stone wall; positive lock is simple, yet unbreakable. YPS sash admits as high as 80% more light than wood sash, and gives greater ventilation when open.

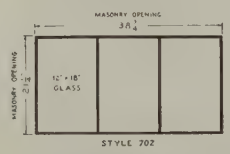
Five standard sizes.

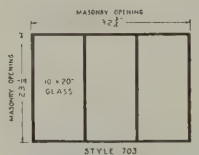
YPS Basement Window

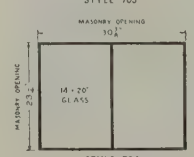
Style No.	Type	Glass size, in.	Masonry opening, in.	Weight, lb.
701	3 light	10 x 12	32¾ x 15¼	18
702	3 light	12 x 18	38¾ x 21¼	23
703	3 light	10 x 20	32¾ x 23¼	22
704	2 light	14 x 20	30⅜ x 23¼	20
705	3 light	10 x 14	32¾ x 17¼	20

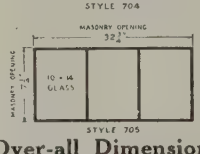


Note: Window No. 705 is a new YPS sash for use with concrete block construction where no sill is desired. No. 701 and 703 require sills, but can also be used for this type of construction.









Over-all Dimensions Standard Sizes of YPS Basement Windows

Specifications for YPS Coal Doors and Basement Windows

Provide and install where shown on the plans ..... YPS Copper Steel Coal Doors and ..... YPS Solid Steel Basement Windows of sizes to fit masonry openings shown on the plans, and as manufactured by The Youngstown Pressed Steel Company, Warren, Ohio.

Deliveries of Coal Doors and Basement Windows

YPS Coal Door and Basement Windows are sold through dealers.

These dealers, located throughout the United States are in a position to make deliveries, of any quantity of the sizes listed in the tables.

ESTABLISHED 1883

THE ADAMS COMPANY

Manufacturers of Building Specialties and Fireplace Furniture

109 West 6th Street, DUBUQUE, IOWA

Products

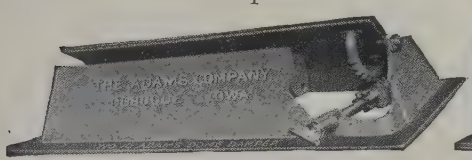
ADAMS FIREPLACE DOME DAMPERS, ASH PIT DOORS, ASH DUMPS, COAL CHUTES.

Also manufacturers of Adams Fireplace Screens, Fireplace Grates, Andirons, Fire Sets, Metal Fireside Baskets, and complete line of Fireplace Furniture; Floor Drains, Bell Trap Cesspools, Underground Garbage Receivers, Wheel Guards, Chimney Caps, Revolving Chimney Tops, Cistern Covers, Cast Flue Thimbles, Coalhole Covers, and Ventilation Grates.

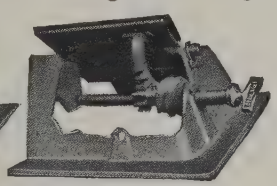
For Adams Steel Windows and Steel Doors, see page A1073.

Adams Dome Dampers

High dome, large throat, simple construction and ease of operation insure perfect draft control to your fireplace under all weather conditions. The large damper blade is center-pivoted. Nothing can lodge behind to hinder operation.



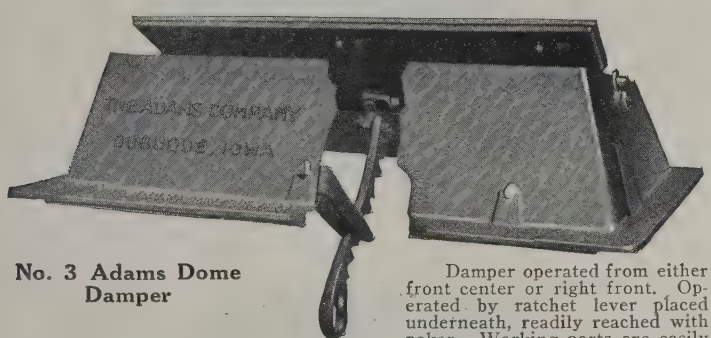
Center or right front operation



End operation

No. 10 Adams Dome Damper

Operated by worm and gear mechanism. Damper operated from front, side or middle of fireplace. Damper easily adjusted, opened and locked at any desired point. Has unobtrusive solid brass handle



No. 3 Adams Dome Damper

Damper operated from either front center or right front. Operated by ratchet lever placed underneath, readily reached with poker. Working parts are easily adjusted, opened and locked at any desired point

Adams Coal Chutes

THE ADAMS COMPANY manufactures a complete line of coal chutes; grade line coal chutes and store coal chutes. Hopper optional. Doors on all chutes lock automatically when closed.

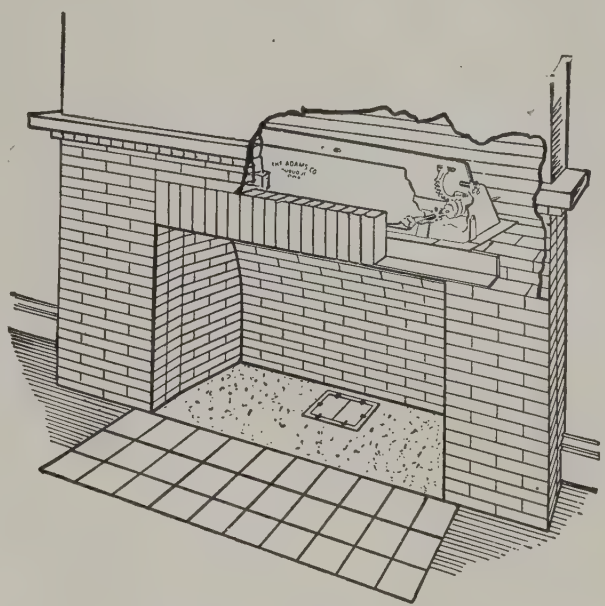
No. 150 Adams Coal Chute

24 in. wide, 17 in. high, 9 in. deep. Two 8x12-in. wire glass panels. Weight 54 lb.

No. 2 Adams Ash Pit Door

Black baked japan finish

Size, in.	Ship. wt. per doz., lb.
8x 8	75
8x10	90
8x12	105
10x12	118
10x14	150
12x12	165
12x15	215



Damper and Ash Dump Installation

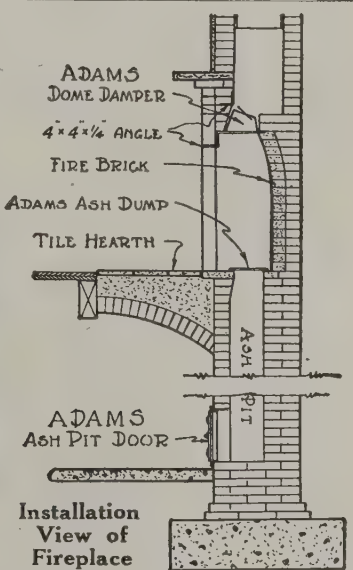
SIZES ADAMS DOME DAMPERS NO. 10 AND NO. 3

Front, in.	Back, in.	Depth, in.	Throat opening, in.	Wt. crated, lb.	Flue size, in.
24	17	13 1/4	18x10	36	8x12
30	23	13 1/4	24x10	40	8x12
32	25	13 1/4	24x10	42	8x12
34	27	13 1/4	28x10	44	8x12
36	29	13 1/4	30x10	46	8x12
38	31	13 1/4	32x10	50	8x16
42	35	13 1/4	36x10	55	8x16
48	41	13 1/4	42x10	64	12x12
54	47	13 1/4	48x10	71	12x16
60	53	13 1/4	54x10	107	16x16
66	59	13 1/4	60x10	115	16x16
72	65	13 1/4	66x10	139	16x20

Damper Easily Installed

Adams Dome Dampers are easily set in all types of fireplaces whether brick, tile, stone, marble or wood mantel.

Adams No. 1 Ash Dump Double Acting, Automatic



Installation View of Fireplace

SIZES ADAMS ASH DUMPS

Number	Outside, in.	Inside, in.	Wt. per doz., crated, lb.
Double Acting Automatic No. 1	7 1/2x8 3/4	5 1/2x7 1/2	42
Single Acting No. 2	10x10	7 3/4x7 3/4	54
Single Acting No. 3	8x8	5 3/4x5 3/4	36
Single Acting No. 4	10x7	7 3/4x4 3/4	33

Catalogues

Catalogues giving illustrations and full information of our products will be gladly furnished upon request.

ESTABLISHED 1856

J. H. BAWDEN & CO.

Manufacturers of Bawden Fireplace Specialties

FREEHOLD, N. J.

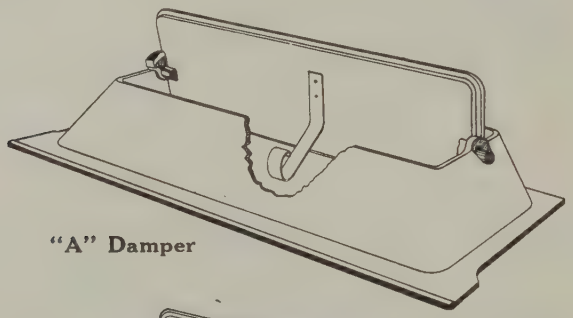
Products

DOME DAMPERS, ASH PIT DOORS and ASH TRAPS.

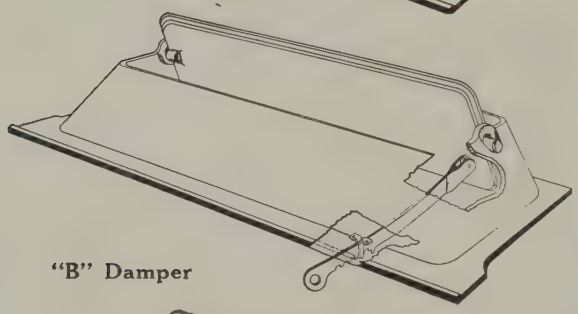
Dome Dampers

Design and Construction—The three types of dome dampers shown are designed with the single idea of efficiency. This has been attained to an unusual degree by so constructing the dampers as to eliminate all pockets or cut-ins, which tend to impede the free passage of the smoke, thus overcoming the principal weakness of the ordinary dome damper. The flange of the damper forms an arch bar of ample strength to support the weight of the masonry above the fireplace.

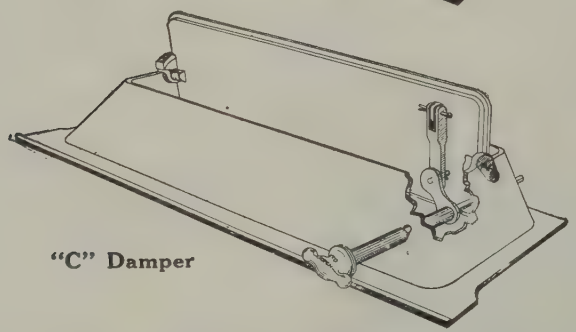
Operation—Extreme simplicity is the cardinal point in the operation of these dampers. All that is required to operate Styles "A" and "B" is a common poker. Style "C" operates with a straight thrust, by means of a rod through breast or side of fireplace. It contains no cogs, gears, worms or springs in the throat to rust fast or give out. *One damper that never fails to operate.*



"A" Damper



"B" Damper

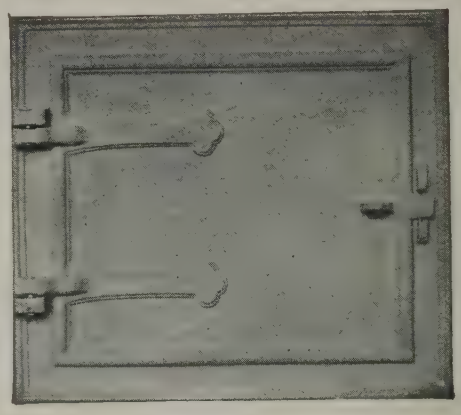


"C" Damper

DIMENSIONS OF BAWDEN DAMPERS

*Damper No.	Extreme of flange, in.			Base of dome, in.			Height of dome, in.	Width of fireplace opening, in.
	Front	Back	Depth	Front	Back	Depth		
24N	24	17	12½	20	15½	9½	3½	20
28N	28	21	12½	24	19	9½	3½	24
32N	32	24	12½	27	22	9½	3½	27
34N	34	27	12½	30	25	10	4½	30
38N	38	30	12½	33	28	10	4½	33
40N	40	33	12½	36	31	10	4½	36
44N	44	36	12½	39	34	10	4½	39
46N	46	39	12½	42	37	10	4½	42
34S	34	25	15	30	24	12	6	30
38S	38	28	15	33	27	12	6	33
40S	40	31	15	36	30	12	6	36
44S	44	34	15	39	33	12	6	39
46S	46	37	15	42	36	12	6	42
52S	52	43	15	48	42	12	6	48
58S	58	49	15	54	48	12	6	54
64S	64	56	17	60	54	12	7	60
76S	76	68	17	72	66	12	7	72

*"N" after number indicates the narrow depth.
"S" after number indicates wide or standard depth.



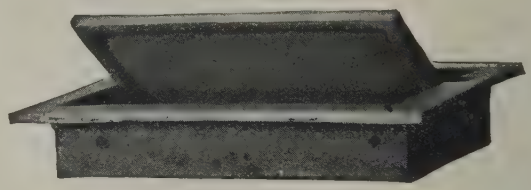
Ash Pit Doors

SIZE OF ASH PIT DOORS

No.	Opening, in.	No.	Opening, in.
3	16x20	4½	10x12
3½	12x16	5	8x12
4	12x12	6	8x8

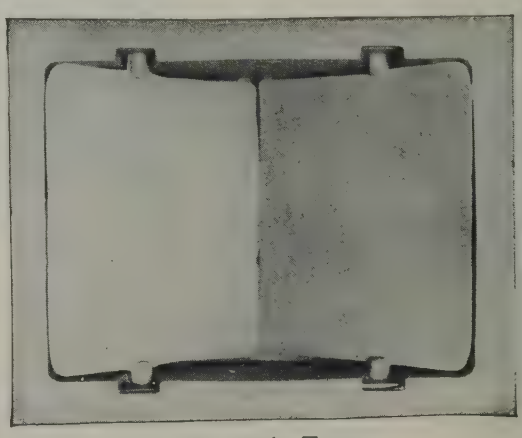
No. 1 Ash Trap

Outside, 7½x9½ in. Opening, 6½x8½ in.



No. 2 Ash Trap

Outside, 6x9 in. Opening, 4½x7¼ in.



Automatic Trap

Outside, 7x9 in. Opening, 5½x7½ in.

COLONIAL FIREPLACE COMPANY

TELEPHONE
LAWNDALE 0140

4644 West Roosevelt Road
CHICAGO, ILL.

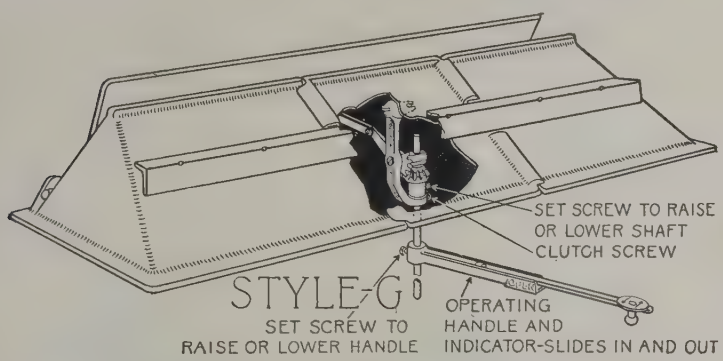
Products and Service

THE IMPROVED COLONIAL HEAD THROAT and DAMPER for Fireplaces; GLO-HOT ELECTRIC GRATE.

Also complete Fireplaces in brick, stone, marble, tile, and wood mantel bases; complete Fireplace Furnishings: Fenders, Grates, Andirons, Fire Sets, Trimmings; Special Brass and Wrought Iron Work for fireplaces.

Colonial Damper Works Right in Any Fireplace

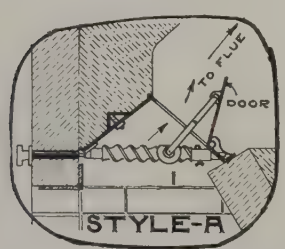
With the new "Style G" lever arm operating device the Colonial Damper may be set one, two or three courses above the opening or even higher with a longer shaft. Operating handle is *out of sight* yet easily accessible. To operate damper door, swing to right or left as indicated on brass plate.



Colonial Damper Takes Up Heat Expansion

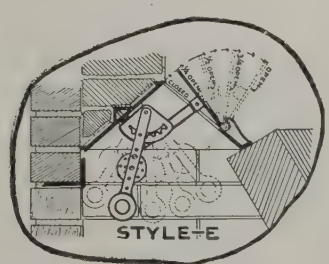
Built in sections of best iron castings reinforced with steel angle bar so as to sustain great weight and intense heat. The overlapping joints between sections take up heat expansion and prevent cracking the face of the fireplace.

Colonial Dampers are available in Styles A, E and G as illustrated. The Colonial Head compels correct formation of the fireplace throat—the vital part—and saves its entire cost in labor. May be used with any type of fireplace, arched or square opening.



Regular Style of Colonial Head Throat and Damper

Key to control draft comes through face of fireplace on left-hand side



Style E

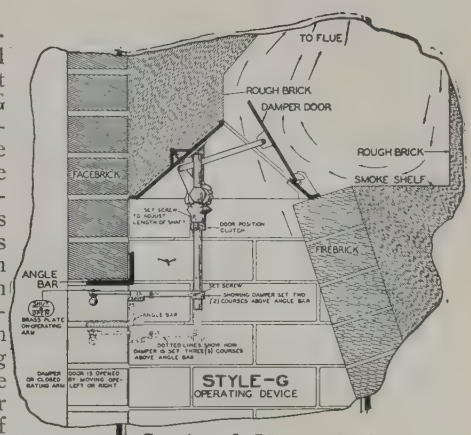
Lever to Control Draft Comes Down in Center of Fireplace

COLONIAL DAMPER, STYLES A, E AND G

No.	Code word	Width of fireplace opening, in.	Proper size of flue, in.	Weight, crated singly, lb.
00	Count	20 to 23	8x8	30
0	Duke	24 to 28	8x8	35
1	Prince	29 to 32	8x12	40
1-A	Valet	33 to 35	8x12	43
2	Regent	36 to 38	8x12	48
2-A	Butler	39 to 41	8x16	51
3	Queen	42 to 44	8x16	53
3-A	Page	45 to 47	8x16	57
4	King	48 to 51	12x12	63
5	Rex	52 to 57	12x12	68
6	Czar	58 to 64	12x16	75
7	Earl	66 to 72	16x16	90

Style A regularly furnished on above code words.
Style E furnished upon adding "Universal" to code word.
Style G furnished upon adding "swing" to code word.

For genuine fireplaces the Colonial Damper is without a peer. The Style-G operating device perfectly regulates the opening of the throat. The operating handle slides forward and moves right or left to open or close and when the draft is adjusted, slides back again under the opening out of sight. The Colonial Damper backs up beauty of your design with the assurance of successful operation.



Sectional View, Style-G

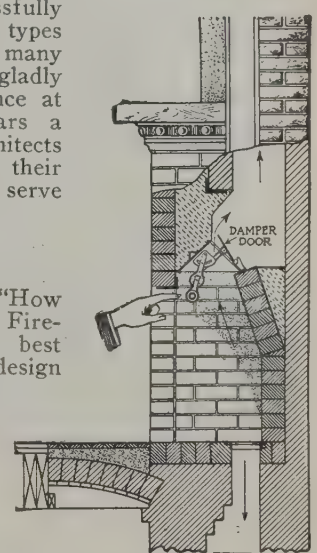
Showing method of operation and adjustments. With this device the Colonial head may be set anywhere in throat as high up as desired

Special Service to Architects and Builders

Through the experience of a quarter of a century we have successfully encountered the difficulties of all types of fireplace construction as well as many unusual conditions, and we will gladly put this knowledge and experience at your command. For many years a growing number of leading architects have written us freely regarding their fireplace problems. We will gladly serve you also.

Fireplace Blue Print Details

A very informative blue print, "How to Avoid Common Mistakes in Fireplace Construction" showing the best and latest practices of correct design sent free on request. Special details if required. Complete catalogue free when requested on business stationery.



Sectional View Showing Position of Style E Damper in Chimney Throat

Glo-Hot No. 261

"Glo-Hot" Electric Fireplace Grate (Patented)

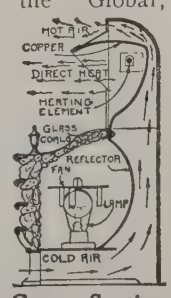
Heats from "Globar" element under hood: radiant heat from the scientifically designed copper reflector, also circulated heat (hot air) over the top of the "Globar," throw all the heat rays straight into the room.

Gives the fascinating flicker as of real fire in glowing coals, and heats as well, without requiring any flue.

Standard size: 1000 watts, 110 volts. Installation requires No. 12 wire on separate circuit. Also in 500-watt and 2000-watt capacities.

The 500-watt size may be connected with ordinary house lighting circuit.

Listed by the Underwriters' Laboratories, Inc.



Cross Section

THE H. W. COVERT COMPANY

Manufacturers of Fireplace Specialties

243 East 44th Street, NEW YORK, N. Y.

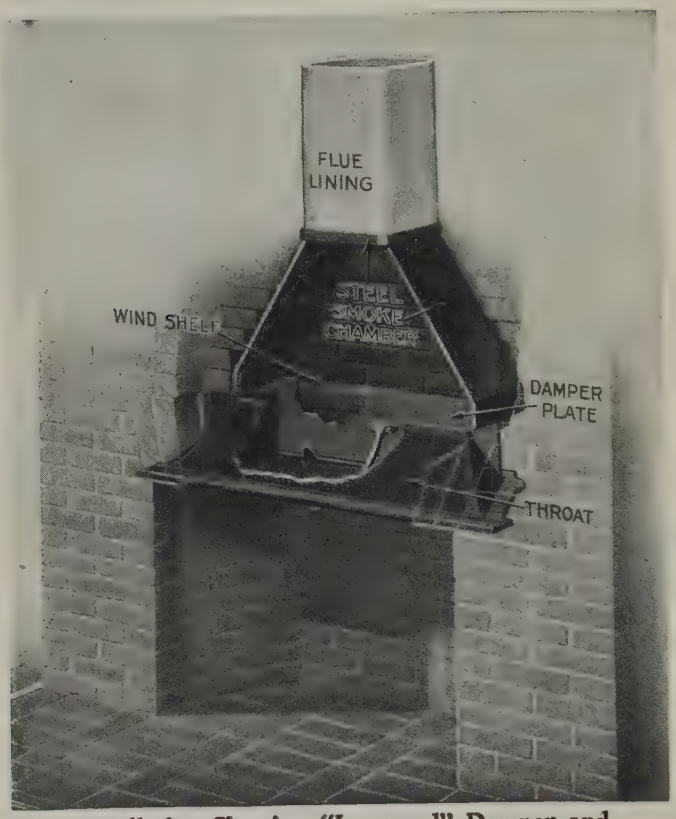
Products

COVERT PATENT FIREPLACE DAMPERS and SMOKE CHAMBERS.

Also Cleanout Doors, Ash Dumps, Franklin Fireplaces, Coalhole Covers, Trap Pit Covers, etc.

For Floor Drains, see page C2749.

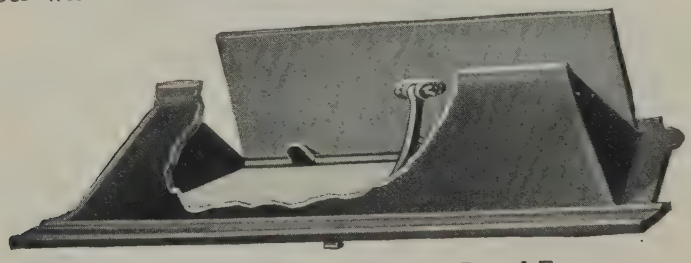
COVERT FIREPLACE DAMPERS
TRADE-MARK



Installation Showing "Improved" Damper and Steel Smoke Chamber

Covert "Improved" Fireplace Damper

This type is very efficient in action due to its curved front and wide, unobstructed smoke opening. Inrushing air follows the curved front up into the smoke chamber with a minimum of resistance.



"Improved" Damper Series D and E

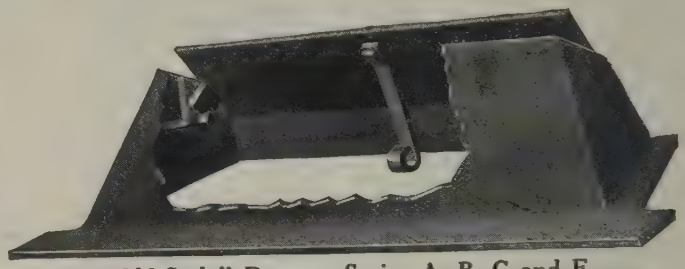
The ratchet handle allows the damper plate to be adjusted to any size opening, from the front of the fireplace. Operating mechanism is very simple and the valve plate is easily removed during construction or for removing accumulations of soot.

Used in fireplaces 20 ins., or less in depth at the hearth.

Covert "Old-Style" Damper

This type is preferred by some architects, especially for use in large and deep fireplaces.

Made in four series, 9, 10, 12 and 16 ins. deep in the base opening, of extra heavy construction, as shown at the bottom of the following page.

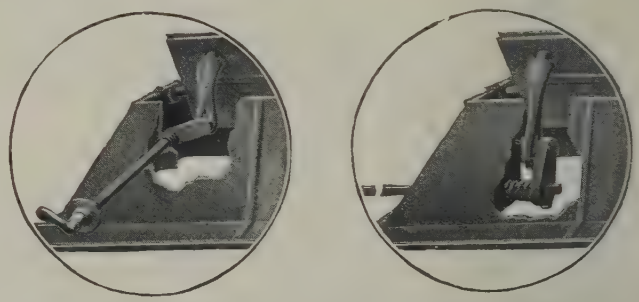


"Old-Style" Damper Series A, B, C and F

Damper plate, operated by a lever reached with a poker, is adjustable to three positions: open, closed and half closed.

Covert Rotary "Face or Side Control" Damper

This type is especially adaptable for use where it is desirable to operate the plate from the face or side of the fireplace by a brass handle.

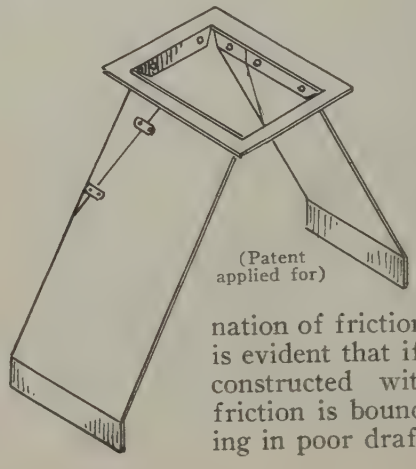


Covert Rotary "Face or Side Control" Damper

Avoiding the usual worm gear (which is likely to become clogged by accumulations of soot), the Covert damper makes use of a simple crank movement that can be connected up to operate from the face or the side of the fireplace with the mechanism accompanying each damper.

Covert Steel Smoke Chamber

To secure the best results a Covert steel smoke chamber should be built above the damper, forming a smooth and properly shaped approach to the flue, thereby reducing friction, increasing the flue power, saving mason's time and insuring proper form of construction.



Since a successful fireplace depends largely upon the elimination of friction to the rising smoke, it is evident that if the smoke chamber is constructed with ragged brickwork, friction is bound to occur, thus resulting in poor draft.

Continued on next page

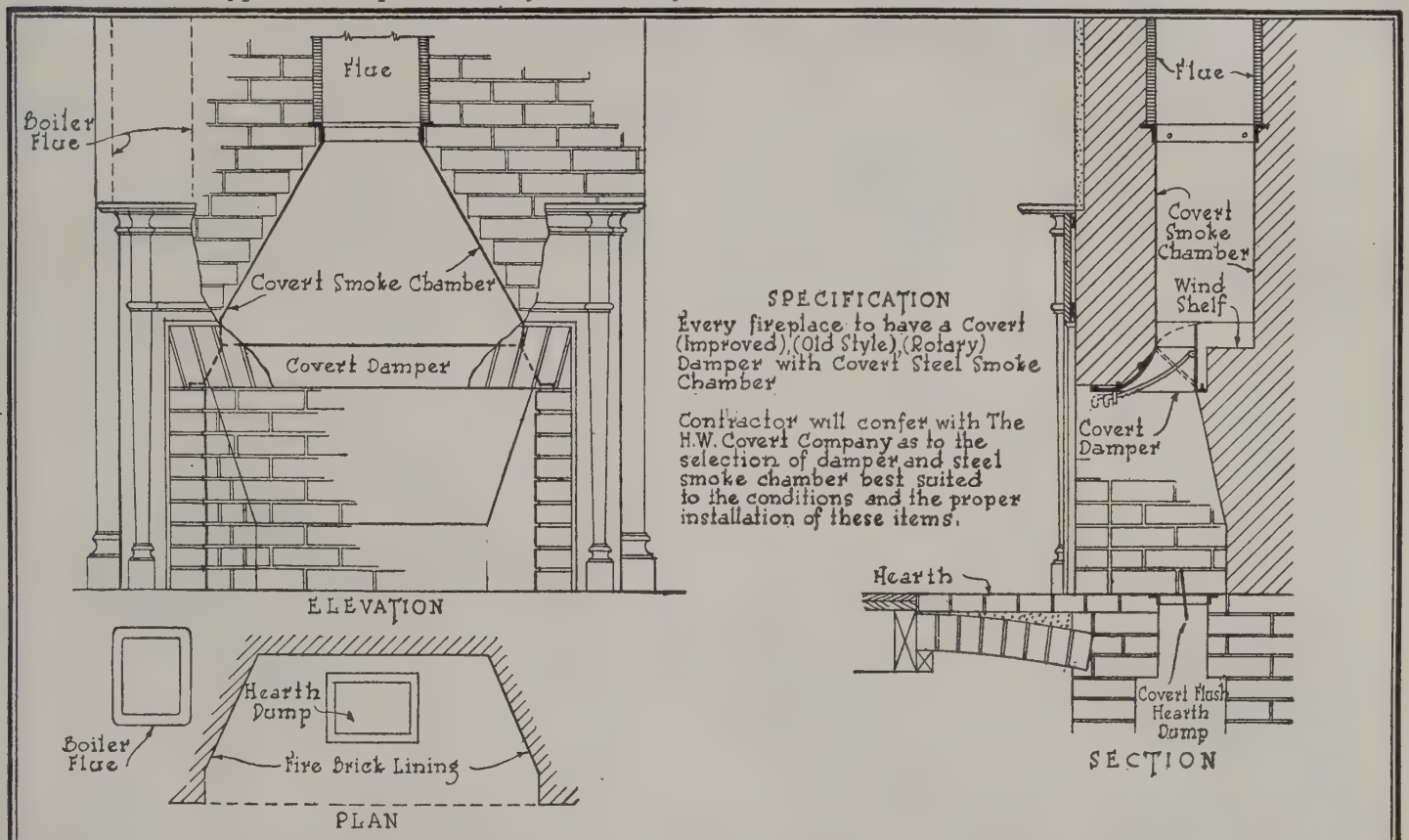
The Covert steel smoke chamber eliminates this difficulty in fireplace construction.

This smoke chamber consists of two steel plates, a collar the same size as the flue lining, and four bolts for fastening. The mason bolts the two plates to the collar, places this frame over the damper, and builds his brickwork around it. Thus we have a smoke chamber with smooth steel sides which practically eliminates friction. This is impossible in brick facing. Moreover we have a chamber of correct form scientifically designed for ample capacity, and installed in much shorter time than under the old method.

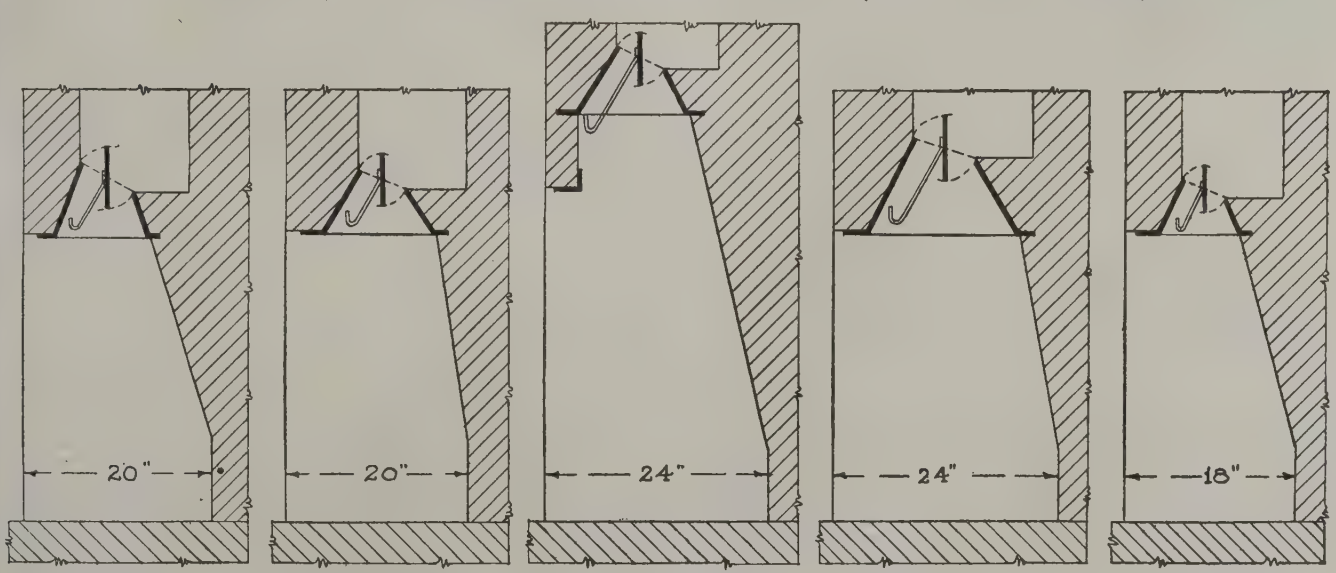
Service

The several types of dampers made by us in many different sizes, covering fireplaces up to seven feet wide, provide the architect, when detailing his fireplaces, with a large choice to meet the many varying conditions encountered in fireplace construction. The following page shows sectional views of each separate type of damper, with their exact dimensions; and the accompanying table gives all further necessary information together with the size of flues recommended in both rectangular and round shape.

We are always pleased to have architects, owners or builders consult with us regarding details of construction of fireplaces and are glad to give them without charge, the benefit of our long experience. Our booklet of fireplace construction will be sent on application.



CONSTRUCTION DETAILS OF FIREPLACE EQUIPPED WITH COVERT SERIES E IMPROVED DAMPER AND STEEL SMOKE CHAMBER



SECTIONS SHOWING HOW COVERT OLD STYLE DAMPERS ARE USED

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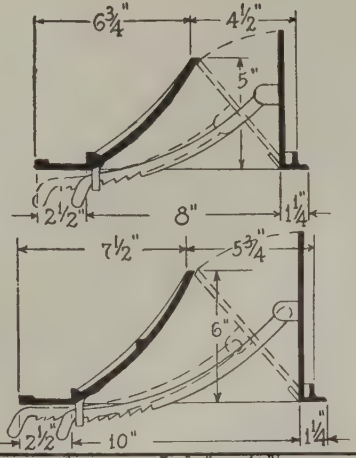
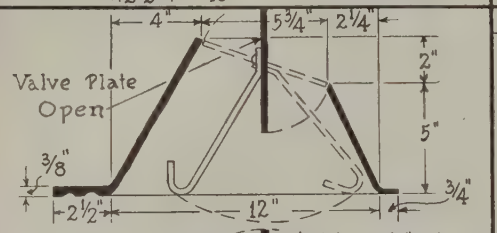
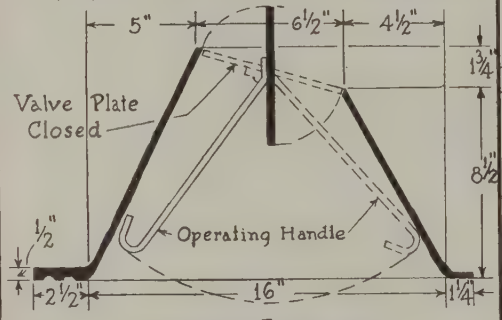
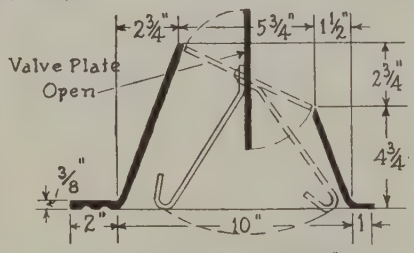
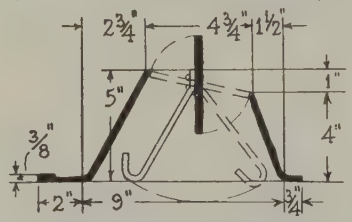
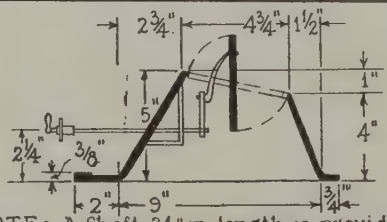




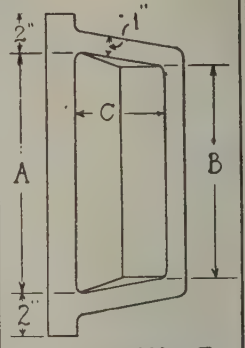




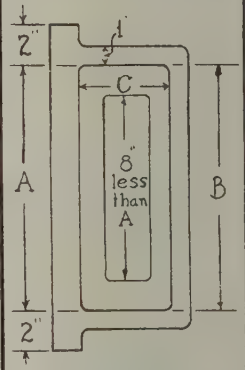




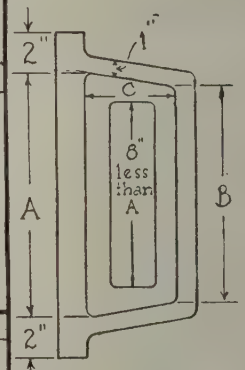
DAMPER NUMBER	FRONT WIDTH OF FIREPLACE OPENING IN INCHES	THROAT AND DAMPER: BASE OPENG OF THROAT NOT INCLUDING FLANGE A	B	C	SHIPPING WEIGHT IN POUNDS	FLUE: PROPER FLUE LINING EXTERIOR DIMENSIONS	EQUIVALENT ROUND FLUE INSIDE DIAMETER
IMPROVED DAMPER SERIES D							
424	24	24	18	8	23	8½ X 8½	8
430	30	30	24	8	31	8½ X 13	10
432	32	32	26	8	32	8½ X 13	10
436	36	36	30	8	34	8½ X 13	10
442	42	42	36	8	38	13 X 13	12
448	48	48	42	8	47	13 X 13	12
454	54	54	48	8	54	13 X 18	15
460	60	60	54	8	60	13 X 18	15
IMPROVED DAMPER SERIES E							
524	24	24	18	10	33	8½ X 8½	8
530	30	30	24	10	40	8½ X 13	10
532	32	32	26	10	46	8½ X 13	10
536	36	36	30	10	52	8½ X 13	10
542	42	42	36	10	60	13 X 13	12
548	48	48	42	10	67	13 X 13	12
554	54	54	48	10	75	13 X 18	15
560	60	60	54	10	87	13 X 18	15
OLD STYLE DAMPER SERIES A							
224	24	24	24	12	26	8½ X 8½	8
230	30	30	30	12	36	8½ X 13	10
232	32	32	32	12	40	8½ X 13	10
236	36	36	36	12	46	8½ X 13	10
242	42	42	42	12	56	13 X 13	12
248	48	48	48	12	66	13 X 13	12
254	54	54	54	12	80	13 X 18	15
260	60	60	60	12	97	13 X 18	15
272	72	72	72	12	110	18 X 18	20
OLD STYLE DAMPER SERIES B							
36½	36	36	36	16	85	8½ X 13	10
42½	42	42	42	16	93	13 X 13	12
48½	48	48	48	16	105	13 X 13	12
54½	54	54	54	16	120	13 X 18	15
60½	60	60	60	16	130	13 X 18	15
72½	72	72	72	16	176	18 X 18	20
84½	84	84	84	16	210	18 X 24	22
OLD STYLE DAMPER SERIES C							
30	30	30	24	10	36	8½ X 13	10
36	36	36	30	10	46	8½ X 13	10
42	42	42	36	10	56	13 X 13	12
48	48	48	42	10	66	13 X 13	12
OLD STYLE DAMPER SERIES F							
724	24	24	18	9	25	8½ X 8½	8
730	30	30	24	9	30	8½ X 13	10
732	32	32	26	9	32	8½ X 13	10
736	36	36	30	9	35	8½ X 13	10
742	42	42	36	9	40	13 X 13	12
748	48	48	42	9	48	13 X 13	12
FACE OR SIDE CONTROL DAMPER							
624	24	24	18	9	25	8½ X 8½	8
630	30	30	24	9	30	8½ X 13	10
632	32	32	26	9	32	8½ X 13	10
636	36	36	30	9	35	8½ X 13	10
642	42	42	36	9	40	13 X 13	12
648	48	48	42	9	48	13 X 13	12



KEY PLAN OF SERIES D & E



KEY PLAN OF SERIES A & B



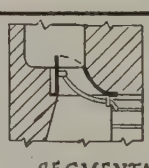
KEY PLAN OF SERIES C, F & FACE OR SIDE CONTROL

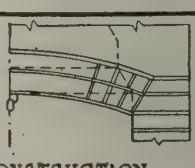
NOTE: A Shaft 24" in length is provided with each face or side control damper so that it may be connected to operate thru the side of the fireplace if front operation is not desired.

Flue sizes given above are for fireplace openings of ordinary height. A fireplace with an opening height greater than usual should be provided with a flue of adequate sectional area. All fireplace flues should bear a relation of never less than 1 to 12 to the fireplace opening.

INSIDE CROSS SECTIONAL AREA OF STANDARD FLUE LININGS

8½" x 8½"	52" Sq. In.	8" Round	50 Sq. In.
8½" x 13"	80½" "	9" "	63 " "
13" x 13"	127" " "	10" "	78 " "
13" x 18"	183" " "	12" "	112 " "
18" x 18"	250" " "	15" "	178 " "
		18" "	255 " "





SEGMENTAL ARCH CONSTRUCTION SHOWING FRONT FLANGE REMOVED

EDWIN JACKSON, INC.

Manufacturers of Jaxon Fireplaces and Building Specialties

50 Beekman Street; also Lexington Avenue and 65th Street

NEW YORK, N. Y.

Products

JAXON DAMPERS, SMOKE CHAMBERS, DUSTLESS ASH TRAPS, BUILT-IN and UNDERGROUND GARBAGE RECEIVERS, WOOD MANTELS, ANDIRONS and FIREPLACE FIXTURES.

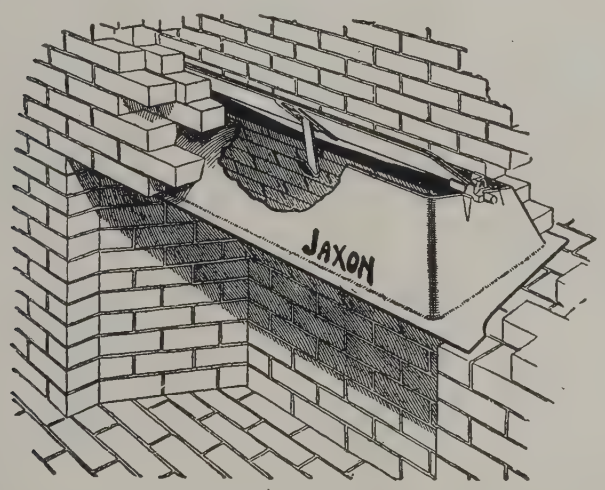
Also manufacturers of Jaxon Sidewalk Chutes, Windo-Shutes, Package Receivers.

For Marble Mantels, Wood Mantels, Iron Linings, Franklin Stoves and Ventilating Grates, see page B1577.

Jaxon Dampers

These dampers are made in three styles, namely, throat, rotary and push. They are designed to insure best possible draft under all conditions.

Our throat type is the latest and best style of fireplace damper. The patent arm holds the door in any desired position. Operation is by poker; no handle shows on the face. Also made in special sizes.



Jaxon Throat Damper

No.	Dimensions, in.				
	Width fireplace opening	Extreme of flange			Flue size
		Front	Back	Depth	
24	24	28	20	12	8x 8
30	30	34	25	12	8x12
32	32	36	27	12	8x12
36	36	40	31	12	8x12
42	42	46	37	12	12x12
48	48	52	43	15	12x12
54	54	58	50	15	12x16
60	60	64	58	19	16x16
72	72	76	70	19	16x16
84	84	88	82	19	16x20
Extra Deep					
x36x	36	40	40	20½	12x12
x42x	42	46	46	20½	12x12
x48x	48	52	52	20½	12x16
x54x	54	58	58	20½	12x16
x60x	60	64	64	22	16x16
x72x	72	76	76	24	16x20
x84x	84	88	88	26	20x20
x96x	96	100	100	26	20x24
x120x	120	124	124	28	24x36

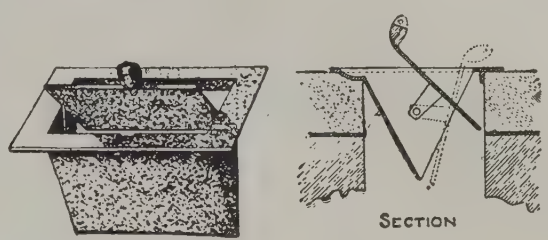
Also made in special sizes.

Jaxon rotary dampers and Jaxon push dampers operate from the front of the fireplace by a rotary rod or push handle. Rotary style can also be had to operate from end of breast.

Jaxon Dustless Ash Traps

For dropping ashes without dust from open fireplaces to the ash pits. In either position, open or closed, there are no openings to permit draft to blow dust into the rooms.

The door is easily operated and there are no springs to get out of order.



Jaxon Dustless Ash Trap

No.	Dimensions, in.		
	Outside flange	Brick opening	Trap opening
9	15 x 9	11½ x 6¼	10⅞ x 5½
6	9 x 7	7¼ x 5¾	6⅝ x 5

Jaxon Built-in Garbage Receivers

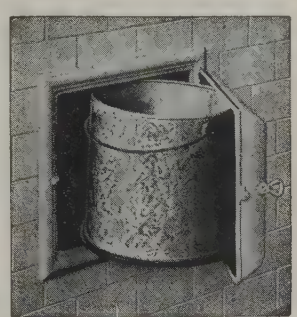
The Jaxon receiver is made of heavy cast iron, including the door and frame. The front of the receiver opens into the kitchen and is so arranged that, when the door is opened, the can is brought forward convenient for use. The door shuts tight and locks securely.

No. 103—Wall opening is 14½ in. wide, 12 in. high and 10 in. deep.

No. 103K, same size and construction, also has an outside door for suburban use.

No. 106—Is similar, and fits a wall opening 19 in. wide, 19 in. high and 10 in. deep.

No. 106K, same size and construction, also has door at back for removal of can through the yard.



No. 3. Garbage Receiver

Wood Mantels

We manufacture wood mantels, copies of good Colonial designs, in stock for prompt shipment. We also make accurately from architect's designs.

For description see page B1577.

Andirons

We import Italian and English andirons, and also make reproductions. We also manufacture other fixtures that will be needed in fireplaces, including grates, fenders, spark screens, etc.

Catalogues

Our catalogues describing in detail all of our products will be gladly sent on request.

THE OHIO FOUNDRY & MFG. CO.

Manufacturers of Dome Dampers and Other Fireplace Accessories

STEUBENVILLE, OHIO

82 Years Manufacturing Fireplace Equipment Exclusively

For eighty-two years we have been manufacturing fireplace equipment exclusively. The products of this company include:

Brilliant Fires	Fire Sets	Dampers
Coal Grates	Gas Logs	Builders' Supplies
Gas Grates	Screens	Electric Logs
Spark Guards	Fenders	Electric Baskets
Portable Baskets	Andirons	Electric Heaters

Bulletins on any of above products or complete catalogue on request.

Ohio 3-in-1 Dome Damper No. 900

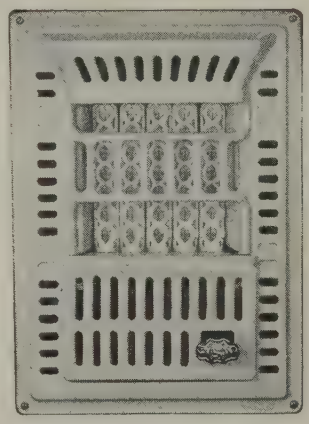
From our long experience with architects and builders, we have learned their wants, and in building our new No. 900 series of dome dampers we have met their demands.

This damper is scientifically correct in construction, complying with all requirements as to measurements of the best known architects in the country.

Damper is shipped equipped for operation either through face of mantle or with underslung lever control. Lid is so arranged that chain pull can be added easily without disturbing the other control and without additional cost.

Ohio Brilliant Bathroom Heaters

A space saver for the bathroom, hall or living room, made in three sizes, vented or unvented. Cast iron front, heavy clay back wall with circulating air chamber thoroughly fireproofed. Equipped with heat-deflecting hood and iron dress guard. Finished in heavy porcelain enamel.

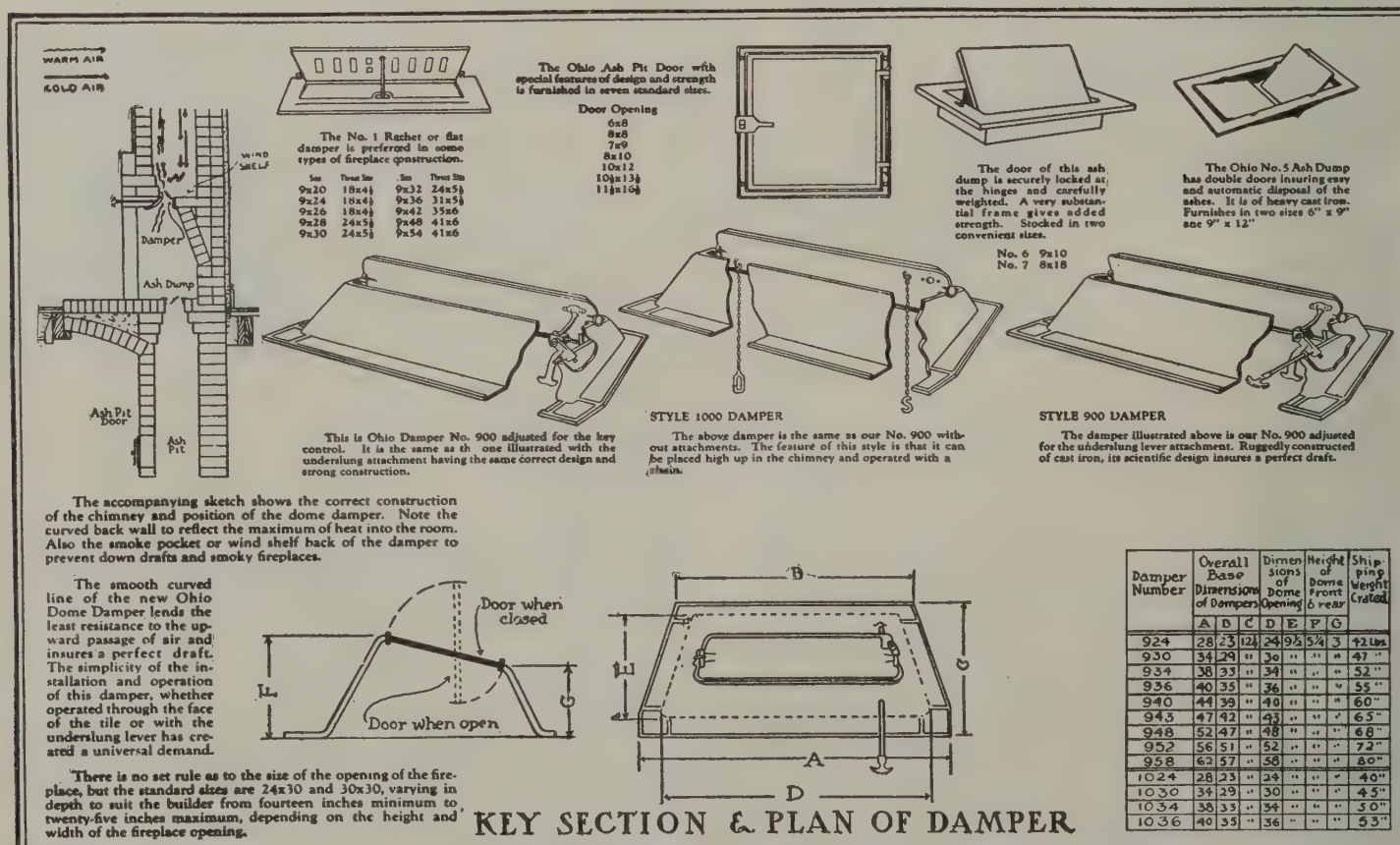


Ohio Brilliant Bathroom Heater

No. 14—5 tubes, outside dimensions 13½x21½ in., fits opening 13½x20½x4 in. Stock finishes, white, blue, green and ivory.

No. 17—7 tubes, outside dimensions 18x22 in., fits opening 16x20½x4 in. Stock finishes, white, gray and mahogany.

No. 18—10 tubes, outside dimensions 22x22 in., fits opening 20x20x4 in. Send for folders.



Damper Number	Overall Base Dimensions of Dampers			Dimensions of Dome Opening		Height of Dome Front & rear		Shipping Weight Crated
	A	B	C	D	E	F	G	
924	28	23	12½	24	9½	5¼	3	42 Lbs.
930	34	29	"	30	"	"	"	47 "
934	38	33	"	34	"	"	"	52 "
936	40	35	"	36	"	"	"	55 "
940	44	39	"	40	"	"	"	60"
943	47	42	"	43	"	"	"	65"
948	52	47	"	48	"	"	"	68"
952	56	51	"	52	"	"	"	72"
958	62	57	"	58	"	"	"	80"
1024	28	23	"	24	"	"	"	40"
1030	34	29	"	30	"	"	"	45"
1034	38	33	"	34	"	"	"	50"
1036	40	35	"	36	"	"	"	53"

DETAILS OF DAMPERS, ASH DUMPS & ASH PIT DOORS

PEERLESS MANUFACTURING CO., INC.

Fireplace Dampers and Builders' Specialties

LOUISVILLE, KY.

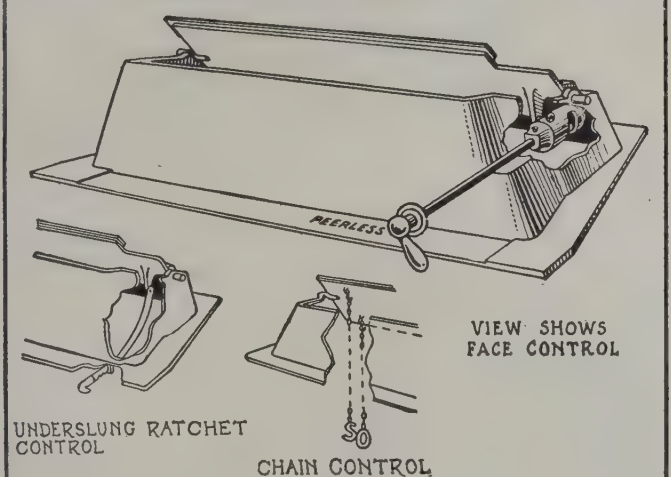
Products

DOME (Fireplace) DAMPERS; COAL WINDOWS; ASH PIT DOORS; ASH TRAPS; IN-THE-GROUND GARBAGE RECEIVERS.

Also Fireplace Furniture (Andirons, Grate Baskets, Screens, Fire Sets, etc.), Gas Ranges, Combination Coal and Gas Ranges, Hot Plates, Radiant Gas Heaters and other Builders' Specialties.

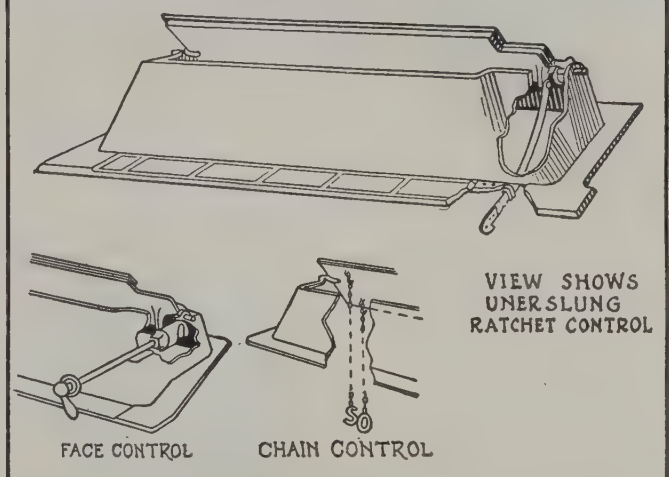
Peerless Fireplace Dome Dampers

This damper is designed to insure a good draft under all atmospheric conditions. It consists of a flanged dome with a door at the top, made from select gray cast iron. The front flange is sufficient strong to support the fireplace arch without the use of angle iron or lintel bar. Made in several different models and all necessary sizes.



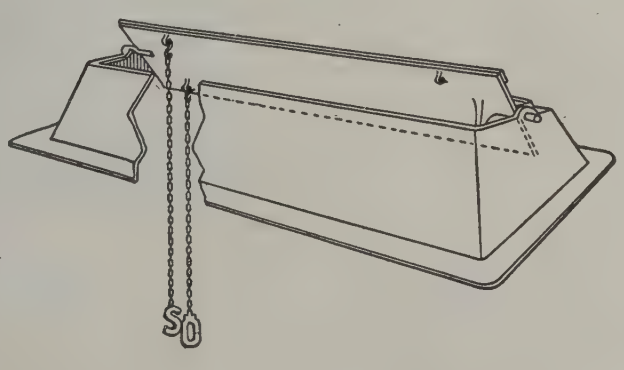
Damper A

Where a heavy weight damper with extra depth is desired this A Damper will meet the need. Can be furnished with any one of the three controls illustrated. *Face Control,* consists of an iron rod with a brass handle and a worm attachment. Operates through the face of the mantel. *Underslung Ratchet Control,* the door is operated by means of an underslung forged steel ratchet lever with a brass handle which operates in an iron loop fastened underneath the right front flange. *Chain Control,* two chains, one to open and one to shut the door



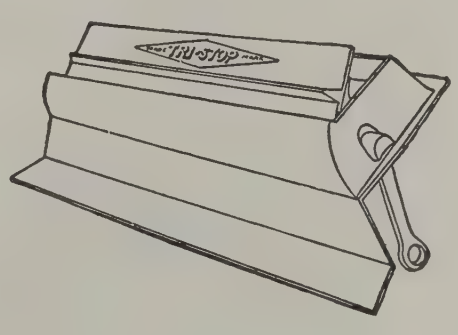
Damper B

A medium weight damper and not quite so deep as Damper A. It has a paneled front flange of extra width thus giving added strength when the front flange is used as an arch bar. Damper B can be furnished with any one of the three controls illustrated: *Face, Underslung Ratchet* or *Chain.* All controls are interchangeable and are simple and effective in operation. No complicated mechanisms to get out of order



Damper C

A light weight damper with one method of control. The door is operated by means of chains, one chain marked with an O opens the door and the other chain marked S shuts the door. Chains may be lengthened or shortened to meet the requirements of the fireplace. This method of control is especially desirable where the damper is placed unusually high in the flue



Tri-stop Damper

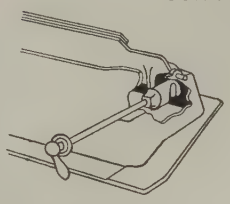
Consists of three parts, dome, lid and handle. No small parts to get out of order. The operating handle has three positive positions, open, partly open and closed. The handle does not project beyond the mantel facing and thus make an unsightly fireplace front. The base of the dome is 3 in. higher than the lintel flange

Continued on next page

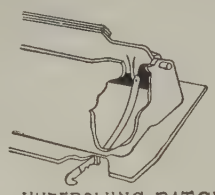
The differences in Dome Dampers A, B and C can be noted by referring to the table of dimensions below

STYLE	METHOD OF CONTROL
A	Face, Underslung Ratchet or Chain
B	Face, Underslung Ratchet or Chain.
C	Chain Control Only.

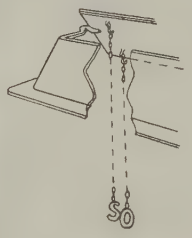
IMPORTANT: Be careful to specify control desired.



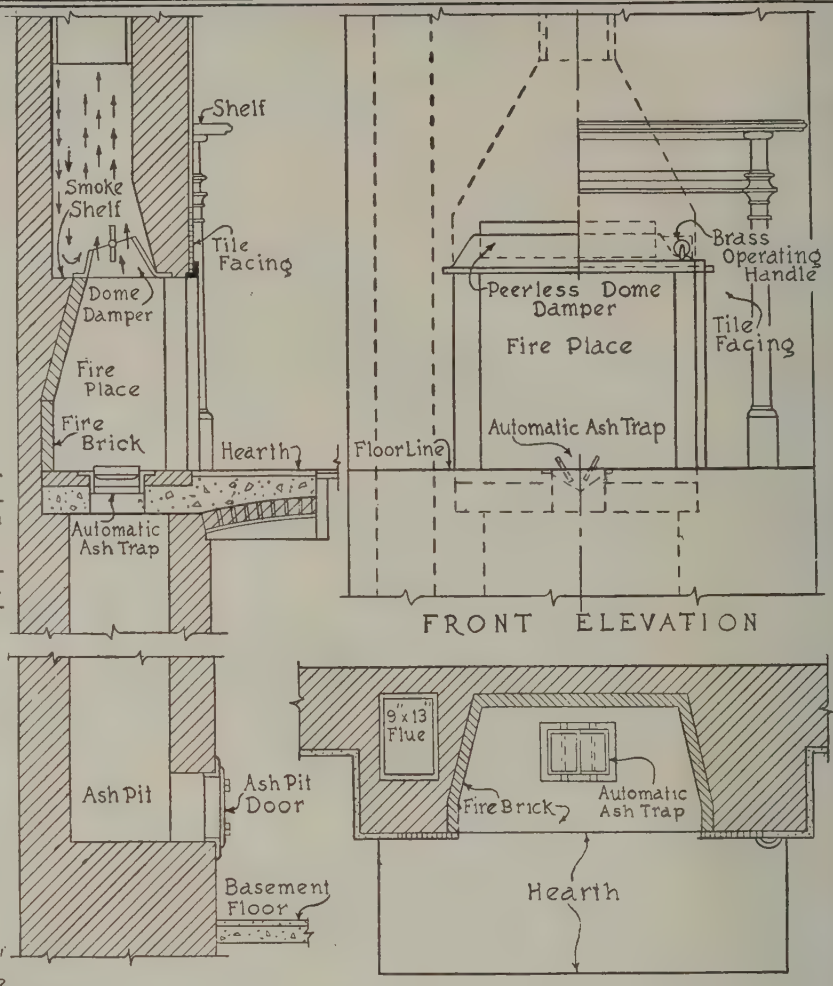
FACE CONTROL: Operated by means of a brass handle attached to a shaft extending through the face of the mantel. By means of a worm gear and cam arrangement, a three-quarter turn of the handle completely opens or closes the door.



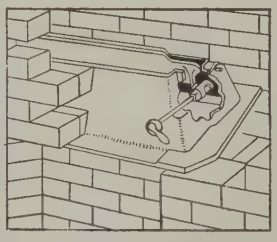
UNDERSLUNG RATCHET CONTROL: Door is operated by means of an underslung forged steel notched lever with brass handle which operates in a cast iron loop fastened underneath the right front flange.



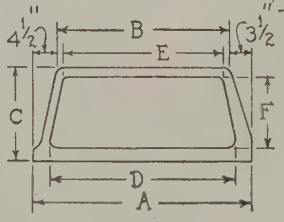
CHAIN CONTROL: Operated by two pull chains, marked S (shut) O (open). This control is necessary when damper is placed high in the flue



DETAILS OF FLAT ARCH FIREPLACE



PERSPECTIVE SHOWING METHOD OF SETTING DAMPER



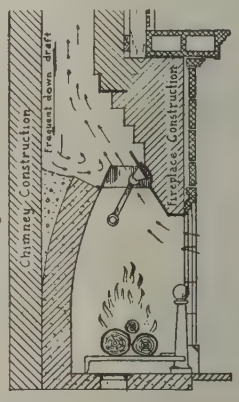
KEY PLAN (See Table Below for Dimensions)

Damper Number	Front Width of Fireplace Opening	Overall Base Dimensions of Dampers A	B	C	Dimensions of Dome Opening at Base of Damper D	E	F	Height of Dome at Front G	at Rear H	Proper Size Flue Exterior Dims	Round Flue Inside Dim's	Shipping Weight Crated Pounds
A-24	24	28	20½	15½	24	18½	12¼	5	3½	9x13	9	38
A-28	28	32	24½	15½	28	22	12¼	5	3½	9x13	10	40
A-30	30	34	26¼	15½	30	24	12¼	6	4¼	9x13	10	45
A-33	33	37	29½	15½	33	27	12¼	6	4¼	9x13	10	50
A-36	36	40	32	15½	36	30	12¼	6	4¼	9x13	10	55
A-39	39	43	35¼	15½	38	33	12¼	6	4¼	13x13	12	61
A-42	42	46	38	15½	42	36	12¼	6	4¼	13x13	12	65
A-48	48	52	44½	15½	48	42	12¼	6	4¼	13x13	12	68
A-54	54	58	50¾	15½	54	48	12¼	6	4¼	13x18	15	85
A-60	60	64	55¼	15½	59½	53½	12¼	6	4¼	18x18	18	100
* A-68	68	72	70	19	68	67	14½	7¾	5½	18x18	18	189
B-24	24	28	23½	13⅜	24	19½	9¾	4¾	3½	9x13	9	37
B-28	28	32	27¾	13⅜	28	24	9¾	4¾	3½	9x13	10	39
B-30	30	34	29½	13⅜	30	26	9¾	5¼	3¾	9x13	10	43
B-36	36	40	35½	13⅜	36	31	9¾	5¼	3¾	9x13	10	48
B-42	42	46	41½	13⅜	42	36½	9¾	5¼	3¾	13x13	12	54
B-48	48	52	47½	13⅜	48	44	9¾	5¼	3¾	13x13	12	64
C-24	24	28	25½	11¼	24	19½	8¾	4½	3¼	9x13	9	26
C-30	30	33¾	31¼	11¼	30	25½	8¾	4½	3¼	9x13	10	30
C-36	36	39½	37½	11¼	36	31¼	8¾	4½	3¼	9x13	10	32

*Chain control only

SECTIONAL VIEW OF TRI-STOP DAMPER INSTALLATION

The Tri-stop damper operating handle has three positive positions, open, partly open and closed. The handle does not project through or beyond the mantel facing. For Tristop damper sizes see table below.



CROSS SECTION

Damper Number	Width of Lintel flange	For finished fireplace opening	Size flue required	Shipping Wght. Crated Pounds
E-24	32½"	24" to 28" Wide	8 x 12	38
E-30	37¼"	30" to 33" "	8 x 12	42
E-36	41½"	36 to 38 "	8 x 16	48
E-40	46¾"	40 to 43 "	8 x 16	54
E-44	52½"	44 to 47 "	8 x 16	74
E-48	56½"	48 to 51 "	12 x 16	80
E-52	61¼"	52 to 55 "	12 x 20	95
E-58	68½"	58 to 62 "	12 x 24	135

DRAWN BY SWEETS CATALOGUE SERVICE, INC.

DETAILS OF PEERLESS DOME DAMPER

NOT DRAWN TO SCALE DATE-SEPT. '28 | DRW'G 1

Continued on next page

Peerless Coal Windows

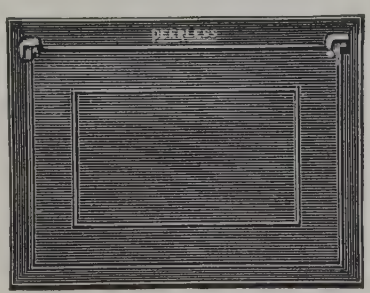
No. 1 Coal Window—Completely automatic. Recommended for the better type of houses, apartments, stores and public buildings.

A gentle pull of the chain, which is usually placed in the kitchen, releases the lock and opens the chute, bringing the door back into the wall and at the same time pushing the hopper forward into place. The chain is then fastened to a peg. When the chain is released, the hopper recedes and the door swings gently into place, at the same time locking securely.

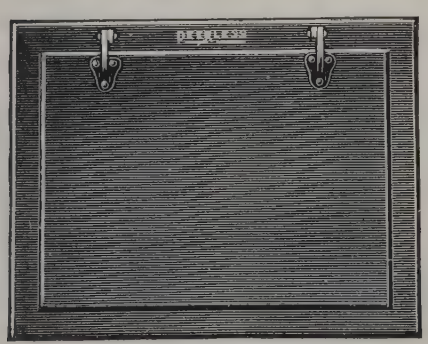
Automatic Coal Window No. 1 with Wire Glass Panel

Cast iron frame and heavy cast iron door fitted with ¼-in. wire glass panel. Heavy gauge boiler plate hopper.

No. 2 Coal Window—Equipped with pull chain control like No. 1 and has a gravity catch. Malleable iron frame and extra heavy boiler plate door. Furnished with or without hopper. Can also be equipped with ¼-in. wire glass door panel.



No. 2 Coal Window



No. 3 Coal Window

No. 3 Coal Window — Malleable iron frame and hinges, heavy boiler plate door. When door is closed it locks automatically. No hopper or chains.

DIMENSIONS AND WEIGHTS OF PEERLESS COAL WINDOWS

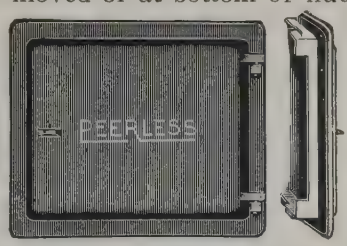
	No. 1	No. 2*	No. 3
Extreme width...in.	25½	25¼	26¾
Extreme height...in.	22⅝	19½	21
Width of wall opening...in.	23	24	23
Depth of wall opening...in.	12	12	9
Height of wall opening, front...in.	19	17	17
Height of wall opening, rear...in.	21	19	18¼
Door opening...in.	20x11½	20¼x11⅜	22¼x16⅞
Shipping weight...lb.	94	62	45

*With wire glass or steel door. Hopper extra.
10 ft. of brass plated steel chain furnished with Nos. 1 and 2.

Specifications for Peerless Coal Windows—Furnish and set where shown on drawings (or herein specified; mention location) .... Peerless No. 1 (or Peerless No. 2 or 3) coal windows as manufactured by the Peerless Manufacturing Co., Inc., Louisville, Ky. Windows to be securely built into the masonry.

Peerless Ash Pit Doors

Peerless ash pit doors are made of heavy cast iron in all standard sizes. Black japan finish. Doors and frames are carefully ground to make them dust tight. Used at bottom of ash pits through which ashes are removed or at bottom of flues to clean out soot.



Ash Pit Door No. 3

NO. 3 DIMENSIONS AND WEIGHTS

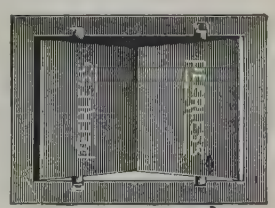
Door opening, in.	Shipping weight, lb.
5 x 7	5
8 x 8	6
8 x 10	7
10 x 12	10
12 x 16	16
14 x 20	22
16 x 24	33

Peerless Ash Traps

No. 9, with double doors, is automatic in operation. No. 8 has a single door.

DIMENSIONS AND WEIGHTS

No.	Outside dimensions, in.	Shipping weight, lb.
8	7 x 10	3
8	9 x 11	4
9	7 x 10	3½
9	9 x 11	5



No. 9 Automatic Ash Trap

Peerless In-the-ground Garbage Receiver

Buried under ground with only the top exposed. Garbage deposited by simply stepping upon lever arrangement which raises the lid. To empty the contents the garbage man has only to lift top and remove can. Top hinged to shell to prevent being carried away.

Comes in three sections, a copper-steel rust resisting outer casing, with its attached cast iron lid and a galvanized iron pail. Easy to install. Simply dig a hole wherever you wish the receiver placed—near kitchen door, sidewalk or street curb—and insert outer casing.

DIMENSIONS, CAPACITIES AND WEIGHTS OF GARBAGE RECEIVERS

Can capacity, gal.	Shell diameter, in.	Shell depth, in.	Top diameter, in.	Shipping weight, lbs.
8	16	14	16¾	34
12	16	20½	16¾	39
15	16	25	16¾	42
20	19¼	25	20½	56

Peerless Fireplace Lining Set No. 42

Each set consists of a back and two sides or wings. Made of high grade cast grey iron. Design of sides matches back.

Back: 20, 24, 27, 30 or 36 in. wide by 30 in. high. Sides: 12, 15, or 18 in. wide by 30 in. high. Also made in special sizes.

Folder illustrating complete line of Lining Sets sent on request.

W. FRED SPARROW CO.

Manufacturers of Fireplace Devices

50 East 42nd Street

NEW YORK, N. Y.

The "Acme" Hearth

This dustless ash dump, operated by a slight pull on a poker, conveniently disposes of the ashes and other debris from either the coal or wood burning fireplace. When the hearth is tipped a curved metal shield automatically seals the opening against dust and sparks.

The framing and body of the hearth are made of cast iron and steel. All movable parts are of malleable iron. There are no springs, oil cups or other parts to require maintenance attention. The total weight is 20 lb. and the hearth is easily handled and installed by one man.

For Home Owner's Information — The "Acme" Hearth has made it possible to have a neat, clean fireplace at all times without the inconvenience usually attendant upon the disposal of ashes and other fireplace debris. No moving of andirons or fireplace baskets is necessary, nor the handling of hot irons—the "Acme" Hearth operates easily, quickly, conveniently.

Typical "Acme" Hearth Installation

Easy to install and keeps the fireplace neat and clean

Specification Data

Supply and install—"Acme" Hearths, as supplied by the W. Fred Sparrow Co., 50 East 42nd Street, New York, N. Y.

Installation—The supporting members of the hearth shall be truly and firmly embedded on the masonry. In pouring the concrete this contractor shall take care that no voids occur under or around the embedded metal.

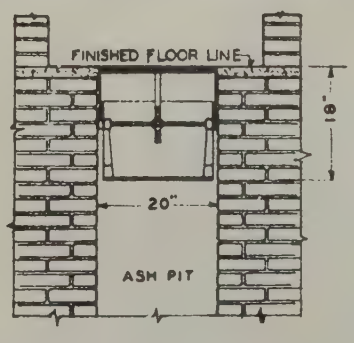
The finished surface of the trap door of the hearth shall be set level with the surrounding floor area of the fireplace.

This contractor shall make sure that sufficient clearance is allowed between moving parts of the hearth and surrounding masonry. Care shall be exercised to avoid clogging of moving parts with mortar, cement or any other foreign matter that might interfere with operation.

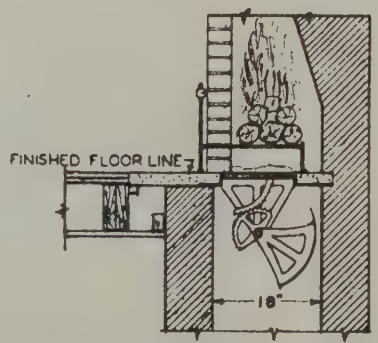
On completion of installation, the hearth shall be solidly bonded to its permanent setting and shall operate freely.

Operation of the "Acme" Hearth

To operate, insert the poker in the receptacle or hole provided, then lift up. This dumps the hearth. Reverse the operation, withdraw the poker, and the hearth is back in its original position clean of all debris.

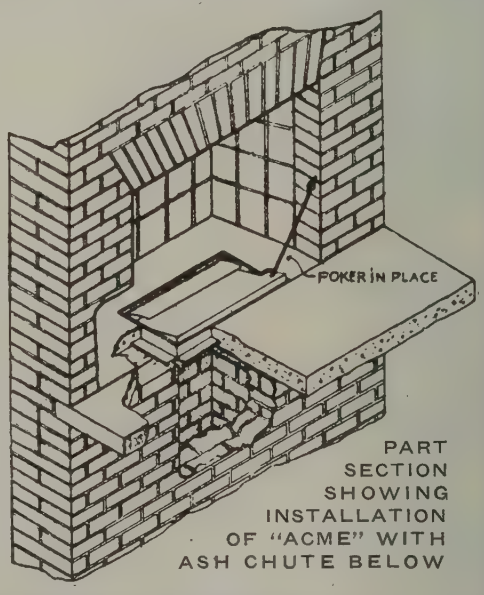


LONGITUDINAL SECTION SHOWING HEARTH IN PLACE



CROSS SECTION THROUGH HEARTH

Operation of the "Acme" Hearth



PART SECTION SHOWING INSTALLATION OF "ACME" WITH ASH CHUTE BELOW

DETAILS SHOWING CONSTRUCTION, INSTALLATION AND OPERATION.

HEATILATOR COMPANY

MANUFACTURER OF

The Heatilator, a Practical Heating and Ventilating Unit for Fireplaces

MAIN OFFICE AND PLANT

Glen Avenue and Brighton, SYRACUSE, N. Y.

Distributed Through Leading Mason Supply Dealers

Description

Heatilator Fireplace Unit

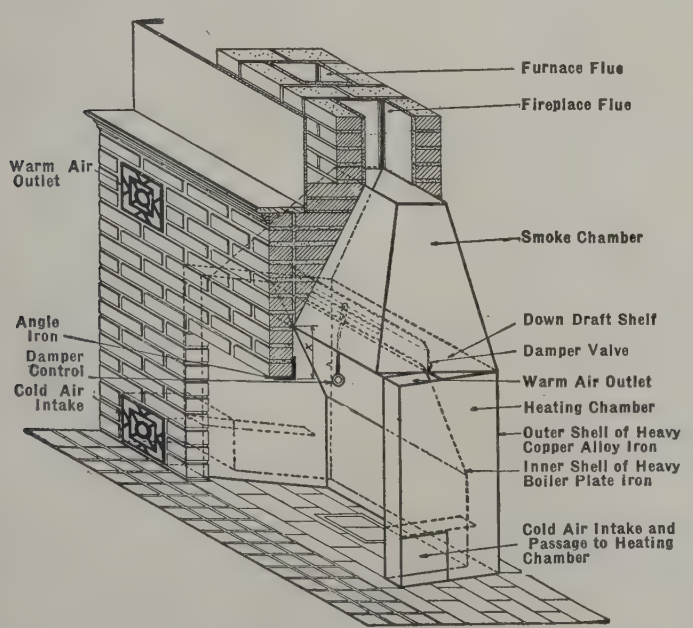
The Heatilator is a metal form around which any mason can build a perfect-operating fireplace that will give double the heat. It absolutely corrects the common faults of fireplace design and construction which cause smoking, cold air drafts, insufficient heat and waste of fuel. Yet the Heatilator does not affect the design of the mantel nor limit the architect in the selection of materials used in the masonry.

A Charming Heatilator-equipped Fireplace

Note grilles for air intakes at floor line with air outlets above the mantel. The grilles can be located anywhere in the sides or front of the fireplace depending upon the design.

Principle of Operation

The basic principle behind the Heatilator is its double wall construction. These walls form an air chamber into which the cold air is drawn through inconspicuous grilles or masonry latticework. This air circulates throughout the air chamber and is discharged again—heated—through other grilles higher up in the masonry. The principle of operation is similar to that of the warm air furnace.



Cross-Section View of Heatilator

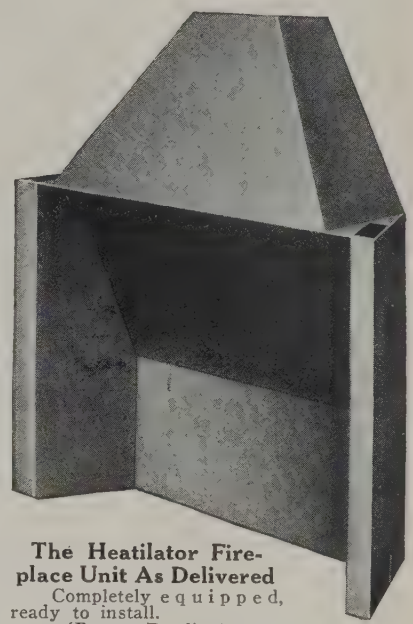
Advantages

(1) Saves one-half its cost in material and labor.

(2) Insures scientifically correct construction.

(3) Makes fireplace more useful by giving twice the heat. Anemometer tests show that the Heatilator-equipped fireplace with a moderate wood fire produces 100 cu. ft. of air per minute at a temperature of 200° to 250° F.

(4) Enhances fireplace beauty through the small decorative grilles for air intakes and outlets.



The Heatilator Fireplace Unit As Delivered

Completely equipped, ready to install.
(Patent Pending)

(5) Increases property value and makes it more readily salable.

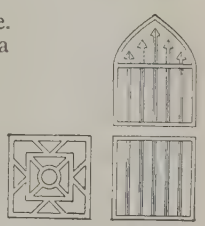
(6) Does not require the services of a highly skilled fireplace specialist.

Grilles—

Grilles for the air intakes and outlets can be had at the following prices, in either of the two designs illustrated:

8-in. Grilles, $1.60 each.
10-in. Grilles, $2.00 each.

Finish is grey iron, japanned and oxidized. Special designs in clay as well as faience. Tile grilles furnished at slight additional cost.



Specifications—

The inner shell forming the firebox is of $\frac{1}{8}$ to $\frac{3}{8}$-in. copperoid boiler plate iron. Downdraft shelf and smoke damper are of the same material. The outside and dome walls which serve as forms for permanent masonry are of 14 gauge copperoid iron. All seams are electrically welded. The damper is easily removed, adjusted to any position—positive poker control requires no mechanism or fixtures in the mantel.

Installation Directions—

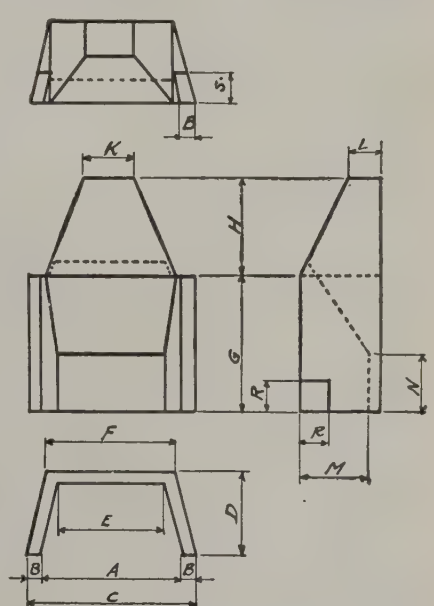
Complete directions for installing, simple and easy to follow, together with a plan drawing, come with each unit.

Shipped for Free Inspection—

Shipment will be made to any reliable dealer or architect for inspection. If not found satisfactory, the Heatilator may be returned and freight charges will be refunded.

Freight Allowed—

Freight is allowed to all rail points east of the Rocky Mountains. Denver rate is allowed to all points west.



See table below for key to these drawings, also for prices

HEATILATOR - DIMENSIONS

MODEL	A	B	C	D	E	F	G	H	K	L	M	N	R	S	PRICE
34-H	34½"	3"	40½"	20"	27"	32"	33½"	24"	12"	8"	17"	15"	8"	8"	$58.
39-H	39"	4"	47"	22"	30"	36"	36"	24"	16"	8"	18"	16½"	8"	8"	$68.
44-H	44"	5"	54"	24"	32½"	40"	42"	24"	16"	8"	19"	18"	8"	8"	$78.
50-H	50"	6"	62"	26"	37"	45"	44"	30"	16"	12"	20"	20"	10"	8"	$96.
62-H	62"	8"	78"	28"	44½"	55½"	48"	36"	16"	12"	22"	22"	10"	10"	$116.
74-H	74"	10"	94"	30"	50"	64"	56"	36"	24"	16"	24"	24"	10"	10"	$136.
28-H	28"	3"	34"	18"	20½"	24⅜"	32"	24"	12"	8"	15½"	14"	8"	8"	$53.

BOIS PATENTED INTERLOCKING SHEET STEEL STAIRS

(N. BOIS, PATENTEE, 2717 BALBOA STREET, SAN FRANCISCO, CAL.)

MANUFACTURED IN THE UNITED STATES, CANADA AND EUROPE BY THE FOLLOWING COMPANIES

New England States
E. VAN NOORDEN & CO.,
100 Magazine Street, Boston, Mass.

Georgia, Tennessee, Florida, North and South Carolina
DOWMAN-DOZIER MFG. CO.,
Campleton Road, Atlanta, Ga.

Ohio, Michigan and Indiana
THE RIESTER & THESMACHER CO.,
1512 West 25th Street, Cleveland, Ohio

Nebraska, Kansas and Western Iowa
PAXTON & VIERLING IRON WORKS,
South 17th Street and Union Pacific Railway, Omaha, Neb.

Texas
SOUTHERN ORNAMENTAL IRON WORKS,
Dallas, Tex.

Illinois
WETZEL IRON WORKS,
3349 West Grand Avenue, Chicago, Ill.

Missouri
LASAR MANUFACTURING CO.,
16th and O'Fallon Streets, St. Louis, Mo.

Northern California
PEERLESS ORNAMENTAL IRON CO., INC.,
1528 Folsom Street, San Francisco, Cal.

Southern California, Washington, Oregon, Colorado, New Mexico, Utah, Wyoming, Nevada, Arizona and Hawaiian Islands
A. J. BAYER CO.,
Slauson and Santa Fe Avenues, Los Angeles, Cal.

Alabama, Louisiana, Mississippi and Arkansas
DECATUR IRON & STEEL CO.,
Decatur, Ala.

Kentucky and Virginia
LOGAN CO. (formerly The Dow Co.),
1025 Franklin Street, Louisville, Ky.

Wisconsin, Minnesota and Eastern Iowa
CONSOLIDATED SHEET METAL WORKS,
661 Hubbard Street, Milwaukee, Wisc.

Great Britain, France and Belgium
FREDK. BRABY & CO., Ltd.,
Petershill Road, Glasgow, Scotland

Products

BOIS PATENTED INTERLOCKING SHEET STEEL TREADS and RISERS.

Also manufacturers of Sheet Steel Stairs.

Advantages

Bois interlocking tread and riser offers distinct advantages of economy, rigidity and rapid erection. The *interlocking* feature eliminates the labor of bolting or riveting, and makes rapid installation possible with unskilled labor.

Heretofore the nosing on sheet metal stairs broke away from the composition steps. Bois interlocking tread and riser prevents breaking away the nosing from the composition step under the heaviest traffic. Its superiority and economy in construction can be readily seen.

Interlocking Feature

The interlocking tread and riser combined is formed from a single sheet of steel with flanged member that interlocks at the nosing line. The metal becomes double thick which reinforces the steps.

Labor Saving Installation

A tie rod is inserted under each tread through the stringer. The installation consists only of setting the tread, bolting up the tie rod and inserting two bolts for each tread where the tread meets the flange of stringer, doing away with the bolting or riveting as in ordinary types of stair work, and speeding up the erection.

Varied Standards

The gauge of metal varies with the width of the stairs and weight to be carried. The interlocking treads and risers can be used with any type of stringer such as sheet steel construction or concrete.

The treads are adaptable to any kind of composition fill, slate, marble, asphalt or concrete, also for any desired safety tread.

Deliveries

When sheet steel stringers are used, the stairs can be assembled at the factory and delivered at the building ready for installation. Each section can be installed as the building progresses, eliminating the use of temporary stairs or ladders, doing away with unnecessary expenses.

If concrete stringers are to be used, the treads and risers are interlocked and put in position from floor to floor, after which the stringers are moulded as usual.

Inquiries

Make all inquiries for estimates to the Manufacturer (list in heading) controlling the territory in which the building is to be erected. State number of treads and risers, width of stairs, type of stringers, and nature of tread. Include sketch or drawing on which all dimensions and quantities are indicated.

Specifications

All metal stairs throughout the building shall be of the Bois Interlocking Tread and Riser construction type.

Each tread and riser shall be of one continuous piece of No. 12 or No. 14 gauge sheet steel. The tread metal shall be continued up and bent into an inner nosing, around which the outer (wearing) nosing shall be bent and secured by an interlocking, depending flange, reinforcing the step and preventing the nosing from breaking away from the concrete.

The junction of the treads and risers shall be securely fastened to the lower flange of the stringers with $\frac{5}{16}$-in. diameter round machine bolts.

The face and wall stringers shall be of No. 10 gauge sheet steel, with outward top flange and inward bottom flange. Stringers shall be securely tied together with $\frac{7}{8}$-in. diameter tie rods, placed under each tread, near the nosing.

Platforms or landings shall be of No. 14 gauge corrugated steel plates, with interlocking nosing for connection with riser and shall be securely fastened to angle iron supports connected to stringers.

Newels, railings and balustrades to be of design and construction as indicated on plans.

All work to have 1 shop coat of approved paint.

Information and Catalogue

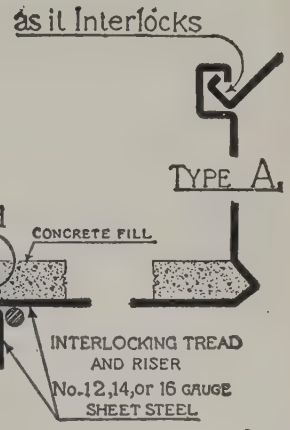
For full information and illustrated catalogues and detail drawings apply to Manufacturer (list in heading) controlling the territory in which the stairs are to be installed.

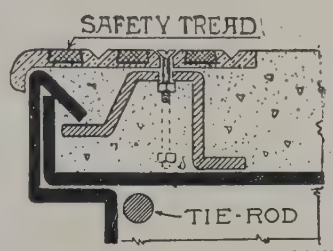
Continued on next page

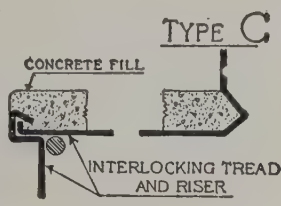
Feature of the Bois Patent Interlocking Treads and Risers for Stair Construction;

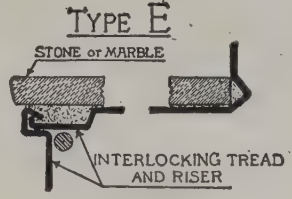
It eliminates all bolting and riveting thus saving considerable labor when assembling the stairs. Where the tread interlocks at the nosing the metal becomes double thick, reinforcing the step and preventing the metal breaking away from the concrete.

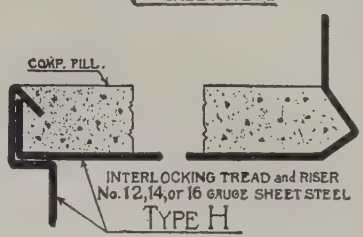
It is the most practical, economical, superior stair construction.

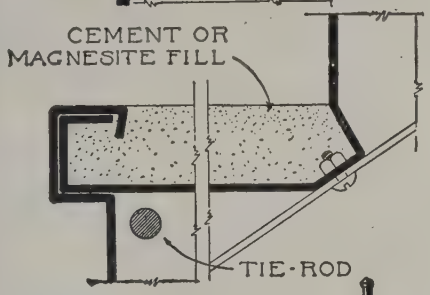


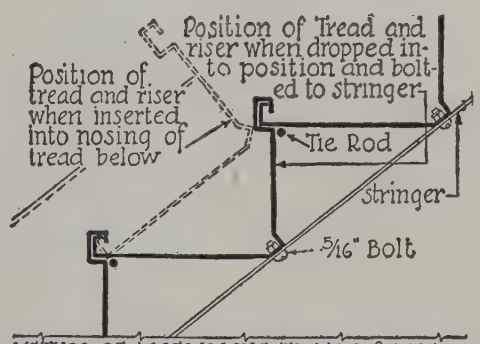




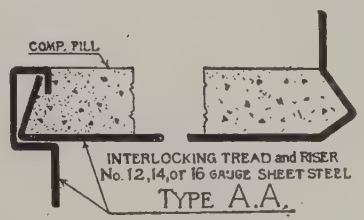


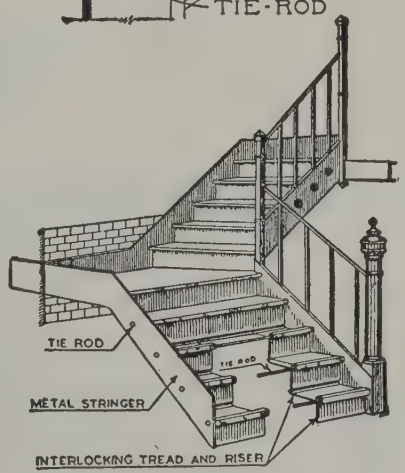


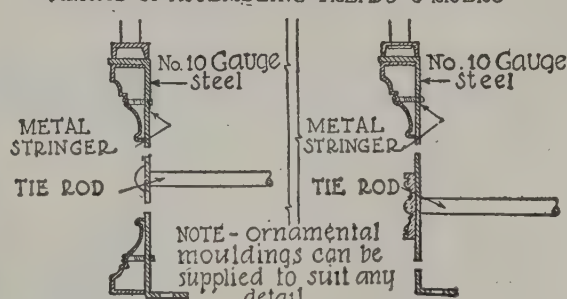




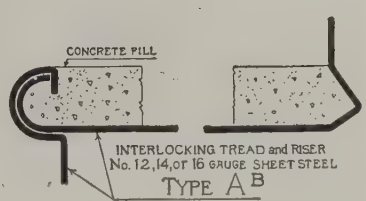
METHOD OF ASSEMBLING TREADS & RISERS







DETAILS OF METAL STRINGERS



U. S. Patent No. 1,244,021
U. S. Patent No. 1,304,533
U. S. Patent No. 1,353,977
Canadian Patent No. 194,134
Canadian Patent No. 194,135
Canadian Patent No. 213,306
France Patent No. 501,494
Belgian Patent No. 281,657
Great Britain Patent No. 145,251

Approximate Weight of Bois Interlocking Treads and Risers

Width of Stairs	Sq. Ft. of Metal in One Interlocking Tr. & Riser	Weight of One Interlocking Tread and Riser		
		No. 12 Ga.	No. 14 Ga.	No. 16 Ga.
2'-0"	4 Sq. feet	18.0 lbs.	12.8 lbs.	10.4 lbs.
2'-6"	5 " "	22.5 "	16.0 "	13.0 "
3'-0"	6 " "	27.0 "	19.2 "	15.6 "
3'-6"	7 " "	31.5 "	22.4 "	
4'-0"	8 " "	36.0 "	25.6 "	
4'-6"	9 " "	40.5 "	28.8 "	
5'-0"	10 " "	45.0 "	32.0 "	
5'-6"	11 " "	49.5 "		
6'-0"	12 " "	54.0 "		

TYPICAL SECTIONS SHOWING CONSTRUCTION OF BOIS PATENTED INTERLOCKING TREADS AND RISERS

Test of Bois Patent Interlocking Sheet Steel Stair Made by E. Van Noorden Co., Boston, Mass.

December 9, 1924

In order to determine accurately the safe loading for the Bois Interlocking Sheet Steel stair, a test was conducted by Professor H. W. Hayward of the Massachusetts Institute of Technology, Cambridge, Mass. A summary of this test is as follows:

"The full load of 600 pounds per square foot was allowed to remain upon the stairs for two weeks. The load was then removed and after four days the inspection was made.

"The slight distortion in channel header (at top) straightened out when the load was removed. The deflection in the top flange of runner was reduced to a negligible amount upon removal of the load. The general appearance of the stairs was good. No indications of overstrain could be noted either as regards lateral or vertical deflections.

"It should be noted that during the time the load was on the stairs the temperature varied approximately from 0° to 50° F. This variation in temperature would cause additional indeterminate stresses on the stairs."

Full report of test will be sent on request.

BABCOCK-DAVIS CORPORATION

Manufacturers of Pre-cast Concrete Stairs with Steel Stringers

474 Dorchester Avenue

BOSTON, MASS.

Products and Services

BABCOCK-DAVIS PRE-CAST CONCRETE STAIRS WITH STEEL STRINGERS. (Patented.)

Also manufacturers of Ornamental Iron Work: including Cast and Wrought Iron Stairs; Railings, Marquises; Wire Grilles; Elevator Fronts, Frames and Thresholds.

Our engineers invite consultation during preparation of plans and will gladly co-operate in making working drawings and computing proper sizes required. Estimates submitted on request.

For Steel Flagpoles, see pages A676-677.

Pre-cast Concrete Tread and Riser

Strength (Factor of Safety, 10)—At the Massachusetts Institute of Technology tests were made by Professor Irving H. Cowdrey on 4 units. Each unit consisted of a pre-cast concrete tread, 4 ft. long by 11¼ in. wide, and 8-in. riser mounted on steel channel iron stringers. The average of these tests shows:

First hair crack in riser at 2300 lb. total load. Maximum load 3575 lb.

Construction—"Pre-cast concrete tread and riser" construction is economical to install and maintain, and is made from a scientifically prepared formula which makes the stair as hard as stone and practically indestructible. The Babcock-Davis "Pre-cast Tread and Riser" stair marks a decided advancement in stair construction for either inside or outside installation. As the name suggests, it is a combined reinforced concrete tread with steel nosing and riser cast in one interlocking unit. This work is done in our own shop and the units are shipped to the building under construction, where they are applied to the steel stringers furnished by us.

Advantages

Its very practical principle of interlocking, replaceable units has many advantages:

It is of lighter construction, is installed more quickly, at a smaller cost than stairs made entirely of concrete, has a steel nosing and *stringer buttress* as required by insurance engineers.

Wood forms, and such obstructions which delay building operations while the cement is hardening in all-concrete stair construction, are done away with.

There is no ringing sound or vibration to Babcock-Davis "Pre-cast Concrete Stairs" when in use, for they are practically noiseless. They are attractive in appearance. All joints are tight. Their upkeep is reduced to a minimum, as steps need not be painted, and, being dustless, they are easily kept clean.

Babcock-Davis "Pre-cast Concrete Treads and Risers" treated with our Non-slipping Formula and with our steel nosing cast into the tread is a fine safety tread, with no opportunity to chip the nosing.

Specifications

In writing specification, state: "BABCOCK-DAVIS CORPORATION, 474 Dorchester Avenue, Boston, Mass., Patentee, will furnish steel stringers, railing and 'Pre-Cast Concrete Treads and Risers' with steel nosing complete."

For schools, hospitals and public buildings, where non-slipping qualities are desired, specify "To be treaded with BABCOCK-DAVIS CORPORATION Non-slipping Formula."

Installations

We have installed our pre-cast concrete stairs in a great many buildings in the United States and in every case they have received the highest praise and approval of every engineer and architect who has investigated them including the Building Department of the City of Boston.

Pre-cast Concrete Stair with Steel Nosing

BUILDERS' IRON WORKS, INC.

Steel Stair Specialists

TELEPHONE
DAYTON 4123-4124

615-617 Tiffany Street

NEW YORK, N. Y.

Product

PRESSED STEEL STAIRS: Ornamental, Plain and Commercial.

Stairway Specialists

We manufacture steel stairways exclusively. Our specialization assures unusual service and low prices. We produce a saving in the cost of manufacture because we have the most modern machinery, dies and labor saving devices. We complete stairs quickly and on schedule time, as we employ only specially trained workmen who are accustomed to our systematized methods. The keynote of our organization is *Stairway Service* to the architect, builder, engineer and contractor.

Erection

We are prepared to erect our stairways anywhere under any weather conditions, rapidly, and at a considerable saving in construction costs.

Construction

Our stairways are constructed in accordance with the best shop practice. We endeavor to maintain the highest standard of quality at all times. Our stairways meet the requirements of the State and city codes. They are attractive and cost less than similar stairways. Our standard stairways can be readily modified to meet the requirements of the architect. Workmanship and materials are guaranteed against defects.

Welding and Riveting—Both welding and riveting are employed as required, and according to the best shop practice.

Treads and Risers—Multiple sections of No. 14, 12 and 10 gauge blue annealed steel are used. A tread and riser are one unit supported by and bolted to angle iron carriers which are machine riveted to stringers.

Stringers—We make three types: plate and angle, pressed steel channel, structural channel.

The first two types are made of universal mill steel plate, especially rolled for stair work. The other type is the standard structural channel.

Newels—Plain or ornamental to suit design in cast iron, pressed steel tubing or square wrought iron tubing. Caps and drops can be had in ornamental cast iron.

Facias—Made of steel plates and paneled with steel moulding where required.

Railings—Wrought or cast iron according to architect's details.

Platforms—Crimp sheet iron platforms to eliminate cross tees or angles, or plain sheet iron over structural steel tees and angles.

Painting—All work is given one coat of rust preventive paint before leaving shop. No painting done in field.

Standard Construction Details

Standard stringer, treads and risers, railings and newels drawn to large scale furnished upon application.

Stairs to Architect's Design

We can furnish steel stairs of any design to meet any requirement.

Information and Estimates

We will be pleased to furnish information regarding construction and typical installations and estimates.

A Typical Installation

A Few Representative Installations

Chanin Building	New York, N. Y.
Kings Park State Hospital	Kings Park, N. Y.
Lincoln Hotel	New York, N. Y.
Pennsylvania Hospital	Philadelphia, Pa.
Friends Meeting House	Atlantic City, N. J.
General Motors Building	New York, N. Y.
Hotel Oglethorpe	Savannah, Ga.
Hotel Kean	West Palm Beach, Fla.
Sky Top Lodges	Canadensis, Pa.
Miami Beach City Hall	Miami Beach, Fla.
Santini Warehouse	New York, N. Y.
Manhattan State Hospital	Wards Island, N. Y.
Corning Building	Hartford, Conn.
Wykagyle Country Club	New Rochelle, N. Y.
North Avenue Market	Baltimore, Md.
Fox Meadow School	Scarsdale, N. Y.
St. Thomas Seminary	Hartford, Conn.
Loyola Library	Baltimore, Md.
St. Francis Parochial School	North Adams, Mass.
Chestnut Street School	Springfield, Mass.
Fairview Hospital	Great Barrington, Mass.
State Teachers' College	Fredericksburg, Va.
Hebrew Women's Home for Crippled Children	Hartford, Conn.
Jewish Community Centre	Staten Island, N. Y.
St. Peter's Church	Hartford, Conn.
Claysmith Building	Staten Island, N. Y.
Newington Home for Crippled Children	Hartford, Conn.
Nurses' Home, Johnston Willis Hospital	Richmond, Va.
Church of Incarnation	New York, N. Y.
Kuhns Building	Dayton, Ohio
City Bank & Trust Co.	Hartford, Conn.
School of Immaculate Conception	Staten Island, N. Y.
Roanoke Apartments	Buffalo, N. Y.
Rittenhouse Apartments	Ardmore, Pa.
Bernardsville National Bank	Bernardsville, N. J.
Hanover McSherrytown Water Co.	Hanover, Pa.
Wilmer Institute, Johns Hopkins University	Baltimore, Md.
Colwick School	Colwick, N. J.
Public School No. 11	Yonkers, N. Y.
McCrory Stores	Miami, Fla.
Royal Typewriter Co.	Hartford, Conn.
State School	Belchertown, Mass.
State Trade School	Hartford, Conn.
Haselsite School	Huntington, N. Y.
Liggett Building	Dayton, Ohio
East Hartford School	Hartford, Conn.
Columbus Hospital	New York, N. Y.
St. Luke's Lutheran Church	Union Course, N. Y.
Grasslands Hospital	White Plains, N. Y.
Blue Point School	Blue Point, N. Y.
Hill Motor Co.	New Rochelle, N. Y.
Wethersfield High School	Hartford, Conn.

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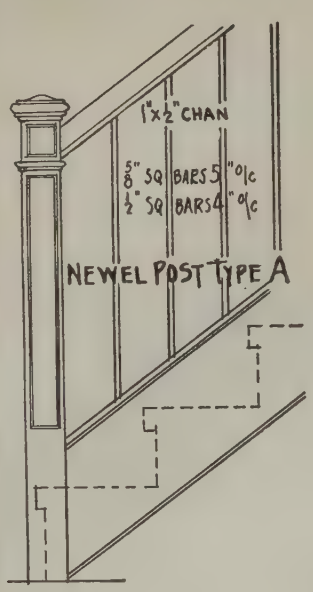

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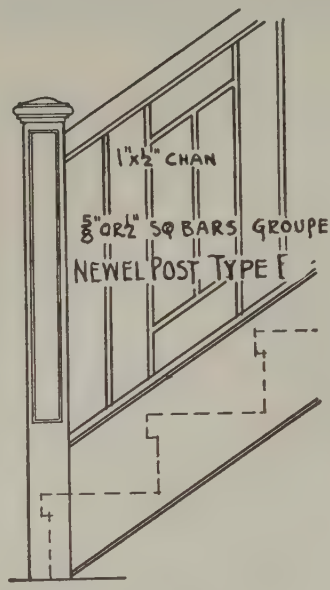

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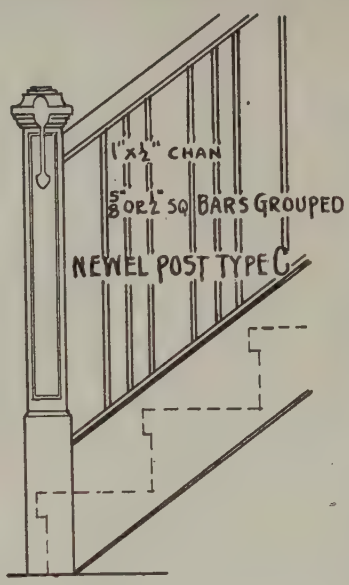

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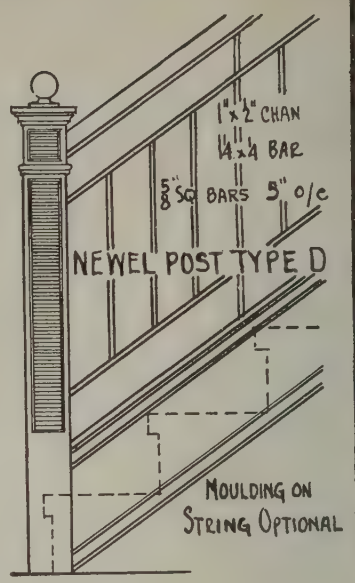

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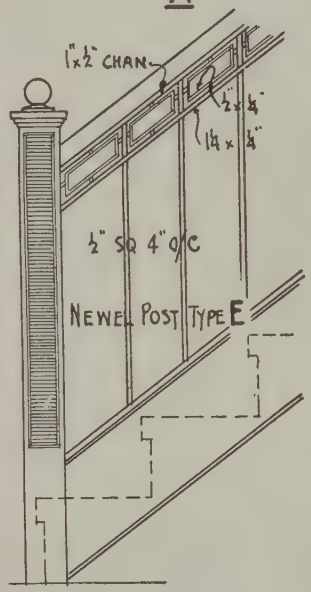

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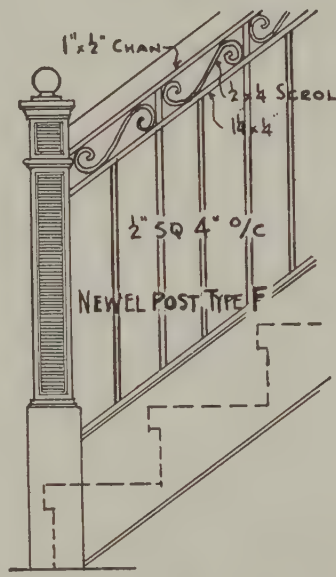

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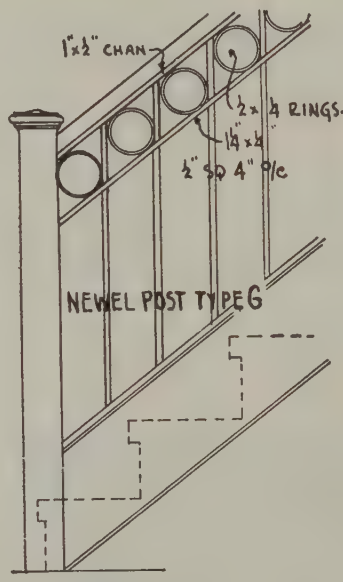

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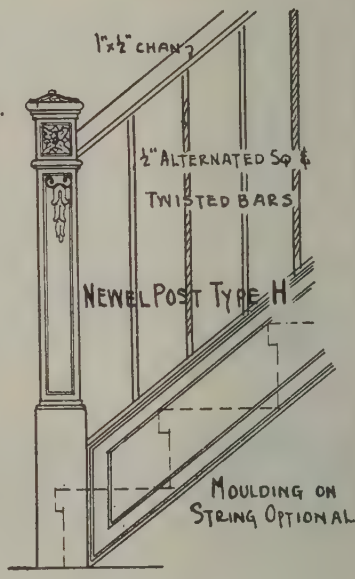

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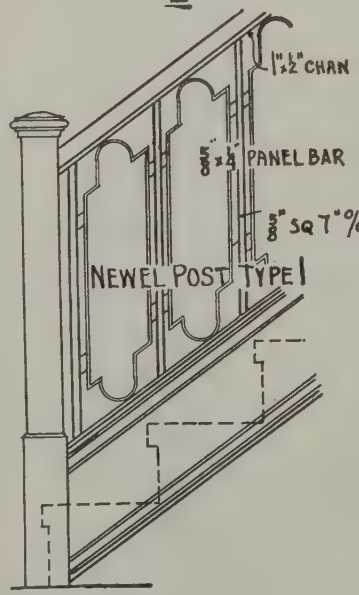

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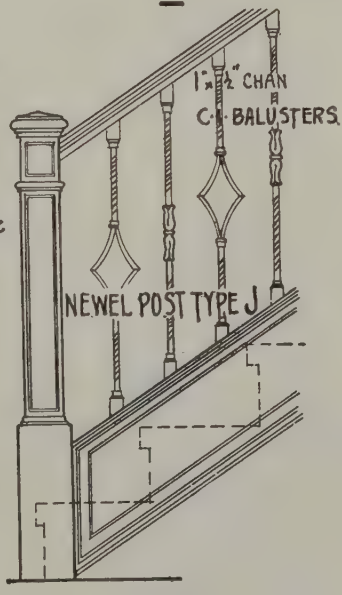

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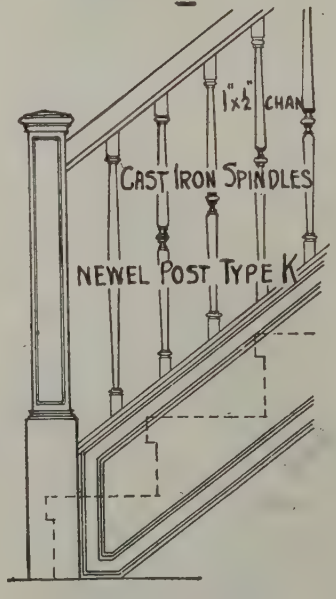

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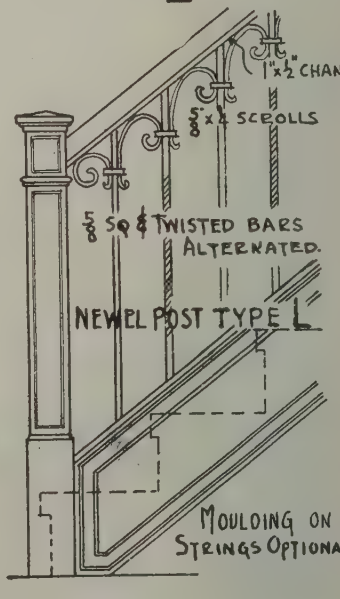

L

-RAILINGS-STRINGS-AND-NEWELS-

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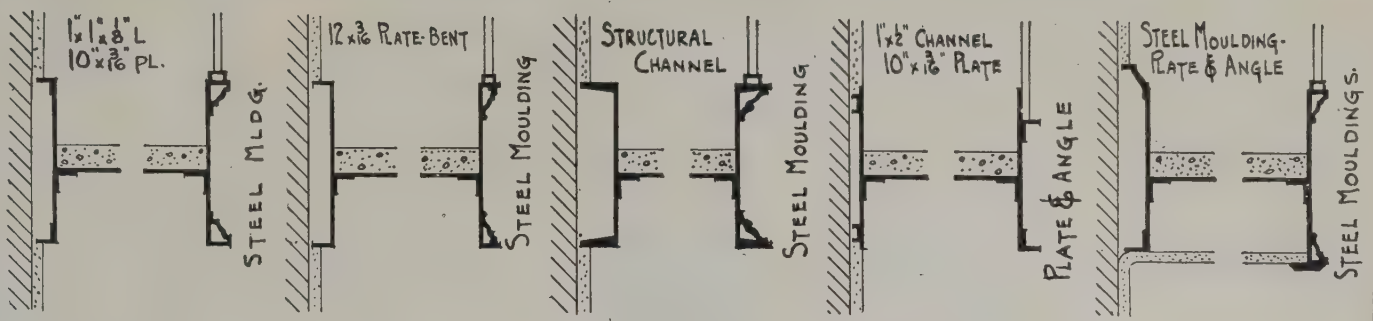
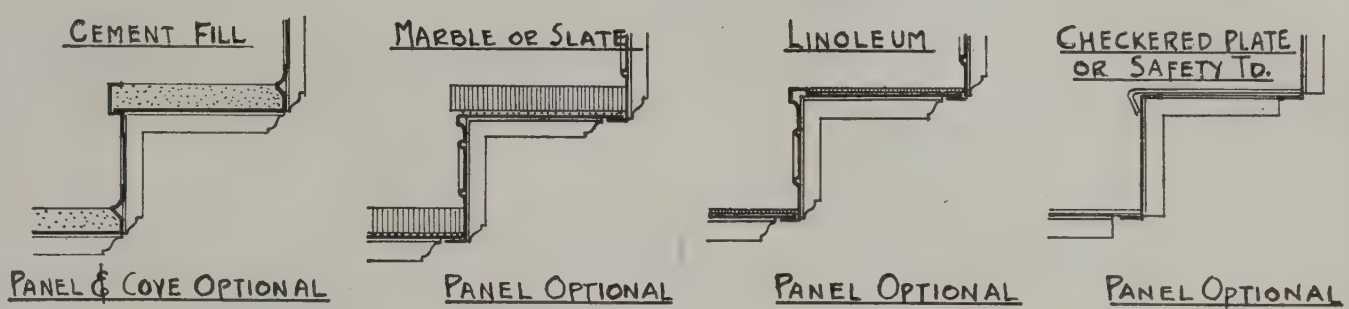


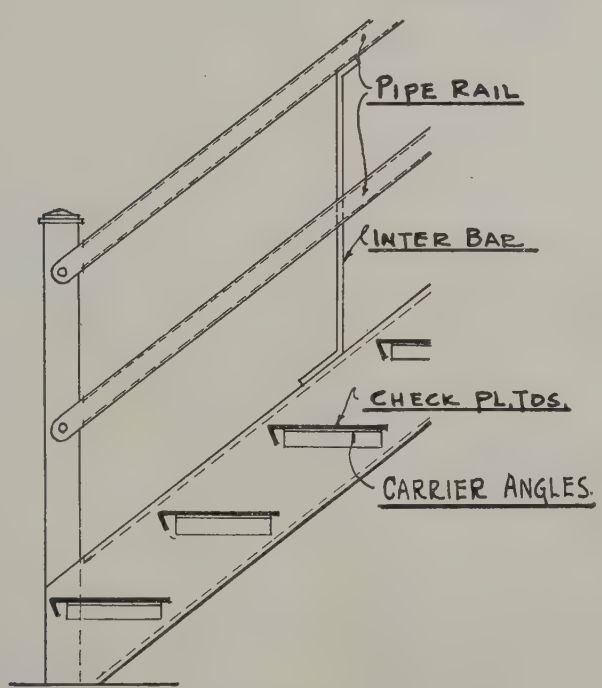
TYPE A PLATE & ANGLE | TYPE B BENT PLATE | TYPE C STRUCTURAL | TYPE D FLUSH TYPE | TYPE E ORNAMENTAL TYPE

STRING SECTIONS

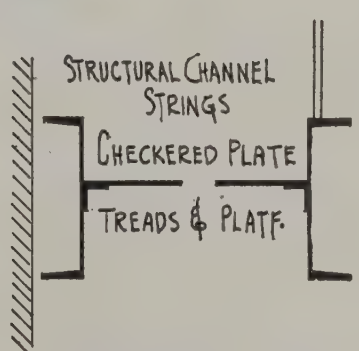


TYPE #1 | TYPE #2 | TYPE #3 | TYPE #4

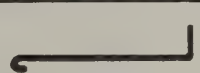
RISER SECTIONS



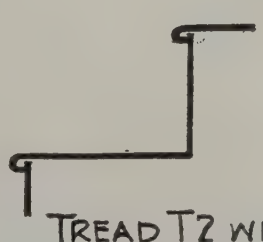
SECTIONAL ELEVATION



CROSS SECTION



TREAD T1 WITH BACK LIP



TREAD T2 WITH RISER

DETAIL OF SERVICE STAIR

SUCCESSORS TO GROSSMAN BROS. & ROSENBAUM, INC.

Steel Stairs Exclusively

MAIN OFFICE AND FACTORY

Leggett Avenue and Truxton Street

NEW YORK, N. Y.

SALES OFFICES IN PRINCIPAL CITIES

Product

Manufacturers of STEEL STAIRS, exclusively and all parts for steel stairs, including Newel Posts, Risers, Stringers, Facias and Railing.

Steel Stairs Exclusively Since 1902

In 1902 we built the first flight of pressed steel stairs ever made, our firm being organized in that year for the purpose of manufacturing *steel stairs exclusively*. In spite of the fact that for some years we were the sole manufacturers of this product, within five years steel stairs had replaced cast iron in practically all new buildings in Greater New York. Soon thereafter steel stairs were in general use throughout the country. In the last twenty-six years we have built not less than 200,000 flights of stairs.

Construction—Our stairs are built to architects' specifications. They are built as a steel structure is built, with rivets, bolts, and strong welds, in accordance with sound engineering practice. Our patents are not for unique methods of assembling stairs, but for the basic machinery and methods of building strong stairs cheaply.

Tests—In 1908 Prof. Ira Woolson of Columbia University tested our stairs and found that they will bear a live load of 400 lb. per sq. ft. with no permanent deflection. Our stairs are approved by the Building Department of the City of New York and have been erected with the approval of the local authorities in practically all communities throughout the United States.

Suggested Specifications for Architect's Use

General—Stairs shall be of steel made by SUCCESSORS TO GROSSMAN BROS. & ROSENBAUM, INC. or of equal construction and in accordance with the following specifications:

Stringers—

Note: When writing a specification use only the paragraphs covering the type of stringers desired.

(1) Wall stringers shall be Type No. W-1 made of 12x$\frac{3}{16}$-in. plate rolled into the form of a channel 10x$\frac{3}{16}$ in.

(2) Wall stringers shall be Type No. W-5 made of 10x¼-in. plate with 1¼x1¼x⅛-in. angles riveted top and bottom to form a channel.

(3) Face stringers shall be Type No. F-1 made of 12x$\frac{3}{16}$-in. plate rolled into the form of a channel 10x$\frac{3}{16}$ in.

(4) Face stringers shall be Type No. F-5 made of 10x¼-in. plate with 1¼x1¼x⅛-in. angles riveted top and bottom to form a channel.

(5) Face stringers shall be Type No. F-2 made of 12x$\frac{3}{16}$-in. plate with an integral moulding rolled into top and bottom.

(6) Face stringers shall be Type No. F-3 made of a 12x$\frac{3}{16}$-plate rolled into the form of a channel 10x$\frac{3}{16}$ in. with our rolled stock steel moulding applied top and bottom.

(7) Face stringers shall be Type No. F-4 made of a 10x¼-in. plate with Braun [Blum] moulding top and bottom.

(8) Face tringers shall be Type No. F-3A made of a 12x$\frac{3}{16}$-in. plate rolled into the form of a channel 10x$\frac{3}{16}$ in. with Braun [Blum] moulding applied top and bottom and a rolled moulding applied to form a center panel.

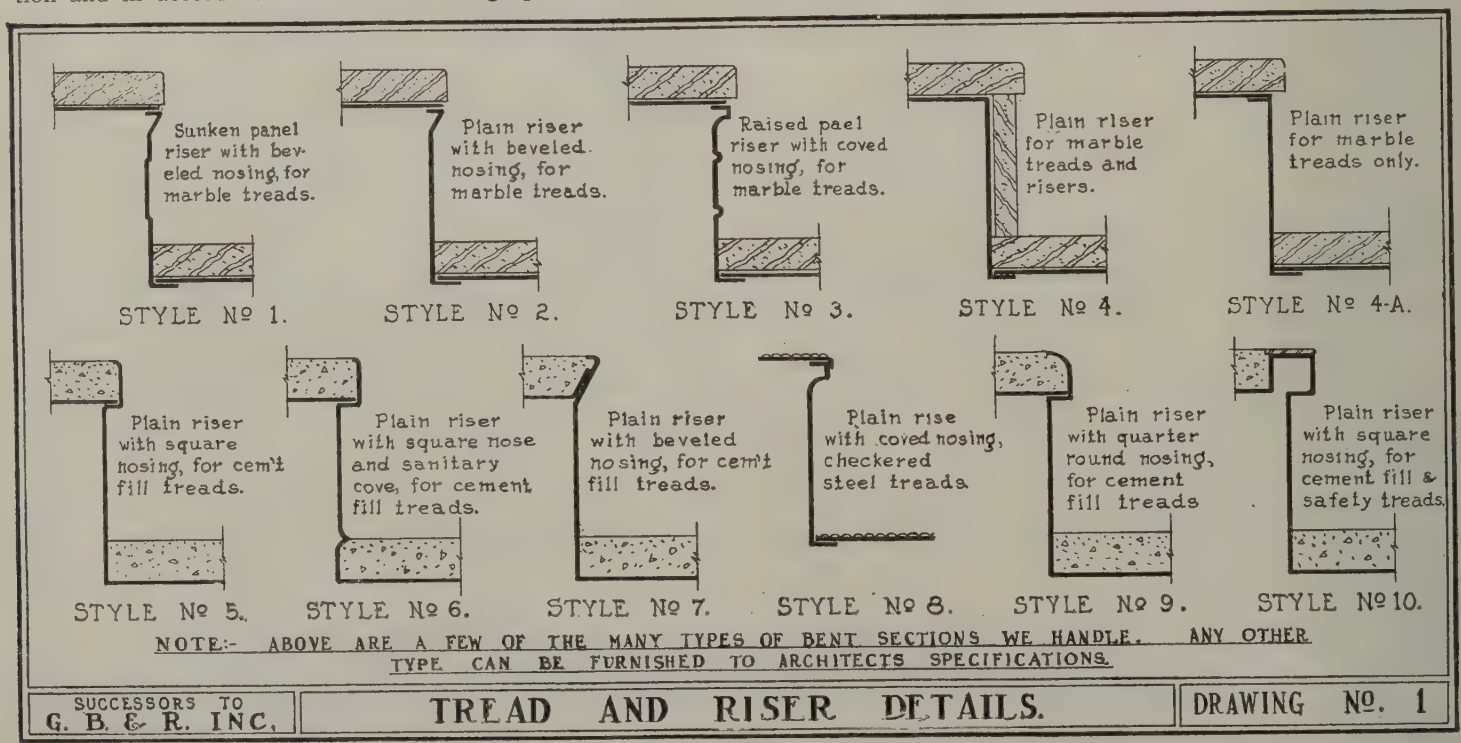
(9) Face stringers shall be Type No. 4A, same as Type No. 4, with a rolled moulding applied to form a center panel.

Carriers—Carriers shall be 1¼x1¼x⅛-in. angles securely riveted to stringers by 3$\frac{3}{16}$-in. round head rivets.

Newels—Starting newel at first floor shall be Type GN (substitute type number desired); other newels shall be Type CN (substitute type number desired).

Railings—The balusters shall be Design A made of ⅝-in. square bars 5 in. on centers with a channel 1x⅜ in. top and bottom, the top channel shall be drilled to receive a wood handrail furnished and installed by others. (Substitute design desired and if pipe handrail is required.)

Risers and Treads—Risers and treads to be Style No. 5 in one continuous piece of blue annealed steel sheet. The riser is to be panelled as indicated. The subtreads are to have nosings for cement fill 1½ in. thick. (Substitute style desired and if for marble, slate, terrazzo, etc.)



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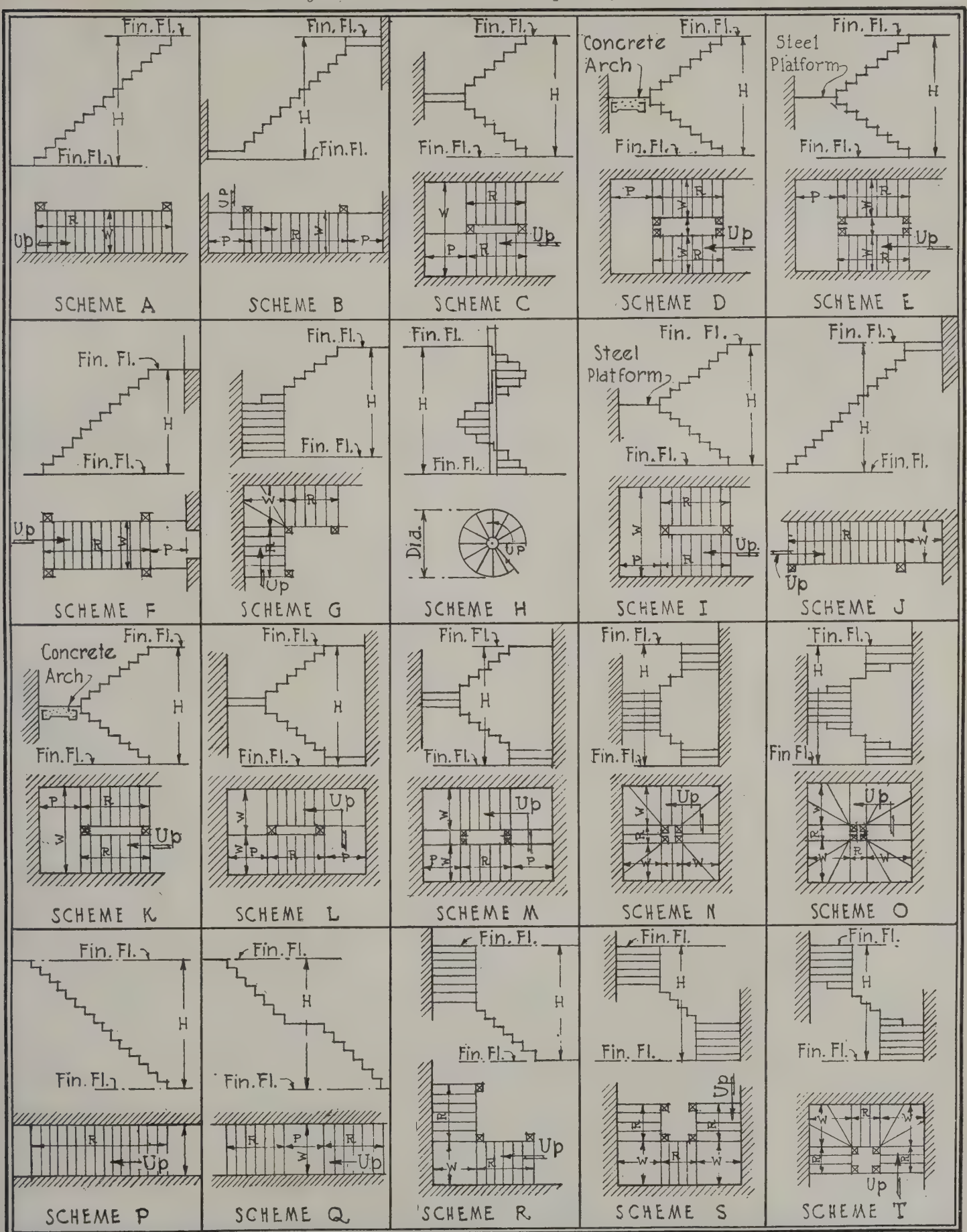
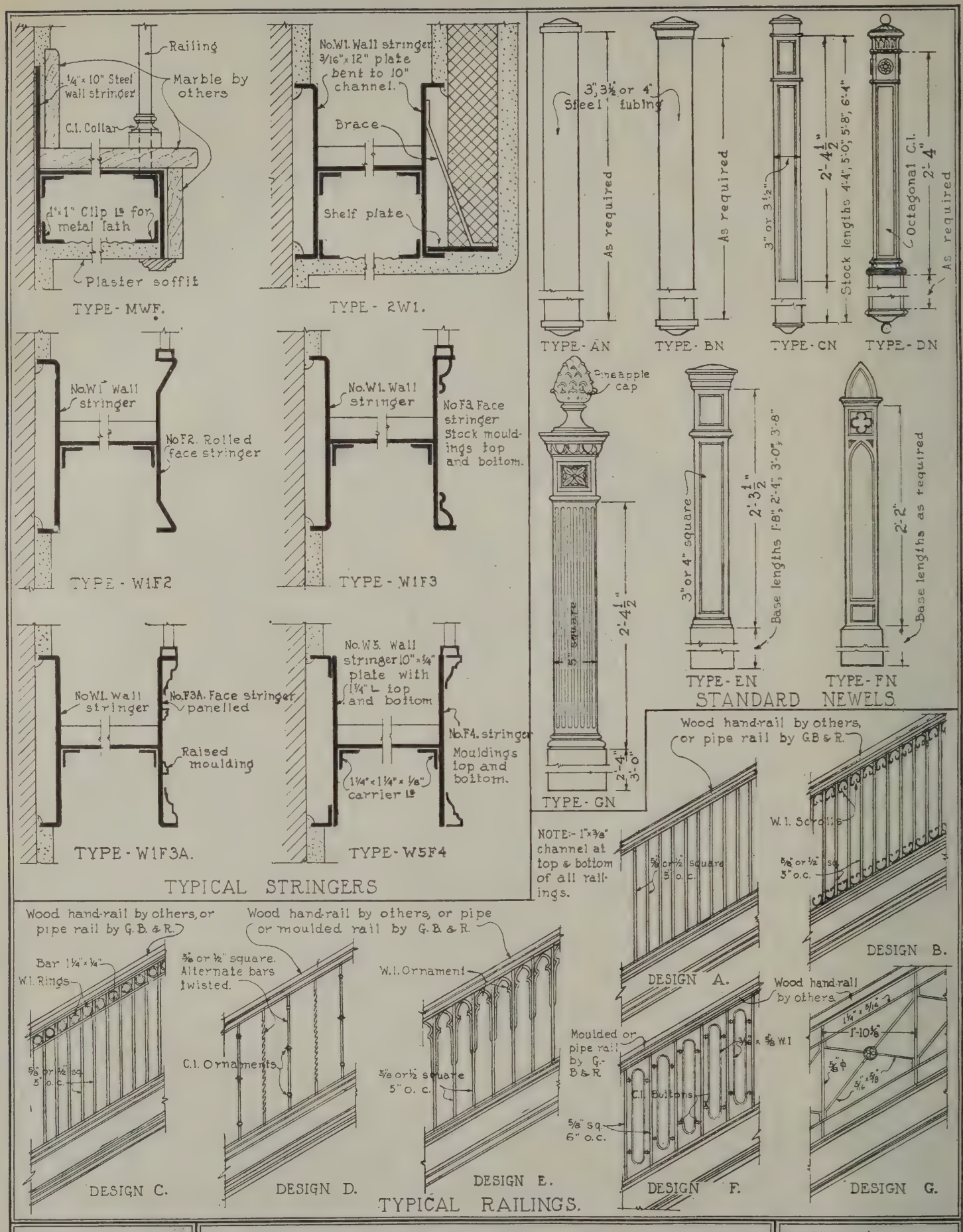
Note: The Indicating Dimensions Are Those Required for Estimating Purposes.



SUCCESSORS TO GROSSMAN BRO'S. & ROSENBAUM, INC	TYPICAL STAIR LAYOUTS	DRAWING NO 2 NOT DRAWN TO SCALE

Continued on next page

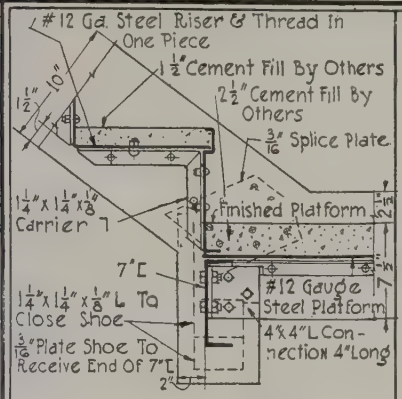


SUCCESSORS TO GROSSMAN BROS & ROSENBAUM, INC.

TYPICAL STRINGER DETAILS AND STANDARD NEWEL POST AND RAILING DESIGNS.

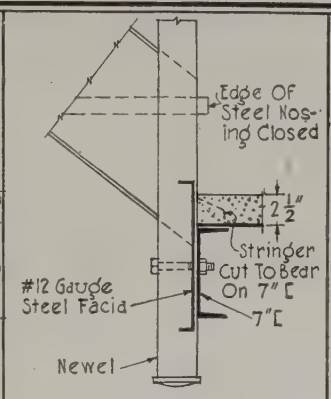
DRAWING NO. 3
SCALE:- ⅜", ¾" & 1½" = 1'-0".

Continued on next page



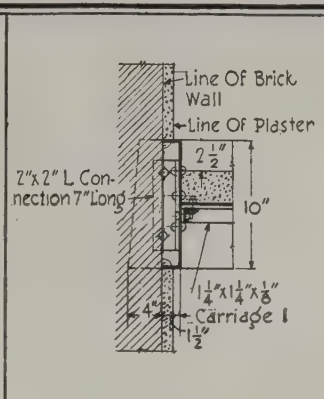
DETAIL "A"

STARTING WALL STRING 7"C AT PLATFORM



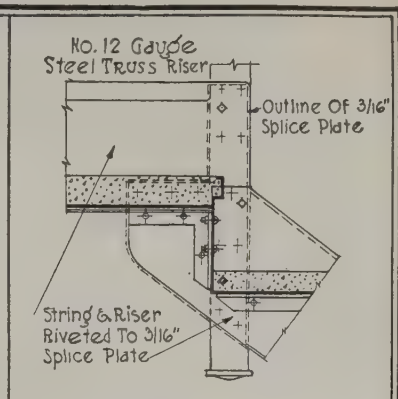
DETAIL "B"

STARTING FACE STRING 7"C AT PLATFORM



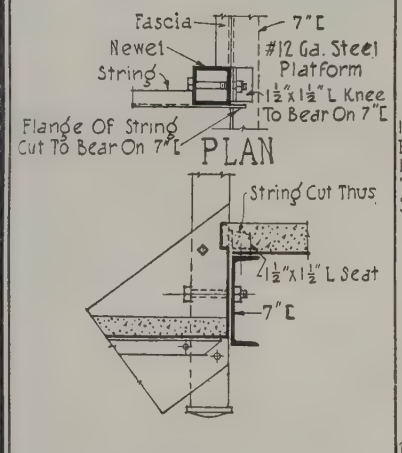
DETAIL "C"

WALL BEARING



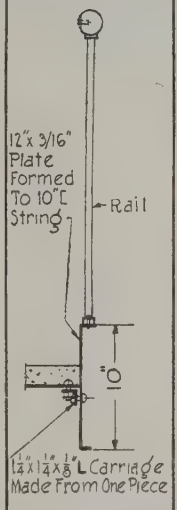
DETAIL "D"

TRUSS RISER

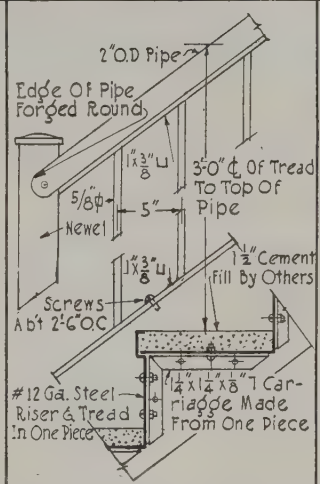


DETAIL "E"

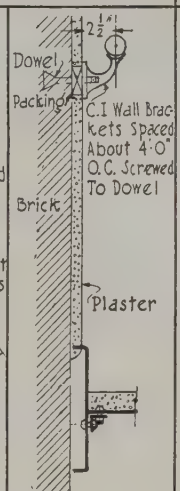
LANDING FACE STRING 7"C AT PLATFORM



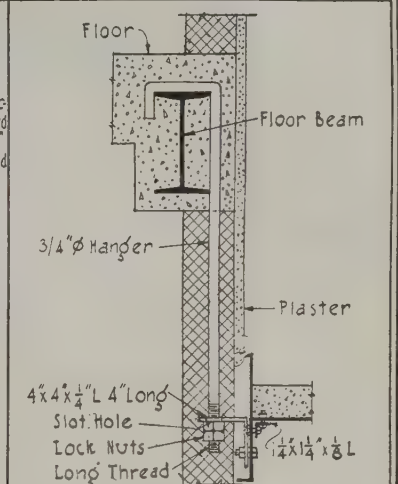
FACE STRING



TYPICAL STAIR DETAILS

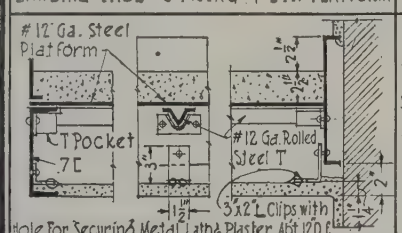


WALL STRING



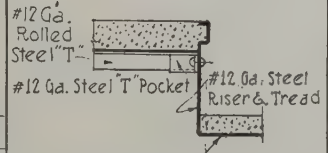
DETAIL "C"

STAIR SUPPORTED BY FLOOR BEAM



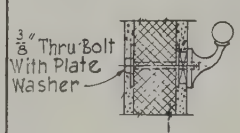
"L" DETAILS ~ "M"

SHOWING "T" PLATE SUPPORT & PLASTER SOFFIT

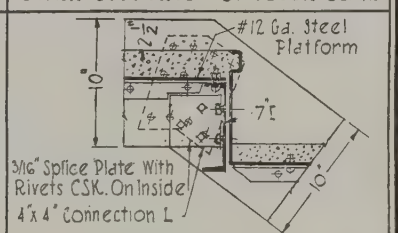


DETAIL "O"

"T" CONNECTION TO RISER

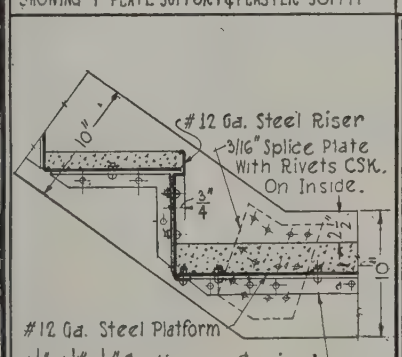


WHERE BRACKET IS SECURED TO TERRA COTTA PARTITION



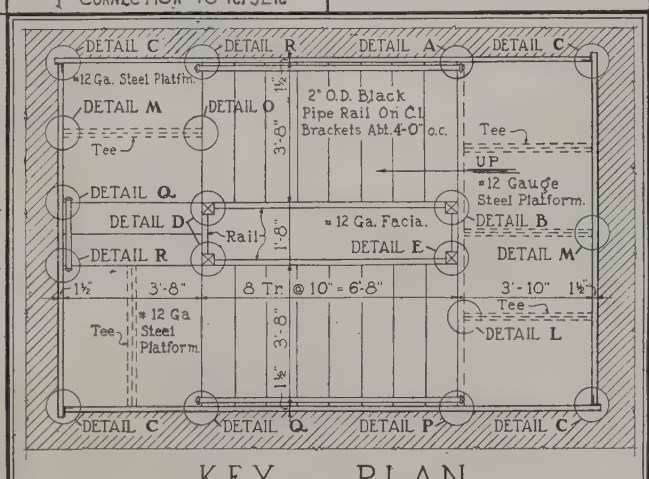
DETAIL "P"

LANDING WALL STRING 7"C AT PLATFORM

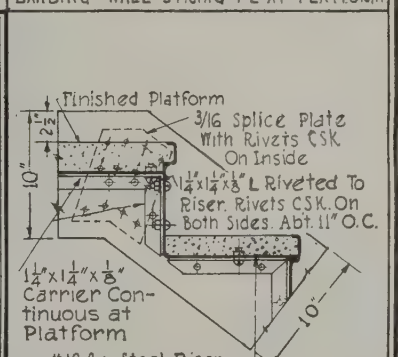


DETAIL "Q"

STARTING WALL STRING FROM PLATFORM



KEY PLAN



DETAIL "R"

LANDING WALL STRING AT PLATFORM

SUCCESSORS TO GROSSMAN BRO'S. & ROSENBAUM, INC.

STANDARD STAIR DETAILS

DRAWING NO. 4
SCALE 3/4"=1'-0"
JULY 1928

GUARSTEEL SAFETY STAIR COMPANY

Manufacturers of Safety Steel Stairs

165 West Wacker Drive

CHICAGO, ILL.

Products

GUARSTEEL STAIRS, REVERSIBLE NOSINGS, BENT STRINGERS, TREADS, RISERS, LIGHT WEIGHT CIRCULAR STAIRS, GUARSTEEL THRESHOLDS and STAIR NOSINGS.

Guarsteel Stairs

The very fact that we manufacture a distinctive one-piece tread and riser equipped with a safety nosing accounts for the fact that Guarsteel Safety Stairs are rapidly becoming known.

The illustration shown below depicts the safety feature of our stairway clearly and concisely and, without stretching the imagination, you can conceive the raised buttons with a perforated hole therein. These raised buttons, spaced 5/8 in. on centers, form a superior safety grip and render long and efficient service.

Architects being selected for their superior knowledge of building materials of all descriptions should protect the owner in every possible manner against accidents. Therefore, why not specify Guarsteel Safety Stairs and receive this protection, also a first class installation in every particular.

Reversible Nosings

The latest development of our Engineering Department covers two new features:

(1) A reversible safety nosing which can be kept in service until the upper surface does not provide a safety grip any longer; then the tap screws can be removed, the nosing reversed, and, in this way, a new safety wearing surface placed above the tread.

(2) The same principle adapted to a plain stair without a safety feature; permitting replacements, when the metal wears through nosing, without removing treads and risers, as is necessary with standard one-piece treads and risers.

These new features are fully covered in the illustrations on the next two pages, and are entitled to your very careful consideration.

Circular Stairs

Guarsteel Spiral Stairs are made entirely of steel, light in construction, but possessing greater strength than any other type on the market.

We do not depend upon any clamp connections to the center pipe column, such as were used in the past, and are never asked to come back to a job to tighten the various parts. We can point with pride to all of our late installations and the efficient service which we render.

We have no patterns to make, no castings to make, and provide a stair at least 40% lighter than the average cast iron stair.

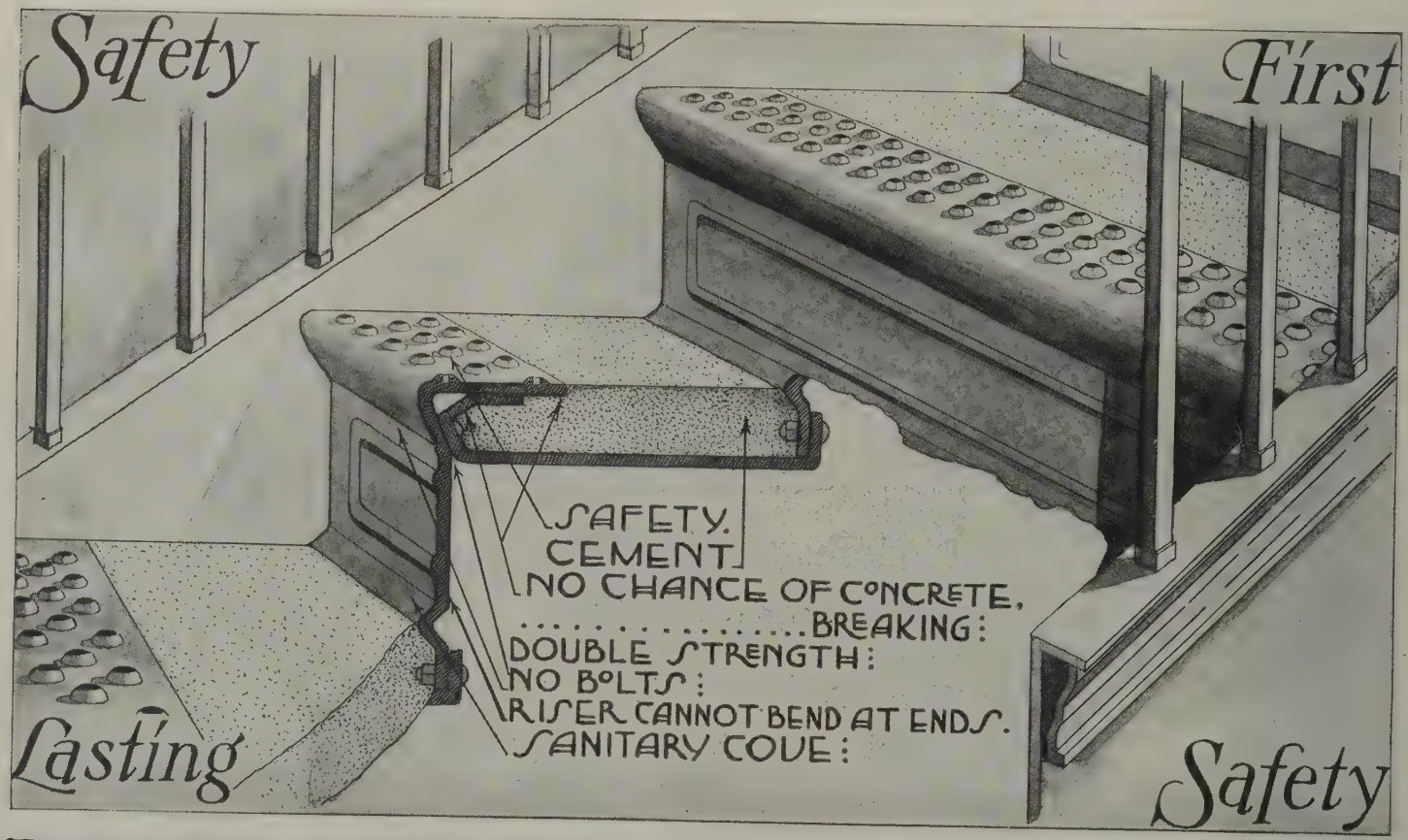
Thresholds

Guarsteel Thresholds are less than half the weight of cast iron and can be made in any required length. The same safety feature is applied to the surface of these thresholds that is used on our stairs.

Catalogue

Write for our Catalogue No. 3, bearing out all of our statements.

We are very glad to co-operate with architects in designing stair structures and will render any assistance that is asked.



GUARSTEEL SAFETY STAIRS

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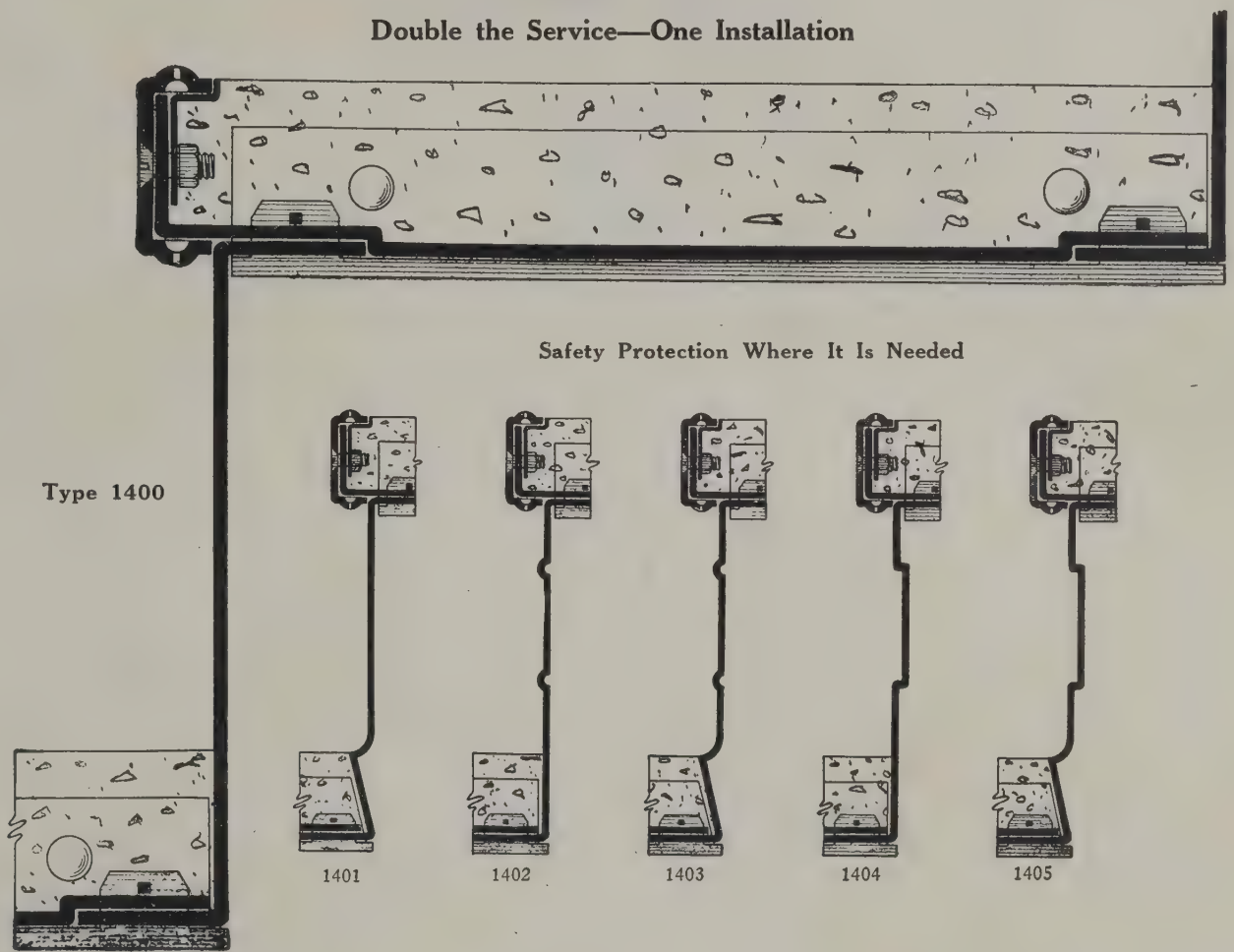
Guarsteel Safety Stair Company

165 WEST WACKER DRIVE. CHICAGO, ILL.

REVERSIBLE NOSINGS

Double the Service—One Installation

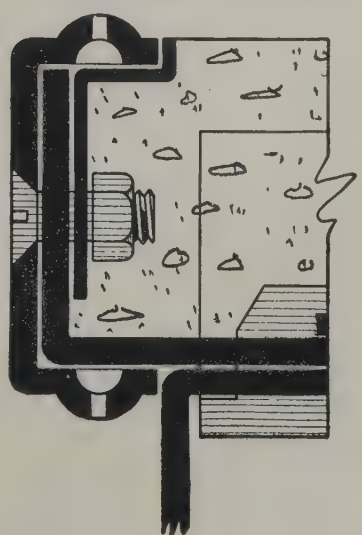


Safety Protection Where It Is Needed

Type 1400

1401 1402 1403 1404 1405

Actual Size of Nosing



The slippery portion of a stairway is at the nosing. That is one reason why we advocate a small nosing with a good safety grip. The back portion of the tread being of cement or composition filling, is liable to wear hollow back of the nosing and, unless the entire tread surface is built of safety material, it will be necessary to patch the tread surface; but, why go to an expense of providing a full safety surface when the expense of patching the cement or fill can be done at a very low cost.

We suggest the use of Guarsteel Reversible Nosings which can be taken off, turned upside down, and provide as many years of additional protection as the original upper surface provided.

The reversible nosings are also made for use in connection with reinforced concrete stairs, either in the form of tread nosings or as a complete riser with safety nosing.

In all cases the inside pan provides against the breaking away of concrete at any time the nosing is removed or replaced and is a feature of our construction.

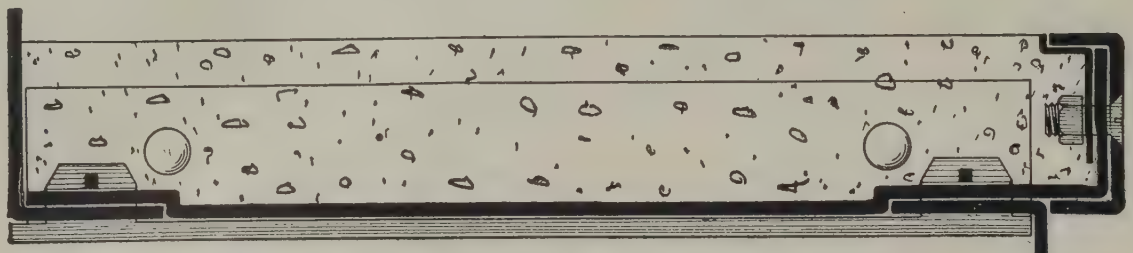
Continued on next page

Guarsteel Safety Stair Company

165 WEST WACKER DRIVE. CHICAGO. ILL.

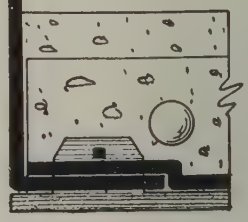
REVERSIBLE NOSINGS

The Latest Achievement in Plain Stairs

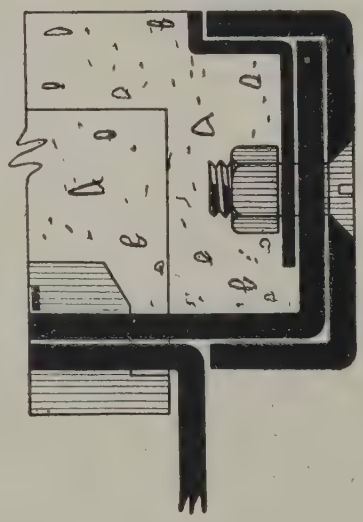


With This Added Feature Our Stairs Become a Perpetual Installation

Type 1500



Actual Size of Nosing



Take a look at any installation of standard steel stairs. The point that begins to show wear is the steel nosing, and it is a question, depending upon the amount of traffic the stair receives, of how soon the metal will wear through at the outside edge. This is bound to happen, and the only salvation that architects and owners have is to place a safety tread over this portion of the stair. The placing of this safety nosing is above the finished line of the tread and generally lasts but a very short time, when it will have to be replaced.

Modern architects with far sighted ideas are taking kindly to reversible Guarsteel nosings, shown on this page, which doubles the life of the nosing at the outside point, and in years to come, when both surfaces of the nosing have been worn through, it is only necessary to buy these small nosings and place them on the stairs.

We claim that the reversible nosing feature makes our stairs a perpetual installation, and there is no way of doubting this assertion because of the easy manner in which replacements can be made at the only wearing point.

Our literature covering the complete usage of these nosings is ready for distribution and we feel that architects and builders will welcome the opportunity of receiving this information.

FOUNDED 1850

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

Jones & Laughlin Building, PITTSBURGH, PA.

For District Sales Offices and Warehouses, see page A667

Products

J & L Light Weight Channels for Stair Stringers and other uses.

Also J & L Structural Shapes and Fabricated Structural Work, Columns, Girders, Trusses, Plate Work, Tanks, Mill and Factory Buildings; J & L Steel Piling; J & L Wire Products.

For J & L Bars for Concrete Reinforcement, see page A148; for J & L Junior Beams, see pages A667-669; for J & L Tubular Products, see pages C2720-2721.

Description of J & L Light Weight Channels

J & L Light Weight Channels are produced on modern rolling mills and are similar in type to standard channel sections. They have constant dimensions, making fabricating and fitting to other work economical.

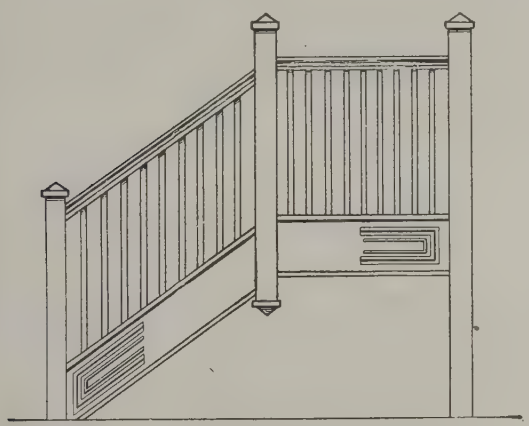
Due to the rolled shape, the material is ready, as received, for fabrication into various uses, including stair stringers, thereby saving time. The rolled shape also reduces to the minimum shop equipment for fabrication. J & L Light Weight Channels are economical in weight and form a strong structure.

The lines are straight and true, resulting in proper fitting at the joints, thus making a well-finished installation.

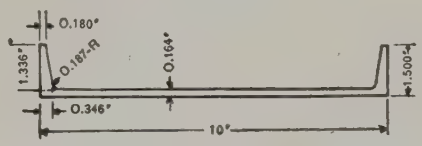
These sections are available at the present time in two weights—8 lb. per ft. and 8.8 lb. per ft.

A cut showing typical installation, as well as tables giving dimensions, allowable loads on both 16,000 and 18,000 lb. per sq. in. stress and other properties are shown below.

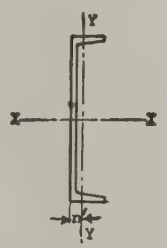
The new light weight channels are available for immediate shipment from the following points: Chicago, Cincinnati and Pittsburgh. Carried in lengths of 20, 25, 30 and 40 ft. Other lengths by special arrangement.



Typical Installation



Note: Dimensions above are for C-751. See table below for C-750.



DIMENSIONS

Section index	Depth of channel, in.	Wt. per ft., lbs.	Flange width: In. and decimal parts	Flange width: In. and fractional parts	Web thickness: Decimal parts of an inch	Web thickness: Fractional parts of an inch
C-750	10	8.8	1.523	1 33/64	0.1875	3/16
C-751	10	8.0	1.5	1 1/2	0.164	11/64

PROPERTIES OF SECTION

	Axis X-X (perpendicular to web)			Axis Y-Y (parallel to web)			
Area sq.in.	I	r	S	I′	r′	S′	n′
2.57	32.2	3.54	6.4	0.35	0.37	0.28	0.28
2.34	30.3	3.60	6.1	0.33	0.38	0.27	0.29

ALLOWABLE LOADS

	Index No.	Weight per ft., lb.	Bend. mom., ft. lb.	Span, feet: 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Fiber Stress, 18,000 Lb. per Sq. In.																												
Total load in thousands of pounds	C-750	8.8	9660	44.9	38.6	25.8	19.3	15.5	12.9	11.0	9.7	8.6	7.7	7.0	6.4	5.9	5.5	5.2	4.8	4.5	4.3	4.1	3.9	3.7	3.5	3.4	3.2	3.1	3.0
	C-751	8.0	9090	39.4	36.4	24.2	18.2	14.5	12.1	10.4	9.1	8.1	7.3	6.6	6.1	5.6	5.2	4.8	4.5	4.3	4.0	3.8	3.6	3.5	3.3	3.2	3.0	2.9	2.8
Total deflection, in.					.007	.017	.030	.047	.067	.091	.119	.151	.186	.225	.268	.315	.365	.419	.477	.538	.603	.672	.745	.821	.901	.985	1.073	1.164	1.259
Load in lb. per lin. ft. of channel	C-750	8.8		44900	19320	8587	4830	3091	2147	1577	1208	954	773	639	537	457	394	343	302	267	239	214	193	175	160	146	134	124	114
	C-751	8.0		39400	18180	8080	4545	2909	2020	1484	1136	898	727	601	505	430	371	323	284	252	224	201	182	165	150	137	126	116	108
Fiber Stress, 16,000 Lb. per Sq. In.																												
Total load in thousands of pounds	C-750	8.8	8587	36.4	34.3	22.9	17.2	13.7	11.4	9.8	8.6	7.6	6.9	6.2	5.7	5.3	4.9	4.6	4.3	4.0	3.8	3.6	3.4	3.3	3.1	3.0	2.9	2.7	2.6
	C-751	8.0	8080	27.7	32.3	21.5	16.2	12.9	10.8	9.2	8.1	7.2	6.5	5.9	5.4	5.0	4.6	4.3	4.0	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.6	2.5
Total deflection, in.					.007	.015	.027	.041	.060	.081	.106	.134	.166	.200	.238	.280	.324	.372	.424	.478	.536	.598	.662	.730	.801	.876	.953	1.035	1.119
Load in lb. per lin. ft. of channel	C-750	8.8		36400	17173	7633	4293	2748	1908	1402	1073	848	687	568	477	406	350	305	268	238	212	190	172	156	142	130	119	110	102
	C-751	8.0		27700	16160	7182	4040	2586	1796	1319	1010	798	646	534	449	382	330	287	253	224	200	179	162	147	134	122	112	103	96

Note: Loads above lines at left will produce maximum allowable shear in webs; loads above lines at right will produce excessive deflections.

THE HUGHES-KEENAN CO.

Pressed Steel Stairs and Spiral Steel Stairs

MANSFIELD, OHIO

Products

SAFETY-LOCK and SAFETY-NOSE INSERT PRESSED STEEL STAIRS; SPIRAL STEEL STAIRS.

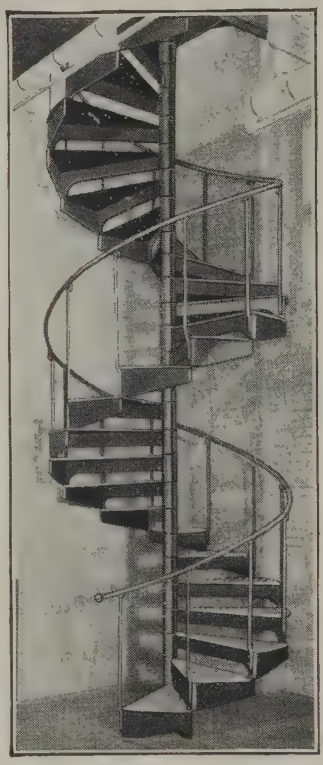
General

Both types of pressed steel stairs and the spiral steel stairs are the result of many years of practical experience in the design, manufacture and installation of steel stairs for all types of buildings and for all purposes. They combine great strength with minimum weight and can be easily adapted to any requirements of the architect or builder and made plain or highly ornamental as desired. They meet the requirements of all State and city building codes.

All special features such as our safety-lock tread and riser, safety-nose insert and spiral stairs are covered by patents allowed and applied for.

Safety-Lock Pressed Steel Stairs

Made with a continuous steel plate tread and riser firmly interlocked at nosing, each tread bolted rigidly to the lower flange of a Z-shaped stringer and all tied together with a tie rod running under the angle of each nosing from stringer to stringer. With channel shaped stringers light steel carriage angles are used with tread bolted to carriage angle. See following page for construction details.



Hughes-Keenan Spiral Stairs in Horace Mann Junior High School, Cleveland, Ohio

Safety-Nose Insert Pressed Steel Stairs

These eliminate exposed sheet metal on treads, providing a safety tread as a part of the stair at a cost considerably below that of special safety treads. Tread and riser is a continuous steel plate formed at nosing into a channel or trough section in which a lead insert is firmly bolted, providing a lead safety nosing in edge of the tread where most needed. This insert is easily and quickly installed. Can be renewed when worn at very low cost and does not affect the tread filler when replacing. Cement, composition or asphalt filler can be used. Tie rods with Z-shaped stringers or carriage angles with channel shaped stringers may be used. See following page for construction details.

Write for our special folder describing these stairs.

Spiral Steel Stairs

The extreme lightness and simplicity of design of the spiral stairs makes one-man erection practical. The lightness comes through a special construction of steel which is decidedly lighter than old-style cast iron yet carries an equal live load.

These stairs are furnished with checkered steel plate treads and plain steel plate risers of open or closed type. They are fastened to steel sleeves which slip over the central supporting column. An erection simplicity that means a decided saving of time and labor.

The finished assembly is decidedly compact and appealingly neat. Complete details are given in a special folder sent on request.

Pre-built Erection Method

The Hughes-Keenan Pre-built Erection Method reduces the cost of the stairs installed in building 25% below usual cost. There is no reduction in quality of stairs—the saving resulting only from low engineering and erection costs and shop standardization. Stairs are on the job to be installed as building progresses, giving contractor use of them instead of requiring erection of temporary ladders or stairs. Cutting and fitting and patching of plaster is avoided.

Write for our special folder describing this method.

Installation

Stairs, except spiral steel stairs, are shipped in completely assembled units so that they can be easily and quickly installed at low cost.

Experienced erectors furnished when desired.

Typical Installation of Hughes-Keenan Safety-Nose Insert Pressed Steel Stairs

Standard Construction Details

Standard stringer, tread and riser, railing and newel details, drawn to large scale, furnished to architects upon application.

Stairs to Architects' Designs

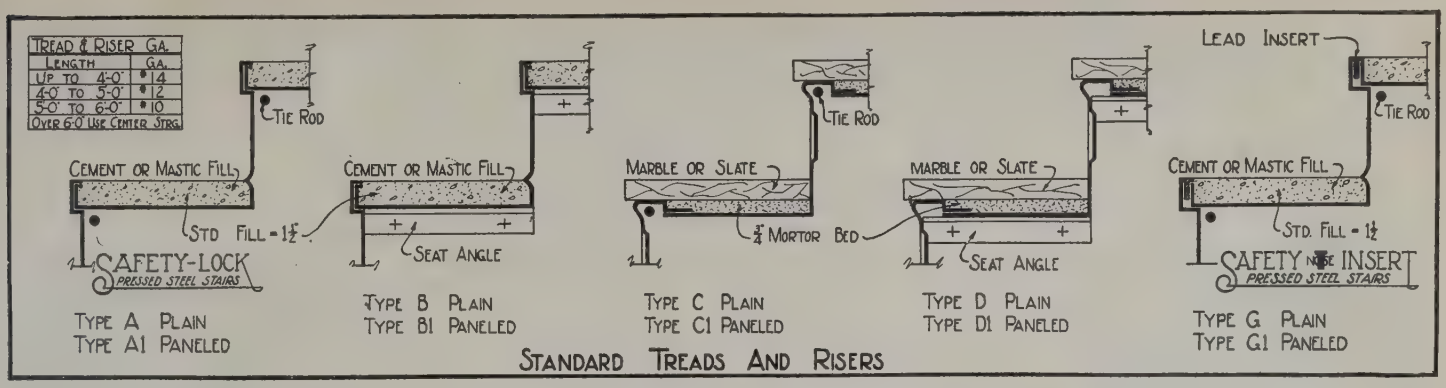
In addition to our patented pressed steel stairs, we can furnish steel stairs of any design and to meet all architects' requirements. We can also furnish the Bois Interlocking Steel Stairs in the states of Maryland, Delaware, District of Columbia, Colorado, Wyoming, Utah.

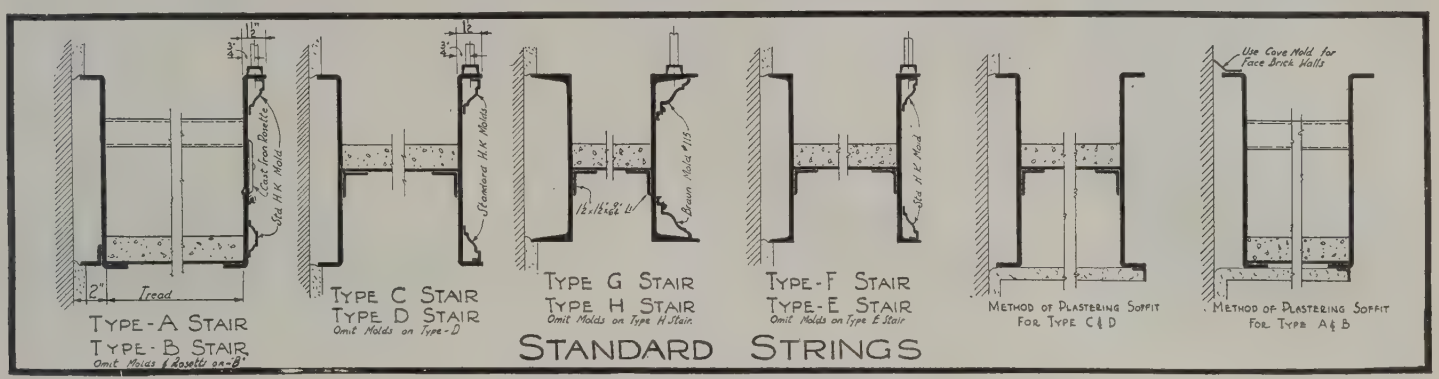
Information and Estimates

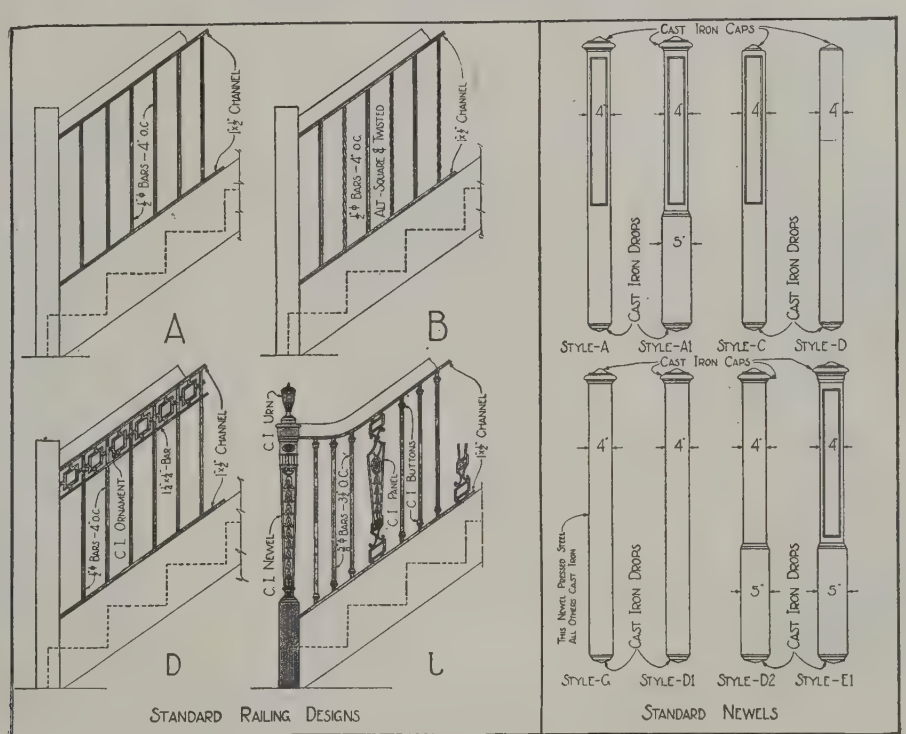
For catalogue, complete information regarding construction and typical installations and estimates, write THE HUGHES-KEENAN CO., Mansfield, Ohio.

Typical Installation of Hughes-Keenan Safety-Lock Pressed Steel Stairs

Continued on next page







Construction Details

Treads and Risers—Illustrated above are standard Safety-Lock and Safety-Nose insert treads and risers. Treads are made to receive cement, composition or asphalt filler. Risers are made either plain or with sunken panel and have sanitary cove.

Standard tread and riser for slate or marble treads are also shown with risers plain or paneled and sanitary cove omitted. The tread and riser is continuous and the gauge of metal used is determined by the width of the stair.

Stringers—Sections of various types of standard stringers are illustrated above. Z-shaped, pressed steel stringers are used for both Safety-Lock and Safety-Nose insert stairs when tie rods are used. Pressed steel or light structural channels are used with carriage angle construction.

The gauge of plate and depth of stringer or size of structural channels is determined by span and width of stair, using a high factor of safety.

Newels and Railings—Newels and railings are furnished to any design to suit architects' requirements. A few standard railing designs are illustrated above. Pipe railings or railings of any other design can be furnished.

The cast iron and pressed steel newels shown are stock designs with square shaft and base. Newels of any design can be furnished. Pressed steel newels are either 3 or 4 in. square, have perfectly smooth surfaces and are very rigid and strong.

MESKER BROTHERS IRON COMPANY

Combination Steel and Concrete Stairs

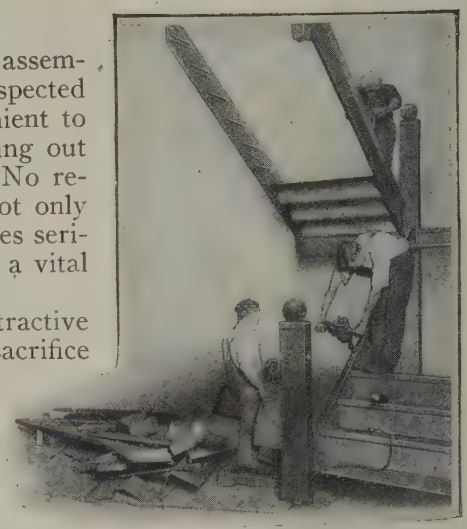
ST. LOUIS, MO.

For Steel Sash and Metal Windows, see pages A1276-1278

Note This Comparison—Erection

Mesker's Stairways come to you completely assembled at factory, carefully painted, checked and inspected prior to being shipped in sections most convenient to handle, and to facilitate installation. No sorting out and assembling various and numerous parts. No refitting, repunching or reboring, all of which not only adds substantially to the cost, but likewise causes serious delay in erection of same, as well as being a vital factor in marring the appearance thereof.

In some instances a seemingly more attractive price may be offered by others, but do not sacrifice absolute satisfaction in every respect, as the effects of poor quality and a higher erection cost will in no instance offset the possible difference in the original price.



Specifications

Stringers—Shall be $\frac{3}{16}$-in. steel plate, bent in channel form and of width shown on plans.

Treads and Risers—Shall be made of one continuous steel plate No. 12 or 13 gauge, bent to form as indicated. Treads shall be supported at ends by special clamps, securely bolted to stringers with acorn heads on face strings and shall be filled with concrete or other material by others. (Tread filling $1\frac{1}{2}$ in. more or less in thickness.)

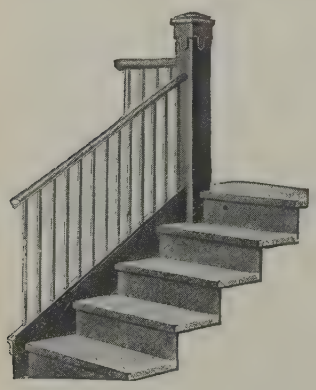
Platforms and Landings—Where required, shall be No. 12 or 13 gauge steel plates, with nosings same as treads and supported on a 2x2x$\frac{3}{16}$-in. angle frame, riveted or bolted to stringers, and reinforced with tees not over 2 ft. on centers.

Newels—Shall be No. 12 gauge blue annealed steel with cast iron caps and pendants.

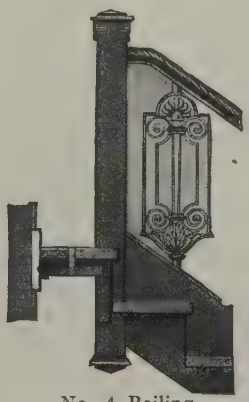
Railings—To be design indicated on drawings. All to have a shop coat of paint.

Typical Installations

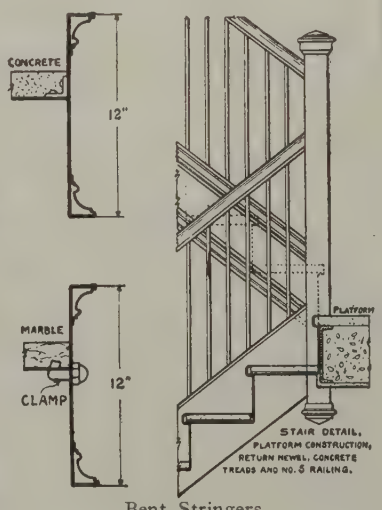
Spiral Stairway



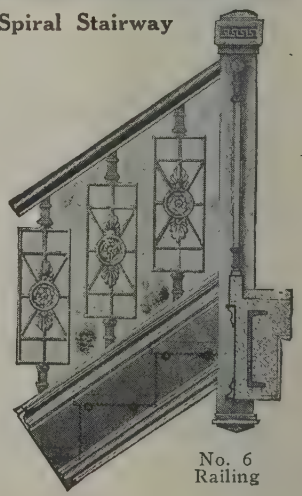
No. 5 Railing



No. 4 Railing



Bent Stringers



No. 6 Railing

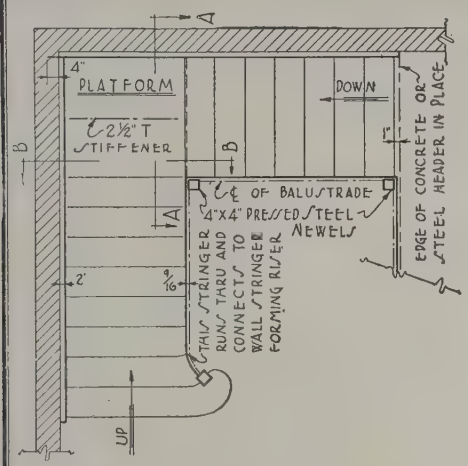
Mesker Steel Stair Details

THE ORNAMENTAL IRON WORK COMPANY

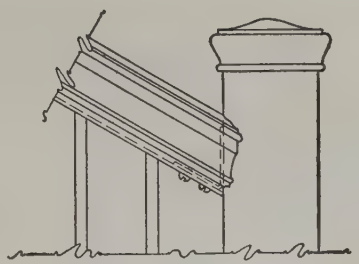
Stairs of Every Description and of Any Construction for Every Purpose

Sweitzer Avenue and East Crosier Street

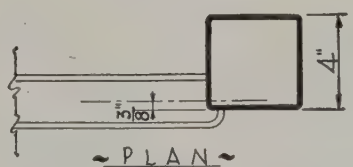
AKRON, OHIO



PLAN Nº 1-SW

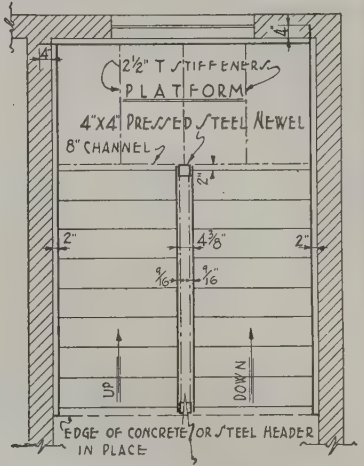


~ELEVATION~

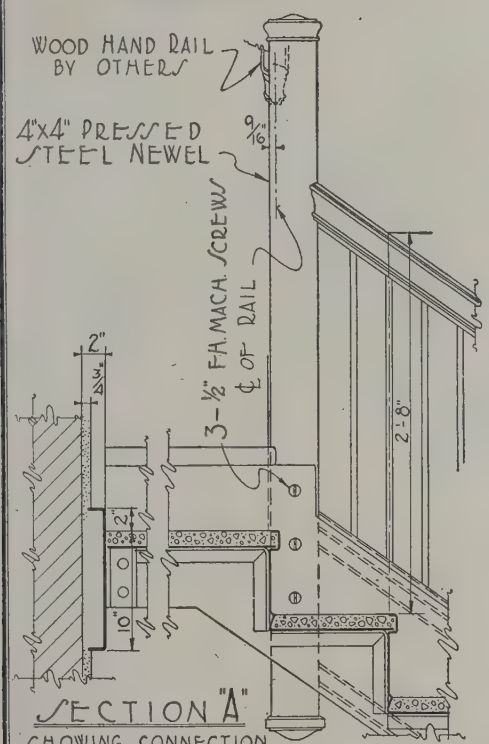


~PLAN~

DETAIL SHOWING HOW WOOD HAND RAIL RETURNS ON ITSELF AROUND CORNER OF NEWEL

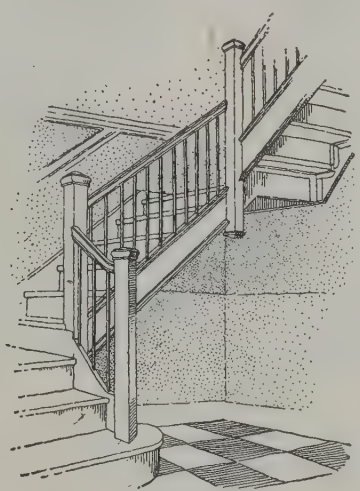


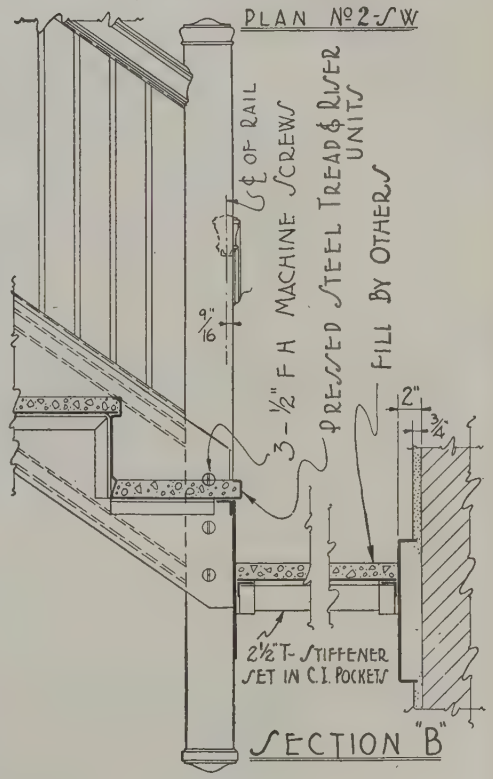
PLAN Nº 2-SW



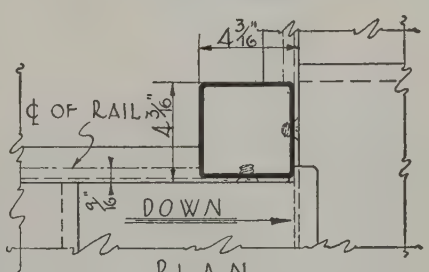
SECTION "A"

SHOWING CONNECTION OF STRINGER TO NEWEL



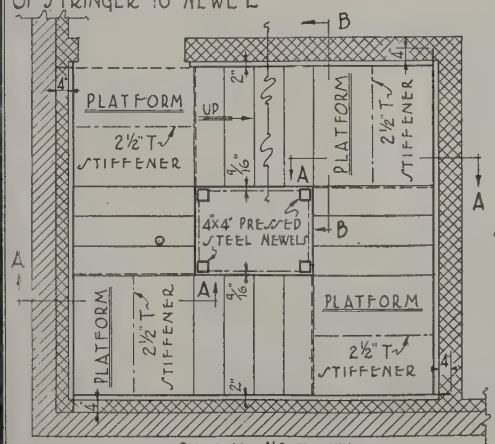


SECTION "B"



PLAN

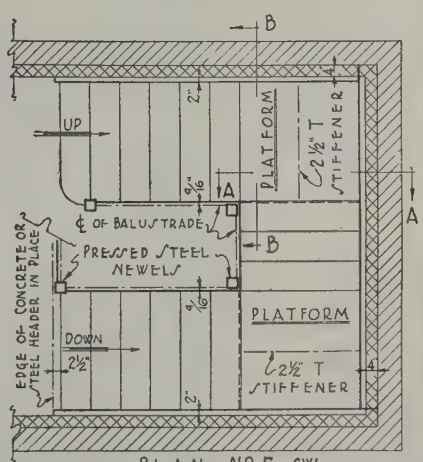
SHOWING HOW WEB OF STRINGER CONNECTS TO SIDE OF NEWEL



PLAN Nº 7-SW

~NOTE~

THE PLANS & DETAILS SHOWN ON THIS SHEET ARE FOR OUR "SIDE WHEEL TYPE" STAIRS. THIS ARRANGEMENT BEING PRACTICALLY SELF SUPPORTING, IS OF THE STRONGEST POSSIBLE CONSTRUCTION AS THE RISING STRINGER FORMS THE RISER AT PLATFORM MAKING A BRIDGE EFFECT WITH THE SPLICE ALWAYS IN COMPRESSION. THE WEB OF THE STRINGER PASSING THE NEWEL ELIMINATES CONNECTION ANGLES AND BOLT HEADS. THE PRESSED STEEL NEWEL IS MOST DESIRABLE, ALTHOUGH CAST IRON MAY BE SUBSTITUTED. WHERE SPACE IS LIMITED THIS IS THE BEST TYPE OF STAIR TO USE. THE MAIN FEATURES OF THIS TYPE OF STAIR IS ITS STRENGTH, NEATNESS SIMPLICITY & ITS LOW COST OF CONSTRUCTION. WHEN SPECIFYING JUST REFER TO "SW" CONSTRUCTION



PLAN Nº 5-SW

~STANDARD~SIDE WHEEL TYPE~STAIR CONSTRUCTION~

THE RIESTER & THESMACHER COMPANY

Manufacturers of Bois Patented Steel Stairs

1514-1526 West 25th Street
CLEVELAND, OHIO

Products

Bois Interlocking Pressed Steel Stairs.
For Hollow Metal Doors, see page A983.

Service

A modern plant with complete equipment and an efficient organization qualified to give service. We have a thoroughly efficient estimating and draughting department and are glad to assist in construction details. Typical stair details, estimates and suggestions submitted upon request.

Description

The simple interlocking feature of the tread and riser in this stair, offers distinctive advantages in economy, rigidity, strength and rapid erection. It is also easily adapted to any desired tread material. The treads and risers are formed from one single sheet of steel with flanges that interlock at the nosing line, producing a reinforced edge that is always straight horizontally. This feature of double strength material prevents the nosing breaking away from tread filler. The stringers are tied together with a tie rod running under the angle of each nosing from stringer to stringer. The gauge of metal used is governed by the width of stair and weight to be carried. The entire construction makes for a very strong and rigid stair and the light gauge steel is not used to reduce cost with a proportionate reduction in strength. Tests of a standard Bois stair have been successfully made carrying a dead weight of 600 lb. per square foot.

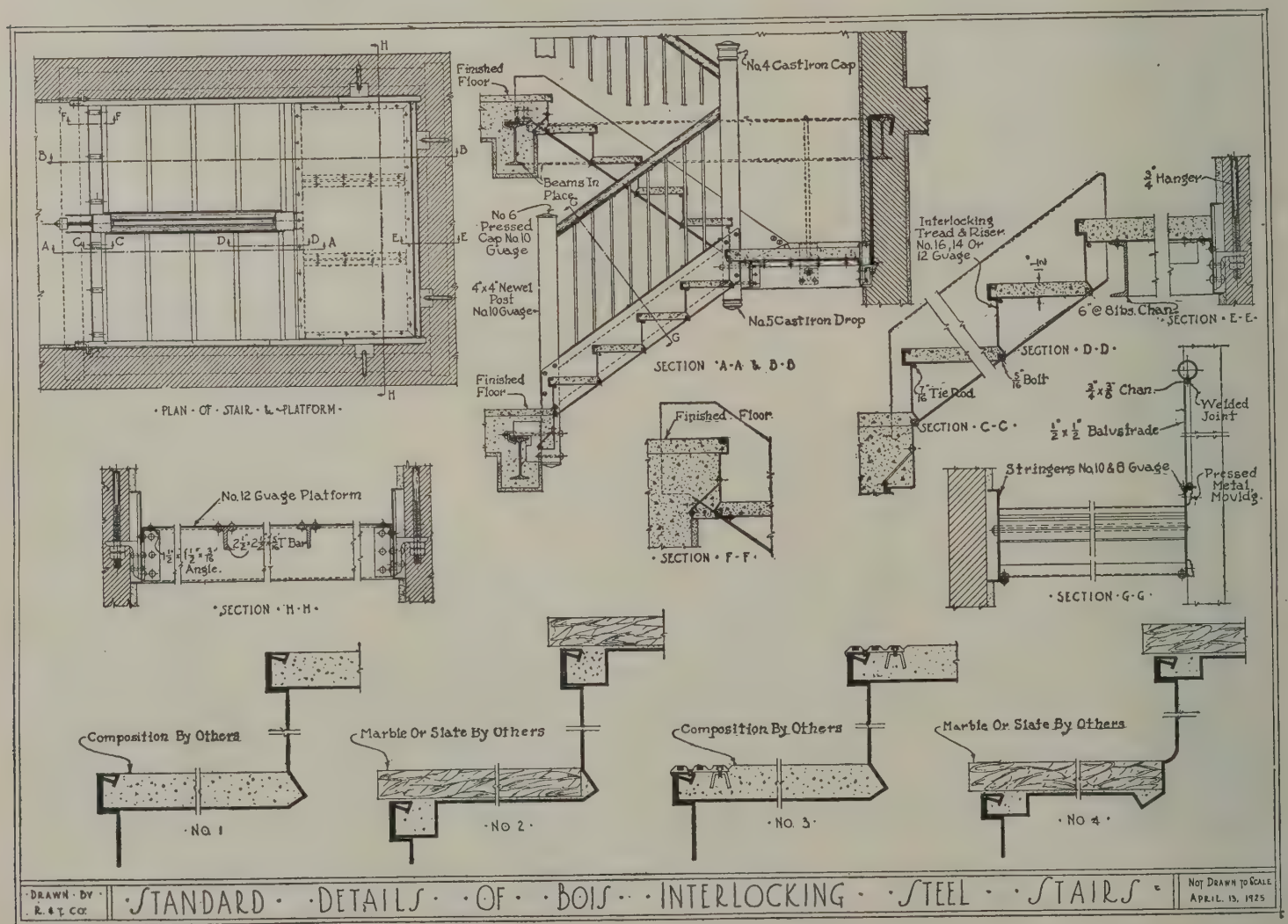
Design

This stair meets the requirements of all state and city building codes and while very simple in design is attractive in appearance and can be readily adapted to the requirements of the architect or builder. Construction may be modified or embellished by ornamenting newel posts, ends of tie rods and stringers, or using cast iron newel posts.

Installation

The interlocking feature dispenses with all riveting and makes for rapid assembling. Each flight of stairs is assembled in a complete unit in the factory and is, therefore, economically erected at the building. This also permits of the stairs being erected with the frame work of the building, giving immediate service before the installation of tread fillers.

For reference we will be glad to furnish names of architects who have specified this product or typical installations which we have made.



TITCHENER IRON WORKS, INC.

Structural, Architectural and Ornamental Iron Work

25 Griswold Street
BINGHAMTON, N. Y.

Products

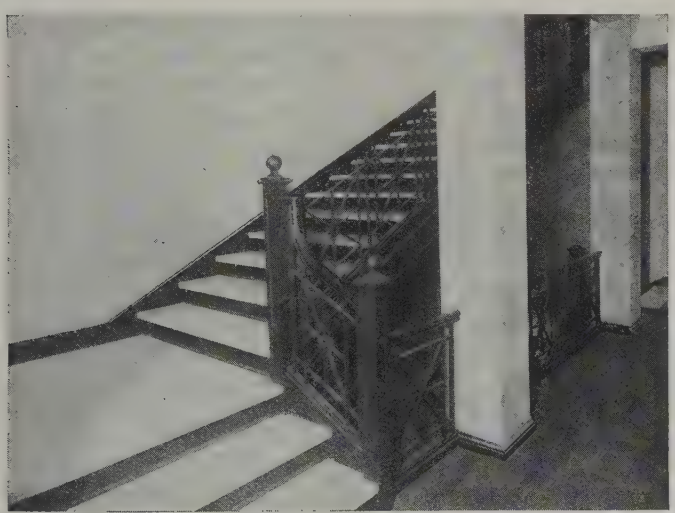
ORNAMENTAL IRON WORK:

Iron Stairs, Fire Escapes, Spiral Stairs, Steel Ladders, Iron and Bronze Railings, Pipe Railings, Folding Gates, Area Gratings, Window Guards, Grilles, Sidewalk Doors, Coal Chutes, Coalhole Covers, Marquises, Trusses, Beams, Columns, Metal Lumber, Balconies, Flagpoles, Steel Sash, Store Fronts, Iron Fences, Entrance Gates, Wire Fences, Wire Partitions.

Stair Specifications

All iron stairs shall be pressed steel as made by TITCHENER IRON WORKS, INC., Binghamton, N. Y.

Stringers—Shall be of 10-inch channels formed from 13x$\frac{3}{16}$-inch steel plates with moulding on top and bottom flanges as detailed.



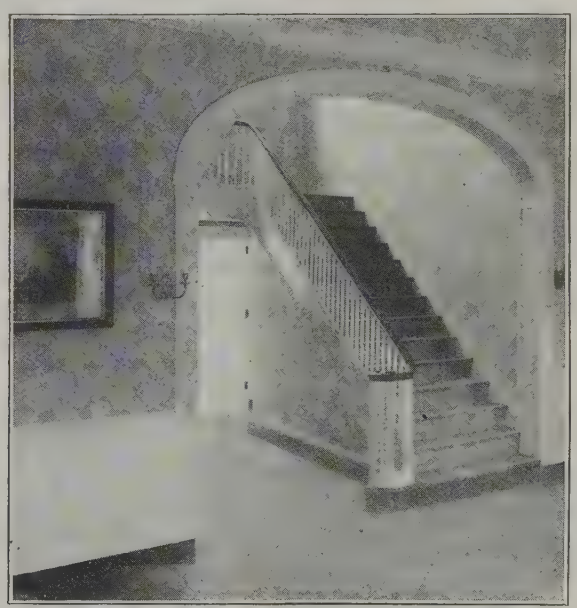
Tread and Riser—Shall be one unit formed from No. 12 gauge steel sheets with nosing and shall be recessed to receive 2 inches of composition or concrete filling. All treads and risers shall be supported by and bolted to angle iron hips which are riveted to the stringers.

Platforms and Landings—Shall be of No. 12 gauge steel sheets supported and reinforced by structural tees and angles riveted to stringers and platform channels.

Newel Posts and Railings—Shall be as per details.

All iron work to have one shop coat of approved paint.

Note: The above specification may be changed to meet all architects' requirements.



Gate Specifications

Horizontal rails shall be of 2-inch channels. Hinge bars shall be ¾-inch by 2½-inch flat iron, hung on hand wrought hinges to be laid into masonry. Latch bars shall be the same size as hinge bars. Pickets shall be ¾-inch square bars spaced 5 inches on centers with hand forged top either pointed or upset. Pickets shall extend through horizontal rails and be securely hand calked into place. All to receive one shop coat of approved paint.

SEXAUER & LEMKE, INC.

Ornamental Iron Work, Steel Stairs, and Cast Iron Work

LONG ISLAND CITY, N. Y.

REPRESENTATIVES: Shults Engineering Co., Morgan Building, BUFFALO, N. Y.

Products

Manufacturers of Ornamental Iron Work, including: "S & L" Fireproof Steel Stairs, and Steel Frames for Doors and Partitions.

Also General Iron and Steel Staircase Construction; Iron Grilles; Railings; Entrance Doors, Marquises; Elevator Enclosures; Store Fronts; Gratings; Fire Escapes; Fur Racks for cold storage plants, etc.

Service

The thoroughly equipped estimating and draughting departments are at the service of architects. Estimates and suggestive working details will be gladly submitted on request.

Facilities

Our plant is complete in every respect and equipped with the most modern types of machinery and tools, enabling this organization to meet promptly and efficiently all demands for its products.

Our plant is situated at the East River and provided with own docking facilities.

Sexauer & Lemke ("S & L") Steel Stair Construction

Simple, strong, rigid, exceptionally light and easily erected, these steel stairs lend themselves admirably to every type of public office, warehouse, hospital, school and factory building construction.

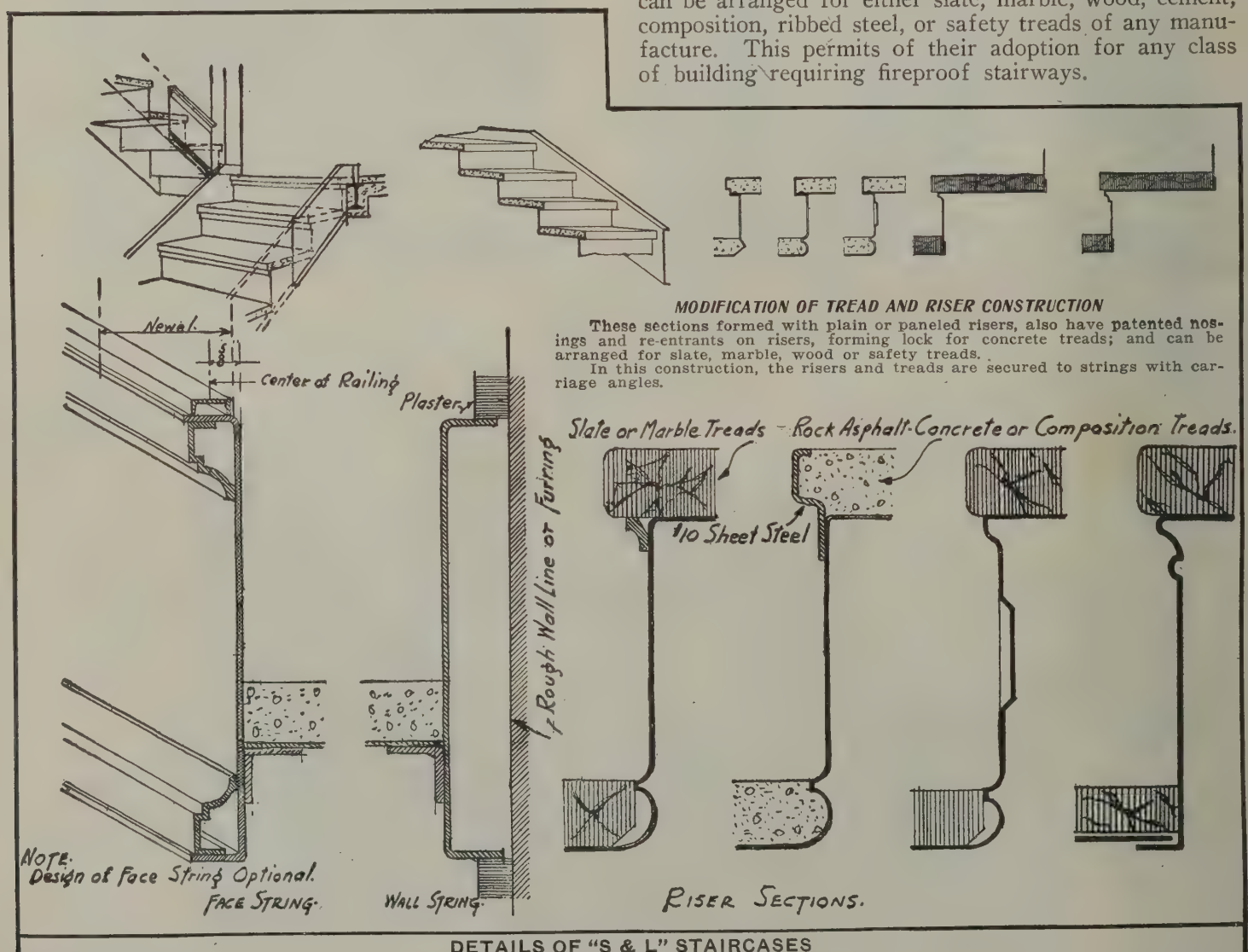
They are formed, primarily, of rolled steel stringers and bent plate steel risers and treads, securely bolted together as shown in line details herewith. The stairs can be furnished to accommodate any condition.

The strings are formed in one piece with flanges, the depth of string, thickness of metal, etc., being governed by the loading, and strings can be made either plain or ornamental with mouldings or otherwise as may be desired.

For stairs for export, the various strings, risers, etc., could be nested to insure compactness and against danger of damage.

All stair structures are figured for a safe live load of 100 lb. per sq. ft. and designed accordingly.

Design—"S & L" stairs can be built plain, or ornamented to any extent to suit architectural requirements and design, with railings and newels to match. Risers may be plain, or paneled and ornamented; treads can be arranged for either slate, marble, wood, cement, composition, ribbed steel, or safety treads of any manufacture. This permits of their adoption for any class of building requiring fireproof stairways.



DETAILS OF "S & L" STAIRCASES

Continued on next page

For cement or composition treads, a patented nosing and re-entrant construction is provided, which forms a pocket or lock for the treads and provides a sanitary cove treatment to the risers.

See detail drawing on preceding page.

The soffits of stairs are left open for painting, and present a neat finished appearance, but can also be arranged for plaster finish, if desired.

Installation—These stairs are particularly easy to erect, as each run is manufactured and fitted in shop before shipment or delivery. This feature insures quick and economical installation; and also permits of the stairs being erected with the framework of the building, thus insuring immediate serviceableness, before the installation of the finish treads.

General Cost and Estimates—These stairways, furnished complete with railing and newels (with concrete treads), are practically as low in cost as stairways of concrete construction with iron railings, and have the advantage of providing a neater and more durable installation. They permit, moreover, a saving in cost of structural supports, on account of special lightness. The thickness of metal employed, depth of strings, and so forth, are governed by the size of stair, loading conditions and so on.

If general layout of stairs together with memoranda of requirements is furnished, the estimating department will be pleased to submit specifications and estimates.

Circular Stairs, Special Stairs, Cast Iron Stairs

Details and information furnished upon request.

Cast Iron and Wrought Iron Front Work

We specialize on all types of this work.

Steel Door Frames

Frames can be formed to meet requirements of all classes of fireproof partition construction. They are formed of No. 14 or 12 gauge steel and the miters and connections are all welded, making a one-piece frame.

Reference Installations of Ornamental and Miscellaneous Iron Work

Liberty Title and Trust Building, Broad and Arch Streets, Philadelphia, Pa.
Equitable Building, Broad and Locust Streets, Philadelphia, Pa.
Hotel Syracuse, Syracuse, N. Y.
Niagara Hotel, Niagara Falls, N. Y.
Buffalo Consistory, Buffalo, N. Y.
Genesee Building, Buffalo, N. Y.
Arlington Hotel, Binghamton, N. Y.
Corning Free Academy, Corning, N. Y.
U. S. National Bank, Johnstown, Pa.
Citizens National Bank, Waynesburg, Pa.
Erie Trust Building, Erie, Pa.
State Bank Building, Albany, N. Y.
Home Savings Bank, Albany, N. Y.

New York, N. Y.

N. Y. Central Office Building, 45th to 46th Street and Vanderbilt Avenue
Overhead Roadway, East Side Grand Central Terminal
De Pinna Store, 52nd Street and Fifth Avenue
Liggett-Winchester-Ley Building, Madison Avenue
Fisk Rubber Co.'s Building, Broadway
Mt. Sinai Hospital, Fifth Avenue
Office Buildings, 379-385 Madison Avenue
Cunard Building, Broadway
Saks Department Store, Fifth Avenue
Citizens Savings Bank, Bowery and Canal Street
Shelton Club Hotel, Lexington Avenue
Aeolian Building, Fifth Avenue and 54th Street
Ritz Tower, Park Avenue and 57th Street
A. G. Spalding Bros. Building, Nassau and Ann Streets
Postum Building, 250 Park Avenue

Cast Iron Front Work, J. C. Penney Warehouse, 330 West 34th Street, New York, N. Y.

THE A. L. SMITH IRON WORKS

Manufacturers and Erectors of Steel Stairs

CHELSEA, MASS.

Products, Organization and Experience

SMITH STEEL STAIRS.

Also Designers, Fabricators and Erectors of Structural Steel and Ornamental Iron and Bronze Work of every description.

We have been building stairs of all types for nearly 30 years. This broad experience, together with the use of sound engineering principles, has developed the Smith Steel Stair, the features of which have been fully patented.

Our modern plant, modern production methods, efficient workmen and standardization of parts enables us to produce Smith Steel Stairs economically, but consistent with substantial and permanent construction.

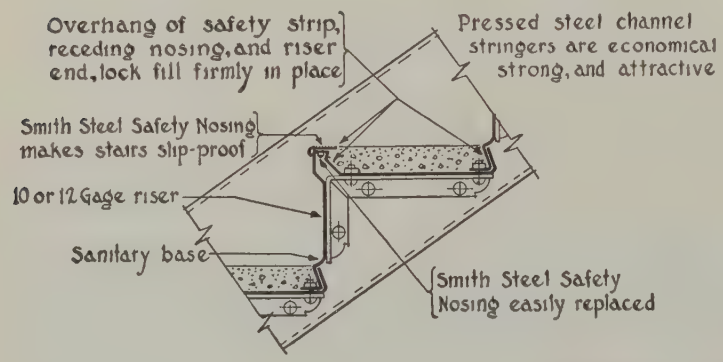
Smith Steel Stairs

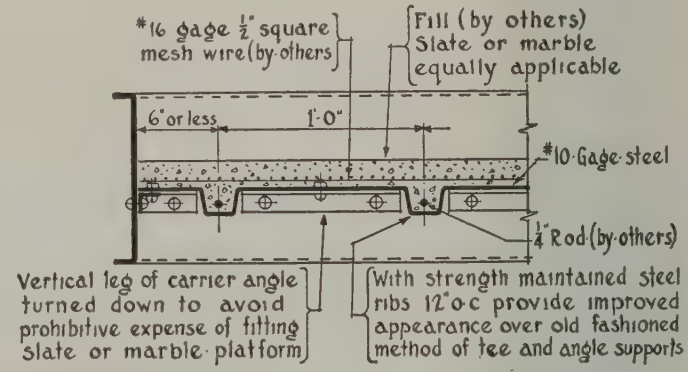
The general description and features of construction of Smith steel stairs are completely covered by the standard specifications and illustrations shown on these pages.

Smith steel stairs are suitable for all classes of buildings and are being specified by leading architects and engineers because of their strength, pleasing appearance and low cost. They have been subjected to severe tests, including the following:

A stair loaded with 48 men weighing 7200 lb., on 71 sq. ft. (101 lb. per sq. ft.), showed no evidence of strain. Another stair loaded with 43,000 lb. of steel plates on 71 sq. ft. (equivalent to 600 lb. per sq. ft., which, on the basis of 100 lb. per sq. ft. gives a factor of safety of 6), showed no indication of failure.

These tests clearly show the relation of maximum possible human loading in actual practice against the ultimate carrying capacity of the stairs.





Features of Smith Steel Stairs

Standard Specifications for Smith Steel Stairs

All stairs marked steel on plans shall be Smith Steel Stairs made (and erected) by THE A. L. SMITH IRON WORKS, Chelsea, Mass.

Stringers shall be 10-in. pressed steel channels $\frac{3}{16}$ in. or ¼ in. thick as required.

Treads and risers shall be of the Smith one-piece nosing type and shall be No. 10 or No. 12 gauge as required. Treads shall be attached to carrier with two bolts. Fill and reinforcing shall be furnished by others.

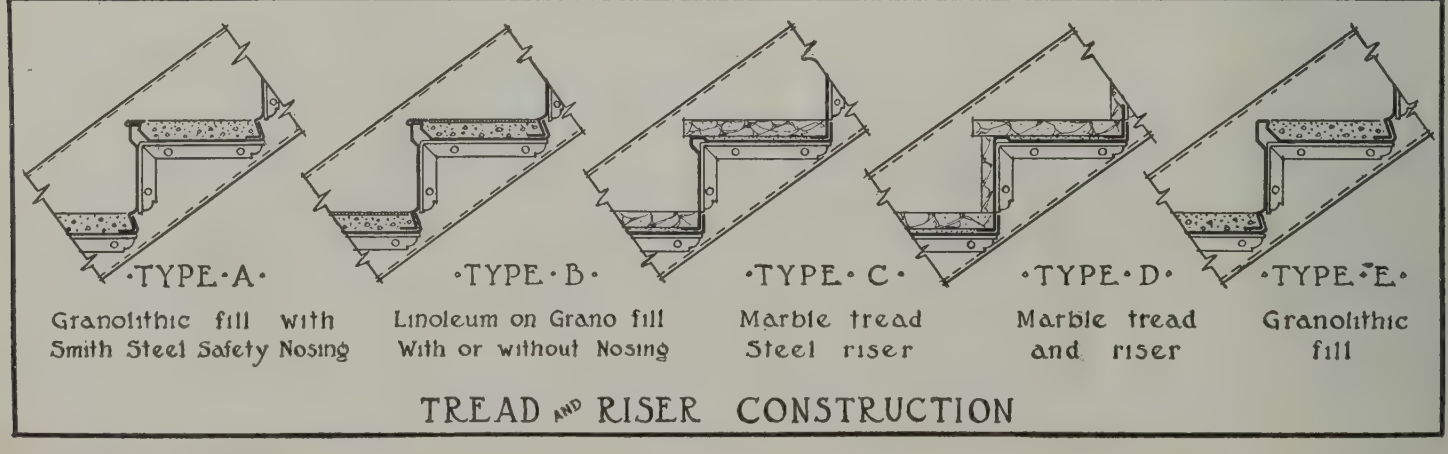
Carriers shall be $1\frac{1}{4}$x$1\frac{1}{4}$x$\frac{3}{16}$-in. angles, machine riveted to stringers with three rivets. Rivets shall be countersunk on outside face of face stringer.

Landings shall be of the Smith one-piece pressed-rib type of No. 10 gauge steel. Ribs shall be supported by angle at wall and sides and by steel channel at head of stairs. Fill and reinforcing shall be furnished by others.

Posts shall be Smith Type ...., made of .... in. square, with standard cap and drop.

Railing shall be Smith No. .... attached to channels top and bottom. Wood handrail shall be furnished and attached to top channel by others. (See details of posts and railings for various types and their numbers.)

Safety treads, where shown on plans, shall be Smith replaceable steel safety nosing.



TREAD AND RISER CONSTRUCTION

Continued on next page

Recent Installations of Smith Steel Stairs

Sears, Roebuck & Co. Building, Boston, Mass., George C. Nimmons & Co., Architects, Chicago, Ill.

Syracuse Memorial Hospital, Syracuse, N. Y., John Russell Pope and Dwight James Baum, Associated Architects, New York, N. Y.

Newton Hospital, Newton, Mass., Densmore, LeClear & Robbins, Architects, Boston, Mass.

Rhode Island State College, Kingston, R. I., Bigelow, Kent, Willard & Co., Architects, Boston, Mass.

Harvard University—group of buildings for the Graduate School of Business Administration, Boston, Mass., McKim, Meade & White, Architects, New York, N. Y.

New Parker House, Boston, Mass., Desmond & Lord, Architects, Boston, Mass.

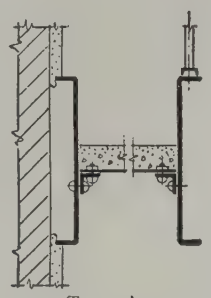
Nurses Home, Eastern Maine General Hospital, Bangor, Me., Coolidge & Carlson, Architects, Boston, Mass.

New Beth Israel Hospital Group—five buildings, Boston, Mass., Densmore, LeClear & Robbins, Architects, Boston, Mass.

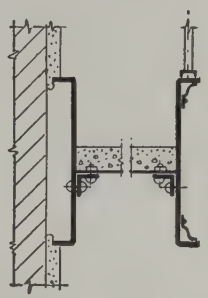
Wesley Methodist Episcopal Church, Worcester, Mass., Coolidge & Carlson, Architects, Boston, Mass.

Lord Jeffery Inn, Amherst, Mass., Putnam & Cox, Architects, Boston, Mass.

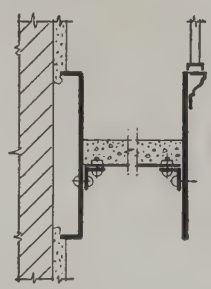
Congress Square Hotel Addition, Portland, Me., H. W. Rhodes, Architect, Portland, Me.



TYPE A
Pressed Steel Channel Face and Wall Stringers

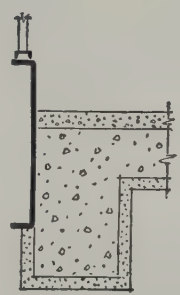


TYPE B
Pressed Steel Channel Wall Stringer, and Face Stringer with Steel Moulding

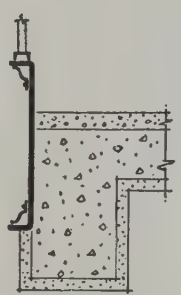


TYPE C
Pressed Steel Channel Wall Stringer; Plate Face Stringer with Moulding

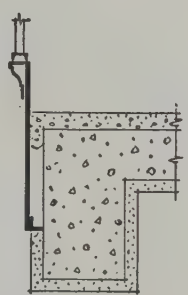
STRINGER DETAILS



TYPE A
Pressed Steel Channel Fascia

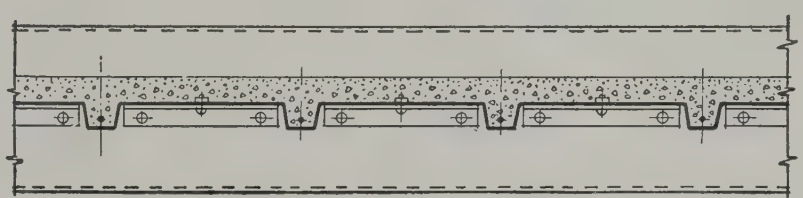


TYPE B
Pressed Steel Channel Fascia with Moulding

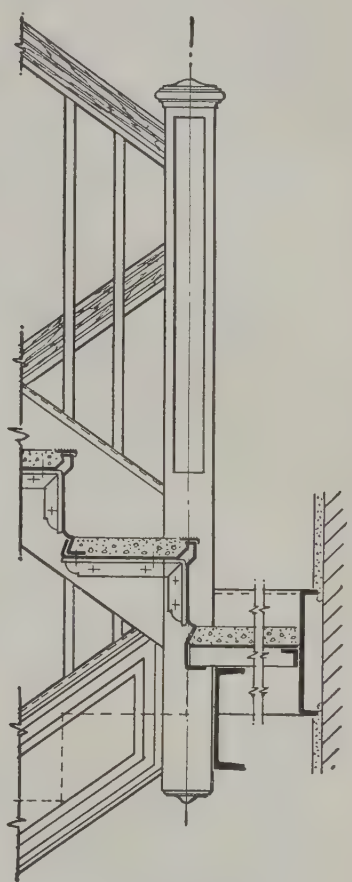


TYPE C
Plate Fascia with Moulding

PLATFORM FASCIA DETAILS

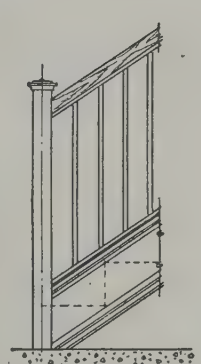


ONE-PIECE PRESSED-RIB PLATFORM

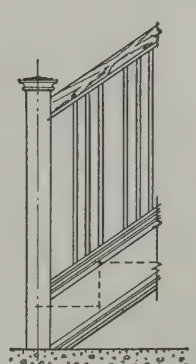


DETAIL AT INTERMEDIATE PLATFORM

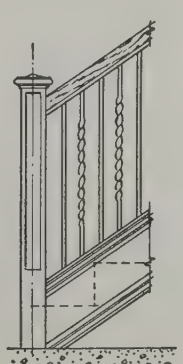
Stringer Fascia and Platform Construction



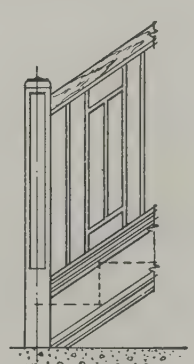
TYPE A POST
Railing No. 1
Post: 3 or 4-in. steel tube.
Railing: ½-in. square bars, 4 in. on centers



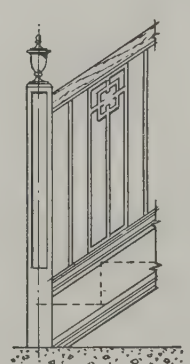
TYPE B POST
Railing No. 2
Post: 4 in. square cast iron; plain.
Railing: ½-in. square bars set in groups of three; 4 in. between groups



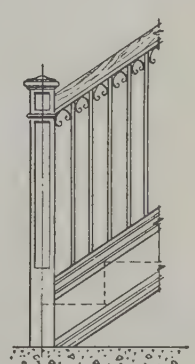
TYPE C POST
Railing No. 3
Post: 3 or 4 in. square cast iron; paneled.
Railing: ½-in. square bars 3 in. on centers; alternate plain and twisted



TYPE D POST
Railing No. 4
Post: 4 in. square cast iron; paneled, with rounded corners.
Railing: ½-in. square bars 3 in. on centers; paneled as shown



TYPE E POST
Railing No. 5
Post: 4 in. square cast iron; paneled, with rounded corners and bronze or brass urn cap.
Railing: ½-in. square bars, 3 in. on centers, paneled as shown



TYPE F POST
Railing No. 6
Post: 4 in. square cast iron; double paneled
Railing: ½-in. square bars, 3 in. on centers, with wrought iron scrolls

Post and Railing Construction

THE TOLEDO WIRE & IRON COMPANY

ESTABLISHED 1871

Engineers, Designers, Manufacturers and Erectors

TOLEDO, OHIO

Products

Ornamental and Architectural Iron and Bronze.
"Tolico" Steel Stairs.
Cast Iron Store Fronts and Door Frames.
Structural Steel.
Gates.
Fences.
Balconies.
Railings.
Fire Escapes.
Also Miscellaneous Iron and Wire Work of all kinds.

"Tolico" Steel Stairs

Our standard steel stairs are of the pan type with J & L or bent plate channel stringers as illustrated on the following page.

Note the full carriage angle supports for both the tread and riser and the fact that these angles are riveted to the stringer insuring absolute safety.

Our stairs are erected more readily than others, due to the fact that the stringers are fastened to the newels by means of a mortise and tenon joint. No field bolts or pins are required for connecting stringers to newels as stringers slip readily into place and the structure becomes absolutely rigid. This connection also eliminates all unsightly connection angles or rivets.

We are prepared to furnish any style of moulded stringer and facia, and any style of pressed steel or cast iron tread and riser to comply with the architect's designs. We have a large number of stock patterns of cast iron newels, railing panels and steel tubing newels, or we will make up or follow special designs as required.

A catalogue of our standard patterns will be sent on request.

Cast Iron Store Fronts

We design cast iron store fronts, facias, etc., complying closely to architects' requirements, but using stock patterns. These can be furnished in virtually any period or style. We can also comply exactly with special designs requiring modeling or carving.

Structural Steel

We manufacture an entirely new design of bow string truss complying with all requirements of the American Institute of Steel Construction which is competitive in price and weight with any truss now on the market. Estimates and design sent on request.

In addition, we fabricate a general line of structural steel, covering jobs up to 200 tons. Estimates furnished.

Tolico Steel Stairs in The Lasalle & Koch Department Store, Toledo, Ohio

Starrett & Van Vleck, New York, Architects
The A. Bentley & Sons Co., Toledo,
General Contractors

This stair has a hand-hammered wrought iron railing permanently protected against rust by the "Udylite" process. Final finish, Antique Swedish Iron

Main Entrance Gates

Estate of John North Willys, Esq., Toledo, Ohio

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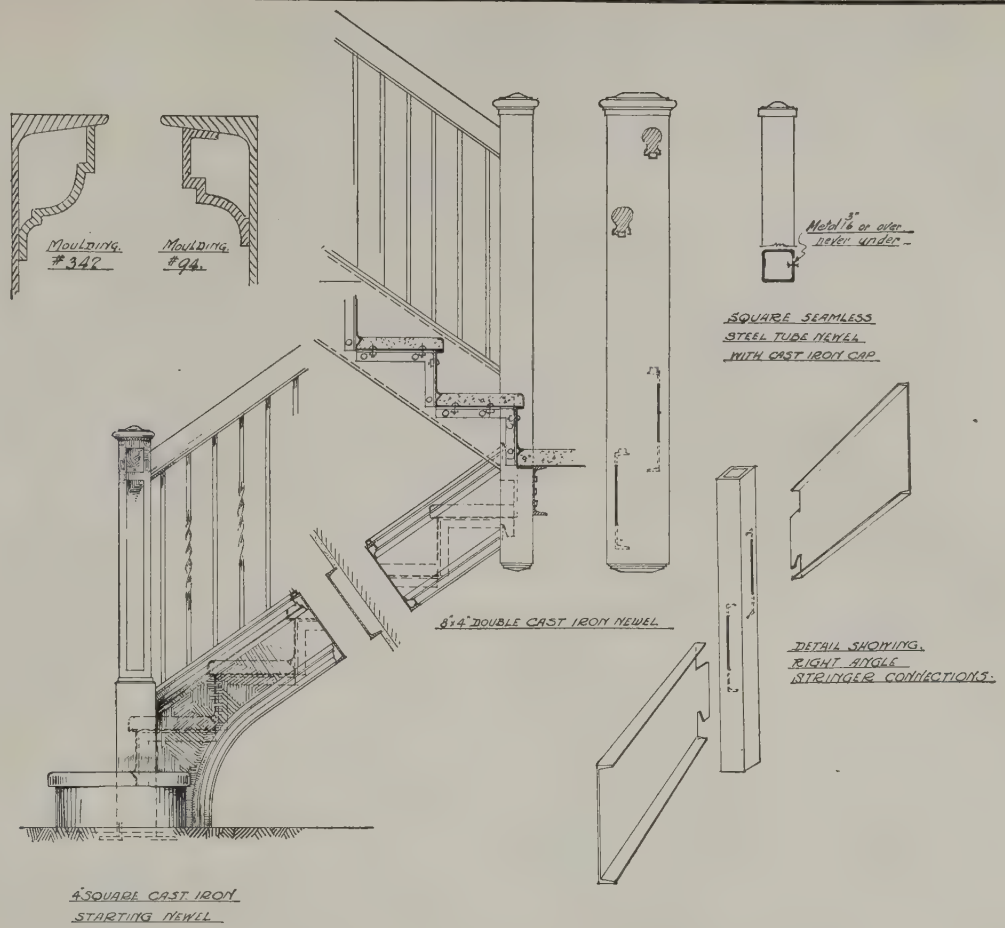
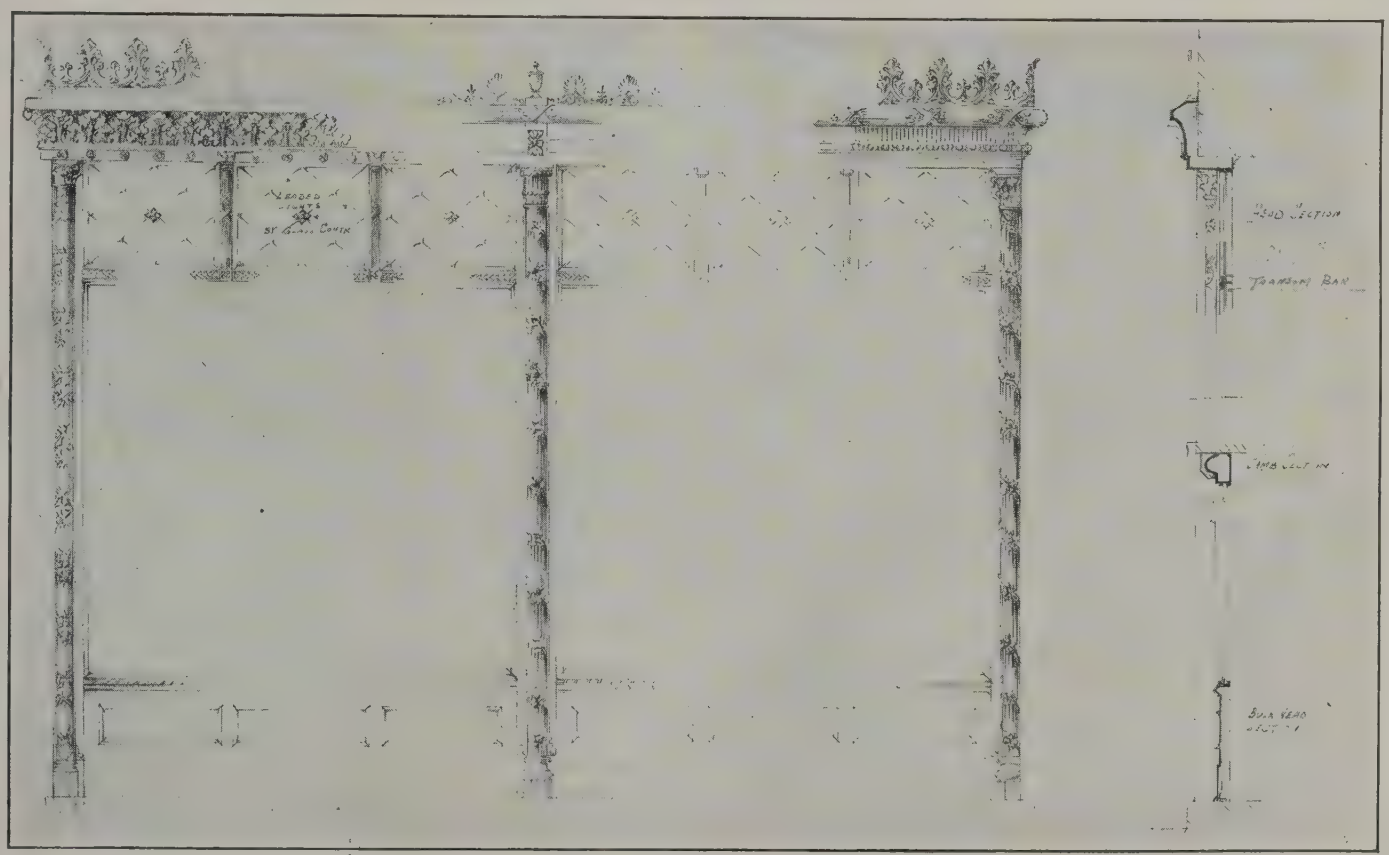


Design "A" Design "C" Design "B"



Design for Iron Store Front

TOLICO STEEL STAIRS AND CAST IRON STORE FRONTS

WESTERN ARCHITECTURAL IRON CO.

Manufacturers of Steel Stairs and Ornamental Iron

TELEPHONE
INDEPENDENCE 1500

3455 Elston Avenue
CHICAGO, ILL.

"Ideal" Steel Stairs

"Ideal" steel stairs are the result of eighteen years of experience in stair building.

They are fabricated by experts in a modern shop with modern facilities of every description.

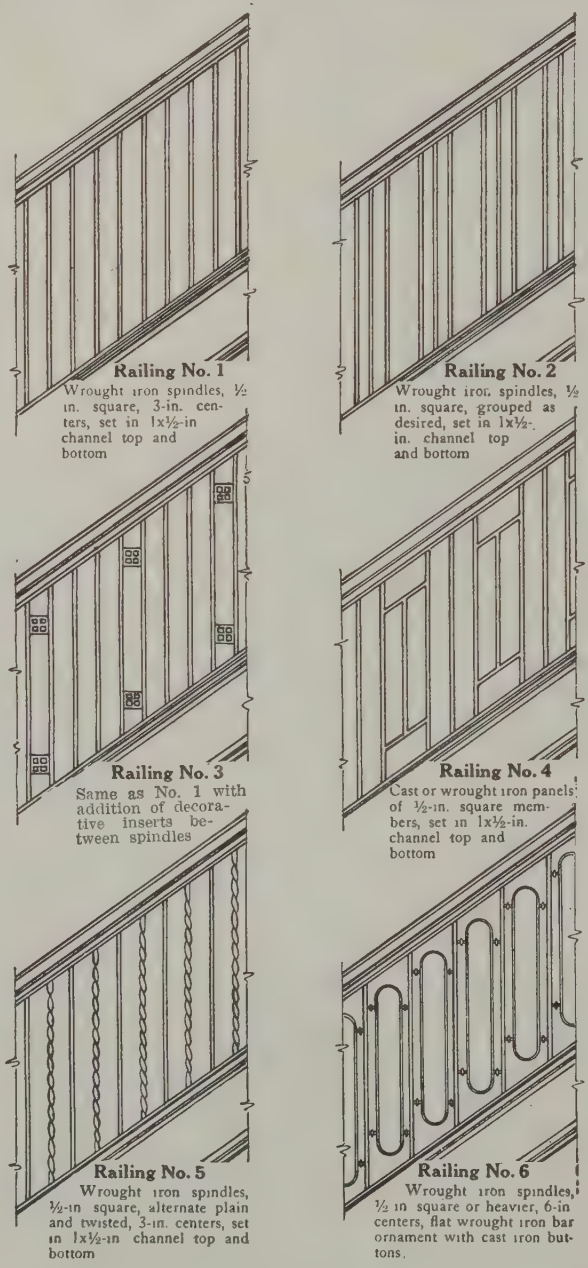
Quality of workmanship in "Ideal" steel stairs is never surpassed and seldom equalled.

Every "Ideal" steel stair is set up complete in the shop before shipment, which insures a perfect fit at the building and results in economy of erection labor.

It is for these reasons they are endorsed by all prominent architects and builders.

Write to us and we will be pleased to furnish additional information and estimates.

We have only attempted to show a few simple designs of railings and newels most commonly used. We can furnish any special railings and newels desired and have many patterns of elaborate design in stock which can be used when something better is desired, without the original high cost of patterns and models.



Railing No. 1
Wrought iron spindles, ½ in. square, 3-in. centers, set in 1x½-in channel top and bottom

Railing No. 2
Wrought iron spindles, ½ in. square, grouped as desired, set in 1x½-in. channel top and bottom

Railing No. 3
Same as No. 1 with addition of decorative inserts between spindles

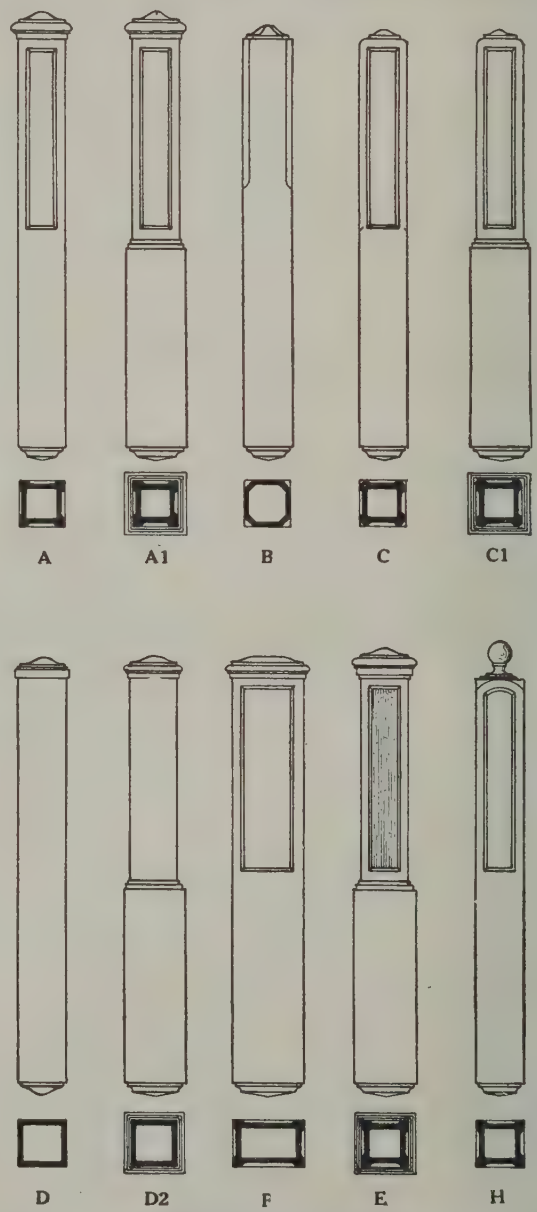
Railing No. 4
Cast or wrought iron panels of ½-in. square members, set in 1x½-in. channel top and bottom

Railing No. 5
Wrought iron spindles, ½-in square, alternate plain and twisted, 3-in. centers, set in 1x½-in channel top and bottom

Railing No. 6
Wrought iron spindles, ½ in square or heavier, 6-in centers, flat wrought iron bar ornament with cast iron buttons.

Standard Railings

Note. **In all cases handrail can be of wood or metal. Any special railing and newel designs can be furnished.**



STANDARD NEWELS

Style	Shaft	Style	Shaft
A	3, 4 and 5-in. square	D	3, 4 and 5-in. square
A1	3, 4 and 5-in. square	D2	3, 4 and 5-in. square
B	4 and 5-in. square	F	6x4 in. rectangular
C	4 and 5-in. square	E	4-in. square
C1	4 and 5-in. square	H	4-in. square

DETAILS OF "IDEAL" STEEL STAIRS

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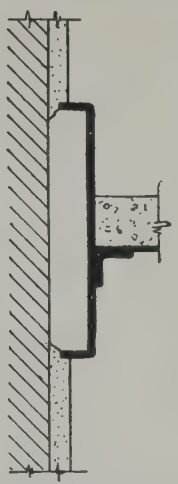
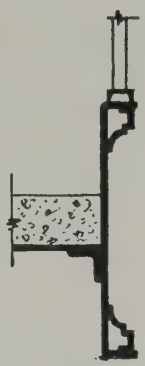
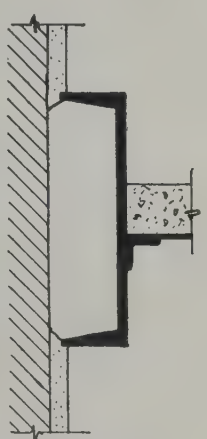


Wall String No. 1
12x1⅜ channel

Face String No. 1
12x1⅜ channel



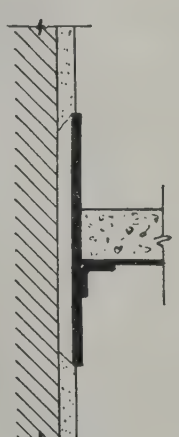
Face String No. 2
12x1⅜ channel with moulding



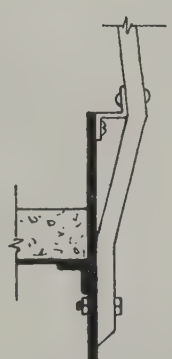
Wall String No. 2
10x15.3-lb channel

Face String No. 3
10x15.3-lb channel

Face String No. 4
10x15.3-lb. channel with moulding

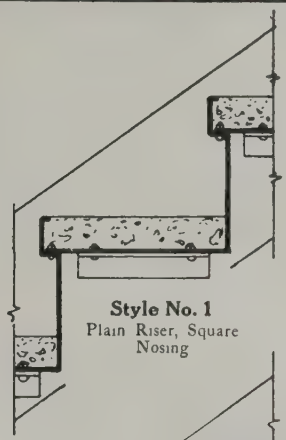


Wall String No. 3
10x¼ plate

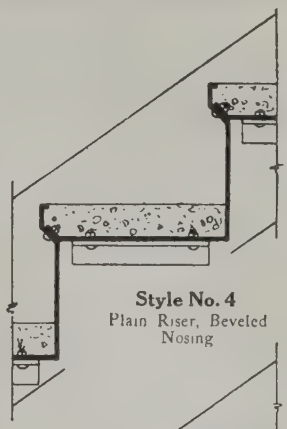


Face String No. 5
10x¼ plate for stair with pipe rail

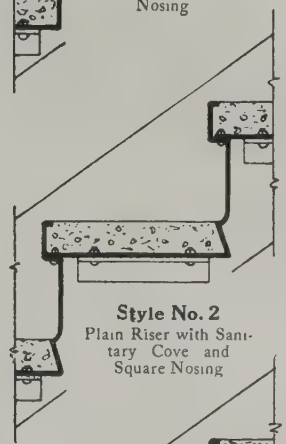
Face String No. 6
10x¼ plate with moulding



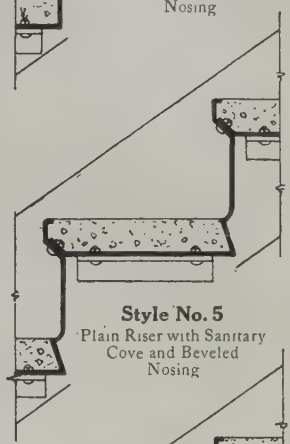
Style No. 1
Plain Riser, Square Nosing



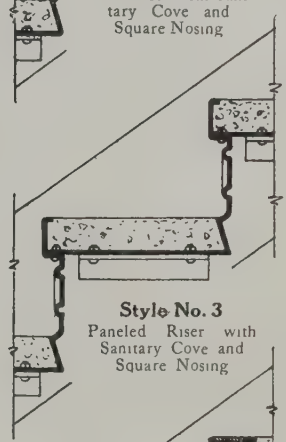
Style No. 4
Plain Riser, Beveled Nosing



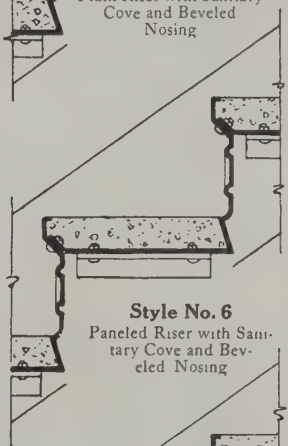
Style No. 2
Plain Riser with Sanitary Cove and Square Nosing



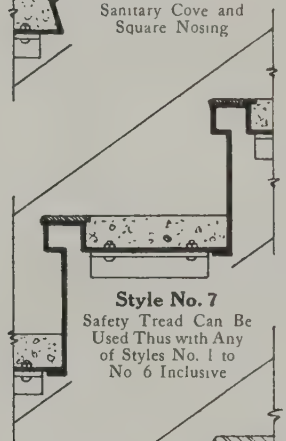
Style No. 5
Plain Riser with Sanitary Cove and Beveled Nosing



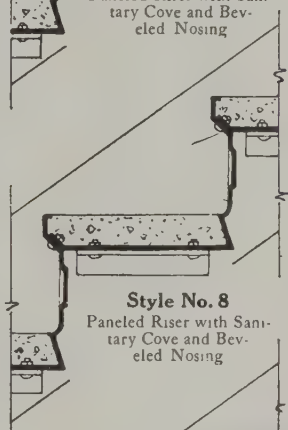
Style No. 3
Paneled Riser with Sanitary Cove and Square Nosing



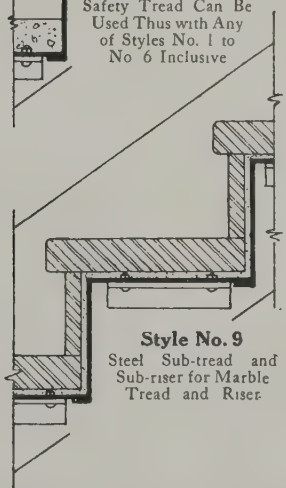
Style No. 6
Paneled Riser with Sanitary Cove and Beveled Nosing



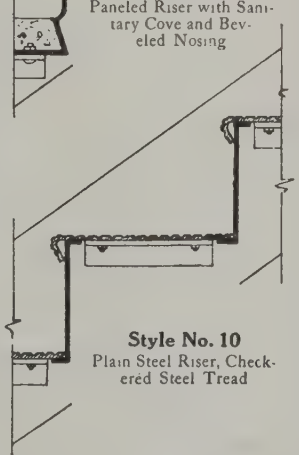
Style No. 7
Safety Tread Can Be Used Thus with Any of Styles No. 1 to No. 6 Inclusive



Style No. 8
Paneled Riser with Sanitary Cove and Beveled Nosing



Style No. 9
Steel Sub-tread and Sub-riser for Marble Tread and Riser



Style No. 10
Plain Steel Riser, Checkered Steel Tread

DETAILS OF "IDEAL" STEEL STAIRS

WOLVERINE IRON WORKS

Manufacturers of Steel Stairs and Ornamental Iron Work

6782 Goldsmith Avenue
DETROIT, MICH.

Products

"Wolverine" Steel Stairs (a specialty).

Also Ornamental Iron Work, including cast iron Store Fronts, Spiral Stairs, Ornamental Railings, Window Guards, Elevator Enclosures, Marquises, etc.

"Wolverine" Steel Stairs

Stringers—Of rolled steel cut channel section, 10 to 15 in. wide; also of plate, 10 to 14 in. wide; ⅛ to ½ in. thick. Face stringers are covered with heavy steel mouldings, paneled.

Treads and Risers—Formed of Nos. 10, 12 or 14 gauge steel in one piece with nosing, and can be used for the various tread materials as illustrated in the details.

Newels—Are of *steel;* either plain square newels of sizes ranging from 2 to 5 in. square, or paneled steel newels of sizes ranging from 2½ to 5½ in. square, as illustrated in the details, with cast iron caps and drops attached.

Erection

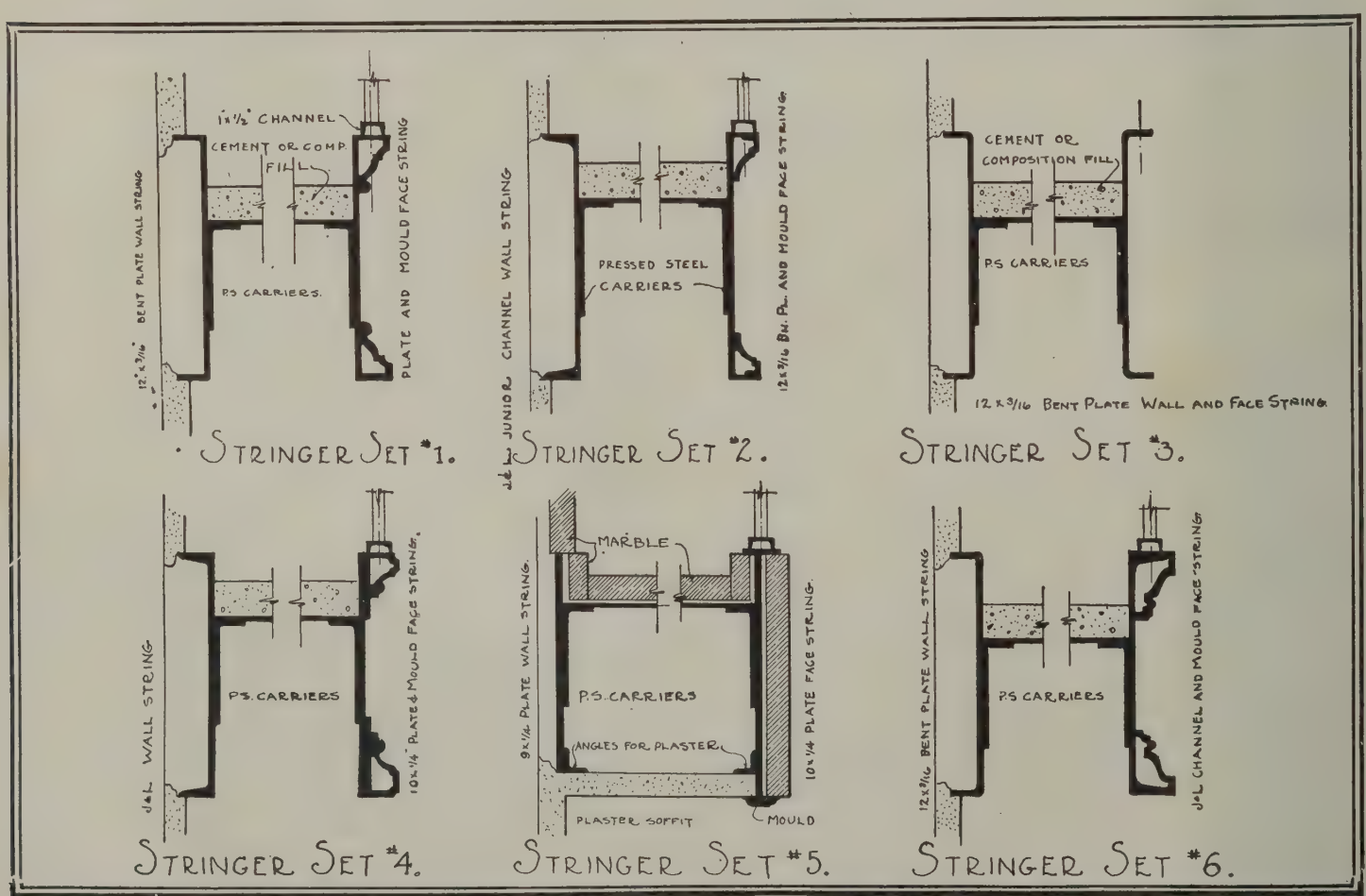
Correctly and scientifically constructed, these steel stairs are designed to be erected by ordinary tools as found on any job. Being so easily assembled, they are suitable for a wide range of use, from the checkered tread of fire escape stairs to the staircase decorated with period ornamentation, as used in buildings of the highest grade.

Costs

"Wolverine" steel stairs compare favorably in cost with any other metal stair. Not only is their installation cost low, but the cost of manufacture has been reduced to a minimum through the use of specially designed machinery.

Information

Information relative to weights, costs, deliveries, construction details, designs or existing installations will be furnished on request.



Stringer Set #1. Stringer Set #2. Stringer Set #3.

Stringer Set #4. Stringer Set #5. Stringer Set #6.

WOLVERINE IRON · WORKS DETROIT · MICHIGAN	WOLVERINE STEEL STAIR STRINGS	NOT DRAWN TO SCALE DATE ~ 1928	DRG. 1

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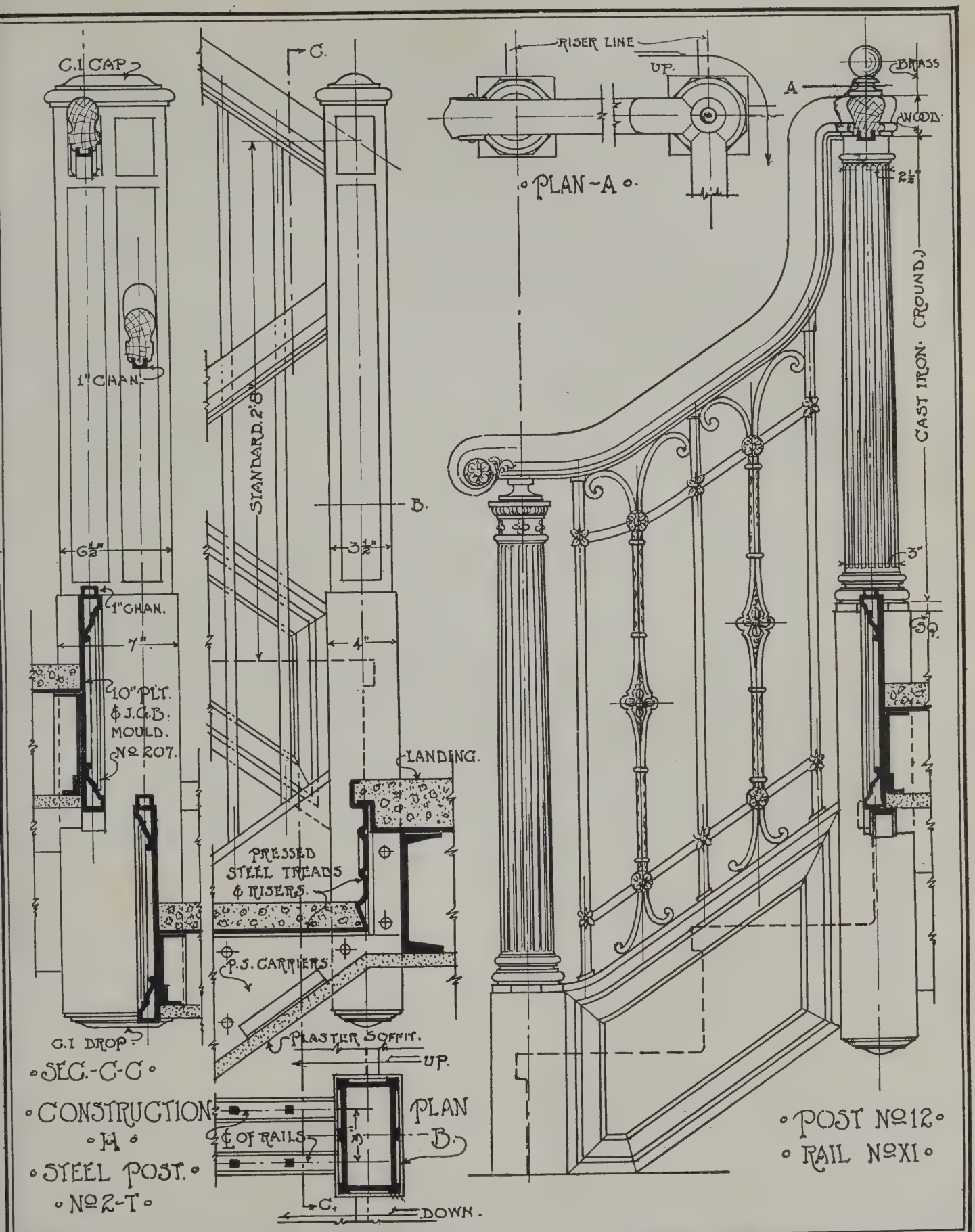

WOLVERINE IRON · WORKS DETROIT · MICHIGAN	DETAIL OF WOLVERINE STEEL STAIRS	NOT DRAWN TO SCALE DATE ~ 1928	DRG. 2

Continued on next page

Cast Iron Store Front Windows and Marquise, 600 ft. Long on 3 Sides of New Hudson Store Building, Detroit, Mich.

Cast Iron Work

With our fully equipped pattern shop and foundry, with expert modelers and moulders in the production of fine ornamental iron castings and our fitting shop with skilled and experienced workmen, we are able to produce fine cast iron work from architects' designs promptly.

Sixty-two cast iron window frames for the new Hudson Store Building, Detroit, Michigan, were delivered in 40 days after receipt of order, the first frame in 14 days.

WOLVERINE IRON · WORKS DETROIT · MICHIGAN	CAST IRON WORK	DATE ~ 1928	DRG. 3

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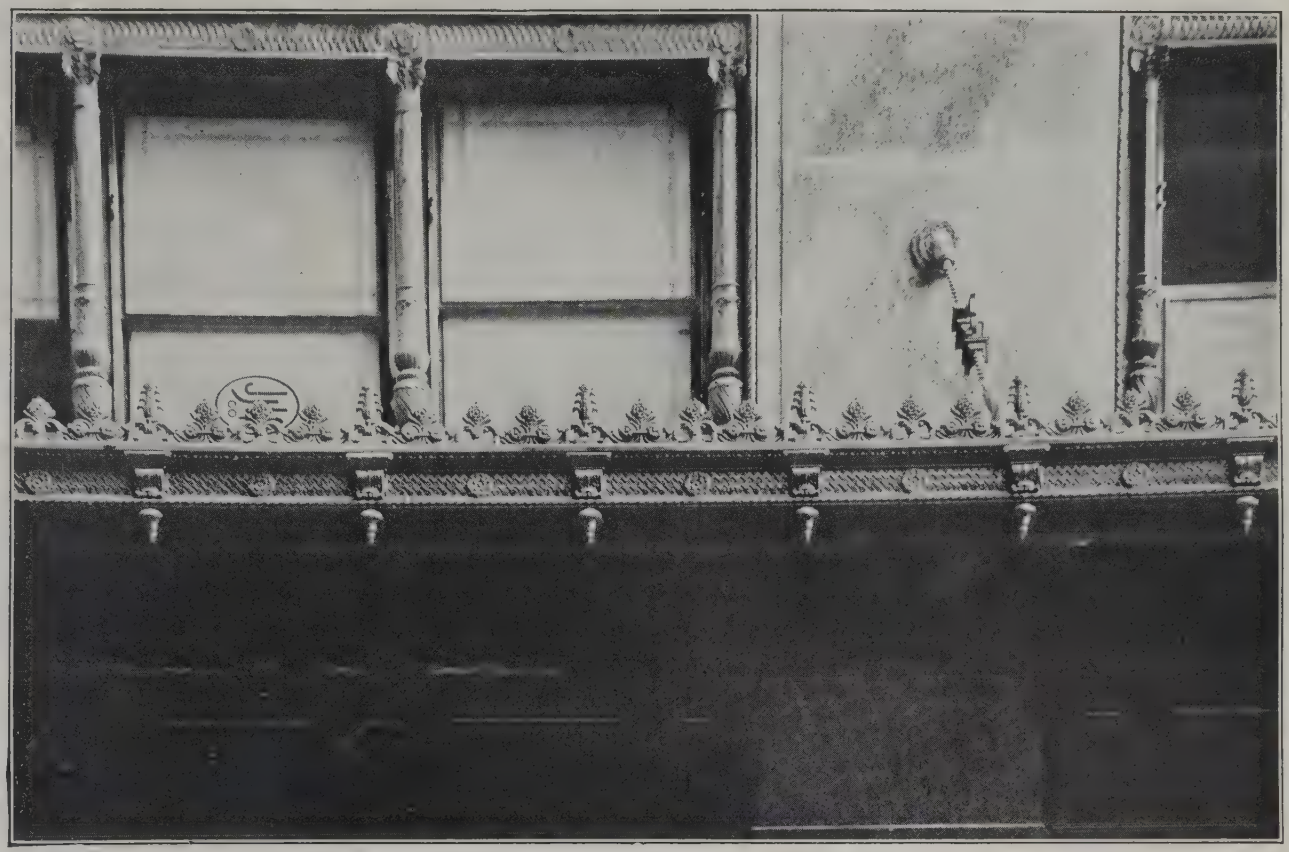


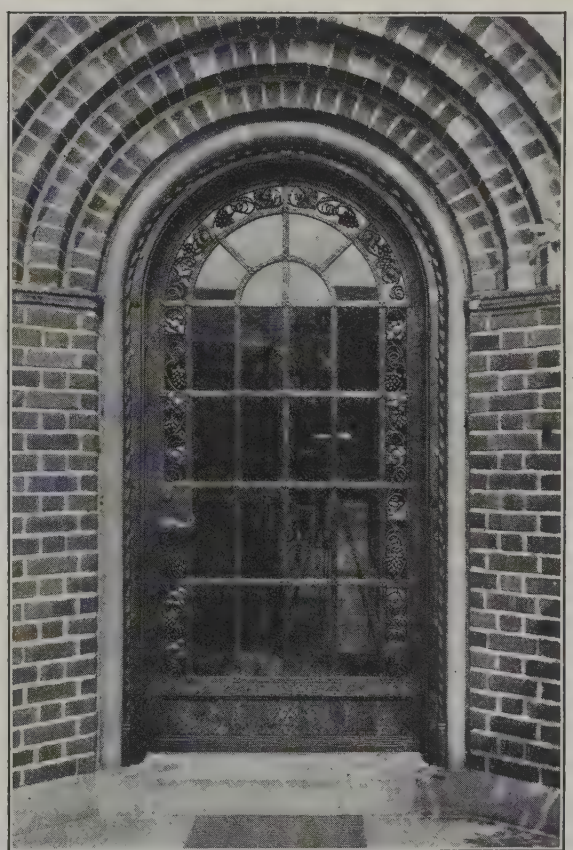
Details Cast Iron Store Front Windows and Marquise, New Hudson Store Building, Detroit, Mich.

Wrought Iron

In our wrought iron department we have blacksmiths capable of producing ornamental wrought iron work of the finest quality from architects' designs.

Designing

We are prepared to furnish designs in cast and wrought iron work, and by using patterns selected from our storage can design store fronts, marquises, etc., that will be in harmony with architectural designs at a minimum cost.



Hand Wrought Iron Entrance Door, Dr. McGraw Residence, Detroit, Mich.

WOLVERINE IRON · WORKS DETROIT · MICHIGAN	CAST & WROUGHT IRON WORK	DATE ~ 1928	DRG. 4

WOODBRIDGE ORNAMENTAL IRON CO.

Incorporated

Manufacturers of PresTeel Stairways

1521 Altgeld Street

CHICAGO, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES

Product

PRESTEEL—"Tested for Strength" —STAIRWAYS.

Strength Tests

Armour Institute of Technology, Chicago, Ill., was selected by our consulting engineers as the best place to conduct exhaustive strength tests of Woodbridge PresTeel Stairways. Separately, stringers, treads, risers, platform channels, tees, hanger rod connections, newel post connections and other parts and connections were subjected to various tests to determine their carrying capacity. Also various designs of completed stairways were subjected to applications of ultimate loads.

From this data, our engineers were enabled to design stairways equal to all requirements, not only in the stringers or platforms, but in all of the component parts.

Exhaustive research has given us a set of tables that definitely eliminate guesswork as to the actual live load that can be carried when using varying weights of metal.

Guarantee

We unequivocally guarantee, without any exception whatever, the satisfactory completion of any work with which we are intrusted; and, without reservation, guarantee all workmanship and materials against defects and to be exactly as represented.

Design

The Woodbridge Standardized PresTeel Stairways can be furnished plain or ornamental to suit any architectural design, with railings and newel posts to match. The risers may be plain or paneled, the treads can be arranged for marble, slate, cement, terrazzo, rezilite, alberene, asphalt, mosaic, cork, carpet, wood, linoleum, or any composition filling, with or without sanitary cove. The soffits of stairs are usually left open and present a neat finished appearance, but can also be arranged for plastering if desired.

Construction

Our construction provides a light, inexpensive, strong, durable, non-combustible and easily assembled stairway. It is adaptable to office, hotel, warehouse, factory, school, church, lodge hall and hospital construction; in fact, any building where fire-resistant construction is required.

Woodbridge Stairways are built with stringers made of PresTeel, thickness not lighter than $\frac{3}{16}$ in. The treads and risers are made of one piece of blue annealed steel pressed into the form required, platform plates are made of blue annealed steel reinforced with the necessary channels and tees, all securely bolted and riveted together. Our construction is so designed and planned as to form a permanently rigid and therefore noiseless stairway. The thickness of metal used for the treads and risers as well as stringers depends upon the safe live load requirements and the length of span.

The Woodbridge Patented Standardized PresTeel Construction is reinforced at nosing, which prevents the nosing from breaking away from the tread filling. This stair tread will absolutely stand up at this point under the constant wear and tear the tread nosing must withstand.

The stair assembled forms a solid mass which is free from vibration under loading stress, both vertically and laterally. The strength of our construction insures the maximum of efficiency against damage or failure in case of fire.

Manufacturing Details

Special attention is called to the details of the Woodbridge standardized manufacture. Only the best of materials and workmanship goes into the makeup with a view to making these stairs last forever—if such a thing were possible—and thus reducing cost and upkeep to a minimum.

Our product is made to last—to withstand the hardest usage—to embody all the necessary requirements and to give the greatest value possible for the money expended.

Cheap material and construction only increase the cost of an article, in added repair and replacement charges.

Installation

Woodbridge Stairways are exceedingly easy to erect. Each flight is erected, inspected and marked in our factory, then knocked down for shipment. If contractor desires to do his own erecting, we furnish shop details and printed erection instructions when shipment is made. A good man and helper can erect two flights of stairs per day, unless stair is extremely complicated. This company will be glad to handle the erection for those unable to take care of this work.

We often erect these stairs with the framework of the building, thus putting the stairs into immediate service, The tread filling is afterwards put in when the structure is nearing completion.

Painting

All Woodbridge Stairways are given one shop coat of battleship gray rust inhibitive metal coating, applied by the air brush process. We do no painting in the field.

Service to Architects

Our thoroughly organized Engineering, Estimating and Sales Departments are at the service of architects, engineers and builders. For those interested in designing and detailing stairway construction, our standardized construction in ¾-in. scale drawings for use in the drafting room, will be furnished upon request.

Continued on next page

The Woodbridge Patented PresTeel Tread and Riser

Made of one piece of No. 12, No. 14 or No. 16 Gauge Blue Annealed Steel, depending upon safe load required and length of tread

Plaster Soffits unnecessary with this construction.

By placing angle iron in this position one man can set treads and risers. No scaffolding or ladders necessary

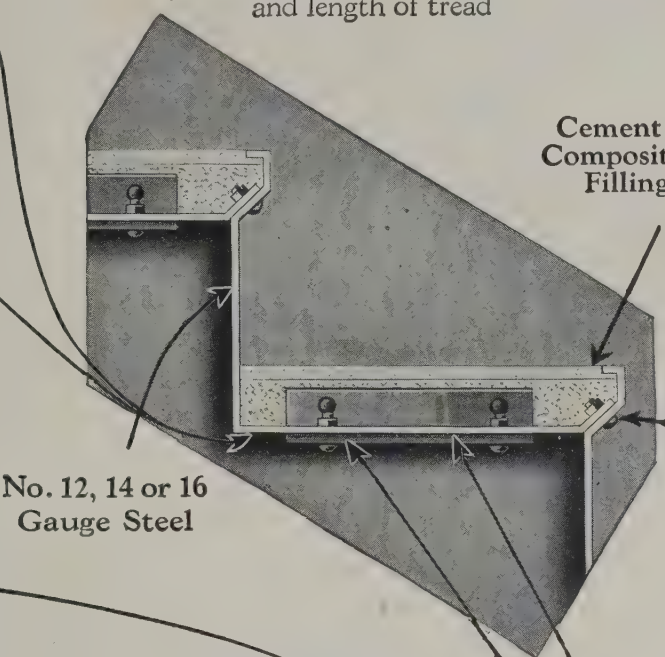
All angle irons cut to the same length and carried in stock.

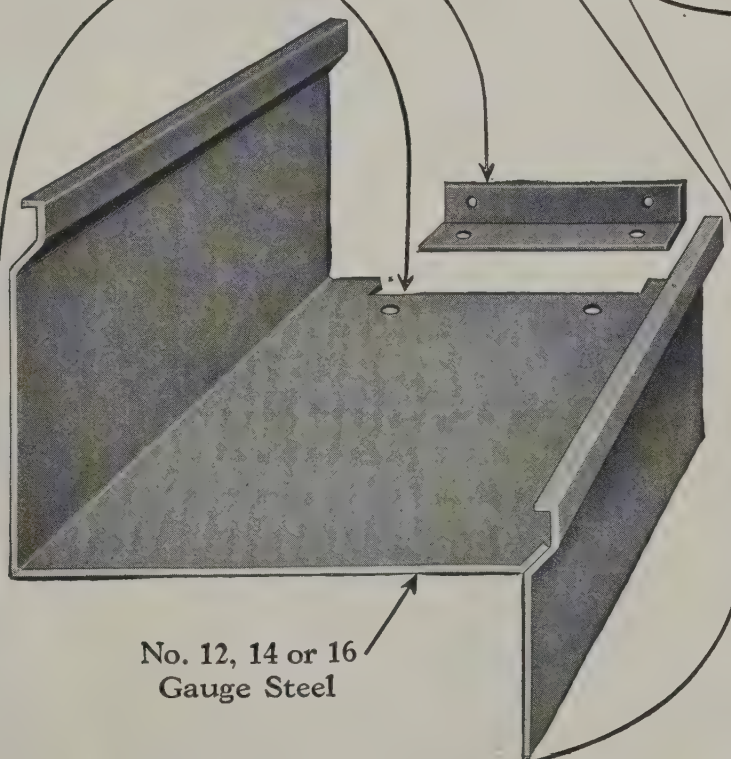
All holes in angle iron are punched in 2 operations.

The recess in treads positively gauges and positions treads.

Treads are recessed and punched in 1 operation.

Only lower side of angle iron exposed.





Construction allows for variation in width of treads.

Construction strengthens risers, making braces or anchors unnecessary. Nosing positively will not break away from concrete or other fill.

This construction partially conceals bolt heads.

No unsightly construction from below.

Full strength of angle iron utilized in supporting tread.

Note how accessible these bolts are from the top for tightening.

We do not depend on these 2 bolts to support treads.

THIS type of stair construction has passed the experimental stage as we have installed them in all principal cities of the United States. It meets all the requirements of the building and fire ordinances, and is recommended by leading Architects and Engineers.

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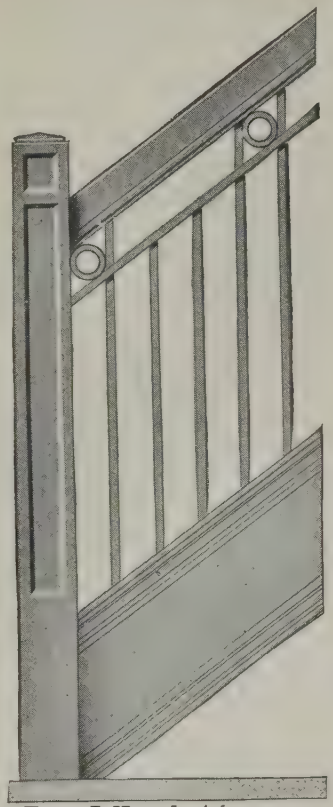
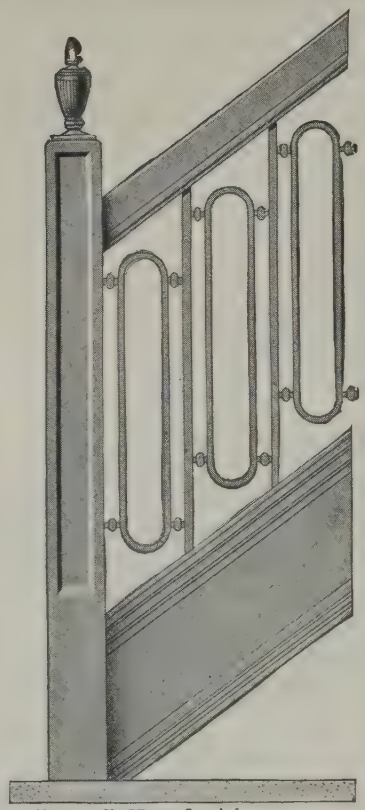


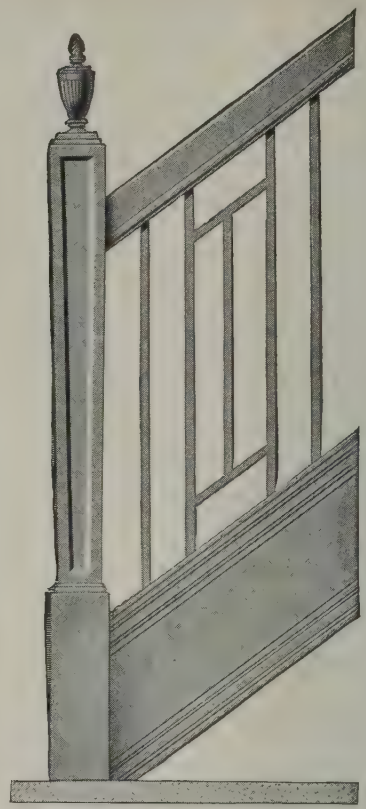
Type J Newel—4 in. square cast iron.

Design No. 12 Rail—Spindles are ½-in. square wrought iron bars, 3 in. on center, set in 1x½-in. channels and with a 1x½-in. flat bar at top and a 1x½-in. channel at bottom.



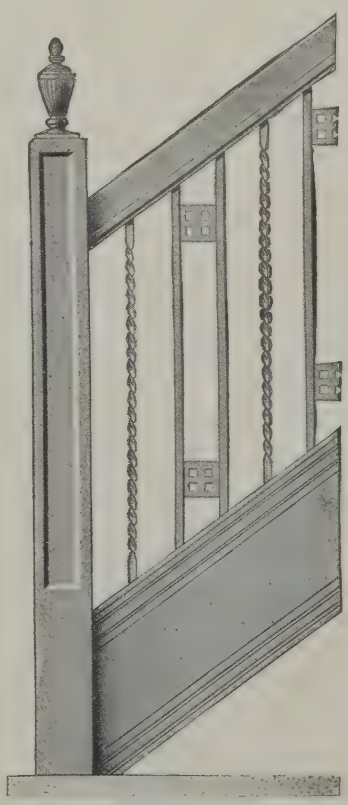
Type G Newel—4 in. square cast iron, rounded corners.

Design No. 14 Rail—Spindles are ½-in. square wrought iron bars, 6 in. on centers; ornament is $\frac{3}{16}$x⅜-in. wrought iron bar with ornamental iron separators between.



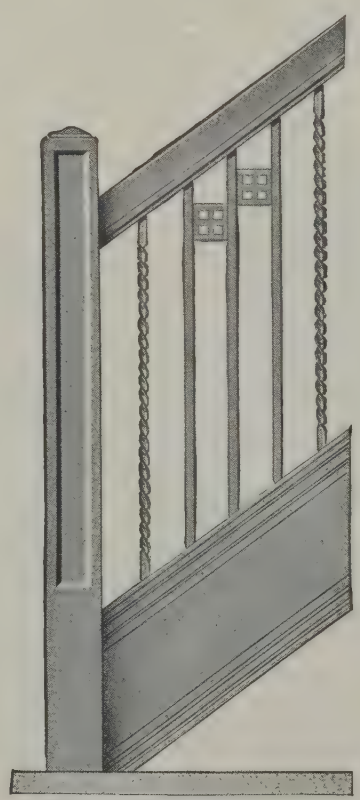
Type L Newel—4 in. square cast iron tapered shaft, bronze urn top.

Design No. 3 Rail—Spindles are ½-in. square wrought iron bars, 3 in. on centers, arranged in panel form with single spindle between panels. Spindles set in 1x½-in. channels at top and bottom.



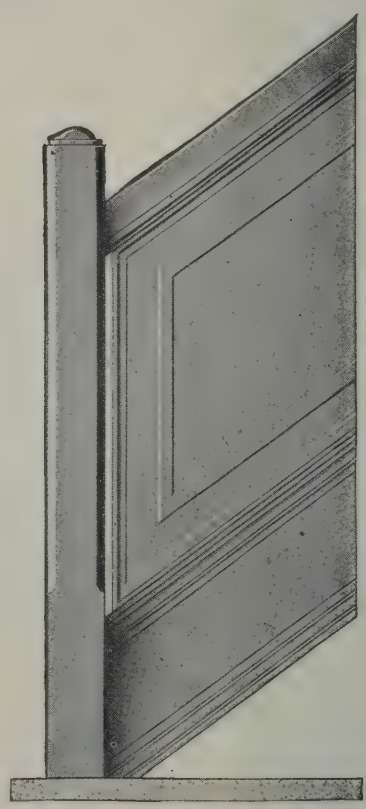
Type G Newel—4 in. square cast iron, rounded corners.

Design No. 20 Rail—Spindles are ½-in. square wrought iron bars, set 3 in. on centers, in a 1x½-in. channel at top and bottom. Also available with two twisted spindles between panels.



Type F Newel—4 in. square cast iron, rounded corners.

Design No. 19 Rail—Spindles are ½-in. square wrought iron bars, set 3 in. on center, in a 1x½-in. channel at top and bottom. Two cast iron ornaments between spindles at top.



Type D Newel—4 in. square cast iron, beveled corners.

Design No. 22 Rail—Closed rail, adapted to schools, etc., made of No. 12 gauge steel paneled with 1x⅛-in. flat bars. Can also be furnished with panels omitted.

Combinations of Railings and Newel Posts

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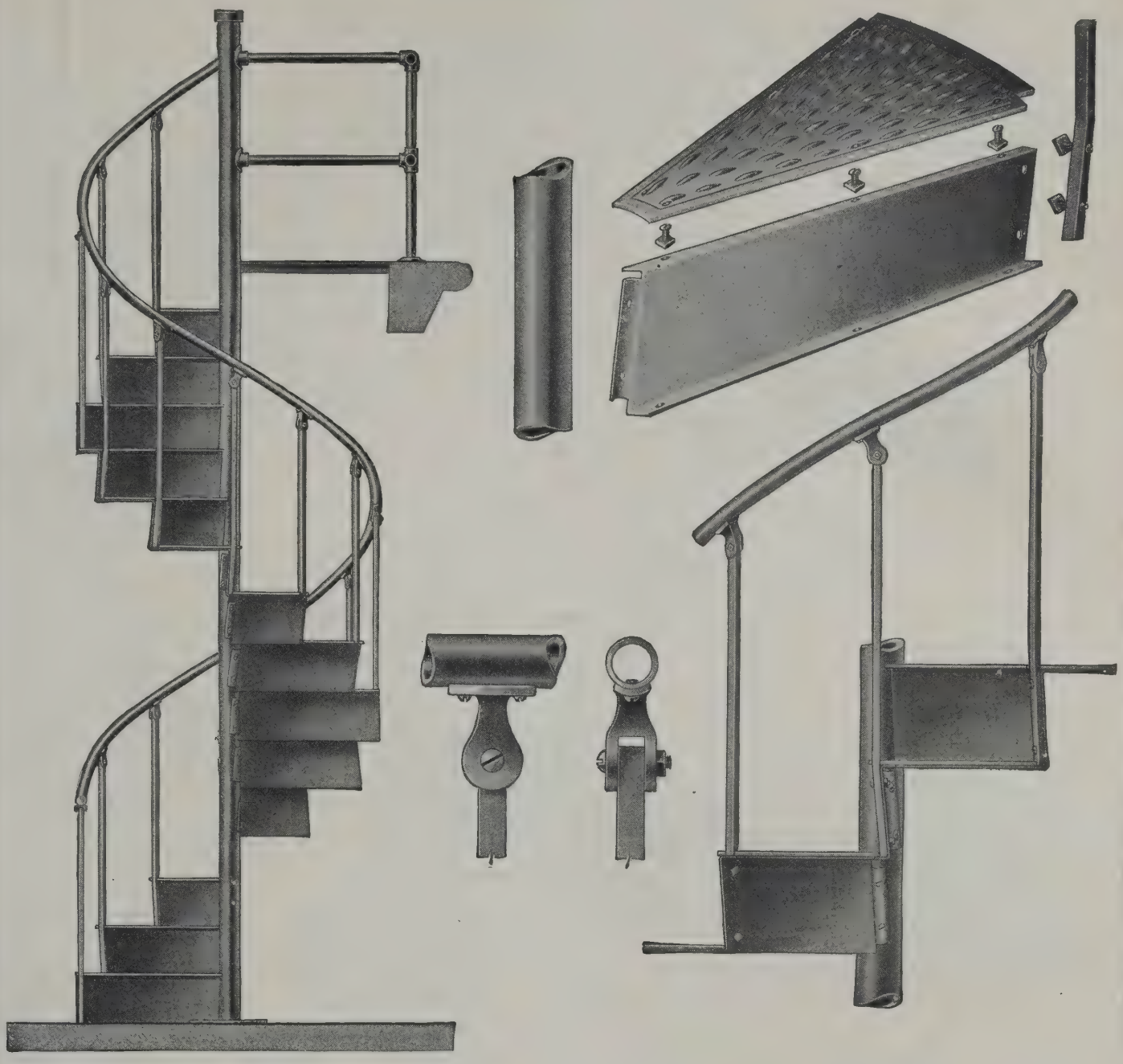


Woodbridge Spiral Stairway Design No. 20B

Notice the greater beauty of this latest design. Compare it with other spiral stairways that are on the market.

This new spiral, like all Woodbridge Stairways, is exceedingly easy to erect. All parts are marked and treads and risers are interchangeable.

Description—

Treads are made of cast iron with diamond pattern surface to match steel diamond plate platform.

The same casting is used for right or left-hand treads. All treads are interchangeable and easily removed.

The risers are made of No. 12 or 14 United States Standard gauge steel.

Each riser is flanged and bolts to the center pipe.

The uprights are made of ¾-in. square bars and are bolted to each riser.

The handrail is made of 1½-in. inside diameter pipe and is rolled to exact radius required.

Platform is made of $\frac{3}{16}$ or ¼-in. diamond plate steel which matches surface of treads.

The New Woodbridge Spiral Stairway

THE BESSLER DISAPPEARING STAIRWAY CO.

AKRON, OHIO

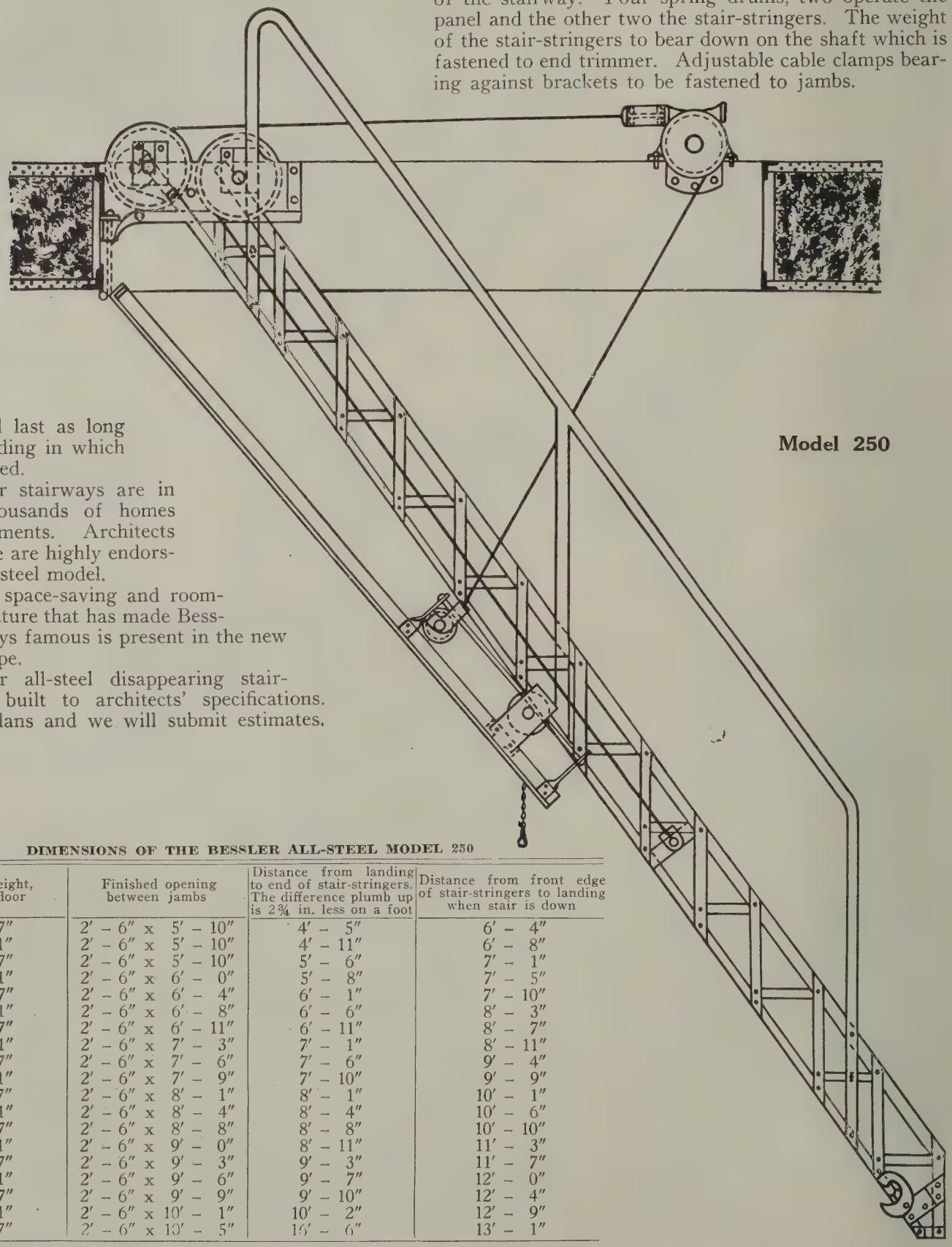
For Bessler Wood Models, see pages B1572-1573 in the Carpentry Section

Bessler All-steel Disappearing Stairway, Model 250

The all-steel stairway is fireproof and burglarproof, and is suitable for use where every hazard must be eliminated and every possible feature of safety must be provided.

Specifications

Stairway to be all-steel mounted on panel to slide on rollers. Panel to have adjustable hinges permitting edge to come to bottom of ceiling. Hand rail for right or left side. One equalizing bar is to be on each side of the stairway. Four spring drums, two operate the panel and the other two the stair-stringers. The weight of the stair-stringers to bear down on the shaft which is fastened to end trimmer. Adjustable cable clamps bearing against brackets to be fastened to jambs.



Model 250

It will last as long as the building in which it is installed.

Bessler stairways are in use in thousands of homes and apartments. Architects everywhere are highly endorsing the all-steel model.

Every space-saving and room-making feature that has made Bessler stairways famous is present in the new all-steel type.

Bessler all-steel disappearing stairways are built to architects' specifications. Send us plans and we will submit estimates.

DIMENSIONS OF THE BESSLER ALL-STEEL MODEL 250

Ceiling height, floor to floor	Finished opening between jambs	Distance from landing to end of stair-stringers. The difference plumb up is 2¾ in. less on a foot	Distance from front edge of stair-stringers to landing when stair is down
7′ – 7″	2′ – 6″ x 5′ – 10″	4′ – 5″	6′ – 4″
8′ – 1″	2′ – 6″ x 5′ – 10″	4′ – 11″	6′ – 8″
8′ – 7″	2′ – 6″ x 5′ – 10″	5′ – 6″	7′ – 1″
9′ – 1″	2′ – 6″ x 6′ – 0″	5′ – 8″	7′ – 5″
9′ – 7″	2′ – 6″ x 6′ – 4″	6′ – 1″	7′ – 10″
10′ – 1″	2′ – 6″ x 6′ – 8″	6′ – 6″	8′ – 3″
10′ – 7″	2′ – 6″ x 6′ – 11″	6′ – 11″	8′ – 7″
11′ – 1″	2′ – 6″ x 7′ – 3″	7′ – 1″	8′ – 11″
11′ – 7″	2′ – 6″ x 7′ – 6″	7′ – 6″	9′ – 4″
12′ – 1″	2′ – 6″ x 7′ – 9″	7′ – 10″	9′ – 9″
12′ – 7″	2′ – 6″ x 8′ – 1″	8′ – 1″	10′ – 1″
13′ – 1″	2′ – 6″ x 8′ – 4″	8′ – 4″	10′ – 6″
13′ – 7″	2′ – 6″ x 8′ – 8″	8′ – 8″	10′ – 10″
14′ – 1″	2′ – 6″ x 9′ – 0″	8′ – 11″	11′ – 3″
14′ – 7″	2′ – 6″ x 9′ – 3″	9′ – 3″	11′ – 7″
15′ – 1″	2′ – 6″ x 9′ – 6″	9′ – 7″	12′ – 0″
15′ – 7″	2′ – 6″ x 9′ – 9″	9′ – 10″	12′ – 4″
16′ – 1″	2′ – 6″ x 10′ – 1″	10′ – 2″	12′ – 9″
16′ – 7″	2′ – 6″ x 10′ – 5″	16′ – 6″	13′ – 1″

DUVINAGE SPIRAL STAIR CO.

Manufacturer of Spiral Stairs

89 West Lee Street
HAGERSTOWN, MD.

Product

DUVINAGE IRON SPIRAL STAIRS.

Duvinage Iron Spiral Stairs

Duvinage spiral stairs have been erected and approved for their simple, durable construction as well as their economy in floor space, in offices, churches, theaters, stores, mezzanines, boiler rooms, sewage disposal pumping wells, power plants, gas houses, water towers, mines, cement plants, etc.

They are made of the best grade of iron; have single 1-in. pipe railing on stairs and double rail around well; and center pipe 3 in. for 42 and 48-in. stair, and 4 in. for 54 to 96-in. stair.

The regular stock treads of these stairs can be furnished either right or left hand (illustration shows right hand) and 12 or 16 treads to the circle. Riser heights are affected by height between floors.

To provide sufficient headroom under top platform, risers should not be less than 8¼ in. high. By calculating number of risers required, the relative positions of starting and landing points can be determined, and a right or left-hand stair decided upon.

In ordering, give diameter, distance between floors, starting point, and position of landings desired. The *60-in. diameter is the best to use.*

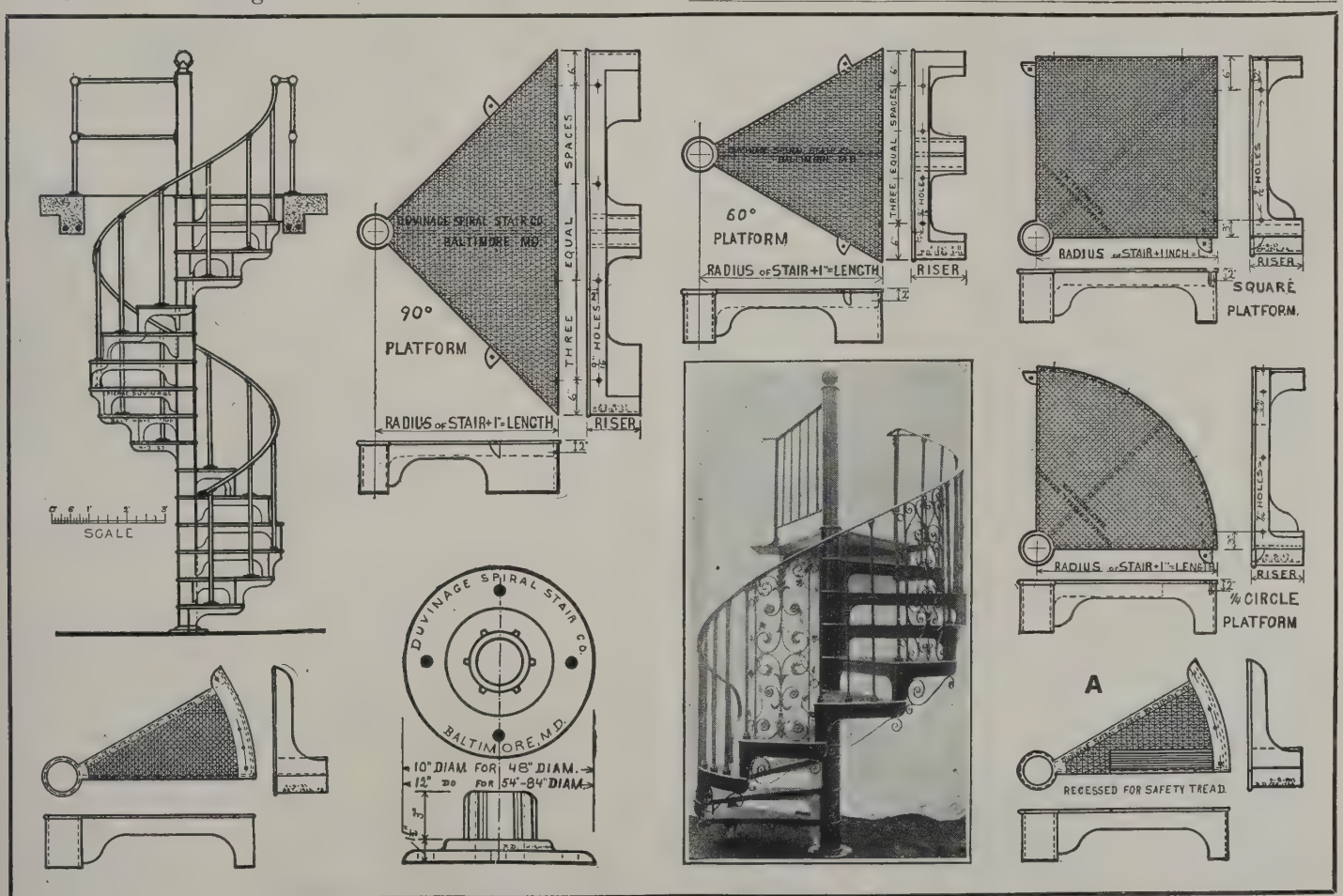
Send for Catalogue No. 58.

Where Duvinage Stairs Have Been Installed

Chevrolet Motor Co., Flint, Mich.
Seybold Bakeries, Miami, Tampa and Daytona Beach, Fla.
City National Bank of Commerce, Columbus, Ohio
New York Life Building, New York, N. Y.
Hearst Publications Building, New York, N. Y.
Church of Ascension, Philadelphia, Pa.
Century Club, New York, N. Y.
Thompson Dairy, Washington, D. C.
N. J. State Home for Boys, Jamesburg, N. J.
St. Elizabeth's Hospital, Elizabeth, N. J.
Woodstock Hotel, New York, N. Y.
Atlantic Delicatessen Warehouse, Atlantic City, N. J.
Baltimore City College, Baltimore, Md.
Roxy Theater, New York, N. Y.
Industrial Drive Pumping Station, East Chicago, Ind.
Dunn Sulphite Paper Co., Port Huron, Mich.
Montgomery, Ward & Co., Baltimore, Md.
And many others.

SIZES OF PLATFORM AND FLOOR OPENINGS

Diam. of stair, in.	Center pipe, in.	Platform, in.		Floor opening, in.	
		Square	Circular radius	Square	Round (diameter)
42	3	22x22	22	44x44	44
48	3	25x25	25	50x50	50
54	4	28x28	28	56x56	56
60	4	31x31	31	62x62	62
66	4	34x34	34	68x68	68
72	4	37x37	37	74x74	74
84	4	43x43	43	86x86	86
96	4	49x49	49	98x98	98



Duvinage Riser Design, Iron Spiral Stairs
Detail A required by U. S. Post Office Specifications

AMERICAN ABRASIVE METALS CO.

TELEPHONE
CORTLANDT 7444, 6467

Hudson Terminal Building, 50 Church Street
NEW YORK, N. Y.

FACTORY
IRVINGTON, N. J.

BRANCHES
CHICAGO, ILL., Conway Building
BOSTON, MASS., 136 Federal Street
PHILADELPHIA, PA.,1700 Walnut Street
BUFFALO, N. Y., Erie County Bank Building
PITTSBURGH, PA., Farmers Bank Building
SAN FRANCISCO, CAL., 444 Market Street
AGENCIES IN PRINCIPAL CITIES

ABRASIVE-METALS
ALUMALUN FERALUN BRONZALUN
FERROX
CARBORUNDUM

Products

Manufacturers of ABRASIVE-METALS:

FERALUN, BRONZALUN and ALUMALUN for Anti-Slip Tread Surfaces; FERROX for Drill and Torch Resistant Bank Vault Linings and Door Plates.

Sole Sales Representatives for ANTI-SLIP TILE.

Code Requirements

Largely on account of slippery and unsafe walkway surfaces "Falls of Persons" are *annually* causing more than 17,000 fatalities and nearly 2,000,000 serious injuries in the United States. The building and safety codes of several States, numerous large cities and industrial organizations now require walkway surfaces of higher frictional resistance than formerly used for certain purposes.

Approvals

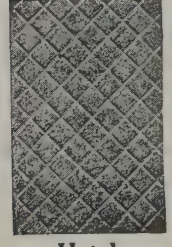
The Underwriters' Laboratories, Inc., approve Feralun without qualification as providing a fire-safe, anti-slip tread. The State industrial boards of New York, Pennsylvania and Ohio, as well as insurance carriers in general, recommend Abrasive-Metal Treads to avoid slipping hazards.

Abrasive-Metal Anti-Slip Tread Surfaces

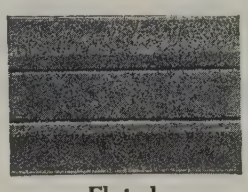
Feralun, Bronzalun and Alumalun are the different abrasive-metals used for anti-slip tread purposes. They are the indicated metals with abrasive grain incorporated in the wearing surface at the time of casting. This grain, projecting slightly, "bites" or provides a high frictional resistance which eliminates the slipping hazard. It covers and protects against wear the metal matrix in which it is firmly embedded, assuring extreme durability with freedom from maintenance troubles. Inasmuch as the grain is cast in the metal matrix, there is no possibility of disintegration.

Uses—Abrasive-Metals are especially adapted for walkway surfaces where sure protection against slipping and great durability are desirable. Representative hazardous locations that can and should be made safe through the use of the desired Abrasive-Metal are:

Stair treads and landings
Floor plates
Trench covers
Elevator door thresholds
Freight elevator landings
Drainage gratings
Entrance door saddles
Coalhole covers
Ramps
Shipping platforms



Hatch



Fluted

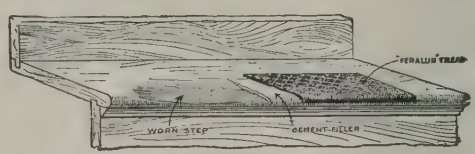
Plain

Sizes and Designs—Abrasive-Metal treads are obtained in practically any form in which metal may be cast. Certain forms are so frequently ordered that they have become standardized and are illustrated in detail on the second and third pages following. (These details in larger size for tracings will be sent on request.)

The wearing surface is furnished plain, fluted or hatched as specified.

Stair Treads—In Abrasive-Metal stair treads the anti-slip element is carried well down over the nosing edge. This is a most important safety feature, for it is the nosing that is the contact point of the foot when descending. Either plain or hatched surface is furnished. Grooves parallel to the edge are not recommended; they are hazardous and often cause tripping. Various designs of structural or surface treads shown in details are standard. (See Plates 1, 2 and 3.)

Repairs to Worn Steps—Styles A, C or D are applied to existing steps. Style A, long lip, is especially designed for covering badly worn steps. (See Plate 8.)



Method of Repairing Worn Wood, Concrete, Slate, Iron or Marble Steps with Style A Feralun Anti-Slip Treads

Anti-Slip Thresholds and Saddles—Especially desirable at entrance doors and exposed locations. Styles L and T are extensively used. (See Plate 6.)

Elevator Thresholds—The elevator code, approved by the American Engineering Standards Committee as an American Standard and now in effect, requires that "the landing threshold shall be constructed and maintained so that persons will not readily slip thereon." Abrasive-Metal thresholds provide the necessary quality and, unlike the ordinary cast or extruded variety, are very sturdy and not slippery. The grooves or slots for door guides are machine-planed and straight, true, free from fins, and correct to 5/1000 in.

Made in any of the three metal bases to harmonize with architectural requirements.

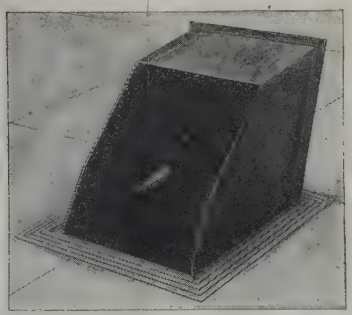
For Ramps and Grades—With steeper grades Feralun may be used and much space saved. Firm, even traction is essential in garages. When ramps are tracked or covered with Feralun, they give a feeling of security to every car owner, and are positive protection against the damage caused by one car skidding into another or into posts and walls. (See Plate 5.) Desirable also where hand trucking is done.

Floor Plates and Trench Covers—To avoid the slipping hazard Abrasive-Metal (Feralun) Plates are particularly desirable where there is heavy wear. On oil covered areas Feralun does not lose its effectiveness against slipping—especially desirable around heavy machinery. (See Plate 5.)

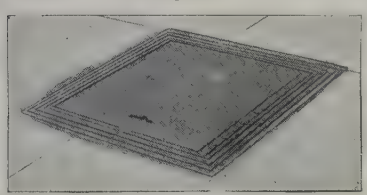
Continued on next page

Feralun Safety Coalhole Covers and Frames

Made of iron with emery cast into the wearing surface. Not slippery even when wet. Have no heel-catching projections or depressions; flush with sidewalk. When open, they are enclosed on all sides and top, except toward curb where coal chute is inserted. Hinges especially constructed to overcome breakage and are concealed. Easy to install, cost nothing to maintain. Made in three sizes: 18, 20 and 24 in.



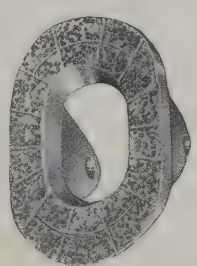
Open



Closed

Feralun safety covers and frames comply with the requirements of New York City Department of Public Works.

Alumalun Non-skid Ladder Shoes



Abrasive in the bottom face of the shoes keeps ladders from slipping on iron, steel, wood and concrete floors. Easily applied. Always ready. Light in weight, 12 oz. each. Cost less than accidents.

Specifications for Abrasive-Metal Treads

Concrete Steps, Platforms and Landings—All concrete steps, including nosing edges of platforms and landings, shall be equipped with "Feralun" [Style A, C or D] as made by American Abrasive Metals Co. Style A shall extend continuously along the step to within .... inches (3 to 4 in.) of stringers. Style C and D shall extend from string to string. Treads shall be .... inches (at least 4 in., and preferably 6 to 7½ in.) wide. Treads shall be set flush with the cement surface and firmly secured with anchors. Surface of treads shall be kept free from all cement finish.

Iron Stairs with Risers—All iron stairs with risers shall be equipped with "Feralun" [Style O, S or K] as made by American Abrasive Metals Co.

Iron Stairs without Risers—All iron stairs without risers shall be equipped with "Feralun" [Style R or R-K] as made by American Abrasive Metals Co. Style R and R-K are cast with lugs to be bolted to the stringers. Style K may be used bolted to angles on stringers.

Elevator Door Thresholds—All elevator door thresholds shall be "Feralun" [Style V-1 or V-2] as made by American Abrasive Metals Co.

Door Saddles, Exterior and Interior—All entrances, interior, and fire door saddles shall be "Feralun" [Style L, T, W or M] as made by American Abrasive Metals Co.

Walkway Surfaces—All (mention location, such as boiler room floors, floors around machinery, inclines, ramps, elevator floors, vestibules, freight corridors, trench covers, drainage gratings, coalhole covers, etc.) shall be "Feralun" as made by American Abrasive Metals Co. and as shown on plans.

Note: At locations where architectural effect is desired, "Bronzalun" or "Alumalun" may be substituted for "Feralun" in the above.

Anti-Slip Tile—For specifications for Carborundum Anti-Slip Tile see third page following.

Anti-Slip Terrazzo Aggregates

Used in place of 10% to 20% of the marble chips in terrazzo, or troweled into a granolithic finish, these aggregates, developed especially for the purpose, make such walkway surfaces more durable and slipproof.

Ferrox Bank Vault Linings and Door Plates

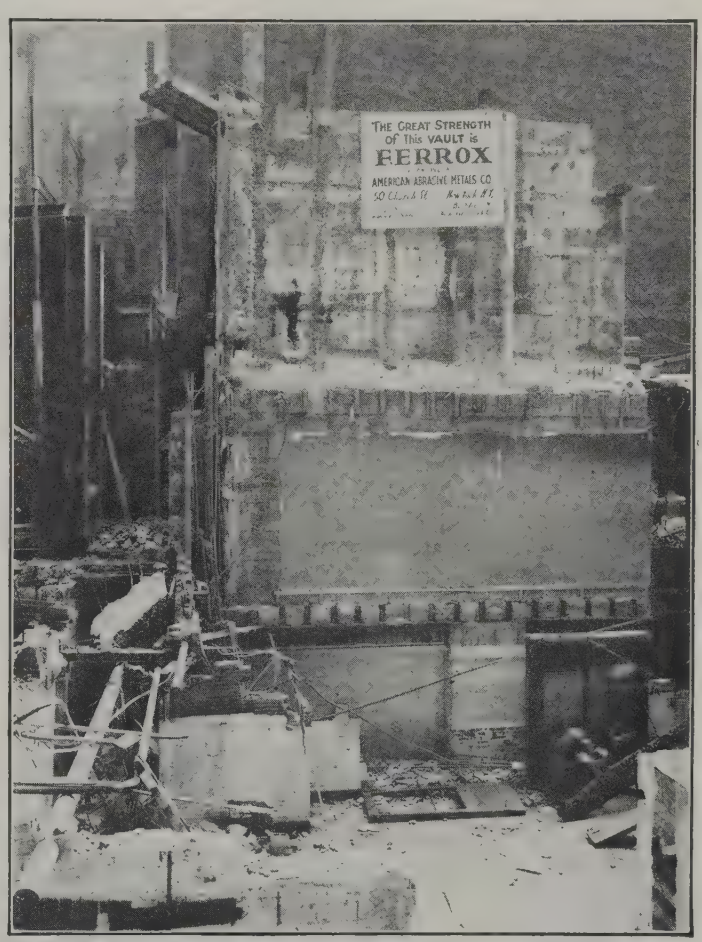
The development of destructive forces since the World War, coupled with the increasing menace of criminal violence, has compelled radical revision of structural elements required for adequate safeguarding of funds and securities.

Armor plate, manganese steel, etc., that successfully defeated attack by drill and explosives, have become obsolete, because of the ease with which they are cut with the torch. A 6-in. plate of such material is pierced in a few seconds and a manhole cut within a few minutes. Masonry walls alone are inadequate. Concrete with lightweight reinforcing yields readily to attack with sledges and chisels; with heavy reinforcing, the torch and wedge attack quickly succeeds.

A combination of electrically protected and properly reinforced concrete with effective drillproof and torch-resistant interlining, Ferrox has been found capable of resisting modern attack. The reinforced concrete is insufficient of itself, but it provides an essential fireproofing and structural element and also retards and interferes with an open attack on the interlining. The linings in such a combination strengthen the concrete in the part it plays and provide the necessary element to defeat chisel, wedge, explosive, torch, and drill attacks.

Ferrox—This product was developed to meet a definite need in bank vault construction. Recognition of its value has spread, so that many of the more important vaults recently built have been Ferrox equipped.

Our engineers on request will gladly discuss details with those interested.



The Mechanics & Metal National Bank Vault
This vault is the one that made the record in resisting demolition—it was Ferrox equipped

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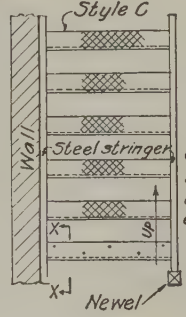
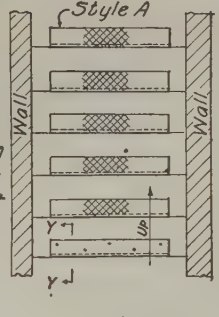
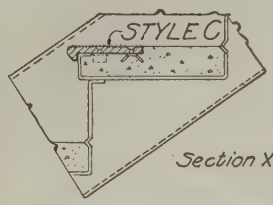


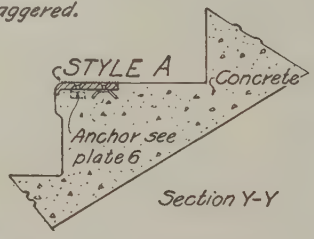


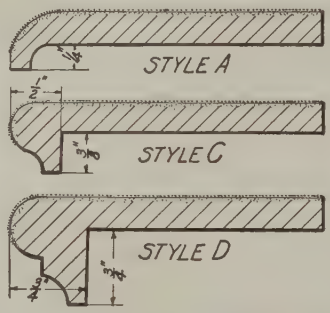
On cement or composition filled steps use Style A, C or D treads extending from stringer to stringer.

On concrete steps use Style A treads usually 6" or 8" shorter than distance between stringers. Styles C and D extend from stringer to stringer.

Holes for anchoring spaced not over 3" from ends and 15" on centers staggered.







Size Limitations For Styles A, C and D

Minimum thickness	5/16"
5/16" thick not over	4½" wide
3/8" "	9" "
7/16" "	12" "
1/2" "	20" "
5/16" "	6'-0" long
3/8" to 1/2" "	9'-0" "

Treads over 9'-0" long will be furnished in sections.

TREADS FOR CONCRETE ①

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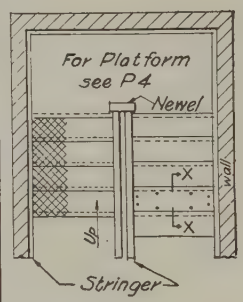

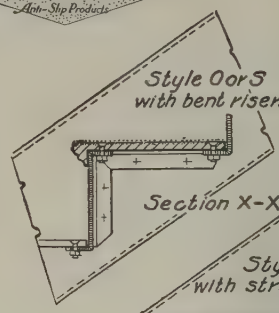

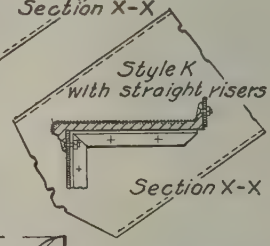

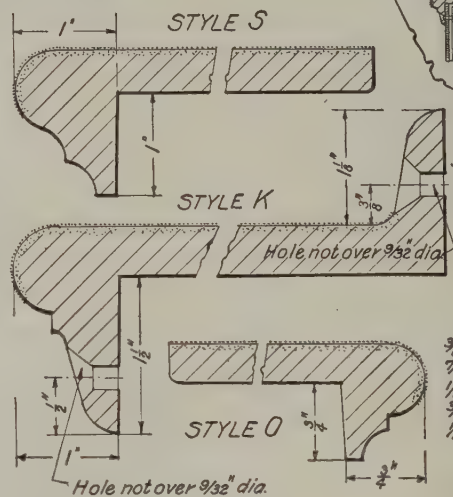

Important
State if width is given back of nosing or overall.

Size Limitations For Styles O and S

Minimum thickness	3/8"
3/8" thick not over	9" wide
7/16" "	12" "
1/2" "	20" "
3/8" "	5'-0" long
1/2" "	9'-0" "

For Style K Minimum thickness 7/16" otherwise as above.

STRUCTURAL TREADS - risers required ②

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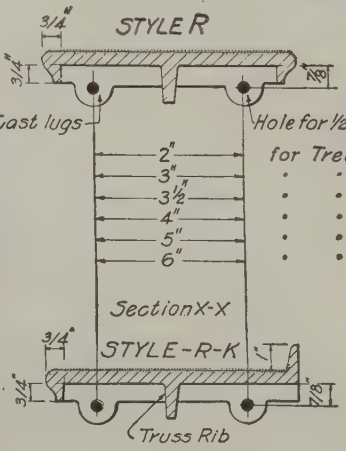
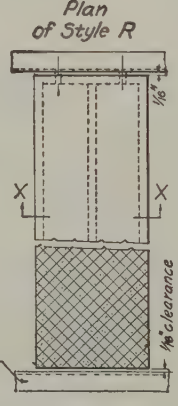
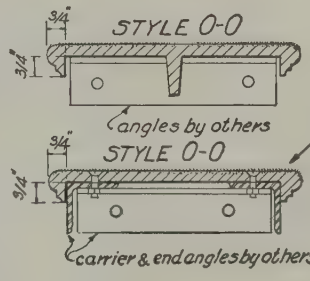


for Treads 5" wide	
2"	6"
3"	7"
3½"	8"
4"	9"
5"	10"
6"	



Size Limitations For Styles R, RK and O-O

Minimum thickness	½"
½" thick not over	42" long
5/8" "	54" "
¾" "	60" "



Special construction for Style O-O when supported by longitudinal carrier angle. For thickness see plate 2..

Above styles also made with perforated surfaces for drainage For further information ask for details.

STRUCTURAL TREADS - no risers required ③

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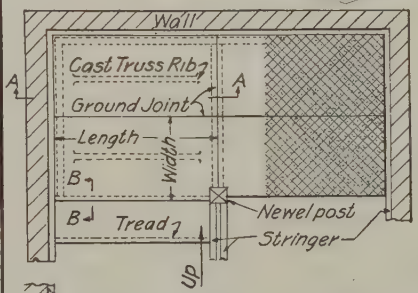
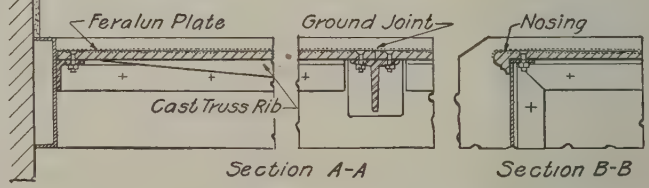
Size Limitations For Platforms

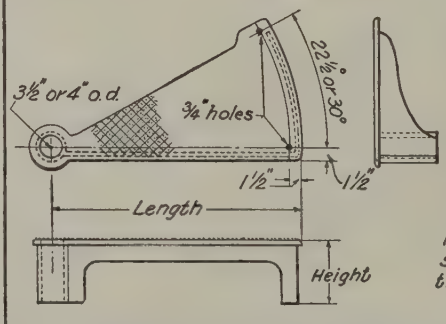
Widths 42"
Lengths 60"

Under 20" width ½" thick
20"-42" " ⅝" "
Over above limits in sections

For extra heavy loads ¾ or 1" thickness







Size Limitations For Spiral Treads

Length from 22" to 48"

Treads 12 or 16 to a circle

Minimum height 8' to allow sufficient headroom

For further information send for special spiral tread details.

STRUCTURAL PLATFORMS - SPIRAL TREADS ④

DETAIL OF STYLES AND SIZES—ABRASIVE-METAL ANTI-SLIP TREADS

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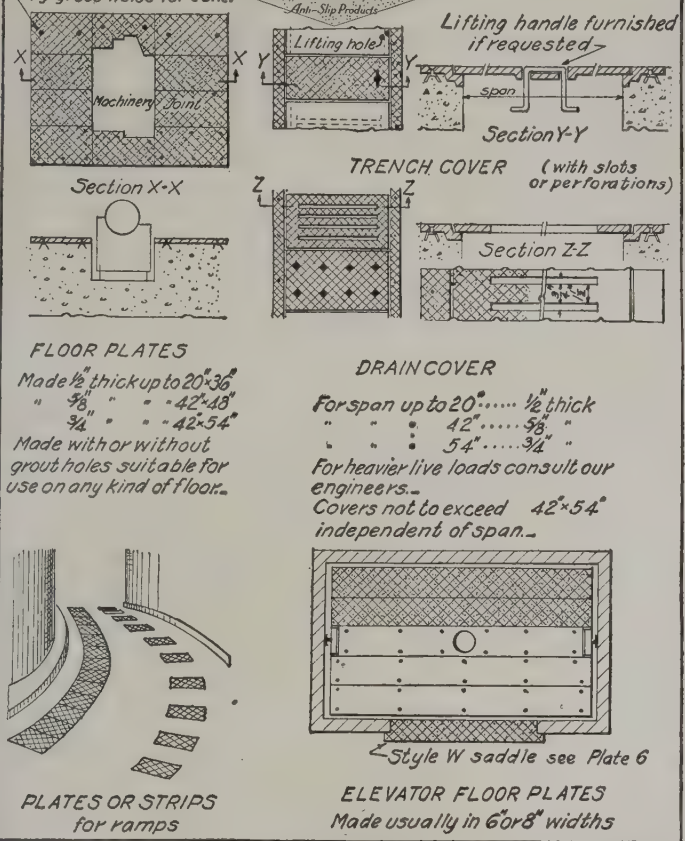

FLOOR PLATES ⑤

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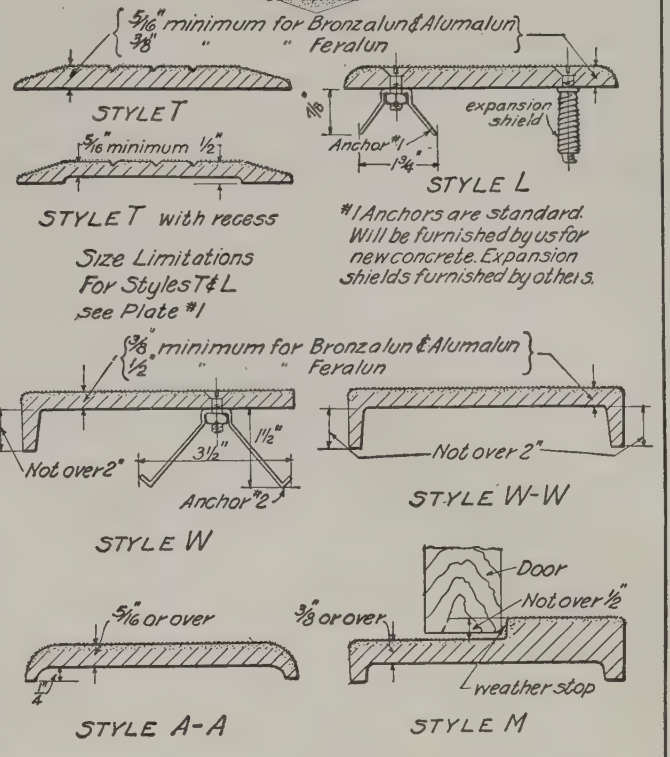
Anti-Slip Products



DOOR SADDLES ⑥

ABRASIVE-METAL
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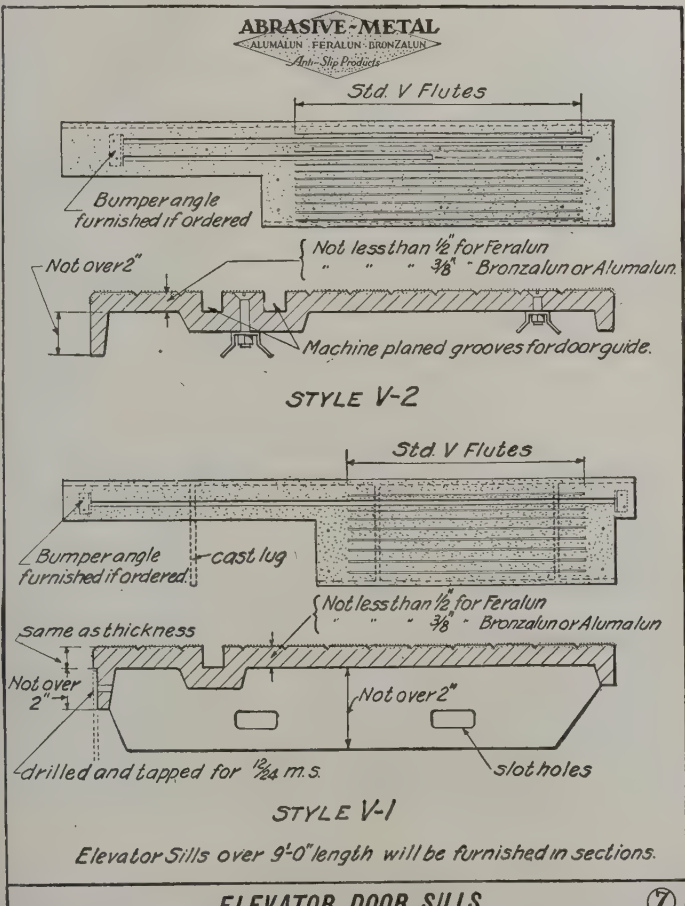
Anti-Slip Products



ELEVATOR DOOR SILLS ⑦

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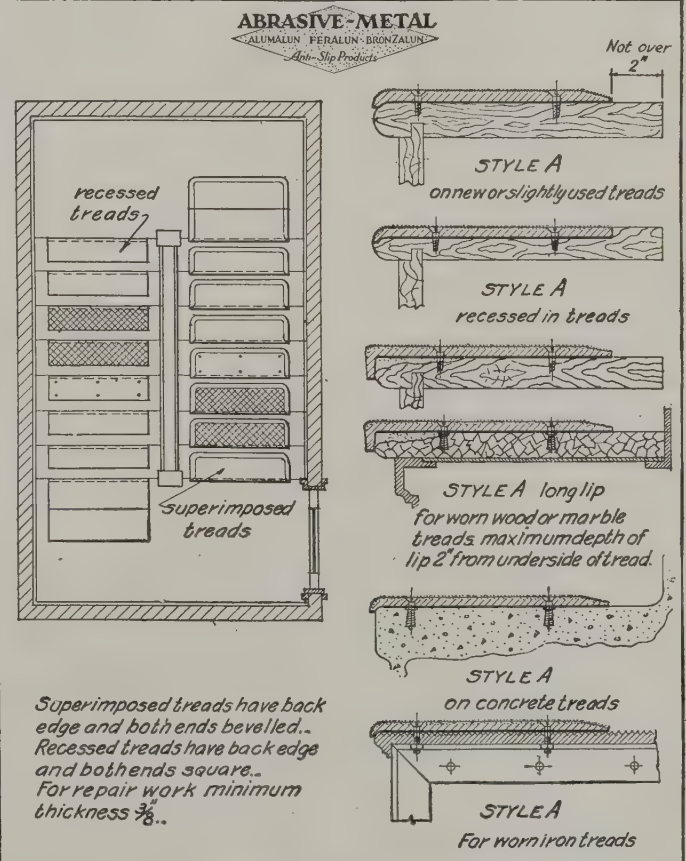
Anti-Slip Products



TREADS FOR REPAIR WORK ⑧

DETAIL OF STYLES AND SIZES—ABRASIVE-METAL ANTI-SLIP TREADS

Continued on next page

Carborundum Anti-Slip Tile

This tile is made of both Carborundum and Aloxite, abrasive products of the electric furnace. These manufactured abrasives have been recognized for years as among the greatest of all grinding materials, and are extensively used for the grinding of steel, iron, brass, bronze and other metals. Both are produced by fusing crude materials in electric furnaces at extremely high temperatures. The resultant crystal masses are taken from the furnace and are broken and crushed to standard sizes of grains or crystals. These crystals are mixed with clays and ceramic materials and moulded into the various sizes and shapes of tile. The tile are then vitrified in high temperature kilns.

Carborundum Anti-Slip Tile presents a gripping, safe surface that can not wear smooth. It is of the same structure and texture, and the same degree of hardness throughout. It retains its safe, anti-slip surface as long as the tile itself lasts.

Advantages of Carborundum Anti-Slip Tile

Carborundum Anti-Slip Tile never loses its anti-slip surface and is practically non-wearing. Under the slight wearing action of traffic it literally renews its safe surface.

It is safe under all conditions. Oil, water or grease does not affect its anti-slip qualities.

The tile is remarkably strong. Tests at room temperature have shown it to have a *transverse strength* of about 5500 lbs. per sq. in.

Carborundum Anti-Slip Tile presents a fine appearance and can be used with any building material such as concrete, marble, granite, brick, steel or wood.

Where this tile is used an even, flat surface is presented underfoot. The tile is laid flush with the stair tread or floor. There are no corrugations, ribs or ridges to cause tripping or to annoy by accumulating dirt.

The resistance of the tile to wear eliminates the cost of maintenance.

Uses of Carborundum Anti-Slip Tile

Stair Treads—For this purpose the tile is made with a rounded nose, giving a safe, secure footing even on the edge of the step.

Treads, such as concrete, slate, marble, wood, metal, etc., may be made safe by the use of Carborundum Anti-Slip Tile suitably applied.

In Concrete—Carborundum Anti-Slip treads can be used advantageously in reinforced concrete stairs, being placed at the time the concrete is poured. In conjunction with tile or terrazzo this tile provides an architecturally pleasing form of stair tread construction, which at the same time is absolutely slip-proof.

Floors—Entrances to shops, stores, moving picture theaters, swimming pool edges, floors in shower baths and lavatories, hotel and theater lobbies, restaurant kitchens, floor landings at elevators, and in industrial plants the floors around dangerous machinery, are made safe from the slipping hazard by the use of Carborundum Anti-Slip Tile. For such purposes the tile may be used solely or in varying proportions with ordinary tile forming designs. It is laid over old floors or incorporated in new construction in the same manner as ordinary tile.

Ramps—In no type of walkway surface is prevention of the slipping hazard so essential as in the construction of ramps. Here the Carborundum Anti-Slip Tile is especially suitable. It will stand up indefinitely under the severest traffic and its architectural attractiveness for finer work does not preclude its use for heavy duty where its anti-slip qualities give needed foot purchase to workmen handling loads.

Entrances—Stores and building entrance floors are made safe for pedestrians by Carborundum Anti-Slip Tile. It eliminates the menace of slippery doorways, gives long service and provides architectural attractiveness. It can be laid solid or in conjunction with ordinary tile to form various designs.

Swimming Pools—Carborundum Anti-Slip Tile is particularly suitable for use along the edges of swimming pools, presenting a safe, secure footing for swimmers. Water does not affect its anti-slip qualities. Such borders should not be less than 18 in. in width.

Specifications for Laying Carborundum Anti-Slip Tile

In Concrete on Floors, Ramps, etc.—Tile to be soaked in water and laid in same manner as ordinary vitrified tile. (Note: detailed specification will be furnished on request.)

In Mastic on Wood, Steel and Concrete Surfaces—Surface shall be thoroughly cleaned and dry. Tile shall be thoroughly cleaned and dry. Surface shall be coated with boiling asphalt roofing mastic of the proper quality, ¼ in. thick, for an area of not more than 4 tile at one time. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be 1/16 to ¼ in. wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer. It is recommended that this work be installed only by experienced men.

In Treads of Concrete Stairways—Pour concrete stairs and finish as usual. When tread is hard enough, just before concrete sets, from area to be covered by tile remove concrete for a depth of ⅝ in. Tamp water soaked tile into concrete to level, even surface. Joints shall be 1/16 to ¼ in. wide and filled with cement grout.

On Wooden Stair Treads—Tread shall be recessed for a depth of 13/16 in. and for length and width to suit number and size of tile to be used. Recessed surface shall be thoroughly cleaned and coated with boiling asphalt roofing mastic 1/16 in. thick. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be 1/16 to ¼ in. wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer.

Tile shall be held in position by 2 wood screws per tile, or by a No. 20 gauge brass, 1x¼-in. angle, toe guard, the 1-in. leg being fastened to wood tread by screws.

On Metal Stair Treads—Metal surface shall be cleaned and a 1½-in. layer of 1:2½ cement mortar placed on tread and finished to proper level. When this bed of mortar is hard enough, just before it sets, from area to be covered by tile remove mortar for a depth of ⅝ in. Tamp water soaked tile into mortar to level, even surface. Joints shall be 1/16 to ¼ in. wide and filled with cement grout.

STOCK SIZES OF CARBORUNDUM ANTI-SLIP TILE
(Colors: white and reddish brown)

Stair tile (rounded nosing on long side)		Floor tile			
		Square		Oblong	
No.	In.	No.	In.	No.	In.
*T 642	6x 4x ½	S 32	3x 3x ½	R 3152	3x1½x ½
T 643	6x 4x ¾	*S 62	6x 6x ½	R 632	6x3 x ½
*T 62	6x 6x ½	S 63	6x 6x ¾	R 633	6x3 x ¾
T 63	6x 6x ¾	*S 94	9x 9x1	R 943	9x4 x ¾
*T 73	7x 7x ¾	*S 125	12x12x1¼	*R 963	9x6 x ¾
T 943	9x 4x ¾				
*T 944	9x 4x1				
*T 963	9x 6x ¾				
*T 125	12x12x1¼				

*In brown only.
Weight of material: ½ in. thick, 6¾ lb. per sq. ft.; ¾ in. thick, 10 lb. per sq. ft.
Brown tile, 1.38 oz. per cu. in. White tile, 1.25 oz. per cu. in.
Diagonal halves furnished with squares at same square foot price.

Carborundum Anti-Slip Aggregates

Used in place of 10 to 20% of the marble chips in terrazzo, or troweled into a granolithic finish, these aggregates, developed especially for the purpose, make such walkway surfaces satisfactorily anti-slip and more durable.

AMERICAN MASON SAFETY TREAD CO.

GENERAL OFFICE AND FACTORY

LOWELL, MASS.

REPRESENTATIVES

NEW ENGLAND STATES, Metallic Equipment Co., 10 High Street, Boston, Mass.
EASTERN PENNSYLVANIA, Metallic Equipment Co., Philadelphia Bourse, Philadelphia, Pa.
GENERAL DISTRIBUTERS, Joseph T. Ryerson & Son, New York, N. Y., Chicago, Ill., St. Louis, Mo., Cleveland, Ohio, Detroit, Mich., Minneapolis, Minn., Milwaukee, Wis.
WESTERN MISSOURI, KANSAS and OKLAHOMA, John B. Ricketts, 604 Ridge Building, Kansas City, Mo.
CANADIAN REPRESENTATIVES, Darling Brothers, Ltd., Montreal, Toronto, Halifax, Ottawa, Winnipeg, Calgary, Vancouver

Products

Mason Safety Tread (lead or carborundum filled).
Masonco Saftred (with slip-proof nosing).
Mason Structural Tread.
Mason Stair Nosings (in brass or aluminum).
Mason Non-slip Ladder Shoes.
Karbolith Sanitary Flooring.
Mason Safety Nosings.
Mason Safety Edging.
Mason Abrasive Inserts.

Mason Safety Tread (Lead or Carborundum Filled)

Mason safety treads are made of rolled steel or extruded hard brass (delta metal) ¼ in. thick with alternate dovetailed and U-shaped grooves. The dovetailed grooves are filled either with lead, or a mixture containing a large proportion of carborundum and other abrasive substances, firmly held in place by the continuous supporting ribs of hard metal, which give long wear, preserving the non-slipping quality of the tread for a number of years.

Mason Safety Treads Installed on Staircase

The open U-shaped grooves catch and hold any foreign substance, such as pencils, burned matches, cigar ends, wads of paper, etc., giving the foot a sure contact. They can be easily swept or washed out.

The lead can not spread or creep and fill the open grooves. There are no jagged edges for the retention of filth or germs. As the tread wears, it leaves no polished, dangerous, slip-inviting surface.

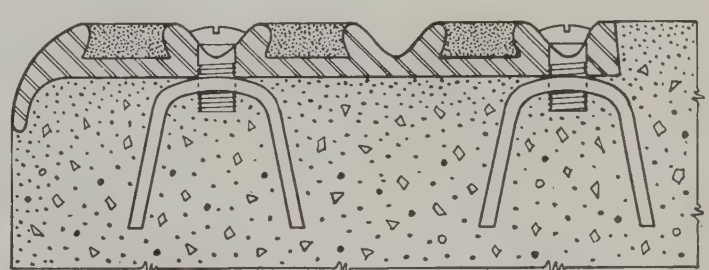
All wood screws, machine screws and nuts, anchors, etc., can be furnished for each installation, when ordered.

Uses of Mason Safety Treads—Mason safety treads are especially desirable for stairs in industrial plants, factories, school buildings, department stores, and wherever the traffic is heavy; for thresholds of doors, elevator openings and fire doors; for ramps and floors around machinery.

Adaptable to all situations, inside or outside of a building, where the surface is liable to become slippery or where steps have worn to an uneven surface.

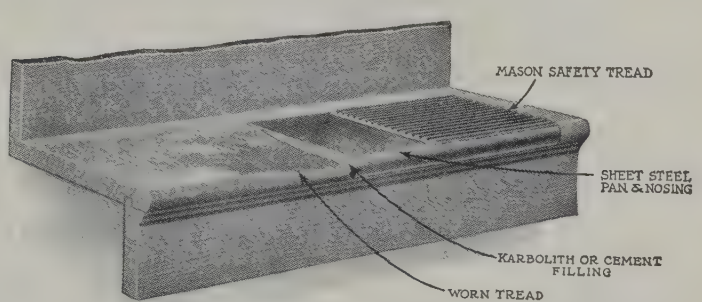
They are suitable for use on granite, marble, slate, cement, iron or wood: and can be installed during new construction or on old work.

They are especially desirable on stairs of concrete, as they prevent the raw edge from chipping off. Special anchors are furnished, which are easily worked into the soft concrete.



Mason Safety Tread as Applied to New Concrete

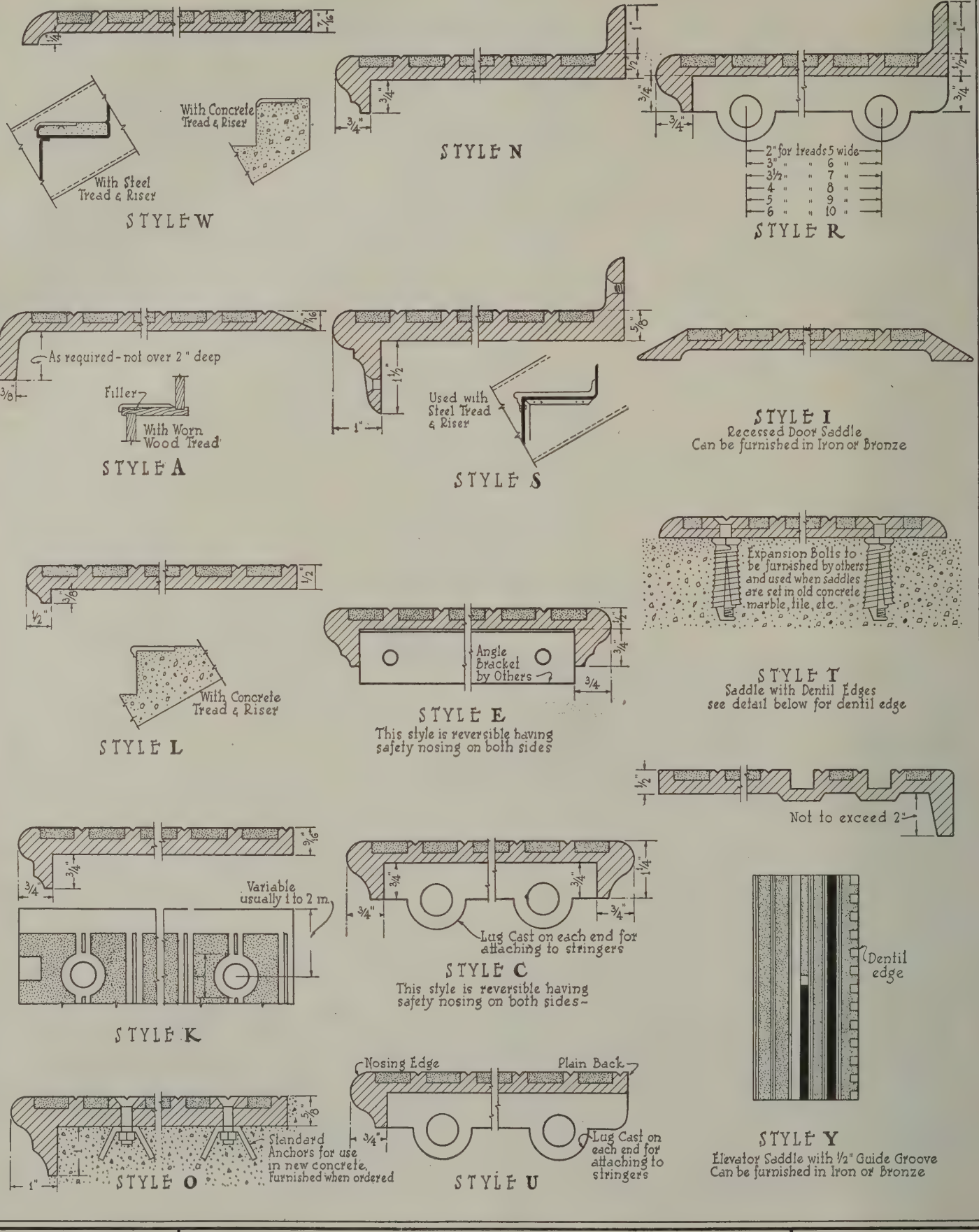
Repairing Worn Stairs with Mason Safety Tread—For repairing purposes, Mason safety tread is ideal. Badly stair treads are repaired as shown, the worn portion being built up to the proper level with Karbolith or cement filling, on which is placed a sheet steel, brass or aluminum pan and nosing; the safety tread is then placed in position.



Mason Safety Tread as Applied to Worn Treads

Our long experience enables us to give directions for the repair of any stairway, of any material and degree of wear. We will furnish without obligation suggestions, sketches or blue prints, showing just how the work can be done best and at the lowest cost.

Continued on next page



SWEETS CATALOGUE SERVICE	DETAILS OF MASON SAFETY TREAD	SCALE 0 1" 2" DATE JULY 26	DRWG 1

Continued on next page

FIG. 1, Steel Base, 6 in Wide, 7 Ribs.

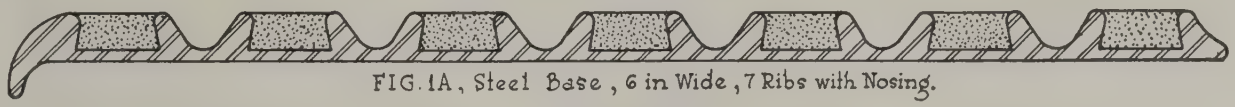


FIG. 1A, Steel Base, 6 in Wide, 7 Ribs with Nosing.

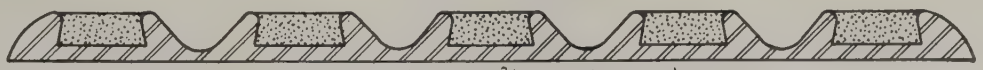


FIG. 2, Steel Base 4¾ in. Wide, 5 Ribs.

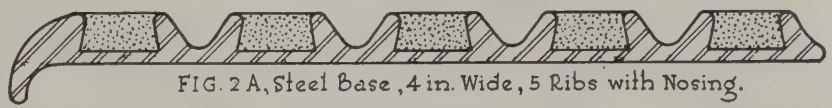


FIG. 2 A, Steel Base, 4 in. Wide, 5 Ribs with Nosing.

FIG. 3, Steel Base, 4 in. Wide, 5 Ribs.

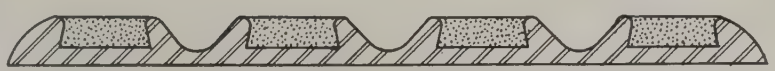


FIG. 3A. Steel Base 3¾ in. Wide, 4 Ribs.

FIG. 6, Steel Base 2½ in. Wide, 3 Ribs.

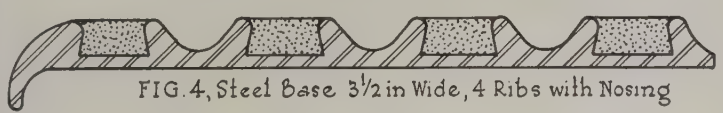


FIG. 4, Steel Base 3½ in Wide, 4 Ribs with Nosing

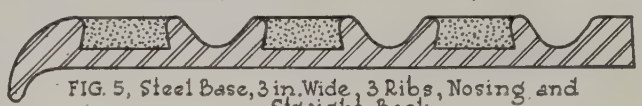


FIG. 5, Steel Base, 3 in. Wide, 3 Ribs, Nosing and Straight Back.

Especially made for granolithic work or for use with cork backing.

STEEL BASE

Base is rolled, unperforated steel with alternate U-shaped and dovetailed grooves filled with lead or carborundum.

Fig. 7, Hard Brass Base, 6" in. Wide, 8 Ribs.

Fig. 7 A, Hard Brass Base, 5¼ in. Wide, 6 Ribs with Nosing.

FIG. 8, Hard Brass Base, 4 in. Wide, 5 Ribs.

FIG. 9, Hard Brass Base, 3 in. Wide, 4 Ribs.

FIG. 10, Hard Brass Base 2¼ in. Wide, 3 Ribs.

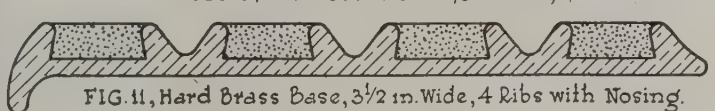


FIG. 11, Hard Brass Base, 3½ in. Wide, 4 Ribs with Nosing.

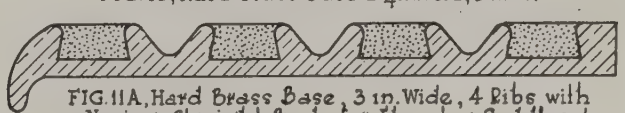


FIG. 11A, Hard Brass Base, 3 in. Wide, 4 Ribs with Nosing, Straight Back for Elevator Saddles etc.

FIG. 12, Hard Brass Base, 2⅛ in. Wide 3 Ribs with Nosing.

FIG. 12 A, Hard Brass Base, 2⅛ in. Wide, 3 Ribs with Nosing.

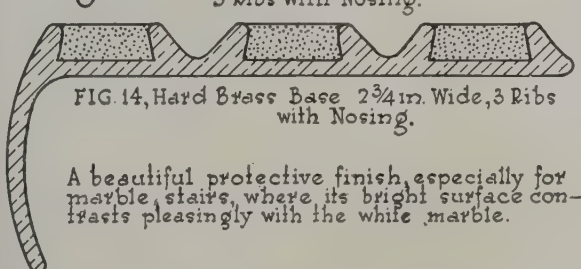
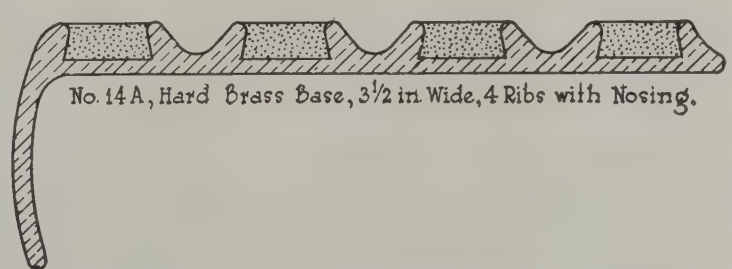


FIG. 14, Hard Brass Base 2¾ in. Wide, 3 Ribs with Nosing.

A beautiful protective finish, especially for marble stairs, where its bright surface contrasts pleasingly with the white marble.



No. 14 A, Hard Brass Base, 3½ in. Wide, 4 Ribs with Nosing.

HARD BRASS BASE

Base of hard extruded brass (delta metal) with alternate U-shaped and dovetailed grooves filled with lead or carborundum.

SWEETS CATALOGUE SERVICE	DETAILS OF MASON SAFETY TREAD	SCALE FULL SIZE DATE JULY 26	DRWG 2

Continued on next page

STANDARD SIZES OF MASON SAFETY TREAD

Steel Base				Hard Brass Base			
No.	Number of ribs	Width, in.	Front edge	No.	Number of ribs	Width, in.	Front edge
1	7	6	Plain	7	8	6	Plain
1A	7	6	Nosing	7A	6	5¼	Nosing
2	5	4¾	Plain	8	5	4	Plain
2A	5	4	Nosing	9	4	3	Plain
3	5	4	Plain	10	3	2¼	Plain
3A	4	3¾	Plain	11	4	3½	Nosing
4	4	3½	Nosing	11A	4	3	Nosing
5	3	3	Nosing	12	3	2⅛	Nosing
6	3	2½	Plain	12A	3	2⅛	Nosing
				14	3	2¾	Nosing
				14A	4	3½	Nosing

Cut to length, punched and countersunk for screws. If other than standard widths are ordered, an additional charge will be made for splitting.

Any concrete work, treads should be ordered with anchors.

Any combination of Nos. 1, 2, 3, 3A and 6 will make any width tread desired without a nosing. The same is true of Nos. 7, 8, 9 and 10.

Any combination of No. 1A, 2A or 4 with No. 1, 2, 3, 3A or 6 will make any width tread desired with one nosing. The same is true of No. 7A, 11, 11A, 12, 12A, 14 or 14A with No. 7, 8, 9 or 10.

No. 5—with nosing and square back edge; especially made for cement and concrete work.

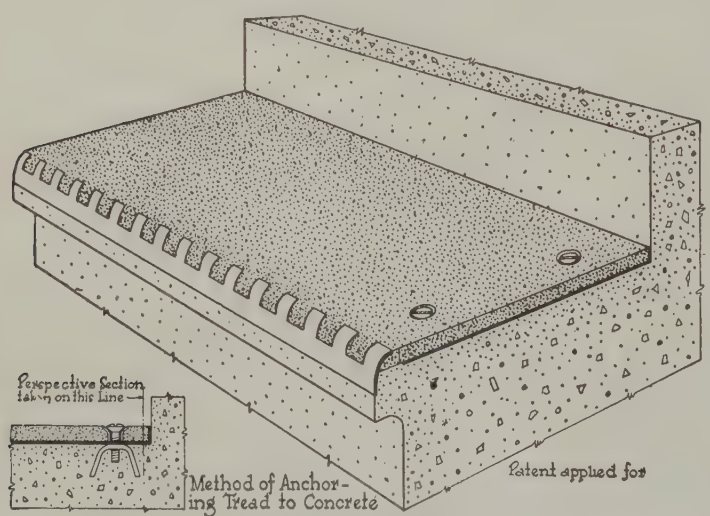
Masonco Saftred (Carborundum Filled Treads with Slip-proof Nosing)

Masonco Saftred is designed to meet the present day demand for a tread that will positively prevent accidents and combine appearance with durability.

Plain nosings of cast iron, steel or other hard materials may prove satisfactory from the standpoint of durability, but even though coated with a thin layer of abrasive, they soon become polished, smooth and slippery. On the other hand, nosings which consist solely of tile or other non-slip materials may prevent slipping, but they do not possess durability.

Masonco Saftred is a perfectly flat tread with a nosing consisting of alternate hard metal and carborundum teeth. The two wear down evenly together, thus insuring both durability and non-slip qualities.

This is the only type of metal-base safety tread with a nosing which not only prevents the foot from slipping forward over the edge of the step, but prevents it from slipping sidewise as well.



Masonco Saftred

How Furnished—Masonco Saftreds are made in one piece, in widths to fit any tread, and in lengths up to 60 in. Nosings are regularly ½ in. deep, but nosings of any special size or shape will be furnished to meet requirements. The treads are shipped with screw holes countersunk, ready for installation.

Repairing Worn Stairs with Masonco Saftred—Instead of tearing out worn stairs, they can be economically and durably repaired with Masonco Saftred.

First build up the worn portions with Karbolith filler, then apply Masonco Saftred with slip-proof nosing built to fit your stair nosing—thus, all evidence of wear or repair will be concealed.

Mason Structural Tread (Requires no Subtread)

Mason Structural Tread is a complete step and safety tread combined. It requires no subtread, can be installed with or without a riser. Furnished ready to bolt to staircase stringers if so desired.

This tread consists of a channeled cast iron base, filled with Mason carborundum filling, which extends to the extreme front edge. The toothed nosing, which is similar to that of Masonco Saftred, prevents any possibility of slipping.

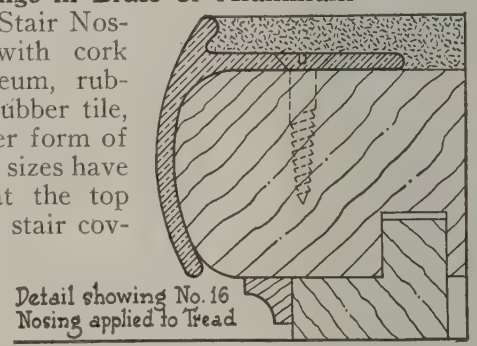
Uses—Mason Structural Tread can be used with any type of iron stair construction. It is particularly recommended for power plants, engine or boiler rooms, industrial plants, factories, schools and for heavy traffic conditions.

How Furnished—Mason Structural Treads are furnished in any tread width; in lengths up to 60 in.; and in thicknesses of ½, 9/16, ⅝ and ¾ in.

The ½-in. thickness is recommended for treads up to 36 in.; the 9/16-in. for treads up to 40 in.; the ⅝-in. for treads up to 48 in.; and the ¾-in. for treads up to 60 in. long.

Mason Stair Nosings in Brass or Aluminum

The "Mason" Stair Nosing is for use with cork composition, linoleum, rubber, interlocking rubber tile, carpet, or any other form of stair covering. All sizes have a vertical edge at the top which protects the stair covering from wear at its edge and prevents slipping. Made in four sizes. For specific details of Mason Nosings see next page.

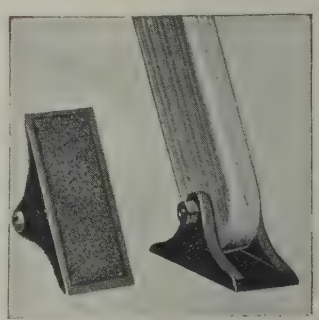


Mason Stair Nosing

Mason Non-slip Ladder Shoes

Many thousands of these ladder shoes are in use throughout the country. They are indorsed and recommended by accident liability companies and recognized by the courts as an efficient safety device.

Illustrations show method of application and abrasive material in bottom of shoes.



Mason Ladder Shoes

Karbolith Sanitary Flooring

A composition with a base largely of magnesium that produces a hard, durable, sanitary surface, proof against rats, fire and germs. It is impervious to heat, cold and dampness, and will not chip, crack, tear loose nor disintegrate. It can be laid over cement, iron or wood, and binds firmly to the base.

Extensively used for flooring of railway cars, industrial plants, offices, laboratories, garages, railroad stations, steamships, etc. We manufacture this flooring and furnish instructions for installing.

Continued on next page

Mason Safety Nosings, Inserts and Edgings

Mason Safety Nosings

Uses—Mason Safety Nosings are for use in combination with linoleum, cork carpet, rubber, interlocking tile, carpet or any other form of stair covering on stairs of wood, concrete, slate, marble, iron, etc.

Design—All types are provided with a deep sturdy lip, which protects the stair, and with a vertical top which is so beveled as to lock the covering securely in place, absolutely preventing the front edge from raising and catching the foot on ascending or descending the stairs.

It also protects the covering at the front edge where the wear is greatest. From a standpoint of appearance, Mason Safety Nosings are unsurpassed.

Sizes—Mason Safety Nosings may be furnished in any of the sizes shown below, in solid highly polished extruded brass.

Figs. 15, 16, 18, 18A and 20 may also be furnished in aluminum, either highly polished or clear satin finish.

All sizes are furnished complete with wood screws, lead plugs or anchors, according to specifications.

Mason Safety Edging

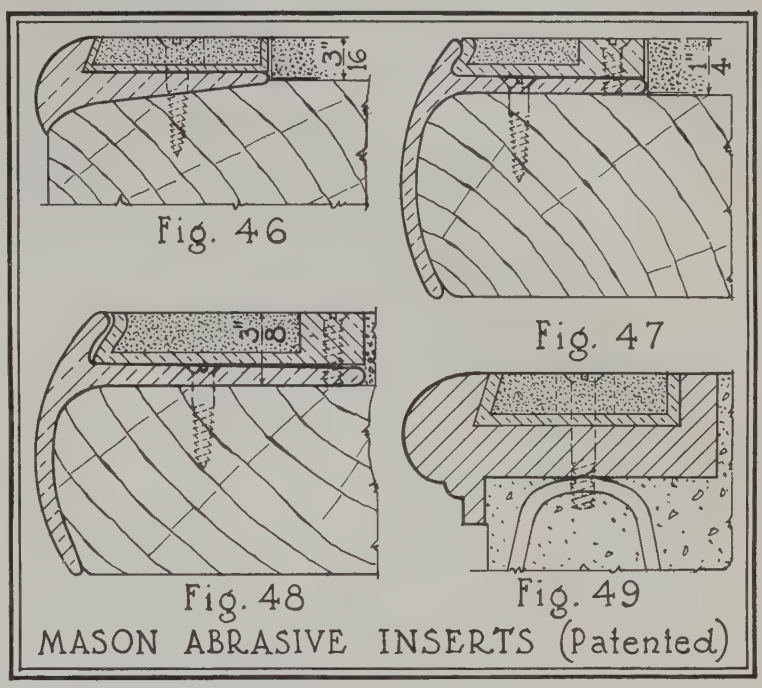
Mason Safety Edgings are for use with linoleum, cork carpet, etc., where only part of a floor is to be covered—such as behind and in front of counters, school, church and theatre aisles, etc.

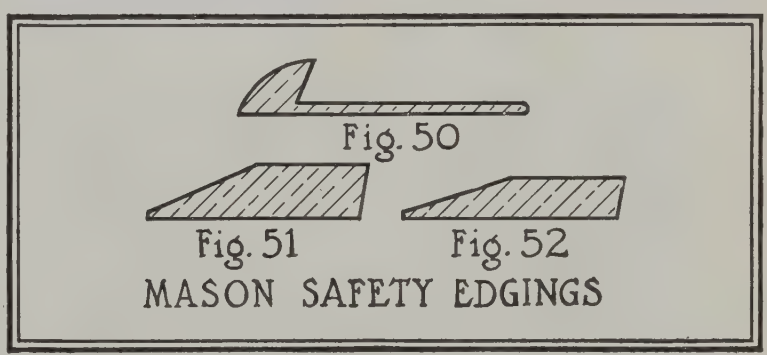
They prevent the edge from being broken by scuffing and subsequent tripping on this edge.

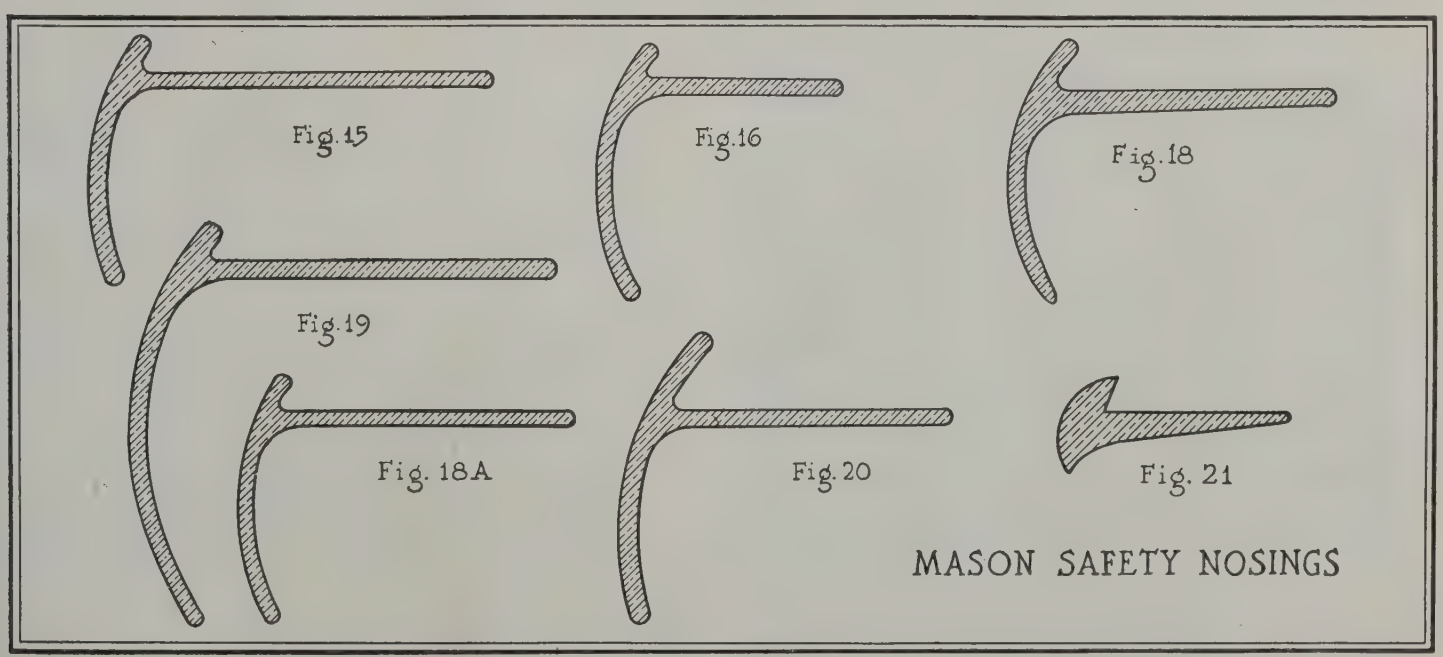
They may be furnished according to the full sized sections shown at right, in solid extruded brass, cut to length, drilled and polished.

Mason Abrasive Inserts

Mason Abrasive Inserts are recommended for use with safety nosings to insure protection to the extreme front edge of the step. They have a high safety factor and are attached to the nosing in such a way that when worn they are very readily replaced without disturbing the stair covering or nosing in any way.







Mason Safety Nosings

NORTON COMPANY

"Norton Floors"—Alundum (Non-slip) Floor and Stair Tiles and Treads

WORCESTER, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 53 Park Place
DETROIT, MICH., 5805 Lincoln Avenue
CHICAGO, ILL., 11 North Jefferson Street
PHILADELPHIA, PA., 4732-46 Stenton Avenue
PITTSBURGH, PA., 338 Third Avenue
CANADIAN PLANT: NORTON COMPANY OF CANADA, LTD., HAMILTON, ONT.

Products

TILE (Semi-Vitreous):
ALUNDUM FLOOR and STAIR TILE.
ALUNDUM CERAMIC MOSAIC TILE.
AGGREGATES:
Alundum Aggregates for terrazzo and for cement, asphalt and composition flooring, and for NON-SLIP ART MARBLE.

Alundum Abrasive

"Alundum" is the trade-mark of an electric furnace abrasive made by NORTON COMPANY and well-known throughout the industrial world. The non-slip and wear-resisting features of Norton Floors are due to the toughness of this abrasive and to the method of bonding it into the form of tiles and aggregates.

Advantages of Norton Floors

Safe—Because of the permanently "non-slip" surface whether wet or dry. Water and oil do not decrease the slip-proof effectiveness of Norton Floors. There are no grooves nor corrugations to cause tripping nor metal nosings to cause slipping.

Durable—Because all Norton Floor products contain hard, tough Alundum abrasive. The wear-resisting surface of Norton Floors will stand up under the most severe traffic conditions.

Quiet—Because the structure of all Norton Floor products is of such character as will prevent reverberation.

Economical—Because Norton Floors are permanently non-slip and extremely wear-resisting the bother and expense of continual replacements is eliminated.

Alundum Floor and Stair Tile (Semi-Vitreous)

Description—The semi-vitreous tile contain 35 to 80% Alundum abrasive bonded with clay. The mixture is pressed in moulds to standard shapes and sizes, and kiln baked.

Uses—***Floor Tile***—Suggested for service walkways in public buildings of all kinds such as railroad stations, schools and industrial plants; for store entrances, elevator landings and ramps.

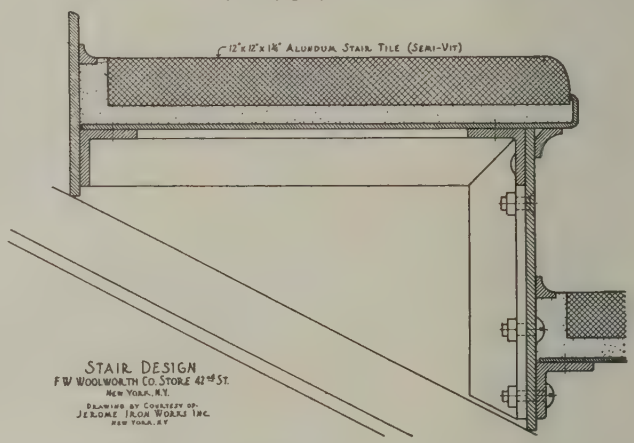
Stair Tile—Suggested for railway stations, schools, industrial plants and other buildings where protection against slipping and tripping accidents is desirable.

Graybar Building, New York, N. Y.
SLOAN & ROBERTSON, Architects
Alundum Aggregate in terrazzo in main corridor from Lexington Avenue to Grand Central Station

STANDARD SIZES AND COLORS FLOOR AND STAIR TILE

Floor Tile	Stair Tile
Sizes, in.	Sizes, in.
3x1½x½ 3x3 x½	6x4x½ 6x4x¾
6x3 x½ 6x6 x½	6x6x½ 6x6x¾
6x3 x¾ 6x6 x¾	9x4x¾ 9x6x¾
9x4 x¾ 9x6 x¾	
Special sizes: 6x4, 7x3½, 9x9 and 12x12 in.	Special sizes: 7x7 and 12x12 in.

Colors: brown, buff, gray, white granite and green.



Alundum Ceramic Mosaic Tile (Semi-Vitreous)

Description—Alundum Mosaic Tile contains 35 to 80% Alundum abrasive bonded with clay. The mixture is pressed in moulds to standard shapes and sizes, and kiln baked.

Uses—***Alundum Mosaic***—Suggested for store entrances, elevator landings and areas in all public buildings where 100% non-slip, wear-resistant floor is desired and ceramic mosaic tile favored.

Alundum with Vitreous Ceramic Mosaic Tile—Suggested for swimming pools, shower baths, washrooms, and service counters and in all buildings where ceramic mosaic tile is favored and prevention against slipping accident is desirable.

STANDARD SIZES AND COLORS ALUNDUM CERAMIC MOSAIC TILE

Size	Colors
¾ in. square	Brown, white granite, buff, gray, salmon, green
1 in. hexagonal	Brown, white granite, buff, gray, salmon, green
1 1/16 in. square	Brown, white granite, buff, gray, salmon, green
1 1/16 x 2¼ in. oblong	Brown, white granite, buff, gray, salmon, green
2¼ x 1 1/16 in. nosing	Brown, white granite, buff, gray, salmon, green

Alundum Aggregate (Semi-Vitreous)

Description—Alundum Aggregate contains approximately 80% Alundum abrasive bonded with clay. The mixture is pressed in moulds, the blocks being kiln baked and then crushed and screened to standard commercial sizes.

ALUNDUM AGGREGATE (REGULAR)

No.	Size, in.	Colors
2	¼ to ⅜	Brown, gray, buff, green
1	⅛ to ¼	Brown, gray, buff, green
0	1/28 to ⅛	Brown, gray, buff, green

Uses—Alundum Aggregate size No. 1 in standard colors is used in plastic terrazzo (non-slip) flooring also in precast non-slip art marble. No. 0 in standard colors is used for surface treatment of decorative cement floors also for terrazzo (non-slip) flooring. No. 2 is used only where extremely heavy traffic is to be encountered and the wear severe.

Continued on next page

Alundum Aggregate (Cement Floor)

Description—Alundum (Cement Floor) Aggregate is made extremely hard to resist the shock and wear of heavy trucking such as subjected to in floors of industrial plants and roadway surfaces. Alundum (Cement Floor) Aggregate contains approximately 80% Alundum abrasive bonded with clay, the mixture being pressed in moulds. The moulded aggregate blocks are kiln baked and then crushed and screened to "coarse" and "fine" sizes as listed.

ALUNDUM AGGREGATE (CEMENT FLOOR)

Coarse	$\frac{3}{32}$ to $\frac{19}{64}$ in.
Fine	$\frac{1}{32}$ to $\frac{3}{32}$ in.

Not made in different colors.

Uses—Alundum (Cement Floor) Aggregate is used in the topping or surface of cement sidewalks, and industrial flooring (cement or asphalt) subjected to heavy traffic and where a wear-resisting and non-slip (wet or dry) surface is desirable.

Alundum Aggregate Products (Precast)

Description—Precast Alundum Aggregate stair treads, floor tile and thresholds are made in various shapes and sizes, to detail. These products are manufactured in a plant suitably equipped, the material being mixed, cast, surface ground and finished by modern machine methods. The precast products contain Alundum Aggregate with or without marble chips and bonded with cement. Cement colorings are used when required.

Uses—Precast Alundum Aggregate tile and treads are used in all types of buildings where the decorative feature is an important consideration plus the non-slipping and wear-resisting features—such as banks, hotels, theaters, department and chain stores, churches, railroad stations, colleges, schools, and office, civic, fraternal, industrial and other buildings.

Licensees—Arrangements have been made with the Chicago Art Marble Co., 2883 Hillock Avenue, Chicago, Ill., to manufacture under Norton patents, NON-SLIP ART MARBLE and other precast Alundum Aggregate products. Estimates to supply and install Alundum precast products may be obtained from the Chicago Art Marble Co. or from local marble dealers. The name and address of other licensees, located in the metropolitan district of New York also in the New England states, furnished upon request.

Specifications

Suggested form as follows:

(1) Furnish and install where shown on accompanying drawings, Alundum Products as manufactured by NORTON COMPANY, Worcester, Mass., and as below specified.

(2) Floor tile, where shown on plans, shall be Alundum Floor Tile, semi-vitreous, (state size, thickness, shape and color) as manufactured by NORTON COMPANY, Worcester, Mass.

(3) Stair tile where shown on plans shall be Alundum Stair Tile, semi-vitreous, (state size, thickness, shape and color) as manufactured by NORTON COMPANY, Worcester, Mass.

(4) Ceramic mosaic, where shown on plans shall be Alundum Ceramic Mosaic Tile (state size) as manufactured by NORTON COMPANY, Worcester, Mass. Colors and designs as indicated on plans or as specified.

Recommendation: Place above in tile specification. If Alundum mosaics are wanted set with vitreous ceramic mosaic tile, so state in specification.

(5) Aggregate thresholds where shown on plans shall be precast Alundum Aggregate Thresholds as manufactured by licensee of NORTON COMPANY, Worcester, Mass. To detail as indicated on plans, color combination as selected or sample approved.

(6) Aggregate floor tile where shown on plans shall be precast Alundum Aggregate Floor Tile (state size, shape) as manufactured by licensee of NORTON COMPANY, Worcester, Mass. To detail as indicated on plans, color combination as selected or sample approved.

Recommendation: Place above (5) and (6) in tile (or marble) specication.

(7) Aggregate stair treads where shown on plans shall be precast Alundum Aggregate Treads as manufactured by licensee of NORTON COMPANY, Worcester, Mass. To detail as indicated on plans, color combination as selected or sample approved.

(8) Art Marble (non-slip) where shown on plans shall be NON-SLIP ART MARBLE as manufactured by the Chicago Art Marble Co., Chicago, Ill. Color combination as selected or sample approved.

Recommendation: Place above (7) and (8) in marble specifications.

(9) Terrazzo floors, where shown on plans shall be Alundum Plastic Terrazzo of color combination as selected or sample approved, the aggregate used as manufactured by NORTON COMPANY, Worcester, Mass.

Recommendation: Place above in terrazzo specification.

(10) Cement floors, where shown on plans shall have embedded in the surface Alundum Aggregates (state size and amount per square yard or per square foot) as manufactured by NORTON COMPANY, Worcester, Mass.

Recommendation : Place in cement floor finish specifications.

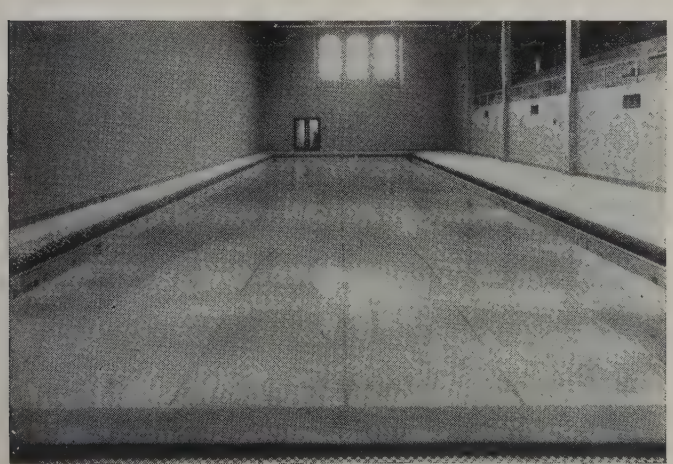
(11) **Samples**—When requested and before proceeding with the work, the contractor shall submit to the architect a sample of the product as may be indicated on plans or as specified.

(12) **Setting**—Before proceeding with the work, the contractor shall obtain from the manufacturers complete information for satisfactory installation of the products as specified.

(13) **Protection**—After completion, protect all work from dirt, stain or injury until the building or work has been completed and accepted.

Literature and Samples

Literature and samples will be sent on request.



Women's Gymnasium, University of Washington, Seattle, Wash.
BEBB & GOULD, Architects

Buff Alundum Ceramic Mosaic Tile on curb and in checkerboard design with vitreous mosaics on floor around pool

Stevens Hotel, Chicago, Ill.
HOLABIRD & ROCHE, Architects

Alundum Aggregate Treads (NON-SLIP ART MARBLE) precast by Chicago Art Marble Company

STANDARD SAFETY TREAD CORP.

Manufacturers of Standard Safety Treads, Stair Nosings and Floor Edgings

110 East 42nd Street
NEW YORK, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

STANDARD NON-SLIP TREADS; STANDARD "PROTECTIVE" and "SURE-GRIP" STAIR NOSINGS; STANDARD "PROTECTIVE" FLOOR EDGINGS.

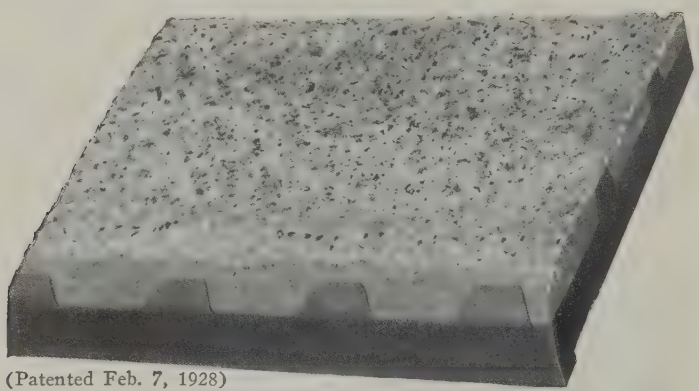
Standard Non-Slip Treads

Standard Non-Slip Treads consist of cast iron or bronze with a flat wearing surface of a hard abrasive mixture. They have three outstanding and distinctive features, viz.: the depth of the wearing surface, the absence of deep grooves and the design of the nosing.

The wearing surface is not superficial, but extends down almost to the base. The absence of deep grooves and corrugations gives more non-slip surface and eliminates all chances of the shoe catching and tripping the wearer.

In the nosing the abrasive is likewise carried down to a *considerable depth which affords absolute protection against slipping where the wear is the greatest.*

This nosing feature, as well as the unusual depth of the abrasive, has resulted in the Standard Safety Tread receiving wide recognition in the profession.



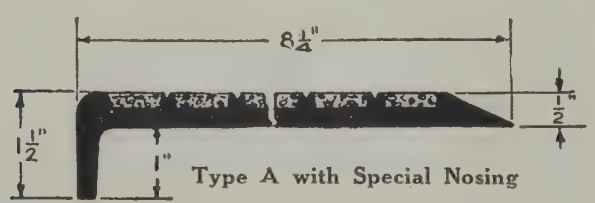
(Patented Feb. 7, 1928)

Standard Non-Slip Tread Showing Nosing with Abrasive Carried Down to a Considerable Depth

Absolute protection against slipping where the wear is greatest

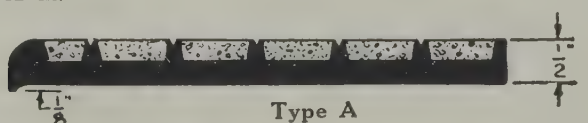
Types

Type "A", with Special Nosing 1 in. Deep—For badly worn wood, slate or marble steps. This style can also be furnished, with square instead of beveled back edges, when safety treads are to be rabbetted.



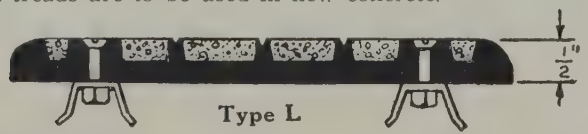
Type A with Special Nosing

Type "A"—Furnished either with lip nosing as shown or flat and with either square or beveled back, in widths from 3 to 12 in.



Type A

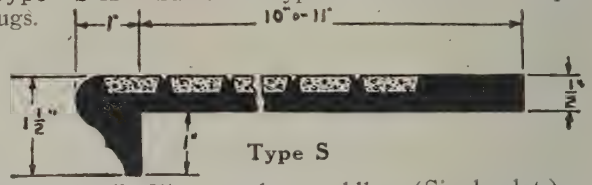
Type "L"—Furnished 3¾, 4¾ and 6 in. wide with full rounded nosing edges, reversible. Anchors attached complete when treads are to be used in new concrete.



Type L

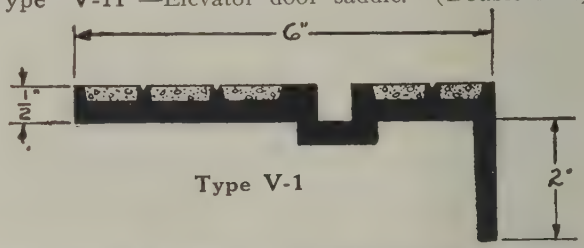
Type "S"—School tread, structural type, holes drilled ready to attach to either riser or stringer brackets.

Type "S-K"—Same as Type "S" but with kick plate or end lugs.



Type S

Type "V-1"—Elevator door saddle. (Single slot.)
Type "V-11"—Elevator door saddle. (Double slot.)



Type V-1

Stairway with Standard Treads in the Lincoln High School, Jersey City, N. J.

JOHN T. ROWLAND, JR., Architect

Installations

A few other buildings in which Standard Safety Treads were specified and are now in service with satisfactory results, are as follows:

LOCATIONS	ARCHITECTS
Clifton High School, Clifton, N. J.	Lee & Hewitt
Comfort Station, City of New York, 148th Street and Willis Ave.	
Factory, Continental Can Co., Jersey City, N. J.	Francisco & Jacobus
Hospital Group, Hudson County, N. J.	John T. Rowland, Jr.
Freeport Public School, Freeport, N. Y.	F. J. Berlenbach
Jersey Journal Office Bldg., Jersey City, N. J.	John T. Rowland, Jr.
Fink Bakery, New York, N. Y.	L. S. Beardsley
St. Barnabas Parochial School, Yonkers, N. Y.	Ward & Meetee
Perth Amboy Station, Central R. R. of N. J.	
Brooklyn Manhattan Transit Co., New York, N. Y.	
Bloomingdale Warehouse	Abbott, Merkt & Co.

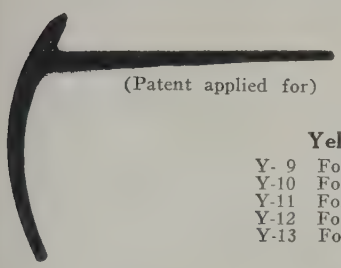
Continued on next page

Standard Stair Nosings

"Protective" Type—

Designed to protect the front edges of steps and platforms, used in conjunction with linoleum, cork, rubber tile, mastic and similar floor coverings.

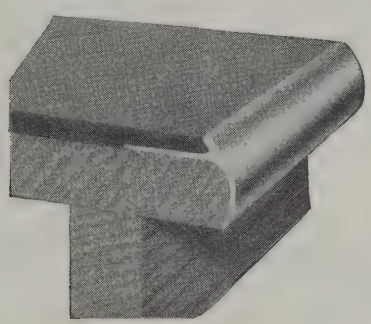
The tapered flanges permit the flooring material to lie flat, making rabbeting of the steps unnecessary, thus reducing installing costs to a minimum.



(Patent applied for)

Yellow Brass

Y- 9 For ⅛-in. material
Y-10 For 3/16-in. material
Y-11 For ¼-in. material
Y-12 For ⅜-in. material
Y-13 For ½-in. material



White Metal

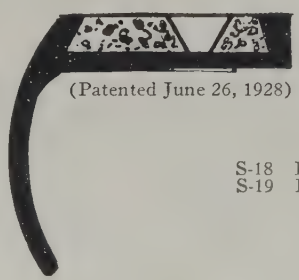
W-14 For 3/16-in. material
W-15 For ¼-in. material
W-16 For ⅜-in. material
W-17 For ½-in. material

The extreme wide flanges also insure successful installation not only on wood but also on marble, slate or stone steps as well, without danger of breaking the front edges in drilling screwholes.

Furnished in both yellow brass and white metal aluminum with hardening alloy.

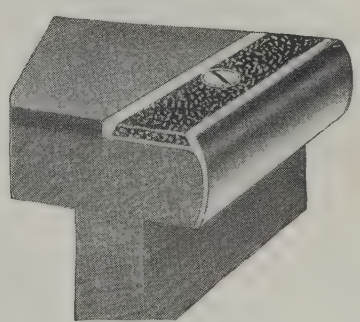
"Sure-Grip" Type—

A protective nosing for flooring material and a safety tread combined for use on stairs where the traffic is extremely heavy, the hard abrasive filler preventing slipping. This type of nosing as well as the flooring material can be reset or renewed independently of each other.



(Patented June 26, 1928)

S-18 For 3/16-in. material
S-19 For ¼-in. material



Screws bear on metal sleeves inserted in the abrasive filler.

Provided with anchors attached, when desired, when nosings are to set in new concrete, terrazzo, composition or concrete.

Furnished in yellow brass only.

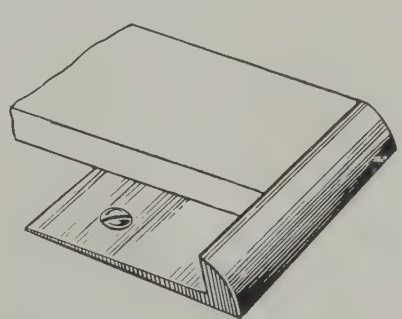
"Protective" Floor Edgings

Designed to protect the edges of linoleum, rubber tile and similar flooring materials at door entrances, aisle passageways, table and desk tops, etc.

The flanges reinforce the edging in such a manner that it lies level at all stages of wear and all unsightly screws are concealed by the flooring material.

E-20 For ⅛-in. material
E-21 For 3/16-in. material
E-22 For ¼-in. material
E-23 For ½-in. material

Furnished in yellow brass only



Stocks Carried

All types of nosings and edgings carried in stock, thus insuring prompt service, furnished, cut to size, holes drilled and countersunk, the yellow brass with highly polished finish and the white metal with brush finish.

THE SAFETY STAIR TREAD COMPANY

Wooster Safe-Groove Stair Treads; Wooster Security Nosings and Edgings

WOOSTER, OHIO

NEW YORK OFFICE: 1133 Broadway

CHICAGO OFFICE: 803 Transportation Building

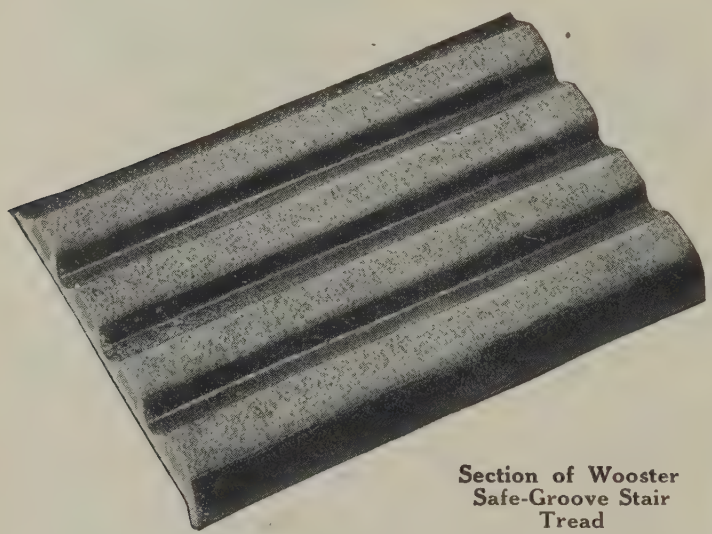
REPRESENTATIVES IN PRINCIPAL CITIES

Products

STEEL BASE, YELLOW BRASS BASE AND WHITE BRASS BASE WOOSTER SAFE-GROOVE TREADS; WOOSTER SECURITY NOSINGS AND WOOSTER SECURITY EDGING.

Wooster Safe-Groove Treads

Wooster Safe-Groove Treads are scientifically designed and proportioned in three metal bases to prevent stairs, saddles, thresholds and ramps, or any walking surface from becoming worn or dangerously smooth. They also protect stair steps from disfiguring wear under heavy traffic conditions.



Section of Wooster Safe-Groove Stair Tread

Material—Wooster Safe-Groove Treads are fabricated in black steel, highly polished yellow brass or in silvery white non-rusting and non-tarnishing white brass.

For the steel and yellow brass base treads the antislip filler may be of either carbo (abrasive grits) or lead. For the white brass sections, lead only is used.

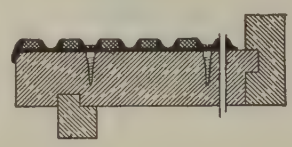
Design—Wooster Safe-Groove Treads are so designed as to present a walking surface of broad ribs of wear-resisting, abrasive material alternating with deep narrow grooves.

These antislip ribs extend clear to the bottom of the treads and the recess in which they are held is so shaped as to be wider at the bottom than at the top. This increases the area of the antislip material as the tread wears down after years of use, and increases the safety factor in proportion to the rate of wear.

Specifications—All stairs, platforms and landings to be provided with Wooster Safe-Groove (Carbo or Lead Anti-slip Filled) Treads, to be 6 in. shorter than the entire length of the steps and to be installed according to manufacturer's specifications.

Each step shall be covered according to the amount of wear to which it will be subjected. For lightly used stairs, 3, 3½ or 4-in. width with lip nosing is sufficient provided the tread is set flush into the step. Where the tread is not rabbeted or set flush, at least two-thirds of the depth of the step shall be covered. On stairs subjected to heavy traffic the treads shall be 6 to 9½ in. wide.

Methods of Application—Cross section details below show methods of applying Wooster Safe-Groove Treads to various types of stairs. Wherever the treads are to be set in new concrete they are shipped with anchors riveted on, so that after the concrete has set, the treads become an integral part of the steps.

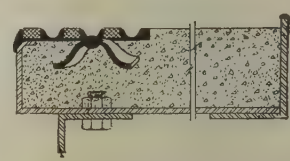


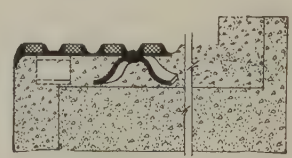
Wood, Slate, Marble, etc. Stairs

Treads shall be fastened to wood subtreads by means of No. 10 1-in. wood screws. For marble, slate or stone stairs, treads are attached with wood screws in lead shield

Pressed Steel

Treads shall be set flush with cement surface to either extend from stringer to stringer, or if sweeping space is desired to be 6 in. less than entire length of the step. Anchors are riveted on for pressed steel installations.



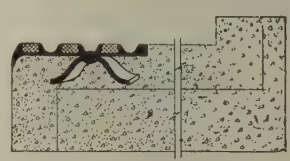


Concrete

Detail shows standard section 3½ in. with lip nosing. To give a wide walking surface 6 to 10 in. wide for stairs subjected to heavy traffic, this should be combined with one or more standard sections. Treads with anchors attached are centered between stringers and even with finish line of step

Concrete

Detail shows tread installation on concrete for stairs subjected to normal traffic. Single tread section with nosing is used to make a walking surface 3 in. wide. Anchors are attached



STANDARD SIZES WOOSTER SAFE-GROOVE STAIR TREADS

Section No.	Number of ribs	Width, in.	With or without nosing
Yellow Brass Base, Narrow Groove Type			
20	3	2⅛	long nosing
21	3	2¾	long nosing
22	4	3	lip nosing and sq. bk.
23	4	3½	lip nosing
24	4	3½	long nosing
25	5	4	without nosing
26	8	6	without nosing
27	4	3	without nosing
28	6	5¼	with lip nosing
Steel Base			
33	4	3½	with lip nosing
32	3	3	with lip nosing and sq. bk.
31	3	2½	without nosing
36	5	4	with lip nosing
34	5	4	without nosing
35	7	6	without nosing
White Brass Base Narrow Groove Type			
40	5	4	lip nosing
41	5	4	without nosing
42	8	6	without nosing
43	4	3	without nosing
44	3	2¾	long nosing

All sections (except the square back ones—No. 32 in steel base and No. 22 in yellow brass base—which are especially used in concrete construction) are made with angle back and can be combined with other sections to make any width desired.

Continued on next page

Actual Size Cross Sections Wooster Safe-Groove Stair Treads

STEEL BASE

Section No. 33, in Steel Base only, 3½ in. Wide, with Nosing and Angle Back.

Section No. 32, in Steel Base only, 3 in. Wide, with Nosing and Square Back.

Section No. 36, in Steel Base only, 4 in. Wide, with Nosing and Angle Back.

Section No. 31, in Steel Base only, 2½ in. Wide, without Nosing.

Steel Base cut to any desired length up to 17 ft.

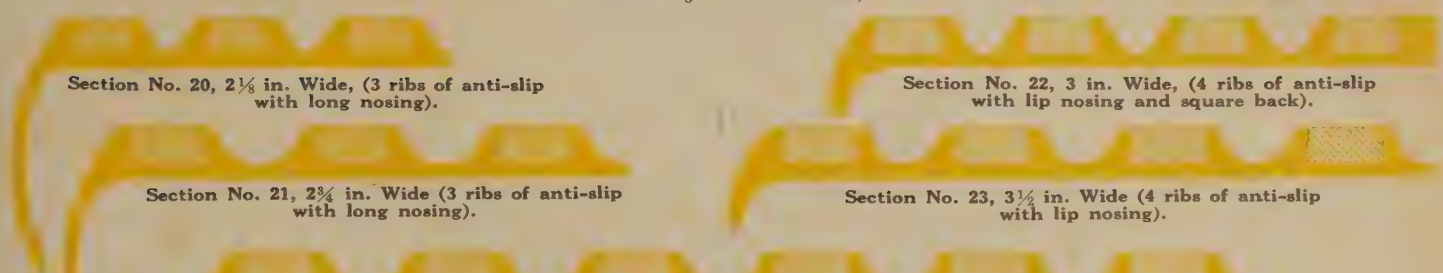
Section No. 34, in Steel Base only, 4 in. Wide, without Nosing.

Steel Base with abrasive grits or lead filler.

Section No. 35, in Steel Base only, 6 in. Wide, without Nosing.

YELLOW BRASS BASE

(abrasive grits or lead filler.)



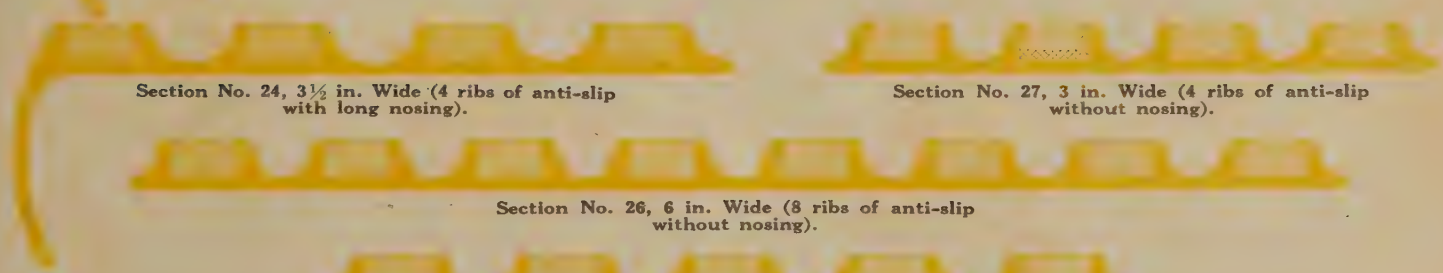
Section No. 20, 2⅛ in. Wide, (3 ribs of anti-slip with long nosing).

Section No. 22, 3 in. Wide, (4 ribs of anti-slip with lip nosing and square back).

Section No. 21, 2¾ in. Wide (3 ribs of anti-slip with long nosing).

Section No. 23, 3½ in. Wide (4 ribs of anti-slip with lip nosing).

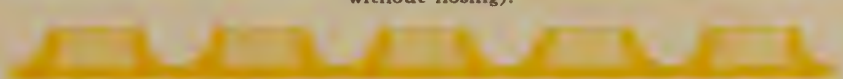
Section No. 28, 5¼ in. Wide (6 ribs of anti-slip with lip nosing).



Section No. 24, 3½ in. Wide (4 ribs of anti-slip with long nosing).

Section No. 27, 3 in. Wide (4 ribs of anti-slip without nosing).

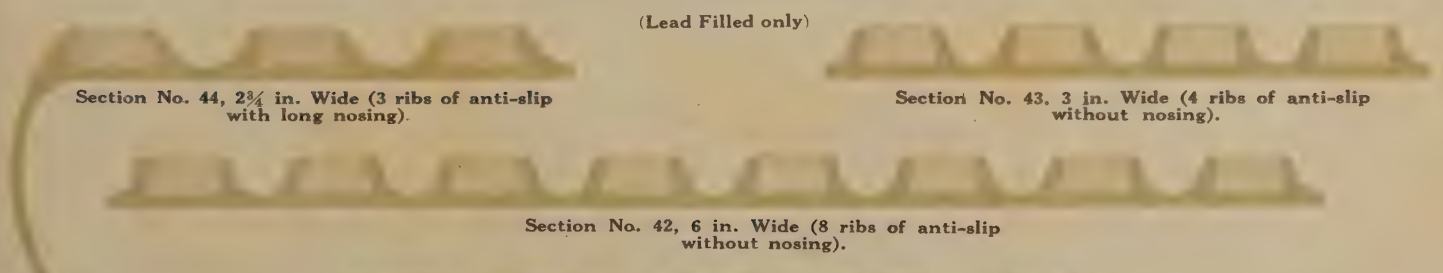
Section No. 26, 6 in. Wide (8 ribs of anti-slip without nosing).



Section No. 25, 4 in. Wide (5 ribs of anti-slip without nosing).

WHITE BRASS BASE

(Lead Filled only)

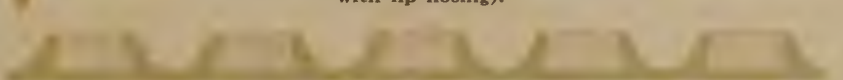


Section No. 44, 2¾ in. Wide (3 ribs of anti-slip with long nosing).

Section No. 43, 3 in. Wide (4 ribs of anti-slip without nosing).

Section No. 42, 6 in. Wide (8 ribs of anti-slip without nosing).

Section No. 40, 4 in. Wide (5 ribs of anti-slip with lip nosing).



Section No. 41, 4 in. wide (5 ribs of anti-slip without nosing).

Continued on next page

Wooster Security Nosings

Wooster Security Nosings are designed to protect from the scuffing wear of traffic the edges of linoleum, composition, cork tile, rubber tile, or other flooring material when used on stairs, platforms or landings.

Material—Wooster Security Nosings are made of highly polished yellow brass and silvery white, non-rusting and non-tarnishing white brass.

Design—Wooster Security Nosing is of sturdy design and retains its smooth even surface for many years. The body of the nosing which extends down over the front edge of the step cannot be bent or dented by the ordinary shock of traffic. The nearly vertical lip securely locks the covering material in place, and the horizontal flange holds the nosing rigidly to the step. Flanges are feather-edged, an exclusive Wooster feature.

Sizes—Wooster Security Nosings are made in sections of different thickness for use with any flooring material from ⅛ to ½ in. thick. Full size cross sections are shown below:

Method of Application–All nosings are delivered cut to desired length, polished and drilled with proper number of countersunk screw holes for attachment. Wooster Security Nosings are fastened by means of screws through the countersunk holes in the horizontal flange. This flange is completely covered by flooring material, leaving nothing to show but attractive face of the nosing.

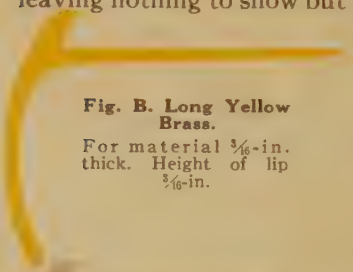


Fig. B. Long Yellow Brass.
For material 5/16-in. thick. Height of lip 5/16-in.

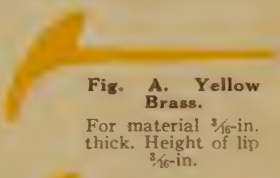


Fig. A. Yellow Brass.
For material 5/16-in. thick. Height of lip 5/16-in.

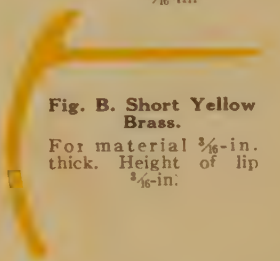


Fig. B. Short Yellow Brass.
For material 5/16-in. thick. Height of lip 5/16-in.

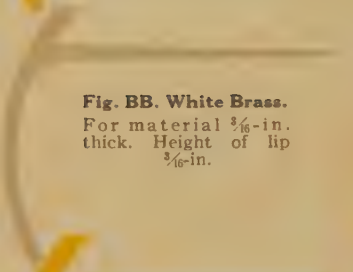


Fig. BB. White Brass.
For material 5/16-in. thick. Height of lip 5/16-in.

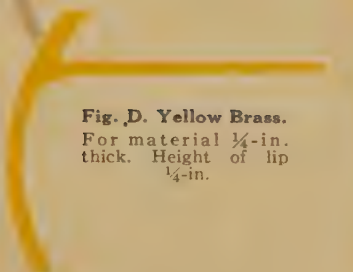


Fig. D. Yellow Brass.
For material ¼-in. thick. Height of lip ¼-in.

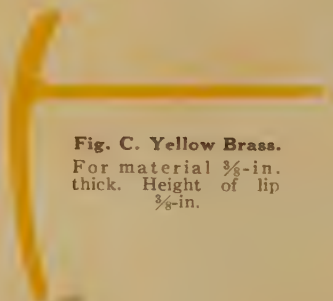


Fig. C. Yellow Brass.
For material ⅜-in. thick. Height of lip ⅜-in.

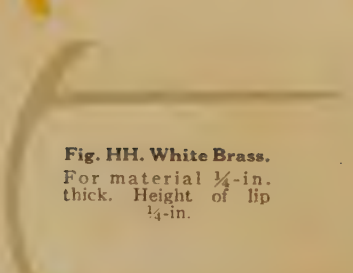


Fig. HH. White Brass.
For material ¼-in. thick. Height of lip ¼-in.

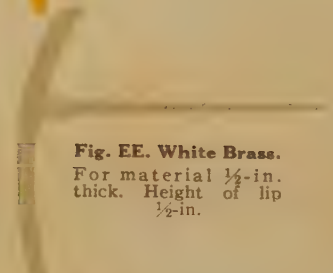


Fig. EE. White Brass.
For material ½-in. thick. Height of lip ½-in.

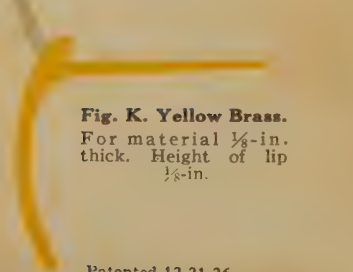


Fig. K. Yellow Brass.
For material ⅛-in. thick. Height of lip ⅛-in.

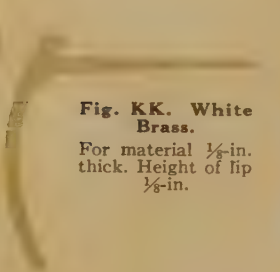
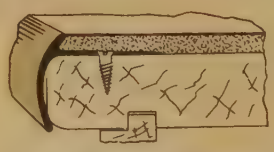


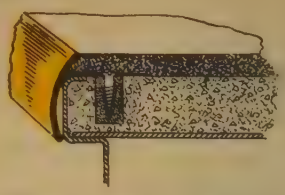
Fig. KK. White Brass.
For material ⅛-in. thick. Height of lip ⅛-in.

Patented 12-21-26.

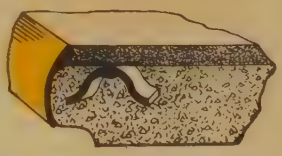
Detailed drawings below show methods of application to stairs of various material.



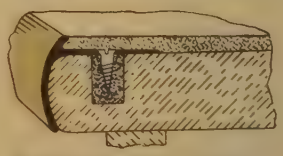
Wooster Security Nosing on Wood, No. 6 Wood Screw.



Wooster Security Nosing on Pressed Steel Stairs, Installed with Wood Screw in Shield or with Anchors.



Wooster Security Nosing on Concrete Stairs, Nosing Installed with Anchor Attached.



Wooster Security Nosing on Slate, Marble or Stone Construction, No. 6 Wood Screw in Lead Shield.

Wooster Security Edgings

Wooster Security Edgings are designed to protect the edges of linoleum, composition, cork tile, rubber tile or any flooring material from wear when laid on floors of any kind.

Material—Wooster Security Edgings are made in highly polished yellow brass in ⅛, 3/16 and ¼-in. thicknesses to match flooring material.

Design— Wooster Security Edgings have a slanting lip which locks the flooring material securely in place. A feather-edged flange, screwed or anchored into the floor, holds the edging firmly in position and is entirely covered by the flooring material. This feather edged flange is an exclusive feature in Wooster Security Edging.

Full Size Cross Sections

Fig. V. Wooster Security Edging, Yellow Brass.
For material ⅛-in. thick. Height of lip ⅛-in.

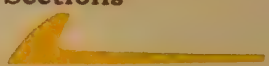
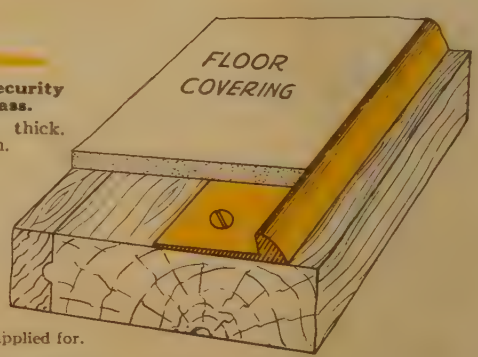


Fig. W. Wooster Security Edging, Yellow Brass.
For material 3/16-in. thick. Height of lip 3/16-in.

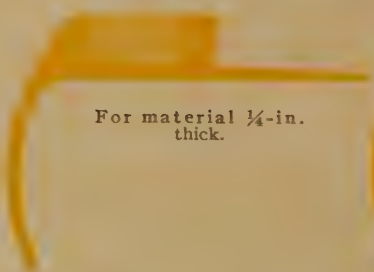
Fig. X. Wooster Security Edging, Yellow Brass.
For material ¼-in. thick. Height of lip ¼-in.



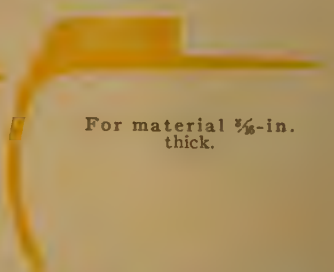
Patent applied for.

Method of Application—Illustration above shows method of application and cross section of Wooster Security Edging. Notice how flooring material is securely locked under lip of edging.

Combination Tread and Nosing



For material ¼-in. thick.



For material 5/16-in. thick.

UNIVERSAL SAFETY TREAD COMPANY

40 COURT STREET, BOSTON, MASS. FACTORY, WALTHAM, MASS.

REPRESENTATIVES

NEW YORK, N. Y., Foran Foundry & Mfg. Co., 50 Church Street
PHILADELPHIA, PA., R. R. Hammond Co., 419 Widener Building
BALTIMORE, MD., V. D. Eastwood, 15 E. Fayette Street
CHICAGO, ILL., W. C. Burdick, 1710 Conway Building
SAN FRANCISCO, CAL., G. H. Trask, 39 Natoma Street
LOS ANGELES, CAL., A. W. Arlin, 519 Delta Building
SIOUX CITY, IOWA, O. S. Dean, 308 Davidson Building
ATLANTA, GA., Steel Specialties Co., 608 Walton Building

Products

Universal Anti-Slip Metal Tread (Abrasive) Type I.

Universal Safety Tread (Lead-Filled) Type II.

General Uses

Surfaces to be protected include all stairs and landings of any material, such as iron, wood, slate, stone, concrete or marble; ramps, runways, platforms, train pits, elevator door thresholds, saddles, ladders, frames around vault lights, coalhole covers, and all surfaces that might become slippery.

Universal Grit-Meter Tread in Color

This tread is constructed of a light metal baseplate to which is attached the hardest known abrasive with a soft Grit-Metal binder. There are no hard metal surfaces exposed to the foot, the diamond hard grains properly embedded withstand the most severe wear under heavy traffic. Owing to the fact that the abrasive material extends the whole thickness of the tread to the baseplate makes it non-slip for its entire life. The Grit-Metal material is simply used as a binder and filler between all the voids around the abrasive grains, but has the advantage of allowing the use of color. Grit-Metal treads are supplied in the three colors shown here and black which affords the architect still another avenue of expression along the lines which are engrossing the attention of the entire profession—the use of color in safety tread and its means of securing complete harmony between diversified materials.

Grit Metal

TREADS
IN
BLACK, BRICK RED, OAK,
MAHOGANY

Grit-Metal Safety Tread has a base plate that is offset at the nosing to allow the abrasive grain to be present at the very edge of the stair where the greatest wear comes.

The color and abrasive grains in Grit-Metal Treads goes through to the base plate and will always be present regardless of how many years the treads are down.

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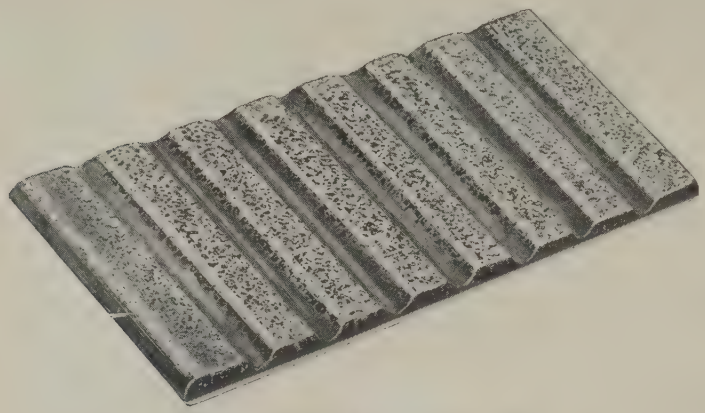
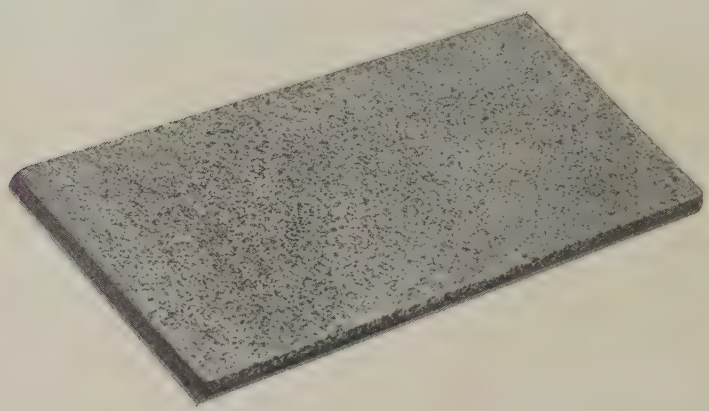


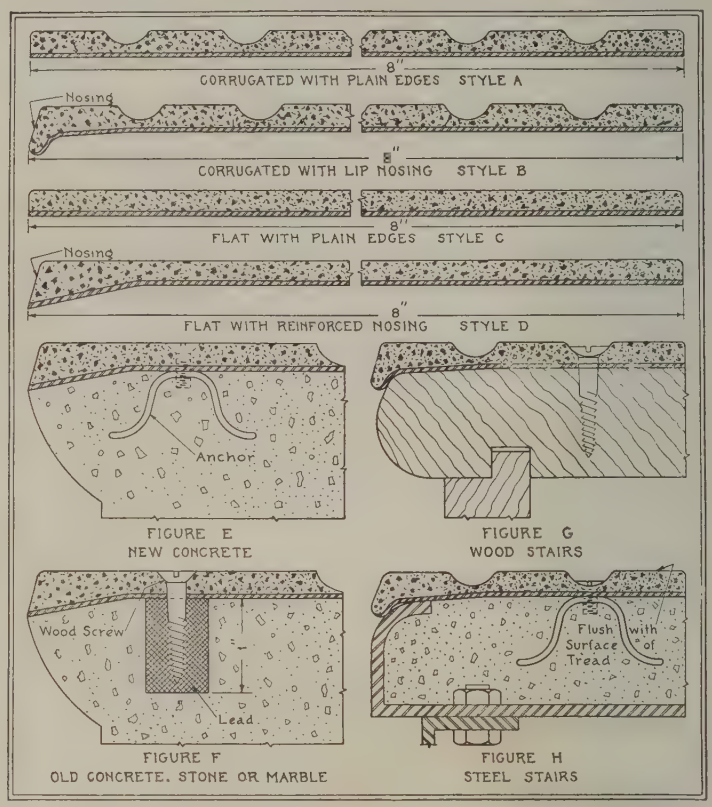
Corrugated Style A, Plain Edge

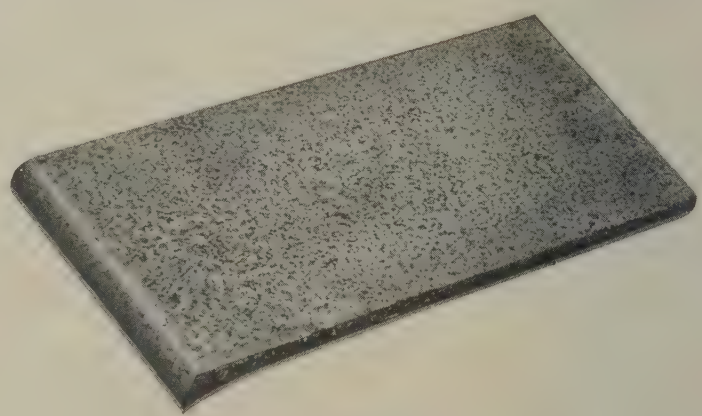
Corrugated Style B, with Lip Nosing



Flat Style C, Plain Edge

DETAILS OF TYPE I SAFETY TREADS





Flat Style D, with Reinforced Nosing

Universal Anti-Slip Metal Tread, Type I

This tread is constructed of a tinned steel base-plate to which is attached the hardest known abrasive with a soft lead binder. There are no hard metal surfaces exposed to the foot, but the diamond hard grains properly embedded to withstand the most severe wear under heavy traffic. Owing to the fact that the abrasive material extends throughout the whole thickness of the tread to the base-plate, makes it non-slip for its entire life. The lead is simply used as a binder and filler between all the voids around the abrasive grains. It is moistureproof, frostproof, non-porous, and scuffproof, and made in a flat or corrugated form as preferred. During many years of experience in the manufacture of safety treads, we have perfected a tread which fulfills the most exacting requirements.

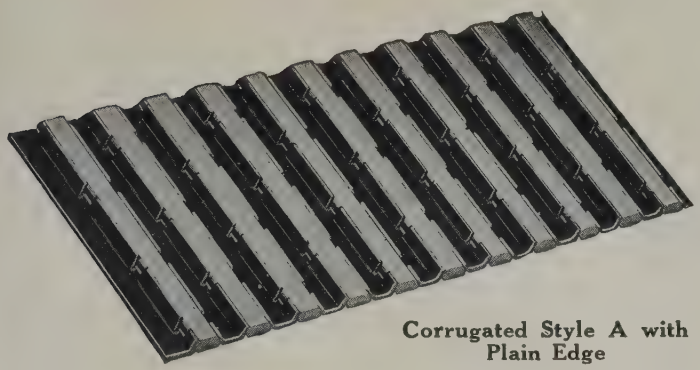
Surfaces and Nosing — Universal Anti-Slip Metal Tread Type I is made with flat or corrugated surface—Style "A" representing the corrugated surface, plain edge; Style "C" representing the flat surface with plain edges; Style "B" representing the corrugated surface with "lip" nosing; Style "D" the flat surface with reinforced nosing.

The idea of having it reinforced as shown in Style "D" is to build the abrasive as a non-slip shoulder to a depth of almost ½ in. on the edge, which is the point of heaviest wear. This reinforcement practically doubles the life of tread. For hospitals and similar buildings a flat surface is recommended for its sanitary advantages.

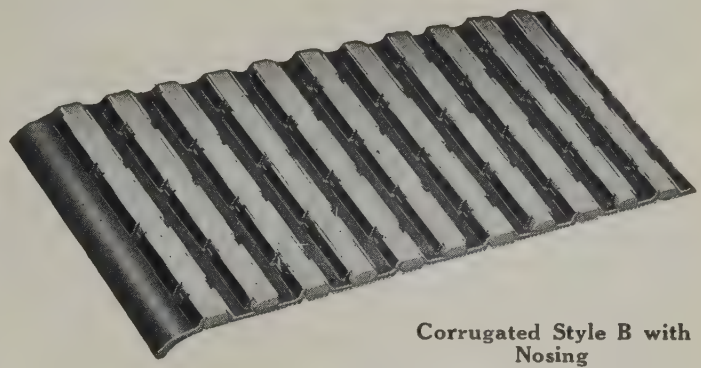
Installation—The above show the methods of attaching Universal Treads on new concrete with special anchors as shown at Figure E, and on old concrete as at Figure F. As applied to old concrete or stone, it is necessary to drill holes about 1 in. deep and fill same with lead plugs or expansion bolts. The safety treads are then attached by means of ordinary wood screws into these lead inserts in the same manner as in the case of wood stairs as in Figure G. When the treads are to be installed on cast iron or steel, the sub treads have to be tapped and drilled for ½-in. tap screws, round or flat headed. The flat headed screws are generally preferred.

Holes—Universal Treads are provided with the required number of holes in the plates properly countersunk. In concrete work we furnish the special anchors as shown.

Continued on next page

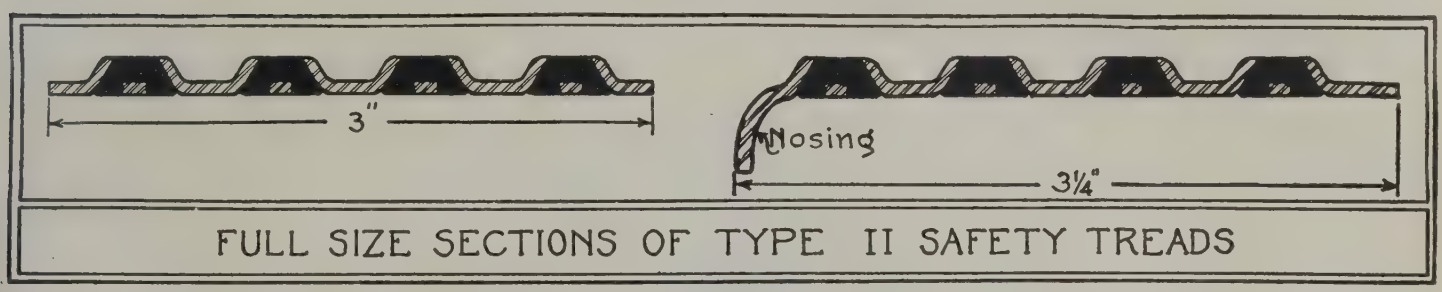


Corrugated Style A with Plain Edge



Corrugated Style B with Nosing

Universal Safety Tread (Lead Filled) Type II



Universal Safety Tread (Lead Filled) Type II

This tread is constructed of a steel, brass or aluminum baseplate, punched to receive the non-slip lead inserts which are rolled in and firmly clamped. The lead fills the perforations and a non-slip surface is presented for its full thickness. There are no continuous metal ribs on the outer edge, which is the danger point on all stairs, but the lead, being exposed between the steel or brass teeth, presents a non-slip edge at all times. This is especially important in descending stairways. A minimum of hard supporting metal and the maximum of non-slip lead form the wearing surface. Baseplate can be extended to form a nosing of any depth required. We can furnish alloy-coated or galvanized steel to resist the action of salt water or dampness. Our brass treads are also recommended where it is necessary to have a rustproof and safe surface.

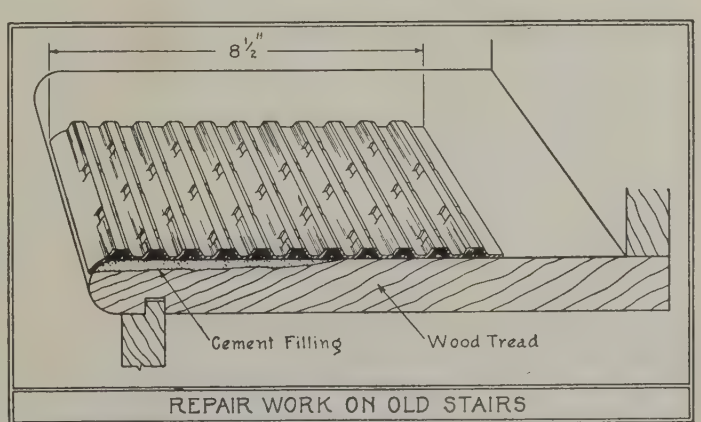
Sizes—Universal Safety Tread can be furnished in almost any standard width and in any specified lengths, either with or without nosing according to the requirements of the stairs or landings. We show some of the widths which are most commonly specified and used. We also show the way it is used on repair work on which the nosing can be extended to any depth desired to cover evidences of repair.

Cost of Safety Treads

The use of safety treads is a paid-up accident insurance during the life of the tread. All casualty companies demand a reasonable degree of safety on stair treads and traffic surfaces in all types of buildings and where their recommendations are followed there is a consequent saving in the cost of insurance. Damages from tripping or slipping on surfaces where safety treads have been provided have invariably been decided for the defendant. Accidents from falls on stairs in one year caused the death of 1,149 people and crippled for life more than 4,000 in this country. In New York City alone there were 118 deaths, and in Chicago, 37 deaths in one year.

Although wood, iron, stone, marble or concrete surfaces are supposed to be safe at first, after a short period of wear they are sure to develop to some extent a slippery and unsafe condition. The use of any of the various types of Universal Safety Tread Company's products will reduce these hazards to a minimum.

Use Safety Treads to Repair Worn Stairs



AMBLUCO NON-SLIP BLUE STONE STAIR TREADS AND FLOORING

QUARRIES AND MILLS
AMBLUCO, WYOMING CO., N. Y.

Produced by
AMERICAN BLUE STONE COMPANY
101 Park Avenue, NEW YORK, N. Y.

Products

AMBLUCO NON-SLIP STAIR TREADS and LANDINGS for interior steel and concrete stairways; AMBLUCO FLOORING, THRESHOLDS and WALL BASE for interior and semi-interior uses.

For Genesee Valley Blue Stone for exterior uses, and Naturcleft Flagging, see page A329.

Reg. U. S. Pat. Off.

Facilities

This company has well developed quarries on its own property of about 200 acres, located at Ambluco, Wyoming County, N. Y. The mills and yards are equipped with the most modern machinery so that large volumes of business can be handled without delay.

One building 150 ft. long, devoted exclusively to the storing and finishing of AMBLUCO Products, is heated during the cold weather so that orders can also be filled in the winter.

Ambluco Non-slip Stair Treads and Landings

These treads and landings have established themselves wholly on their own merits, with practically no introduction on our part. By those who have studied their qualifications or used them, they are declared to be superior to and more economical than any other type.

Attractive (Color and Texture)—The uniformity in color, even grained texture and standard sand sawed finish (free from saw marks and imperfections) combine to give a splendid appearance. The distinctive shade of light-blue blends well with adjacent light color surfaces or gives a sharp clean contrast with dark material. It is a fine and close grained blue stone, being made up mostly of pure, hard quartz as shown below:

MINERALOGICALLY CONSIDERED	
Fine, hard sand, mostly quartz	70%
Clay, as binding material	28%
Water	2%

Non-slip—The non-slip property, due to the fine grained quartz, does not grip the foot to cause tripping, but gives ample security against slipping at all times, whether wet or dry, without requiring resurfacing or replacing. These quartz particles are always uniformly distributed throughout the entire stone, a condition that is only produced by nature and prevents the surface from ever wearing smooth.

Durable—The extreme durability of the AMBLUCO Treads comes from the character of the material and the steadily increasing hardness of the stone brought on by the heat of the building, causing the treads to resist wear as they age. The density of the stone's structure which helps to give the remarkable wearing quality is revealed comparatively in the following table:

CRUSHING STRENGTH	
Rockport granite (Kidder's Hand Book)	17,750 lb. per sq. in.
Vermont marble	13,500 lb. per sq. in.
Genesee Valley blue stone	19,970 lb. per sq. in.

This blue stone weighs only, approximately, 150 lb. per cu. ft. (or 25 lb. per sq. ft. 2 in. thick) when cut ready to set.

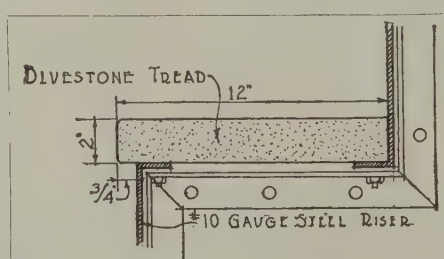
Sanitary—AMBLUCO Non-slip Treads and Landings are easily kept sanitary. Their great hardness prevents generation of dust and permits clean sweeping and mopping. The flat, non-porous surface has no grooves or pores to collect filth and disease germs. The soffits may be painted without danger of the stain coming through the stone to the top surface.

Quiet—They are practically noiseless and do not resound from footsteps nor become loose and rattle. This quiet feature is a truly essential quality for most buildings, and especially for hospitals where many human beings are undergoing great suffering, and for schools where it is so important that the pupils' minds are not distracted from their work.

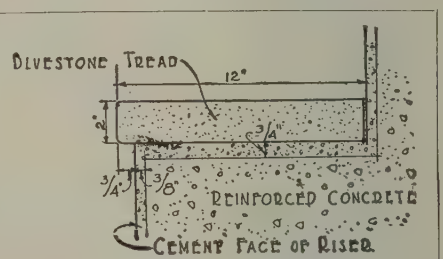
Fire Resisting and Rust-proof—The AMBLUCO Treads and Landings offer great resistance to extreme heat and are of inestimable value in fireproof construction. In contrast to many other treads these AMBLUCO treads do not become rusty themselves nor stain other adjacent materials.

Permanent and Economical—"Lasts the life of a school" is a fitting slogan, for, as indicated by tests and

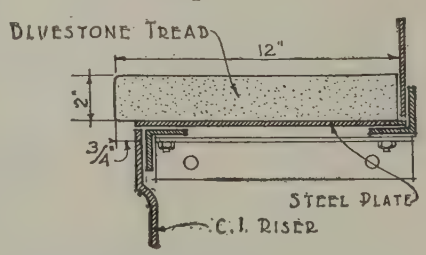
Ambluco Stair Treads, Hartford (Conn.) Fire Insurance Co. Building
PARKER, THOMAS & RICE, Architects
MARC EIDLETZ & SON, Contractors



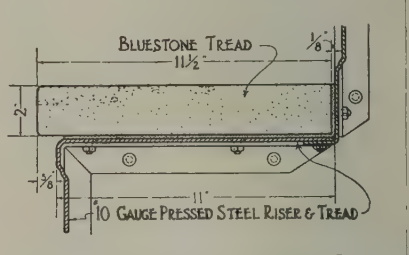
Using Ambluco Treads; Steel Risers; Blue Stone Showing from Below



Using Ambluco Treads; Cement Risers; Reinforced Concrete Supports



Using Ambluco Treads; Cast Iron Risers; Steel Subtreads and Steel Supports



Using Ambluco Treads; Pressed Steel Risers and Subtreads

Details of Ambluco Stair Treads

Continued on next page

reputed records, AMBLUCO Non-slip Treads give satisfactory service in an average school for 50 to 60 years, while observance shows that at the existing rate of advancements in scientific design and construction, a school is considered obsolete in that length of time and is frequently replaced by a new building. In fact, there are records where these blue stone treads have been removed in the wrecking of a school and the same treads later installed in a new school.

The initial cost of the AMBLUCO Treads (1½ in. to 2 in. thick) is about the same or less than other natural stone treads and the ultimate cost much less even than the cheap metal and composition treads.

The facility with which they can be set on the regular types of fabricated or pressed steel stair construction eliminates the great expense of specially designed steel members.

No maintenance cost is necessary after these blue stone treads are properly installed.

As a matter of fact, the AMBLUCO Treads and Landings can be safely adopted without first experimenting.

Specification Suggestions—AMBLUCO Non-slip Treads and Landings should be called by their trade-name, and although in many localities this name is well known, we suggest (to avoid substitution of inferior material) giving the additional information that they are produced by the AMERICAN BLUE STONE COMPANY, New York, N. Y.

The sand sawed or wet sand rubbed are the only two finishes which should be allowed. The former has proved entirely satisfactory and we endorse it as a standard. Planed and axed surfaces should be avoided.

AMBLUCO Treads and Landings are universally used 2 in. thick, but can be furnished down to 1½ in. Complete specifications will be supplied upon application.

Ambluco Flooring, Base, Treads and Risers, Alumnae Hall, Vassar College, Poughkeepsie, N. Y.
HUNT & HUNT, Architects

Accepted as Standard by Prominent Users—Subsequently to the standardizing on the AMBLUCO Blue Stone Treads by the City of Boston and its many suburbs in their schools and other public buildings, nearly all the rest of New England, recognizing the superior features of these treads, did likewise. Many of the leading school architects in the Eastern, Southern and Middle Western States specify them. The use has not been confined to schools, but has also been extended to other public buildings, such as hospitals, museums, colleges, churches, clubs, railroad stations and high class commercial buildings.

Also AMBLUCO installations are frequently made to replace worn-out treads of other kinds.

AMBLUCO Treads and Landings are used, for the most part, by architects and engineers long accustomed to incorporating in their specifications the best material for their work.

A Few Ambluco Tread and Landing Installations

Brookline High School, Boston, Mass., Kilham, Hopkins & Greeley, Architects
Abraham Lincoln School, New Britain, Conn., W. P. Crabtree, Architect
Saunders Trade School, Yonkers, N. Y., G. Howard Chamberlain, Architect
Columbia High School, South Orange, N. J., Guilbert & Betelle, Architects
High School, Sea Cliff, L. I., N. Y., Coffin & Coffin, Architects
North School, Hannibal, Mo., Malcolm S. Martin, Architect
Junior High School, Linden, N. J., Harold B. Brady, Inc., Architect
St. Boniface R. C. School, Sea Cliff, L. I., N. Y., Jas. W. O'Connor, Architect
Homeopathic Hospital, Providence, R. I., Kendall Taylor & Co., Architects
Lehigh Valley Railroad Station, Easton, Pa., J. J. McCleece, Architect
Mt. Pleasant Baptist Church, Belleville, N. J., Chas. Granville Jones, Architect
Federal Reserve Bank, Boston, Mass., R. Clipston Sturgis, Architect
Liberty Telephone Exchange, Boston, Mass., Parker, Thomas & Rice, Architects

Ambluco Blue Stone Flooring, Thresholds, Wall Base, and Swimming Pool Coping

In these days of the exacting of high liability for accidents to mankind, the fundamental requirement in flooring is that it does not become slippery under any conditions. In this blue stone flooring, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface at all times and makes the floor slip-proof and very durable. Besides the rust-proof, non-porous, dustless and sanitary qualifications of this flooring, it is quiet to walk on.

AMBLUCO flooring is either 1½ or 2 in. thick and is especially suitable for interior and porch floors in both regular and irregular designs, suggestions of which are shown on the following page. In case of an irregular pattern, it is advisable for economy to limit the number of sizes to about seven. If, however, a greater variety of sizes and shapes is desired, random sawed slabs may be shipped from the quarries, and then fitted and jointed by local cutters on the job. Joints of ⅛ to ¼ in. are usually used for the regular styles and ¼ to ½ in. joints are more in keeping for the irregular style floors.

Its sawed or rubbed finish gives a level surface on which chairs and other furniture do not rock, a feature so annoying with natural split stone.

Other delightfully artistic effects are gained by several methods. One, by varying the finishes—having some pieces sawed with sand and some with steel shot. Another, by omitting the washing of the stone after sawing, which gives a variegated coloring from the rust stain of the saws.

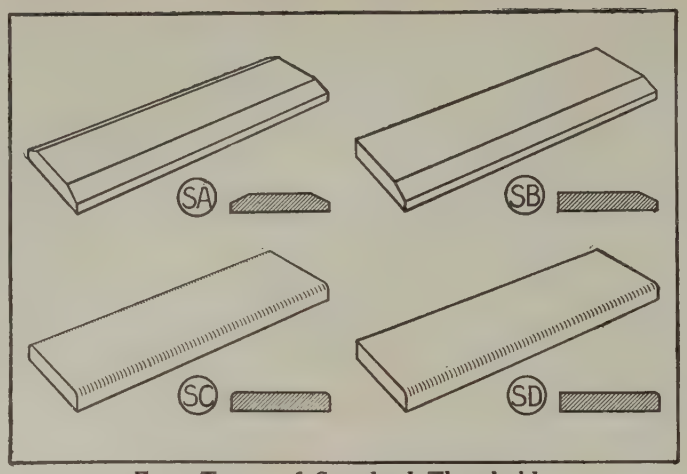
For interior swimming pools it is claimed to be in a class by itself for the border flooring and coping, for it is not dangerously slippery, does not injure the bare feet, and does not deteriorate and necessitate frequent replacements as do some manufactured floorings.

AMBLUCO Flooring is especially appropriate for,

Continued on next page

and is being used extensively in churches, cathedrals, museums, libraries, clubs, hotels, railroad stations, residences, high class commercial buildings, and the vestibules and stair halls of hospitals, schools and college buildings.

Perhaps in no place is there greater and more noticeable wear than in thresholds or saddles, and therefore, for this purpose, this AMBLUCO non-slip sand rubbed product is unapproached. These are furnished 1¼ to 2 in. thick by the desired widths, and with a choice of bevels.



Four Types of Standard Thresholds

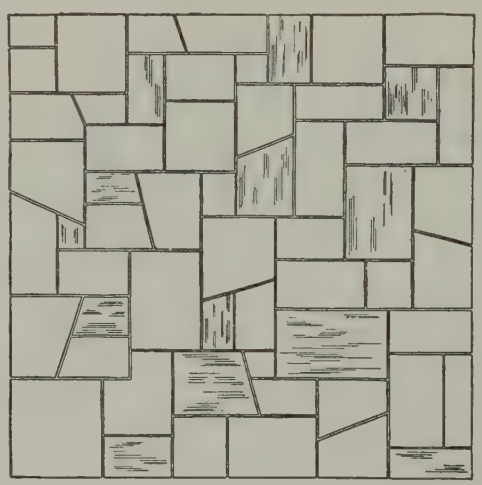
The AMBLUCO Wall Base and Plinths should be used to match the flooring and thresholds, landings and treads. The base and plinths are 1¼ to 2 in. thick by 7 to 14 in. high. A ⅛-in. radius round on the top front arris is usually given or a slight bevel is occasionally applied.

A fine sand rubbed finish is most appropriate, although the sand sawed finish frequently harmonizes better with certain styles of wall.

Specification Suggestions—It is important that this flooring, thresholds and base are specified by trade-name as described under the AMBLUCO Non-slip Treads.

For Flooring—The vestibules, lobbies, lounges (or whatever places desired) shall be of AMBLUCO Blue Stone, 2 in. [1½ in.] thick laid in regular [semi-irregular] [irregular] design (if irregular describe idea) with ¼ in. [½-in.] joints. It shall be set over a concrete fill and set in, at least 1 in. of mortar composed of 2 parts sand and 1 part portland cement. The joints shall be neatly pointed flush with surface of floor with same mortar, to which shall be mixed enough lamp black or other coloring to produce the desired effect.

For Thresholds or Saddles—All interior doorways for (.....) floors where cement, terrazzo or tile floor is used on either side, shall have AMBLUCO Non-slip Blue Stone saddles 2 in. [1¼ in. to 3 in.] thick by the full thickness of the partition wall in width, and the full width of the opening in length, with sand rubbed finish and 1x¼ in. deep bevel on each side. Joiner strips of AMBLUCO Blue Stone 1½ in. thick by 8 to 10 in. wide shall be used wherever different types of floor meet.



Irregular Design—FD

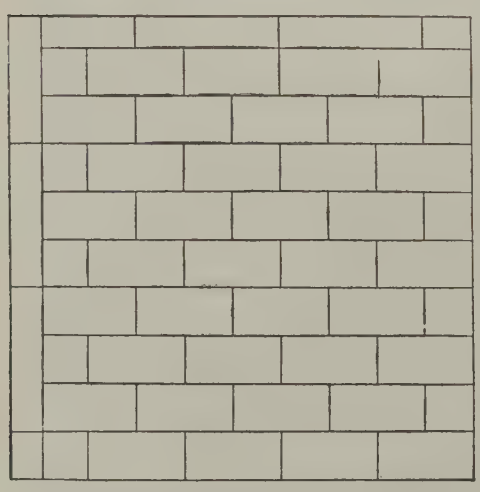
Random size blue stone slabs, showing variegated effect by combining sand sawed and shot sawed finishes. Laid with broken ½-in. joints

Typical Ambluco Flooring, Base and Threshold Installations

Museum of Fine Arts, Boston, Mass., Guy Lowell, Architect
Cathedral of Incarnation, Baltimore, Md., Bertram G. Goodhue, Architect
Christ Church, Bronxville, N. Y., Bertram Goodhue Associates, Architects
University of Maine Arts & Science Building, Orono, Me., Crowell & Lancaster, Architects
Baker Chocolate Co., Dorchester, Mass.
Carl Weeks Residence, Des Moines, Iowa, Rasmussen & Wayland, Architects
George W. Otis Residence, Maplewood, N. J., C. C. Wendehack, Architect
Church of the Redeemer, Morristown, N. J., Parish & Schroeder, Architects

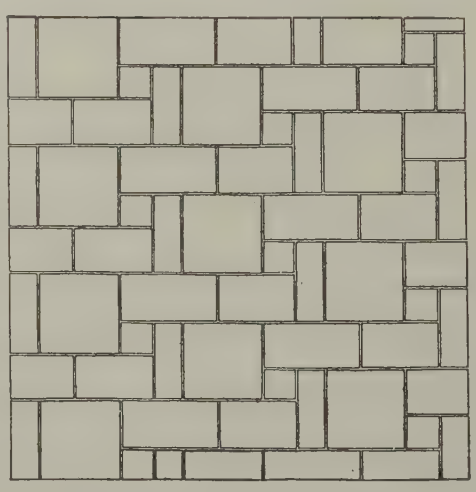
Suggestions for Care of Ambluco Products

After AMBLUCO Treads, Landings, Flooring, etc., have been installed they should be thoroughly scrubbed with sand and water until clean. No acid or other damaging substances should be used. If the light blue color is desired, coat with one or two applications of Truscon's Super Por-Seal. Repeat this six to eight times a year if needed. If it is preferred to have a darker shade, scrub and then paint with raw linseed oil. This can be done as often as will give the best results.



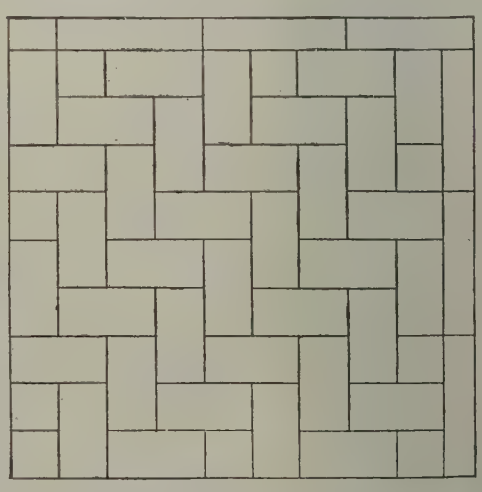
Regular Design—FA

Oblong blue stone slabs 24x12 in. laid with straight joints and transverse joints uniformly broken. Border of blue stone 8 in. wide



Semi-irregular Design—FC

Five different size blue stone slabs laid to a pattern with broken ¼-in. joints



Semi-regular Design—FB

Oblong blue stone slabs laid herringbone. Border of blue stone 8 in. wide

Suggested Designs for Ambluco Flooring

ALBERENE STONE COMPANY

Alberene Stone Stair Treads, Landings and Flooring

153 West Twenty-third Street
NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS., 37 Stilling Street
PITTSBURGH, PA., 617 Ferguson Building
PHILADELPHIA, PA., 913 Liberty Trust Building
RICHMOND, VA., 203 Builders' Exchange Building
CLEVELAND, OHIO, 303 Chester-12th Building
CHICAGO, ILL., 1700 Elston Avenue
NEWARK, N. J., 12 East Park Street

QUARRIES AND MILLS AT SCHUYLER, VA.

Products

ALBERENE STONE, the natural quarried stone, is produced and fabricated for:

Stair Treads and Landings
Flooring and Bases
Door and Window Sills
Plinths, Trim and Wainscoting
Fireplace Linings and Hearths

For Sanitary Equipment, Tubs and Kitchen Sinks, see page B1811; for Laboratory Equipment, see page C3869.

Alberene Stone

"Alberene Stone" is the trade-name of the ALBERENE STONE COMPANY for the natural stone produced at their quarries and mills at Schuyler, Va.

This stone is blue-gray in color, non-stratified and free from cleavage lines, dense and close grained, uniform in texture and hardness, practically non-absorbent, easily cleaned and kept clean. It is chemically inert and highly resistant to acids and alkalis. It is flame-resistant and non-conducting. It is fireproof and not affected even by the highest temperatures. It is easily machined—bored, slotted, grooved, tongued, turned—without splitting or chipping.

This unusual combination of qualities has won for Alberene Stone, for the purposes listed above, its leading place in the architectural and industrial world.

Production Facilities

This company's quarries and mills at Schuyler, Va., are the largest in the world devoted exclusively to the production of stone products of this character. Developed quarries have a capacity for 40 years' supply, while undeveloped properties indicate a reserve ample for 200 years. Both quarries and mills have the most up-to-date machine equipment and are connected by a standard gauge railway to the main lines of the Chesapeake & Ohio R. R. Co. and the Southern Railway Co. Systems. These resources and facilities, coupled with the company's specialized experience of more than 40 years, assure a uniform high grade of material and workmanship and prompt deliveries from ample stocks.

Architectural Service

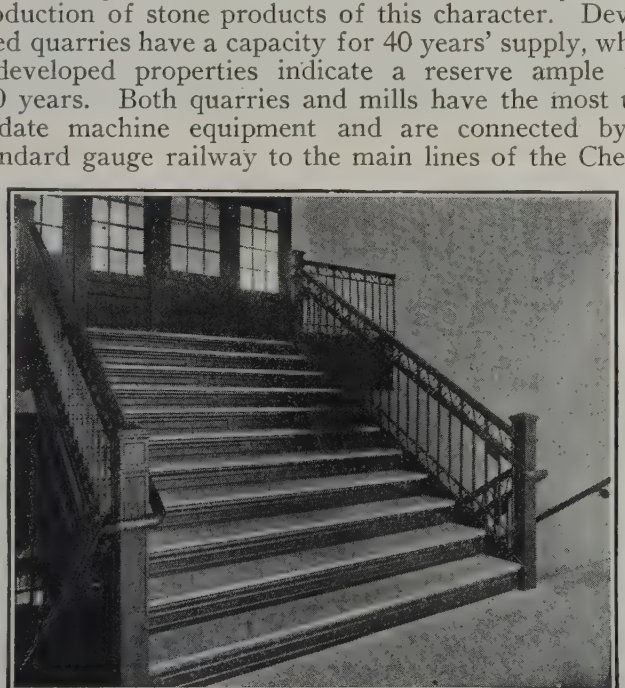
The technical department of the company is prepared and qualified to draw specifications, plans and details on all construction problems involving the use of Alberene Stone.

The experienced counsel of the company's specialists is freely offered to all who may wish to avail themselves of it—without obligation.

Stair Treads, Landings, Flooring, etc.

A selected hard stone is used for this purpose, a stone which has a pronounced "toothed," non-slipping surface and is unaffected by moisture. One specially valuable feature of this material, reducing the fire hazard, lies in the fact that it will not break or crack under heat, or even when a stream of cold water is turned upon it when the stone is at a high temperature. This, combined with the pleasing light color, makes Alberene Stone a superior material for stair treads, landings and flooring where safety and durability are factors. Many instances are known where these treads have been in hard service for more than 25 years and are still in serviceable condition. Due to the lack of a standardized design, it has proven impractical to carry stair treads, landings and flooring in stock. Our mill capacity and supply of uncut stone enable us to make reasonable deliveries in any quantity.

A large majority of Alberene Stone installations are made by our own construction force whose services are always available to architects and builders.



Alberene Stair Treads in High School in Somerville, N. J.
J. N. PIERSON & SON, Architects

A Flight of the 6000 Alberene Stone Stair Treads in the Equitable Life Assurance Co.'s Building, New York, N. Y.

AMERICAN PRESSED STEEL CO.

Rolled Steel Floor Plates

Commercial Trust Building
PHILADELPHIA, PA.

AGENTS AND WAREHOUSE STOCKS IN VARIOUS CITIES

Neverslip Rolled Steel Floor Plates

NEVERSLIP floor plates are rolled from open hearth steel in two patterns—raised diamond pattern and straight corrugated (ribbed) pattern—under the original Linden patents.

"The Original Floor Plate with Raised Diamonds"

TRADE-MARK

Widely used for floors and stairways in buildings, boiler and engine rooms, powerhouses, factories, etc., and on bridges. Also for cellar doors, sidewalk covers, fire escapes, trench covers and in places where structural strength combined with lightness is required for a safe and durable surface.

Non-slipping and Durable

The raised diamonds of NEVERSLIP floor plates are high and have four square edges. The surface of the diamonds is approximately flat, providing an even non-slipping surface with maximum wear, surpassing other types whose rounded and pressed diamonds rapidly become smooth and slippery.

The corrugated pattern also has straight square edges which likewise provide safety and durability.

NEVERSLIP floor plates have no pockets which will permit accumulation of dirt and water and they can be readily cleaned.

Sizes

NEVERSLIP rolled steel floor plates are furnished in thickness from ⅛ in. to ½ in., in widths from 20 in. to 60 in. and lengths up to 240 in. Larger and thicker plates may be furnished if desired.

Specially light NEVERSLIP plates can be furnished in No. 12 and 14 gauge.

Thickness is measured through body of plate exclusive of diamond or rib.

Application

Wood floors or planking. Plates are fastened by lag screws or by ordinary wood screws (occasionally by carriage bolt with lock nuts and washers).

On steel work, stairways, etc., by bolting through the supporting members.

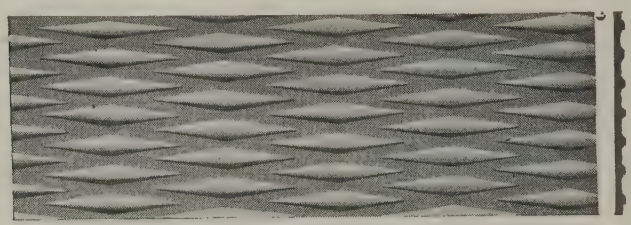
On new concrete floors, stairways, etc., arrangements should be made to lay floor plates flush secured to screw anchors, to expansion bolts, or to wood blocks set flush in the concrete.

Protection for Bridge Flooring

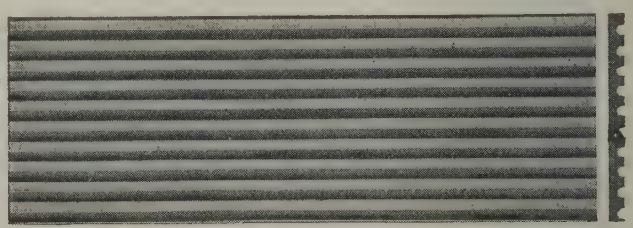
The placing of two lanes of floor plates 24 in. wide, spaced normal gauge of vehicles for the entire length of the bridge directly over the planking, eliminates maintenance cost in reflooring and strengthens the entire bridge.

The floor plates overcome vibration, chatter, rising spikes and planks so dangerous to automobile traffic.

Catalogue and samples on request.



Diamond Pattern

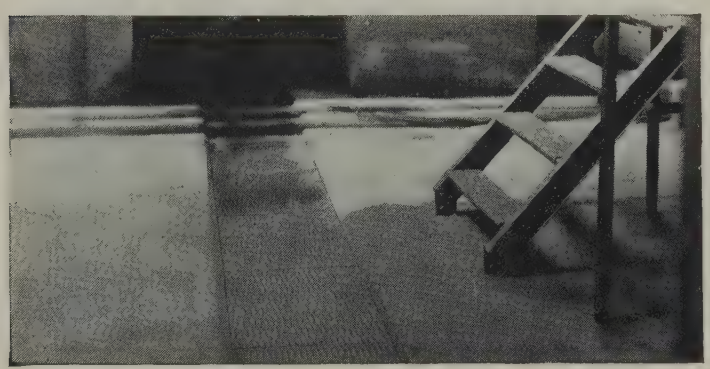


Ribbed Pattern

Neverslip Rolled Steel Floor Plates

Great Structural Strength

NEVERSLIP rolled steel floor plates have practically supplanted cast iron plates because of their greater structural strength, which is three to four times greater. They are also lighter and cost less.



Trench Cover and Ladder

Tread and Walkway

ALAN WOOD IRON AND STEEL CO.

Rolled Steel Floor Plates, Pig Iron, Billets, Blooms, Slabs, Sheared Steel Plates and Blue Annealed Sheets

Widener Building, PHILADELPHIA, PA.

DISTRICT OFFICES

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BOSTON, MASS., 141 Milk Street
SAN FRANCISCO, CAL., 444 Market Street
LOS ANGELES, CAL., San Fernando Building
DALLAS, TEX., Santa Fe Building
SEATTLE, WASH., Dexter Horton Building

"A.W." Rolled Steel Floor Plates

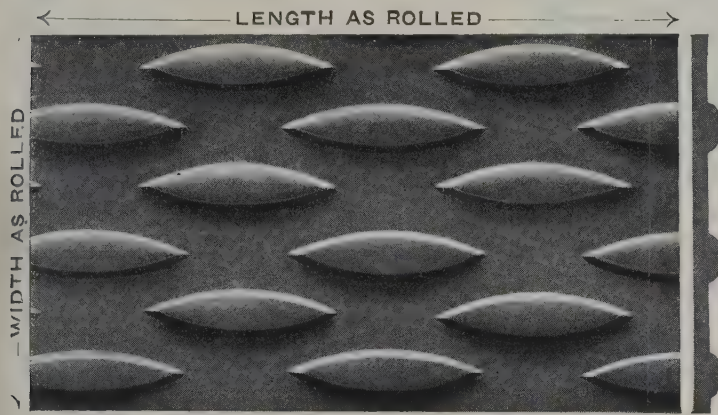
"A.W." Floor Plates are a rolled steel product and will therefore withstand the roughest usage without breaking. The entire production of these plates from raw material to finished product is done in our own plants and any of our patterns can be matched at any time—they are always uniform.

All plates have beveled edges on the patterns to assure firm foothold without cutting, and all are self-draining and cleaning.

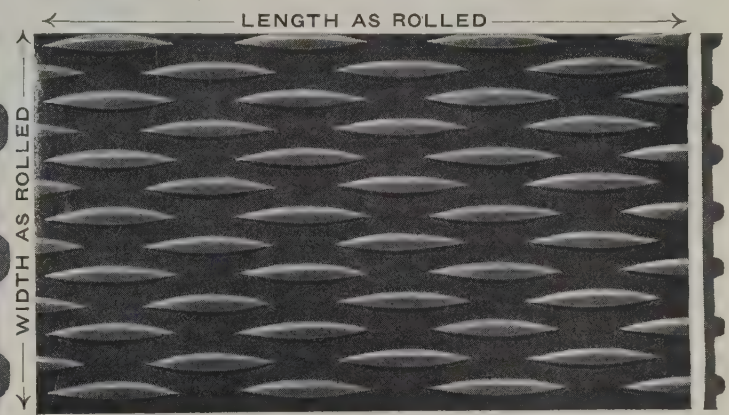
Standard "A.W." Floor Plates—This is our heavy weight plate which has been standard for years for all forms of step, flooring, platform and runway construction where supporting strength as well as antislip qualities are necessary. This type is made in two patterns—Diamond and Ribbed.

The New "A.W." Diamondette—This is (to our knowledge) the lightest floor plate ever rolled and is made for flooring, platforms, walkways, etc., where raised antislip surface is required without necessity for supporting strength.

Made in No. 12 and No. 14 gauge (exclusive of pattern). Maximum sizes, 24x192 in. or 36x144 in.



"A.W." Diamond Pattern Floor Plate (Half Size)



"A.W." Diamondette Floor Plate (Half Size)

SIZES AND WEIGHTS OF "A.W." DIAMOND PATTERN FLOOR PLATES

*Thickness, in.	Width, in. 20	24	30	36	40	44	48	52	56	60	66	72	†Weight per sq. ft. in lb. of "A.W." Diamond Plates
	Length, in ft.												
1/8	20	20	20	20	20	20	20	20	20	20	....	....	7.75
3/16	25	25	25	25	25	25	25	25	25	25	....	....	8.75
1/4	25	25	25	25	25	25	25	25	25	25	20	....	11.25
5/16	25	25	25	25	25	25	25	25	25	25	20	....	13.75
3/8	25	25	25	25	25	25	25	25	25	25	20	20	16.25
1/2	25	25	25	25	25	25	25	25	25	25	20	20	21.5
5/8	25	25	25	25	25	25	25	25	25	25	20	20	26.5
3/4	25	25	25	25	25	25	25	25	25	25	20	20	31.75

*Measured through body of plate, i.e., exclusive of pattern.
†Approximate only. May vary according to size of plate.

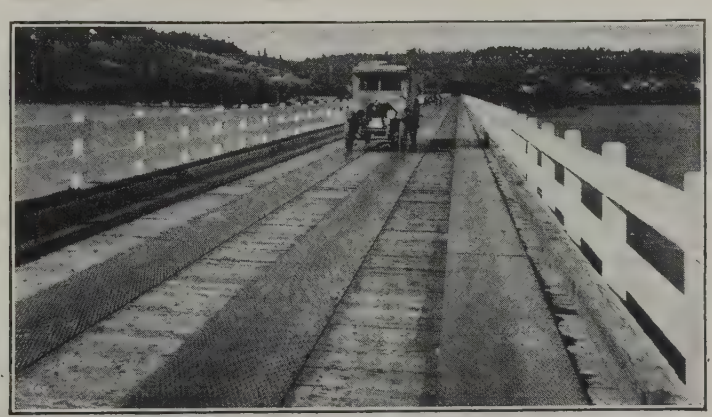
"A.W." RIBBED PATTERN FLOOR PLATES

Can be furnished in		
Thickness, 1/8 to 1/2 in.	Widths, up to 48 in.	Lengths, up to 120 in.

Compare the difference in cost per square foot, dead load weight and area of patterned surface, with the corresponding thicknesses of the standard "A.W." Diamond Plates.

"A.W." DIAMONDETTE FLOOR PLATES AS COMPARED WITH STANDARD "A.W." DIAMOND FLOOR PLATES

Thickness (exclusive of pattern)	Theoretical weight per sq. ft.	
	Lb. per sq. ft.	Percentage compared with 1/4 in.
"A.W." Diamond Floor Plates		
1/4 in.	11.25	100%
3/16 in.	8.75	77%
The New "A.W." Diamondette Floor Plates		
No. 12 gauge	5.5	48.9%
No. 14 gauge	3.5	31.1%



"A.W." Diamond Pattern Rolled Steel Traffic Treads Eliminate Replanking of Wooden Floor Bridges

Approved by engineers. Provide an easy driving surface, reduce vibration to a minimum and prevent nails and spikes from working up through the floors. They make an exceptionally neat appearance and are economical

WALTER BATES STEEL CORPORATION

GARY, IND.

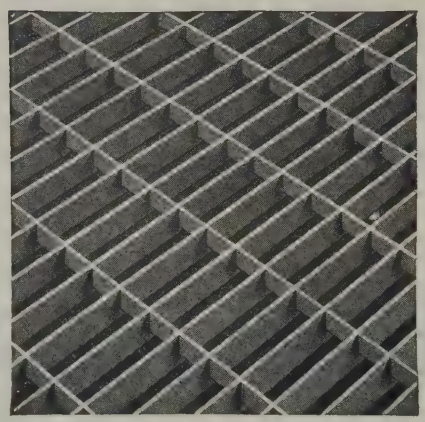
SALES OFFICES

NEW YORK, N. Y. PITTSBURGH, PA. BIRMINGHAM, ALA. DALLAS, TEX. ATLANTA, GA. CLEVELAND, OHIO

Products

- Steel Floor Grating
- Steel Frame Houses
- Steel Towers
- Steel Poles
- Substations
- Railway Structures
- Galvanizing

WALTER BATES STEEL FLOOR-GRATING



Walter Bates Steel Floor-Grating

Provides all the necessary flooring requirements peculiar to power plants, central stations, and certain types of industrial buildings. It is slipproof, strong, permanent, safe. Facilitates air circulation and light penetration. Relatively light in weight and low in cost. Requires no maintenance. Its even surface makes "easy going" for man or truck.

Non-clogging—Due to elimination of small openings and sharp angles it is impossible for dirt, grease or ice to form or accumulate. Always attractive and sanitary.

Positive Lock Joint—There are no welds, rivets or bolts in the construction of Walter Bates Steel Floor-Grating. Details below show construction. Once assembled, no amount of jarring, loading or trucking can shake the grating loose. In effect, it is a single unit throughout. There can be no rattle or chatter, regardless of age.

Note that in preparing the members for joining the extreme, or edge, fibres of the Main Bar "A" are uncut. Thus the most important and strongest metal is neither disturbed or reduced.

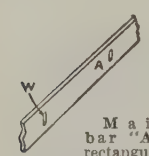
Applications and Uses—Floors and flooring in central stations, power plants, water works tunnels, galleries, walkways, runways, isles of safety, trolley loading platforms, railings, grilles, guards, fire escapes, ventilation shaft covers, sidewalk elevator covers, elevator and penthouse floors, etc.

Walter Bates Steel Step-Grating

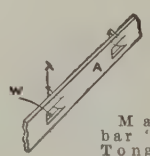
Provides a safe, slipproof stair step for indoor or outdoor use. Construction features, including positive lock joint, are similar to those on the floor-grating, assuring maximum strength, permanent life and lasting economy. Outer edge reinforced to prevent sag or wear. Furnished ready to be bolted to stair stringers.

Estimates and Descriptions

We will be glad to furnish additional information about any Walter Bates Steel Products; or to submit suggested layouts and estimates upon receipt of specifications or descriptions of requirements. No obligation incurred on the part of inquirer.

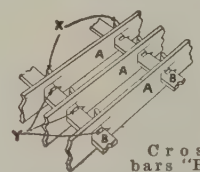


Main bar "A"; rectangular holes "W" punched approximately in center of the section.

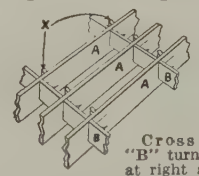


Main bar "A"; Tongues "X" then sheared same width as hole "W." Tongue is curved back, so that it protrudes to one side of Bar "A."

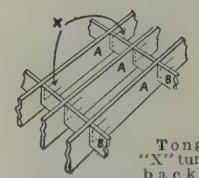
Cross bar "B"; notches "Y" made in bar at correct spacing center to center of notch.



Cross bars "B" inserted in slots "W," of main Bars "A."



Cross Bars "B" turned up at right angles to entry position so that notches "Y" straddle upper portion of main bars "A." Tops of "A" and "B" are flush. (Unsheared portion of bar "B" is same width as height of slot "W," making a tight fit.)



Tongues "X" turned back to original position held before shearing. (Since width of slot "W" was same dimension as thickness of Bar "B," tongue "X" presses tightly against bar "B," forming a positive lock.)

SAFE LOAD TABLE WALTER BATES STEEL FLOOR-GRATING

Explanation of Numerals in Column "X"

(1) Maximum Safe Uniform Load per square foot
(2) Deflection Under Maximum Safe Uniform Load in inches
(3) Maximum Safe Concentrated Load per foot of width
(4) Deflection Under Maximum Safe Concentrated Load

Code Word	Type	Specifications—Bar Size, in.—Centers, in.	Wt. per sq.ft., lbs.	X	2 ft.	2½ ft.	3 ft.	3½ ft.	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.	6½ ft.	7 ft.	7½ ft.	8 ft.	8½ ft.	9 ft.	9½ ft.	10 ft.	10½ ft.	11 ft.	11½ ft.	12 ft.
		Longitudinal	Black	1	855	547	380	279	214	169	137														
	WB	1 x 3/16—1	8.30	2	.056	.091	.131	.178	.233	.295	.364														
Flora	100	Transverse	Galv.	3	827	684	570	489	428	380	342														
		¾x⅛—4½	8.80	4	.045	.073	.105	.143	.186	.236	.291														
		Longitudinal	Black	1	1439	921	639	470	360	284	230	190	160	136	117										
	WB	1¼x3/16—1	10.22	2	.050	.077	.112	.152	.198	.251	.310	.375	.447	.524	.608										
Floer	125	Transverse	Galv.	3	1439	1151	959	822	719	639	575	523	480	443	411										
		¾x⅛—4½	10.83	4	.040	.062	.089	.122	.159	.201	.248	.300	.357	.419	.486										
		Longitudinal	Black	1	2097	1342	932	685	524	414	336	277	233	199	171	149	131	116	104						
	WB	1½x3/16—1	12.13	2	.040	.065	.094	.128	.167	.212	.261	.316	.376	.442	.512	.588	.669	.755	.847						
Floak	150	Transverse	Galv.	3	2097	1678	1398	1198	1049	932	839	763	699	645	599	559	524	493	466						
		¾x⅛—4½	12.86	4	.033	.052	.075	.102	.134	.169	.209	.253	.301	.353	.410	.470	.535	.604	.677						
		Longitudinal	Black	1	2787	1785	1239	910	697	551	446	369	310	264	228	198	174	154	138	124	111				
	WB	1¾x3/16—1	14.04	2	.035	.055	.079	.108	.141	.178	.220	.235	.316	.371	.430	.494	.562	.635	.712	.793	.879				
Flout	175	Transverse	Galv.	3	2787	2230	1858	1593	1394	1239	1115	1014	929	858	796	743	697	656	619	587	557				
		¾x⅛—4½	14.88	4	.028	.044	.063	.086	.112	.142	.176	.188	.253	.297	.344	.395	.450	.508	.569	.634	.703				
		Longitudinal	Black	1	3587	2296	1594	1171	897	709	574	474	399	340	293	255	224	199	177	159	143	130	119	108	100
	WB	2 x 3/16—1	15.95	2	.030	.047	.068	.093	.122	.154	.190	.230	.274	.321	.372	.427	.486	.549	.615	.686	.760	.838	.919	1.00	1.09
Floze	200	Transverse	Galv.	3	3587	2869	2391	2050	1793	1594	1435	1304	1196	1104	1025	956	897	844	797	755	717	683	652	624	598
		¾x⅛—4½	16.91	4	.024	.038	.055	.074	.097	.123	.152	.184	.219	.257	.298	.342	.389	.439	.492	.549	.608	.670	.735	.804	.875
		Longitudinal	Black	1	4501	2881	2000	1470	1125	889	720	595	500	426	367	320	281	249	222	199	180	163	149	136	125
	WB	2¼x3/16—1	17.87	2	.013	.042	.060	.082	.107	.136	.168	.203	.242	.284	.329	.377	.429	.485	.544	.644	.671	.740	.812	.887	.966
Flong	225	Transverse	Galv.	3	4501	3601	3001	2572	2251	2000	1800	1637	1500	1385	1286	1200	1125	1059	1000	948	900	857	818	786	750
		¾x⅛—4½	18.94	4	.011	.034	.048	.066	.086	.109	.134	.162	.193	.227	.263	.302	.344	.388	.435	.516	.537	.592	.650	.710	.773

BLAW-KNOX COMPANY

Steel Grating, Open Flooring and Steel Steps

674 Farmers Bank Building, PITTSBURGH, PA.

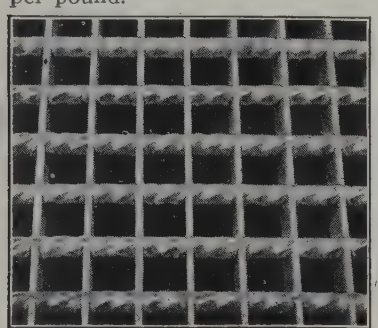
For List of Sales Offices, see page A196; for Steel Roof Sheathing, see pages A196-197

Blaw-Knox Electroforged Steel Grating and Open Flooring

Blaw-Knox Electroforged Steel Grating and Open Flooring is made by a resistance welding process in which longitudinal bars and cross bars are welded—electroforged—into an actual, not theoretical, one-piece construction. No slots, rivets, nor cuts in the metal. In a series of tests first conducted at Columbia University, New York, and lastly under the auspices of the Pittsburgh Testing Laboratory, in which leading commercial gratings were tested as to comparative strength, Blaw-Knox Electroforged Grating was conclusively proven to have greater strength than any steel grating tested.

Non-slip—Perfect traction is afforded by the slightly rough edges of the twisted cross bars, which protrude slightly above the surface of the bearing bars. Impossible to slip on Electroforged Grating.

Greatest Strength—The electroforged one-piece construction—made without rivets, slots, or cuts in the metal—utilizes the full strength of the gross amount of metal. The resulting one-piece section has a maximum loading capacity per pound.



Longest Life—Because of its design and exclusive method of fabrication Electroforged Grating presents a one-piece construction free from cracks, joints or crevices of any kind. It is the only grating which can be 100% galvanized or painted to give absolute protection against corrosion.

One-piece Grating—Blaw-Knox Electroforged Grating is manufactured by laying the twisted bars across the top of the bearing bars without slotting or cutting the metal. Enormous pressure and resistance welding electroforges the bars into one piece where the metals cross. Blaw-Knox Grating is the only one-piece grating on the market.

Self-cleaning—Because there are no acute angles or projections to collect debris, "Blaw-Knox" Grating is absolutely self-cleaning. An examination of its structure will illustrate this fact.

Better Light and Ventilation—The construction of Blaw-Knox Electroforged Grating permits clean-cut rectangular openings. Because a minimum of opaque surface is interposed between the light and its objective, maximum lighting and ventilation are assured.

Easily Installed—Installation cost of Blaw-Knox Grating is reduced to a minimum by a very simple and secure method of fastening grating. This method permits grating to be easily removed when necesary, without use of ladder or scaffold.

Blaw-Knox Steel Steps—Always Visible

Blaw-Knox Steel Steps are made in accordance with the same principle as Blaw-Knox Electroforged Grating.

The outer edges of these steps are made doubly visible by means of an additional set of cross bars placed between the two outer bearings as shown below.

These steps are furnished in all sizes.

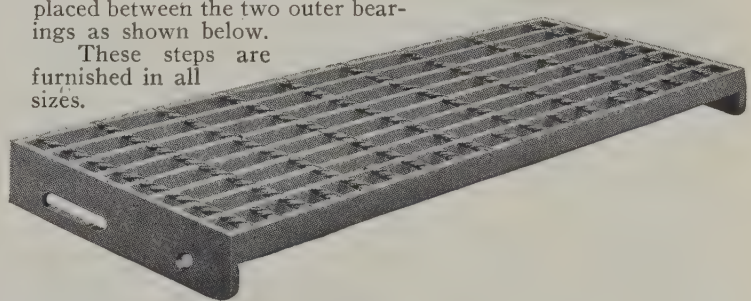


TABLE OF SAFE LOADS—BLAW-KNOX ELECTROFORGED GRATING

Maximum allowable fiber stress 16,000 pounds per square inch

"L"—safe uniform load in pounds per square foot. "W"—safe concentrated load in pounds per foot of width. "C"—deflection constant.

Type	Size of bars, in.		SPACING OF SUPPORTS 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"	9'-0"	Weight per sq. ft., lb.	Type
G	¾x3/16	L	516	330	229	168	128	102								5.92	G
		C	.000171	.000418	.000867	.001607	.002762	.004382									
		W	515	412	343	294	258	229									
GG	¾x3/16	L	656	420	292	214	163	130								7.35	GG
		C	.000134	.000328	.000672	.001261	.002168	.003438									
		W	656	525	437	375	328	292									
J	1 x3/16	L	917	587	407	292	229	181	147	121	102					7.68	J
		C	.000072	.000172	.000357	.000677	.001127	.001872	.002755	.004033	.005696						
		W	917	733	611	524	459	408	367	334	306						
JJ	1 x3/16	L	1163	748	518	372	292	230	187	154	130					9.59	JJ
		C	.000056	.000134	.000280	.000532	.000884	.001526	.002166	.003169	.004469						
		W	1167	934	778	666	584	519	466	425	389						
L	1¼x3/16	L	1432	917	637	468	358	283	229	189	159	136	117			9.43	L
		C	.000036	.000089	.000181	.000344	.000587	.000933	.001424	.002085	.002940	.004081	.005444				
		W	1432	1145	956	819	717	636	574	521	478	440	410				
LL	1¼x3/16	L	1820	1162	812	597	456	360	292	241	203	173	149			11.82	LL
		C	.000029	.000070	.000142	.000270	.000461	.000733	.001160	.001634	.002305	.003208	.004275				
		W	1820	1456	1213	1040	910	810	726	661	606	560	520				
N	1½x3/16	L	2069	1324	920	676	518	409	331	274	229	196	169	129	102	11.18	N
		C	.000021	.000052	.000108	.000200	.000343	.000543	.000834	.001208	.001731	.002359	.003130	.005458	.008750		
		W	2060	1650	1375	1180	1030	916	825	750	687	635	590	515	459		
NN	1½x3/16	L	2632	1680	1169	862	660.	520	421	350	292	250	212	164	130	14.04	NN
		C	.000017	.000041	.000085	.000157	.000266	.000427	.000656	.000946	.001361	.001850	.002542	.004293	.006865		
		W	2620	2100	1750	1500	1310	1166	1050	953	874	806	749	655	582		
O	1¾x3/16	L	2807	1797	1247	917	702	555	449	371	312	266	229	175	139	12.94	O
		C	.000013	.000033	.000068	.000126	.000213	.000343	.000525	.000766	.001087	.001496	.002004	.003443	.005482		
		W	2800	2240	1870	1600	1400	1245	1120	1020	935	862	800	700	624		
OO	1¾x3/16	L	3570	2282	1582	1162	893	706	572	473	397	339	291	223	177	16.28	OO
		C	.000011	.000026	.000054	.000099	.000169	.000270	.000412	.000601	.000854	.001174	.001577	.002702	.004305		
		W	3570	2855	2380	2040	1785	1585	1430	1300	1190	1100	1020	892	793		
P	2 x3/16	L	3668	2348	1628	1195	916	724	588	484	408	347	300	228	180	14.69	P
		C	.000009	.000020	.000046	.000087	.000145	.000231	.000350	.000527	.000730	.001018	.001350	.002315	.003722		
		W	3670	2930	2440	2100	1835	1630	1468	1335	1220	1127	1048	916	815		
PP	2 x3/16	L	4668	2988	2072	1526	1162	922	749	616	520	442	382	290	230	18.51	PP
		C	.000007	.000017	.000036	.000068	.000114	.000181	.000275	.000414	.000569	.000799	.001060	.001821	.002913		
		W	4660	3730	3105	2665	2330	2060	1866	1696	1555	1434	1332	1166	1037		
Q	2¼x3/16	L	4655	2979	2069	1520	1164	920	745	615	517	441	380	291	230	16.43	Q
		C	.000006	.000015	.000038	.000059	.000101	.000161	.000246	.000359	.000510	.000714	.000945	.001607	.002591		
		W	4650	3710	3100	2655	2320	2065	1860	1690	1550	1430	1330	1163	1033		
QQ	2¼x3/16	L	5922	3780	2632	1932	1481	1166	948	782	658	562	484	370	293	20.74	QQ
		C	.000005	.000012	.000030	.000046	.000079	.000127	.000193	.000282	.000401	.000560	.000742	.001263	.002004		
		W	5910	4740	3940	3380	2960	2630	2365	2150	1970	1820	1690	1480	1315		

Note: Spans to right of heavy line not recommended.

Deflection: To obtain the deflection under any uniform load per square foot on a given span, multiply the load per square foot by the deflection constant, "C" from the table for the given span. The result will be the deflection in inches at center of span under the actual load. Actual tests have shown deflections average 23% less than these theoretical computations.

ESTABLISHED IN 1902

IRVING IRON WORKS COMPANY

Manufacturers of Open Steel Flooring, Walkway Grating and Safety Steps

Dutchkill Creek and Third Street, LONG ISLAND CITY, N. Y.

Products

IRVING OPEN STEEL FLOORING in paneled types; IRVING CONTINUOUS STEEL FLOORING; IRVING CONTINUOUS FLOOR ARMORING; "VIZABLEDG SAFSTEPS"; "SUBWAY", "SUNWAY", "SUBLIT", "EGGCRATE", "HONEYCOMB", "RETICULINE", and other forms of flooring and gratings.

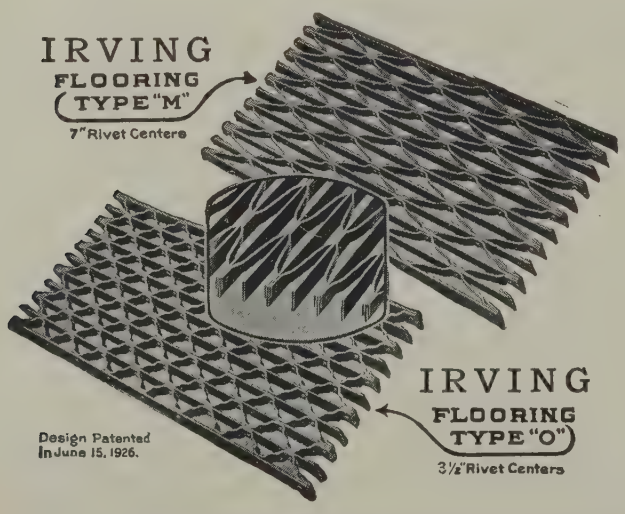
Trade-marks

The trade-mark names "Irvico", "Subway", "Reticuline", "Vizabledg", "Safstep", "Sunway" and "Sublit" are registered in the United States Patent Office, are the property of this company, and cannot legally be used in connection with any flooring, grating or safety step made by any other company.

Irving Open Steel Flooring

This is a structure of units or panels, consisting of alternate straight and "reticuline" steel bars assembled edge-on and solidly riveted together. The straight bars are of greater depth than the "reticuline" bars; the latter have an elongated "S" crimp and meet the straight bars at almost a right angle. Rivet holes are punched above the neutral axis of the straight bars, each of which is supported at its upper chord, where the buckling stress is greatest, by the adjoining "reticuline" bars. Thus the full tensile strength of each member is usefully employed, in a trussed structure in which a concentrated load is distributed over a wide area. This distinctive Irving construction results in the following structural superiorities: (1) maximum load capacity per unit of weight; (2) maximum effective area for lighting; (3) minimum opportunity for lodgement of dirt, ash, snow, etc.; (4) all bars absolutely flush on working face of panel; (5) all panels absolutely flat; (6) permanently non-slipping surface; (7) superior all-directional traction surface for trucks or tractors; (8) a pleasing pattern or design.

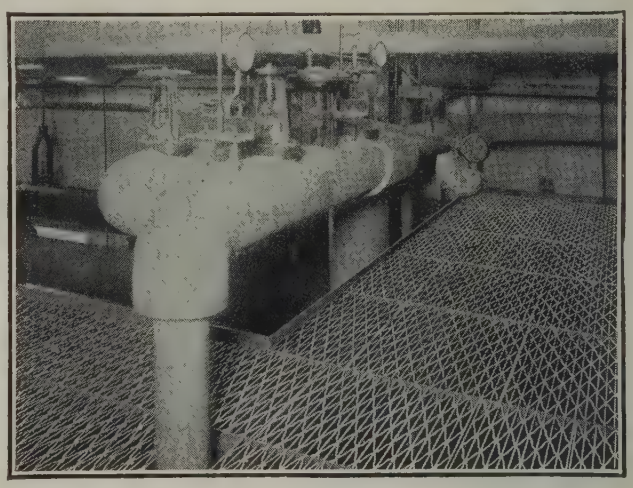
Irving Flooring is made in two standard meshes, as pictured here—Type "M", 7-inch rivet centers; Type "O", 3½-inch rivet centers. (Bulletin H-16.)



Two Standard Types of Irving Open Steel Flooring

Irving Continuous Steel Flooring

This is a unified structure, not a collection of separate panels, made up in standard Irving mesh—the individual sections being bolted together endwise and crosswise with staggered, offset, lapped joints, in a continuous trussed steel structure. A floor with all the distinctive advantages of standard Irving design, plus the outstanding superiority of continuity in every direction. (Bulletin G-16.)



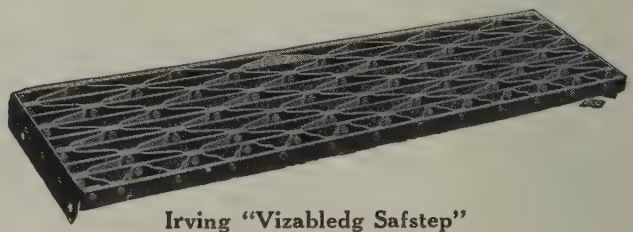
Central Station with Irving Open Steel Floor

Irving Continuous Floor Armoring

This is a structure of Irving Continuous Flooring, in light weight, bedded and anchored flush with the surface of floors of concrete, mastic, asphalt or composition —the mesh being filled with the flooring material, and troweled or rolled flush with the bars. This makes a floor proof against shock, traffic and wear, with a perfect traction surface and no opportunity for breaks or cracks to develop.

"Vizabledg Safsteps"

These are light, strong, all-steel units made of standard Type "M" Irving mesh, except that the "reticuline" bar next to the nosing bar has the Type "O" crimp. This abrupt change in mesh pattern forms a visible edge (Vizabledg) which makes the "Safstep" miss-proof; while the non-slipping Irving surface makes the "Safstep" slip-proof under all conditions. There are 24 standard sizes, each a self-contained unit with punched carrier plates ready for mounting. (Bulletin H-16.)



Irving "Vizabledg Safstep"

Publications

Individual bulletins, listed by numbers under each heading above, describe these products in detail and will be sent on request.

Continued on next page

Standard Construction of Irving Flooring

Spacing—*Types "M" and "G"*—$1\frac{5}{16}$ inches from center to center of straight bars when $\frac{3}{16}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{1}{8}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

Types "O" and "E"—$1\frac{5}{16}$ inches from center to center of straight bars when $\frac{3}{16}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{1}{8}$ inch thick; rivet spacing, $3\frac{1}{2}$ inches center to center on straight bars.

Types "Q" and "K"—$\frac{15}{16}$ inch from center to center of straight bars when $\frac{3}{16}$ inch thick; $\frac{7}{8}$ inch from center to center of straight bars when $\frac{1}{8}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

Standard Made-to-order Units—All types of Irving Flooring are also made to order for prompt shipment, to fit any opening and to meet any conditions. When made to order, Irving Flooring is shipped in units or panels properly marked and accompanied by setting plans.

These units—in the $\frac{1}{2}$, $\frac{3}{4}$ and 1-inch depths, if no larger than 24 inches wide by 72 inches long—and in the $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 and $2\frac{1}{4}$-inch depths, if no larger than $13\frac{1}{2}$ inches wide by 72 inches long—sell at the regularly quoted square foot rates.

If larger than these sizes, there is a small extra charge. Anything smaller than these units is also standard and sells at the regularly quoted square foot rate.

We limit the size of the units, not only to simplify manufacture, but also to facilitate installation and to make removal or rearrangement easy.

Paint and Fastening Devices—Quoted prices always include one shop coat of paint, and fastening devices.

Orders—Orders should designate type, symbol and depth, to avoid mistake; thus "Irving Flooring Type M, 3S, $1\frac{1}{4}$ inch deep."

Show the supporting structure and outline the area to be covered. Let us make the Irving Flooring layout for your approval.

TABLE OF SAFE LOADS FOR IRVING FLOORING—ALL TYPES

Maximum allowable fiber stress, 16,000 lb. per sq. in.

L—safe load in lb. per sq. ft. C—deflection constant

TYPE "M"

TYPE "O"

TYPE "G"

TYPE "E"

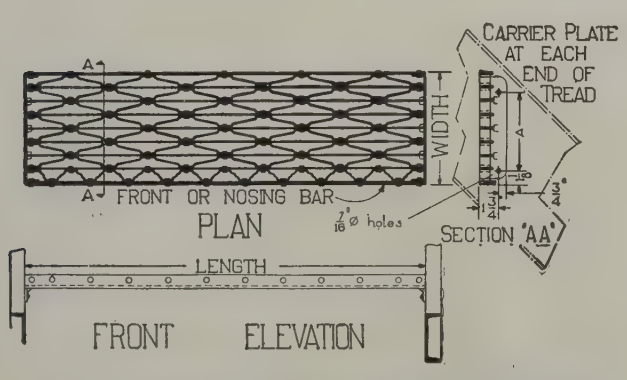
Size and symbol of flooring	Specification		1 ft.-6 in.	2 ft.	2 ft.-6 in.	3 ft.	3 ft.-6 in.	4 ft.	4 ft.-6 in.	5 ft.	5 ft.-6 in.	6 ft.	7 ft.	8 ft.	9 ft.
½ in. deep Symbol, OS	Straight bars, ½x⅛ in. Reticuline bars, ⅜x⅛ in.	L	308	173	110	77		*Note:* Spans to right of heavy line are not recommended							
		C	.00029	.00092	.00227	.0048									
¾ in. deep Symbol, 1S	Straight bars, ¾x⅛ in. Reticuline bars, ½x⅛ in.	L	695	390	250	173	127	97	77	63					
		C	.000045	.00011	.00069	.00143	.00265	.0040	.0055	.0083					
1 in. deep Symbol, 2S	Straight bars, 1 x⅛ in. Reticuline bars, ¾x⅛ in.	L		695	445	308	227	173	138	112	93				
		C		.00012	.00029	.0006	.00112	.0019	.00305	.00465	.0068				
1 in. deep Symbol, 2SA	Straight bars, 1 x⅜ in. Reticuline bars, ¾x⅛ in.	L		1040	665	460	340	260	206	167	140	116			
		C		.00008	.00019	.0004	.00075	.00127	.00204	.0031	.00454	.00645			
1¼ in. deep Symbol, 3SA	Straight bars, 1¼x⅛ in. Reticuline bars, 1 x⅛ in.	L			700	480	358	273	215	175	143	120			
		C			.00015	.00031	.00057	.00097	.00155	.00235	.00348	.0049			
1¼ in. deep Symbol, 3S	Straight bars, 1¼x⅜ in. Reticuline bars, 1 x⅛ in.	L			1100	730	535	410	325	265	215	185	135	100	80
		C			.0001	.00021	.00038	.00065	.00105	.0016	.0024	.0033	.0062	.0105	.0169
1½ in. deep Symbol, 4SA	Straight bars, 1½x⅛ in. Reticuline bars, 1 x⅛ in.	L			1020	707	516	396	314	253	210	173	130	100	77
		C			.000087	.000178	.000333	.00057	.00091	.00138	.00203	.00287	.0053	.00903	.0145
1½ in. deep Symbol, 4S	Straight bars, 1½x⅜ in. Reticuline bars, 1 x⅛ in.	L			1530	1050	775	595	470	380	315	265	202	150	115
		C			.00006	.00012	.00023	.00038	.00061	.0009	.0014	.0019	.0036	.0061	.0097
1¾ in. deep Symbol, 5S	Straight bars, 1¾x⅜ in. Reticuline bars, 1 x⅛ in.	L			2060	1435	1050	810	635	520	425	360	265	200	160
		C			.00004	.00008	.00014	.00024	.00038	.00058	.00085	.0012	.0022	.0038	.0061
2 in. deep Symbol, 6S	Straight bars, 2 x⅜ in. Reticuline bars, 1 x⅛ in.	L			2700	1875	1375	1055	830	675	560	470	345	265	210
		C			.00003	.00005	.00009	.00016	.00025	.00039	.00057	.0008	.0015	.0026	.0041
2¼ in. deep Symbol, 7S	Straight bars, 2¼x⅜ in. Reticuline bars, 1 x⅛ in.	L			3460	2400	1765	1350	1065	865	715	600	440	340	265
		C			.00002	.00004	.00007	.00011	.00018	.00027	.0004	.00057	.0011	.0018	.0029

Deflections—To obtain the deflection under any uniform load per square foot on a given span, multiply your load per square foot by the deflection constant "C" from the table for your given span. The result will be the deflection in inches at center of span under your actual load.

Standard Sizes and Dimensions of Irving "Vizabledg Safsteps"

The tables in the opposite column show the standard sizes of Irving "Vizabledg Safsteps," which are complete units assembled with punched carrier plates attached, ready for setting.

Type "M" flooring is used for all sizes.



Irving "Vizabledg Safstep" Dimension Diagram

"VIZABLEDG SAFSTEP" NO. 1—SPECIFICATIONS

Straight bars ..... in.	¾x⅛	Nosing bars ..... in.	1 x¼
Reticuline bars ..... in.	½x⅛	Carrier bars ..... in.	2½x⅛

Width, in.	Length, ft.-in.			Distance A, in.
5⅜	1–7	1–10½	2–2	2½
7⅞	1–7	1–10½	2–2	4½
10⅜	1–7	1–10½	2–2	7

"VIZABLEDG SAFSTEP" NO. 2—SPECIFICATIONS

Straight bars ..... in.	1 x⅛	Nosing bars ..... in.	1¼x¼
Reticuline bars ..... in.	¾x⅛	Carrier bars ..... in.	2½x⅛

Width, in.	Length, ft.-in.		Distance A, in.
5⅜	2–5½	3–0½	2½
7⅞	2–5½	3–0½	4½
10⅜	2–5½	3–0½	7

"VIZABLEDG SAFSTEP" NO. 3—SPECIFICATIONS

Straight bars ..... in.	1¼x⅜	Nosing bars ..... in.	1½x¼
Reticuline bars ..... in.	1 x⅛	Carrier bars ..... in.	2½x⅛

Width, in.	Length, ft.-in.			Distance A, in.
8¼	3–7½	3–11	4–6	4½
10⅞	3–7½	3–11	4–6	7
12⅜	3–7½	3–11	4–6	7

KERLOW STEEL FLOORING COMPANY

Manufacturers of Steel Flooring, Steps and Allied Products

TELEPHONE
BERGEN 8932

222-238 Culver Avenue, JERSEY CITY, N. J.

REPRESENTATIVES IN FOLLOWING CITIES

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Products

ALL-STEEL FLOORING, SAFETY STAIR STEPS, CONCRETE FLOOR ARMORING, WINDOW GUARDS and MOTOR RADIATOR GUARDS for all industrial, marine and architectural purposes. All Kerlow products are guaranteed.

RAPID-TRANSIT
TRADE-MARKS
Registered

Standard Designs

The four standard designs of Kerlow Steel Flooring, (V, E, R, and L), are produced in thirteen thicknesses from ¾ to 2¼ in., inclusive, depending upon the floor spans and loads. All Kerlow floors are made entirely of steel or non-ferrous alloys, as the existing corrosive conditions demand.

Type "V"—The standard design for all floors, walks and steps.

Type "L"—The standard design used to prevent an accumulation of dust, as in cement plants or grain elevators.

Type "R"—The standard close mesh design for special floors. The strength and non-slip features are similar to Type "V."

Type "E"—The standard car mesh design used for railroad car steps and where very narrow spacing is necessary.

Advantages

The reversible Kerlow floor and step units are designed for hard use, heavy loads and continuous traffic. Each of these units is of one-piece steel construction, all members of which are full depth riveted together at their neutral axes. These units cannot become loose nor can they fall apart. There can be no integral tension nor compression strains to cause distortion and buckling.

Kerlow grating units are finished on both sides, give twice the service and cost no more. More steel is required to finish gratings on both sides and steel is the most expensive

TABLE OF UNIFORM SAFE LOADS PER SQUARE FOOT FOR "KERLOW"

Maximum allowable fibre stress 16,000 lb. per square inch. All intermediate bars ⅛ inch in thickness. Straight bars V1, V2, V4, V6, V8, V10, V12—⅛ inch thick. Straight bars V3, V5, V7, V9, V11, V13—$\frac{3}{16}$ inch thick. L—Uniform Safe Loads. C—Coefficient of Deflection. D—Deflection

Type No.	Depth, in.	Weight, lb.		Spans in feet and inches													
				2′ 6″	3′ 0″	3′ 6″	4′ 0″	4′ 6″	5′ 0″	5′ 6″	6′ 0″	6′ 6″	7′ 0″	7′ 6″	8′ 0″	8′ 6″	9′ 0″
V1	¾	7	L	319	221	164	125	99	80								
			D	.20	.31	.42	.51	.65	.80								
			C	.0006	.0014	.0026	.0041	.0066	.0100								
V2	1	9	L	565	389	287	222	174	142	116	99	83					
			D	.16	.23	.31	.42	.51	.61	.70	.90	1.04					
			C	.0003	.0006	.0011	.0019	.0029	.0043	.0061	.0091	.0125					
V3	1	10	L	719	498	368	281	222	180	149	125	106	94				
			D	.14	.20	.26	.36	.47	.58	.67	.80	.91	1.10				
			C	.0002	.0004	.0007	.0013	.0021	.0032	.0045	.0064	.0086	.0117				
V4	1¼	10.7	L	881	617	454	345	274	223	184	152	131	112	104	90		
			D	.13	.18	.24	.32	.44	.47	.59	.70	.85	.99	1.18	1.41		
			C	.0001	.0003	.0005	.0009	.0016	.0021	.0032	.0046	.0065	.0088	.0113	.0157		
V5	1¼	12.7	L	1127	783	577	444	346	281	232	196	166	144	123	110	98	86
			D	.11	.16	.23	.31	.38	.45	.58	.68	.83	.98	1.06	1.15	1.31	1.44
			C	.0001	.00021	.0004	.0007	.0011	.0016	.0025	.0035	.0050	.0068	.0086	.0104	.0134	.0167
V6	1½	13.2	L	1312	910	671	513	404	329	271	228	191	168	148	136	119	107
			D	.10	.16	.20	.26	.33	.40	.52	.62	.71	.81	.92	1.07	1.21	1.39
			C	.00009	.00018	.0003	.0005	.0008	.0012	.0019	.0027	.0037	.0048	.0062	.0079	.0102	.0130
V7	1½	15	L	1762	1230	899	688	543	440	364	302	270	224	175	162	136	128
			D	.10	.15	.18	.21	.32	.39	.44	.54	.65	.69	.79	1.01	1.09	1.29
			C	.00006	.00012	.0002	.0003	.0006	.0009	.0012	.0018	.0024	.0031	.0045	.0062	.0080	.0101
V8	1¾	16	L	1837	1285	938	719	565	460	380	320	275	234	204	180	160	142
			D	.09	.13	.16	.20	.23	.32	.38	.48	.55	.61	.73	.88	1.01	1.12
			C	.00005	.0001	.00017	.00028	.0004	.0007	.0010	.0015	.0020	.0026	.0036	.0049	.0063	.0079
V9	1¾	18	L	2230	1554	1142	873	688	552	462	388	333	285	250	218	195	172
			D	.09	.12	.15	.19	.21	.28	.37	.46	.53	.60	.70	.81	.92	1.03
			C	.00004	.00008	.00014	.00022	.0003	.0005	.0008	.0012	.0016	.0021	.0028	.0037	.0047	.0060
V10	2	19	L	2580	1803	1267	985	796	642	534	448	385	320	290	253	226	200
			D	.08	.11	.14	.18	.20	.26	.35	.45	.50	.58	.69	.78	.88	1.00
			C	.00003	.00006	.00011	.00018	.00025	.0004	.00065	.0010	.0013	.0018	.0024	.0031	.0039	.0050
V11	2	21	L	2930	2030	1495	1143	904	733	607	508	437	374	330	287	257	227
			D	.08	.10	.13	.17	.19	.22	.31	.41	.48	.56	.66	.72	.82	.93
			C	.00003	.00005	.00009	.00015	.00022	.0003	.0005	.0008	.0011	.0015	.0020	.0025	.0032	.0041
V12	2¼	22	L	3333	2311	1700	1298	1027	834	689	581	498	425	375	325	292	258
			D	.08	.09	.13	.16	.19	.21	.30	.40	.45	.54	.64	.68	.79	.88
			C	.00002	.00004	.00008	.00012	.00019	.00025	.00044	.0007	.0009	.0013	.0017	.0021	.0027	.0034
V13	2¼	24	L	3736	2592	1904	1458	1151	934	772	652	560	477	420	364	327	289
			D	.07	.09	.13	.15	.18	.20	.29	.39	.44	.52	.59	.62	.72	.81
			C	.00002	.00004	.00007	.0001	.00016	.00021	.00038	.0006	.0008	.0011	.0014	.0017	.0022	.0028

Continued on next page

item required in their manufacture. Steel cannot be eliminated without a corresponding sacrifice in strength and durability. In properly designed steel gratings weight is synonymous with strength. Therefore, to give maximum efficiency, the grating should be the same on both sides. Send for a piece, not a sample, and test it out.

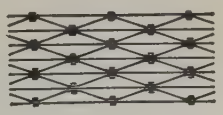
Uses

Kerlow floors, steps and guards are used repeatedly for powerhouses, coal tipples, smoke houses, elevator shafts, engine room floors, sidewalk areas and doors, car platforms, fruit canneries, door mats, armoring concrete floors, loading platforms, refineries, oil stills, dry kiln floors, refrigerator plants, warehouses, steel mills, cement plants, and for every conceivable purpose that a walking, working or ventilating surface should be used.

STANDARD SIZE UNITS

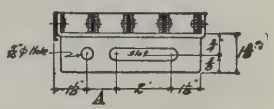
Mark	Width x Length, in.	Mark	Width x Length, in.
T- 1	5¼ x 18	S- 94	25¼ x 74¼
T- 2	5¼ x 21½	S- 95	25¼ x 77⅝
T- 3	5¼ x 25	S- 96	25¼ x 81
T- 4	5¼ x 28½	S- 97	27¾ x 23⅝
T- 5	5¼ x 31½	S- 98	27¾ x 27
T- 6	5¼ x 35	S- 99	27¾ x 30⅜
T- 7	7¾ x 18	S-100	27¾ x 33¾
T- 8	7¾ x 21½	S-101	27¾ x 37⅛
T- 9	7¾ x 25	S-102	27¾ x 40½
T- 10	7¾ x 28½	S-103	27¾ x 43⅞
T- 11	7¾ x 31½	S-104	27¾ x 47¼
T- 12	7¾ x 35	S-105	27¾ x 50⅝
T- 13	10¼ x 18	S-106	27¾ x 54
T- 14	10¼ x 21½	S-107	27¾ x 57⅜
T- 15	10¼ x 25	S-108	27¾ x 60¾
T- 16	10¼ x 28½	S-109	27¾ x 64⅛
T- 17	10¼ x 31½	S-110	27¾ x 67½
T- 18	10¼ x 35	S-111	27¾ x 70⅞
T- 19	9 x 18	S-112	27¾ x 74¼
T- 20	9 x 21½	S-113	27¾ x 77⅝
T- 21	9 x 25	S-114	27¾ x 81
T- 22	9 x 28½	S-115	30¼ x 23⅝
T- 23	9 x 31½	S-116	30¼ x 27
T- 24	9 x 35	S-117	30¼ x 30⅜
S- 25	17¾ x 23⅝	S-118	30¼ x 33¾
S- 26	17¾ x 27	S-119	30¼ x 37⅛
S- 27	17¾ x 30⅜	S-120	30¼ x 40½
S- 28	17¾ x 33¾	S-121	30¼ x 43⅞
S- 29	17¾ x 37⅛	S-122	30¼ x 47¼
S- 30	17¾ x 40½	S-123	30¼ x 50⅝
S- 31	17¾ x 43⅞	S-124	30¼ x 54
S- 32	17¾ x 47¼	S-125	30¼ x 57⅜
S- 33	17¾ x 50⅝	S-126	30¼ x 60¾
S- 34	17¾ x 54	S-127	30¼ x 64⅛
S- 35	17¾ x 57⅜	S-128	30¼ x 67½
S- 36	17¾ x 60¾	S-129	30¼ x 70⅞
S- 37	17¾ x 64⅛	S-130	30¼ x 74¼
S- 38	17¾ x 67½	S-131	30¼ x 77⅝
S- 39	17¾ x 70⅞	S-132	30¼ x 81
S- 40	17¾ x 74¼	S-133	32¾ x 23⅝
S- 41	17¾ x 77⅝	S-134	32¾ x 27
S- 42	17¾ x 81	S-135	32¾ x 30⅜
S- 43	20¼ x 23⅝	S-136	32¾ x 33¾
S- 44	20¼ x 27	S-137	32¾ x 37⅛
S- 45	20¼ x 30⅜	S-138	32¾ x 40½
S- 46	20¼ x 33¾	S-139	32¾ x 43⅞
S- 47	20¼ x 37⅛	S-140	32¾ x 47¼
S- 48	20¼ x 40½	S-141	32¾ x 50⅝
S- 49	20¼ x 43⅞	S-142	32¾ x 54
S- 50	20¼ x 47¼	S-143	32¾ x 57⅜
S- 51	20¼ x 50⅝	S-144	32¾ x 60¾
S- 52	20¼ x 54	S-145	32¾ x 64⅛
S- 53	20¼ x 57⅜	S-146	32¾ x 67½
S- 54	20¼ x 60¾	S-147	32¾ x 70⅞
S- 55	20¼ x 64⅛	S-148	32¾ x 74¼
S- 56	20¼ x 67½	S-149	32¾ x 77⅝
S- 57	20¼ x 70⅞	S-150	32¾ x 81
S- 58	20¼ x 74¼	S-151	35¼ x 23⅝
S- 59	20¼ x 77⅝	S-152	35¼ x 27
S- 60	20¼ x 81	S-153	35¼ x 30⅜
S- 61	22¾ x 23⅝	S-154	35¼ x 33¾
S- 62	22¾ x 27	S-155	35¼ x 37⅛
S- 63	22¾ x 30⅜	S-156	35¼ x 40½
S- 64	22¾ x 33¾	S-157	35¼ x 43⅞
S- 65	22¾ x 37⅛	S-158	35¼ x 47¼
S- 66	22¾ x 40½	S-159	35¼ x 50⅝
S- 67	22¾ x 43⅞	S-160	35¼ x 54
S- 68	22¾ x 47¼	S-161	35¼ x 57⅜
S- 69	22¾ x 50⅝	S-162	35¼ x 60¾
S- 70	22¾ x 54	S-163	35¼ x 64⅛
S- 71	22¾ x 57⅜	S-164	35¼ x 67½
S- 72	22¾ x 60¾	S-165	35¼ x 70⅞
S- 73	22¾ x 64⅛	S-166	35¼ x 74¼
S- 74	22¾ x 67½	S-167	35¼ x 77⅝
S- 75	22¾ x 70⅞	S-168	35¼ x 81
S- 76	22¾ x 74¼	S-169	37¾ x 23⅝
S- 77	22¾ x 77⅝	S-170	37¾ x 27
S- 78	22¾ x 81	S-171	37¾ x 30⅜
S- 79	25¼ x 23⅝	S-172	37¾ x 33¾
S- 80	25¼ x 27	S-173	37¾ x 37⅛
S- 81	25¼ x 30⅜	S-174	37¾ x 40½
S- 82	25¼ x 33¾	S-175	37¾ x 43⅞
S- 83	25¼ x 37⅛	S-176	37¾ x 47¼
S- 84	25¼ x 40½	S-177	37¾ x 50⅝
S- 85	25¼ x 43⅞	S-178	37¾ x 54
S- 86	25¼ x 47¼	S-179	37¾ x 57⅜
S- 87	25¼ x 50⅝	S-180	37¾ x 60¾
S- 88	25¼ x 54	S-181	37¾ x 64⅛
S- 89	25¼ x 57⅜	S-182	37¾ x 67½
S- 90	25¼ x 60¾	S-183	37¾ x 70⅞
S- 91	25¼ x 64⅛	S-184	37¾ x 74¼
S- 92	25¼ x 67½	S-185	37¾ x 77⅝
S- 93	25¼ x 70⅞	S-186	37¾ x 81

Standard Kerlow Units



Order these convenient Kerlow units by mark. They are made in four types—V, L, R or E in gratings Nos. 1, 2, 4, 6, 8, 10, 12 only.

Standard Size Steps Nos. T1 to T24

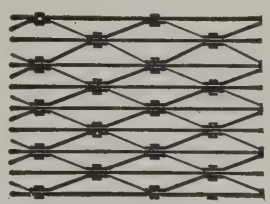


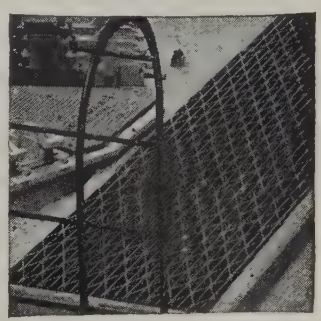
All steps are furnished complete with these carriers ready to use.

Size A—1 in. on 5¼-in. step; 3½ in. on 7¾-in. step; 4¾ in. on 9-in. step; 6 in. on 10¼-in. step.

Kerlow Type "V"

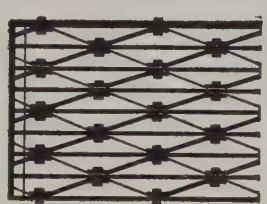
Standard mesh for all floors and stair steps. All bars equal depth. Maximum opening between bars 1 in. Rivets ¼-in. diameter, 6¾ in. on centers. See table for safe loads.

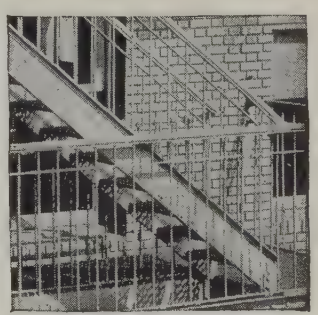




Kerlow Type "V" Stair Step

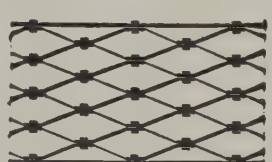
Standard Safety Stair Step complete with carrier ready to bolt in place. Made in 5¼, 7¾, 9 and 10¼-in. widths. See table for standard sizes and safe loads.

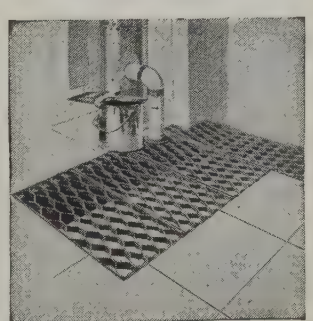




Kerlow Type "L"

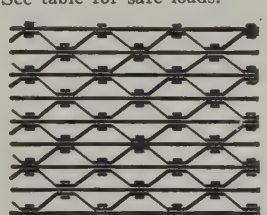
Open mesh for special conditions. All bars equal depth. Maximum opening between bars 2¼ in. All rivets ¼-in. diameter, 6¾ in. on centers.

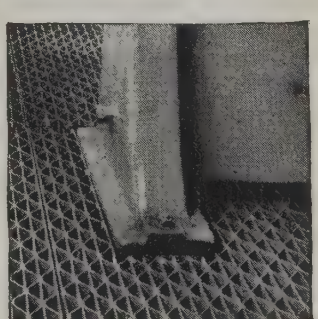




Kerlow Type "R"

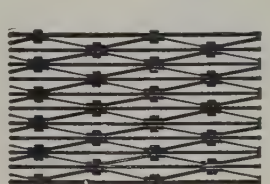
Close mesh for special floors and steps. All bars equal depth. Maximum opening between bars 1 in. Rivets ¼-in. diameter, 4 in. on centers. See table for safe loads.

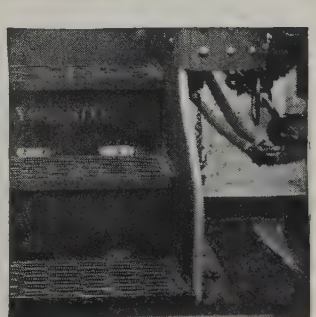




Kerlow Type "E"

Car mesh for railroad car steps. All bars equal depth. Maximum opening between bars ⅝ in. Rivets ¼-in. diameter, 6¾ in. on centers.





THE TRI-LOK COMPANY

Manufacturers of "Tri-Lok" Ventilated Steel Flooring and Tread

5531 Butler Street
PITTSBURGH, PA.

Product

TRI-LOK GRATING and TREAD, a ventilated steel flooring for purposes of transmitting light or air to areas above or beneath, or where extreme strength, durability, or fireproof construction is required with a minimum of weight.

Adaptations

In addition to the use of *Tri-Lok* as hereafter mentioned, it is excellently adaptable to the *reinforcement or surface armoring of concrete floors* wherever additional strength is required or wear is excessive.

A specialty is made of *safety stair treads and landings,* either in open form or concrete filled. The nosings, or front edges of these steps, are positively visible when ascending or descending the stairway. Style BD *Tri-Lok* Nosing is positively non-slipping (illustration C).

Accessories

Continuity bars for the purpose of joining sections of *Tri-Lok* Ventilated Flooring into a continuous span, thus making one integral floor with ample strength and no projections above the surface. *Tri-Lok fasteners* for making all attachments to supporting structures.

Construction

Consists of steel load bearing bars and load distributing bars, triple locked at right angles to each other (illustration A). The bearing bars are punched with curved slots exactly the same width and over-all depth as the cross or load distributing bars. In assembling, the bearers are set on edge with the slot uppermost, in a rigid steel frame which accurately spaces them and assures rectangularity of the finished unit. The bearers are arranged in such a way that the slots curve alternately right and left in adjacent bars. The cross bars are then started into the slots by hand to insure perfect alignment after which the entire unit is subjected to 1600 tons hydraulic pressure.

This drives the distributors to the bottom of the slots in the bearers and completes the triple or twist-and-turn lock, in other words, twists the lower edge of the distributing bars to the right and left at each side of the bearing bars.

Advantages

Strength and Deflection—*Tri-Lok possesses maximum strength per unit of weight of material.*

Since the bearing bars are not slotted or otherwise deformed below the neutral axis, and since all slots are solidly filled by the distributing bars forced into them, the carrying strength of the whole construction is the full equivalent of a solid of equal weight and depth. Deflection is a minimum.

Rigidity and Durability—The twisting of the distributors, alternately to the right and left as they cross the bearers, and the solid filling of the slots in the bearing bars by the cross bars, result in a joint which for rigidity, durability, and virtual indestructibility is unexcelled in this field.

Laboratory tests by Columbia University, the University of Pittsburgh, the Pittsburgh Testing Laboratory and Massachusetts Institute of Technology reveal that *Tri-Lok* joints remain absolutely unimpaired up to, and beyond, the failure point of the material.

Light Weight—Owing to the fact that every ounce of *Tri-Lok* construction represents the effective full strength of the steel, lighter materials may be used than when connections are made by means of rivets, bolts or welds. Comparison of safe load tables will disclose this fact.

Standard anchors, or fastening devices, which seem best suited to the conditions, are furnished with each installation of *Tri-Lok.*

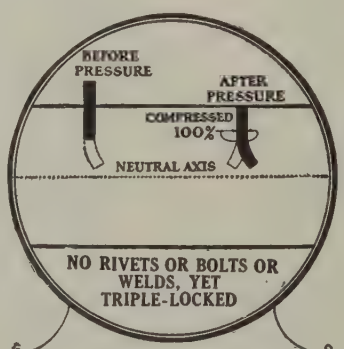
Illumination and Ventilation—*Tri-Lok* is approximately 90% open, thereby transmitting most effectively light and air to areas above or beneath, at the same time assuring absolute cleanliness.

Economy—Due to the triple lock construction a continuous flooring is assured and installation costs are reduced approximately 50% over other types.

In addition to the lower installation cost, the simplicity of *Tri-Lok* construction and its tremendous strength per unit of weight permits the accomplishment of a desired result with *Tri-Lok* at less cost than is usual.

Bent Over Cross Bars—Ask for our new bent over cross bars where edge bars are desired.

Our Service Department will gladly supply detailed literature and engineering data.



What a difference *three locks* make!

First, there is a right-twist lock in every other bar.

Second, there is a left-twist lock in alternate bars.

Third, there is the 1600-ton hydraulic pressure-lock, which is effected by *pressing* the cross bars into the two twist-locks.

Time nor wear can not open the three locks of TRI-LOK.

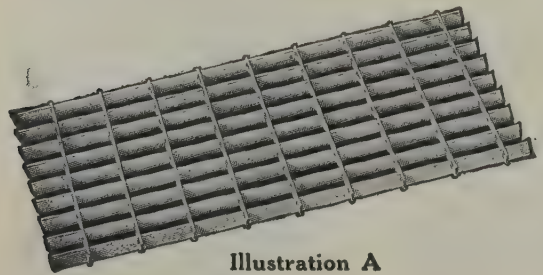
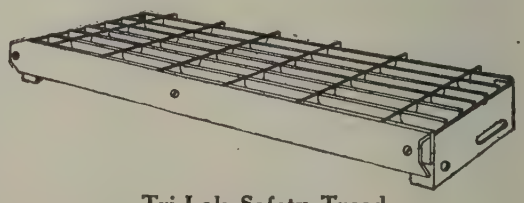


Illustration A

Some Uses for Tri-Lok

(1) "Tri-Lok" Ventilated Steel Flooring for—Area gratings, sidewalk doors, manhole covers, heating radiator guards, heating and ventilating grilles, automobile and truck radiator guards, conveyor walkways, boiler room walkways and platforms, window guards, cooling floors, fire escape landings, theater



Tri-Lok Safety Tread
Illustration C

Continued on next page

Some Uses for Tri-Lok

(1) "Tri-Lok" Ventilated Steel Flooring for—Area gratings, sidewalk doors, manhole covers, heating radiator guards, heating and ventilating grilles, automobile and truck radiator guards, conveyor walkways, boiler room walkways and platforms, window guards, cooling floors, fire escape landings, theatre overhead walkways, flooring and walkways for power plants, pumping stations, waterworks, filtration and sewage disposal plants, chemical plants, oil refineries, foundries, cold storage plants, gas plants, etc. and sidewalk gratings for subways.

(2) "Tri-Lok" Concrete Armoring and Reinforcing for—Loading platforms, industrial floors, armories, stairs, roads and sidewalks.

(3) "Tri-Lok" Safety Treads for—Grain elevators, fire escapes, stairways in boiler rooms, power plants, pumping stations, waterworks, filtration and sewage plants, gas plants, etc., subway exits, street cars, railroad locomotives, freight and tank cars.

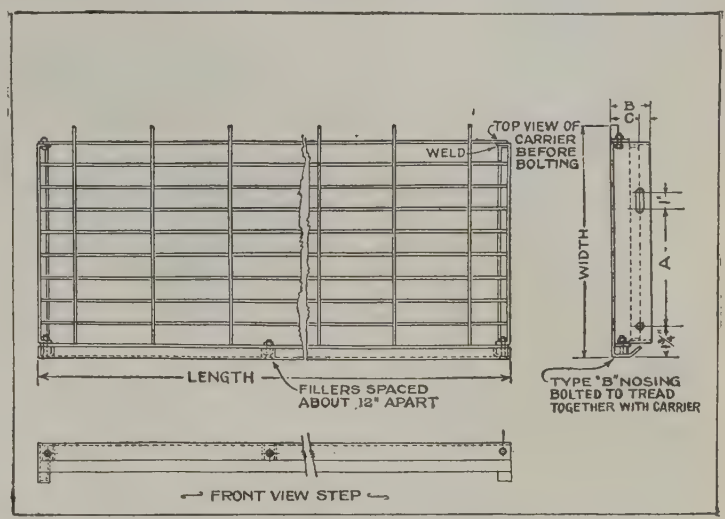
Some Users of Tri-Lok

United States Government for various departments
United States Steel Corp.
Delaware River Bridge Commission
N. Y. Board of Transportation for N. Y. Subway
Philadelphia & Reading R. R. Co.
West Virginia Pulp & Paper Co.
Consolidated Gas & Electric Co.
Union Light & Power Company
West Penn Power Co.
Dewey Portland Cement Company
Packard Motor Co.
Tidewater Oil Company
Aluminum Company of America
Essex Rubber Company
City of Cincinnati, Ohio
United States Gypsum Co.
Stone and Webster, Inc.
Dwight P. Robinson & Co.
Ford Motor Company
General Motors Corp.
The Toledo Furnace Co.
A. E. Staley Company
Pittsburgh Coal Company
Electric Bond and Share Co.
Phoenix Utility Co.

Standard Tri-Lok Safety Steps

The table of standard sizes as shown below, covers safety steps carried in stock for prompt shipment. Architects, engineers and designers are coming to realize the advantages in detailing their structures to conform with these standards as their building operations may be more effectively carried forward by the prompt service which can in this way, be given.

The cleanliness and simplicity of these safety steps may be seen from a study of illustration "C."



DIMENSIONS TYPE T3B "TRI-LOK" SAFETY STEPS

G 1 Bearing bars, 1″ x 3/16″ x 1 3/16″ C to C Cross bars, 1/2″ x 1/8″ x 4″ C to C								G 1¼ Bearing bars 1¼″ x 3/16″ x 1 3/16″ C to C Cross bars, 5/8″ x 1/8″ x 4″ C to C							
Width	Length				A	B	C	Width	Length			A	B	C
6	1′ 7″	1′ 10 1/2″	2′ 2″	2′ 5 1/2″	3′ 0 1/2″	1 7/8	2 1/8	1 1/2	8 7/8	3′ 7 1/2″	3′ 11″	4′ 6″	3 1/2	2 3/8	1 3/4
8 1/2	1′ 7″	1′ 10 1/2″	2′ 2″	2′ 5 1/2″	3′ 0 1/2″	4	2 1/8	1 1/2	11 1/2	3′ 7 1/2″	3′ 11″	4′ 6″	5	2 3/8	1 3/4
9 5/8	1′ 7″	1′ 10 1/2″	2′ 2″	2′ 5 1/2″	3′ 0 1/2″	5	2 1/8	1 1/2	12 13/16	3′ 7 1/2″	3′ 11″	4′ 6″	5	2 3/8	1 3/4
11	1′ 7″	1′ 10 1/2″	2′ 2″	2′ 5 1/2″	3′ 0 1/2″	6	2 1/8	1 1/2							

SAFE LOAD TABLES
Based on Actual Tests Conducted at University of Pittsburgh

TYPE "G" Bearing bars 1″ apart cross bars 4″ c. to c.					SPANS											
Mark	Bearing bars	Cross bars	Weight per sq. ft. lb.		1′ 6″	2′ 0″	2′ 6″	3′ 0″	3′ 6″	4′ 0″	4′ 6″	5′ 0″	6′ 0″	7′ 0″	8′ 0″	9′ 0″	10′ 0″
G 3/4 AB	3/4″x1/8″	3/8″x#14G	3.5	L	778	428	281	194	143	109	87						
				C	.000064	.000207	.000492	.001027	.002487	.003248	.005152						
G1 A	1″ x1/8″	1/2″x1/8″	5.53	L	1380	777	497	346	254	194	154	124	86				
				C	.000041	.000085	.000208	.000432	.000832	.001374	.002182	.003347	.006949				
G1	1″ x3/16″	1/2″x1/8″	7.00	L	1557	1167	746	518	381	292	231	186	130				
				C	.000024	.000057	.000139	.000283	.000534	.000909	.001455	.002231	.004597				
G 1¼	1¼″x3/16″	5/8″x1/8″	8.61	L	3239	1822	1168	809	596	456	360	292	203	149			
				C	.000009	.000029	.000072	.000148	.000273	.000466	.000747	.001137	.002355	.004367			
G 1½	1½″x3/16″	5/8″x1/8″	10.41	L	4660	2625	1680	1167	857	656	519	420	292	214	164		
				C	.000005	.000017	.000041	.000085	.000158	.00027	.000431	.000658	.001364	.002534	.004318		
G 1¾	1¾″x3/16″	3/4″x1/8″	12.12	L	6355	3580	2286	1590	1170	895	707	572	398	292	224	177	143
				C	.....	0000106	.000026	.000054	.000099	.0001696	.000272	.000415	.000859	.001598	.002715	.004345	.006643
G 2	2″ x3/16″	7/8″x1/8″	13.95	L	8300	4666	2987	2079	1525	1176	924	748	519	381	292	231	187
				C	.....	.0000073	.000017	.000026	.000066	.000113	.000182	.000277	.000575	.001068	.001821	.002910	.004432
G 2¼	2¼″x3/16″	1″ x1/8″	15.61	L	10500	5910	3780	2625	1930	1478	1167	945	656	482	369	292	236
				C	.....	.0000038	.000012	.000025	.000047	.000080	.000128	.000195	.000405	.000750	.001280	.002048	.003127

L—Safe load in lbs. per sq. ft. C—Deflection constant.

To obtain the deflection of any span, multiply the safe load figure by the deflection constant (L × C = Deflection). We do not recommend spans greater than those shown on the left of the heavy line in the table.

Type "GS"—Bearing bars 1″ apart; cross bars 2 7/16″ c. to c.
Mark "GS" 2¼ approved by Board of Transportation City of New York for Subways. Safe loads same as Type "G"

Type "GQ"—Bearing bars 1″ apart; cross bars 1 1/8″ c. to c.
Safe loads same as Type "G"
For use where 1″ square spacing is desired.

Other Types of Tri-Lok

Type "K"—Bearing bars 3/4″ apart; cross bars 4″ c. to c.
Type "KS"—Bearing bars 3/4″ apart; cross bars 2 7/16″ c. to c.
Type "KQ"—Bearing bars 3/4″ apart; cross bars 7/8″ c. to c. Gives 3/4″ square spacing.
For safe loads multiply Type "G" loads by 1.28.
Type "H"—Bearing bars 1 1/4″ apart; cross bars 4″ c. to c.
Type "HS"—Bearing bars 1 1/4″ apart; cross bars 2 7/16″ c. to c.
Type "HQ"—Bearing bars 1 1/4″ apart; cross bars 1 3/8″ c. to c. Gives 1 1/4″ square spacing.
For safe loads multiply Type "G" loads by .83.
Type "L"—Bearing bars 1 1/2″ apart; cross bars 4″ c. to c.
Type "LS"—Bearing bars 1 1/2″ apart; cross bars 2 7/16″ c. to c.
Type "LQ"—Bearing bars 1 1/2″ apart; cross bars 1 5/8″ c. to c.
For safe loads multiply Type "G" loads by .71.

For Car Steps and Running Boards

Type "F"—Bearing bars 5/8″ apart; cross bars 4″ c. to c.
Type "FS"—Bearing bars 5/8″ apart; cross bars 2 7/16″ c. to c.
Type "FQ"—Bearing bars 5/8″ apart; cross bars 3/4″ c. to c.
For safe loads multiply Type "G" loads by 1.42.

Especially for Concrete Armoring

Type "G"—Bearing bars 2 5/16″ apart; cross bars 4″ c. to c.
Type "GS"—Bearing bars 2 5/16″ apart; cross bars 2 7/16″ c. to c.
Type "GQ"—Bearing bars 2 5/16″ apart; cross bars 2 5/16″ c. to c.
For safe loads multiply Type "G" loads by .46.

HENDRICK MANUFACTURING COMPANY

Mitco Interlocked Steel Grating, Mitco Shur-Site Treads and Mitco Armorgrids

51 Dundaff Street, CARBONDALE, PA.

SALES OFFICES AND REPRESENTATIVES

ATLANTA, GA., Boiler Equipment Service Co.
BALTIMORE, MD., J. B. Embick
BIRMINGHAM, ALA., Keismer-Geismer Engineering Co.
BOSTON, 9, MASS., Universal Safety Tread Co.
CHARLESTON, W. VA., W. A. Ross Co.
CHICAGO, ILL., Hendrick Manufacturing Co.
CLEVELAND, OHIO, A. E. Quere Co.
DALLAS, TEX., W. A. Sedwick Co.
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GREENVILLE, S. C., J. H. Beattie
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LOS ANGELES, CAL., Continental Building Specialties Co.
MONTREAL, QUE., Economy Railway Appliance Co.
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PHILADELPHIA, PA., Engineering Co. of Philadelphia
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SAN FRANCISCO, CAL., Badt-Falk Co.
SEATTLE, WASH., F. T. Crowe
TULSA, OKLA., Circle Corporation
UTICA, N. Y., H. H. Frey

Products

Mitco Interlocked Steel Floor, Sidewalk and Driveway Grating; Mitco Shur-Site Stair and Ladder Treads and Mitco Armorgrids.

Also manufacturers of Window Guards, Perforated Metal Screens and Grilles.

MITCO
TRADE-MARK
Registered

Mitco comes in types and depths to fit openings of any size and shape. Panels of special widths for unusual conditions are furnished without additional cost. If you will give us an outline of the area to be covered, and indicate the location of supports, our engineers will gladly submit a suggested layout of Mitco panels with recommendations for depths and types.

With ample stocks of Mitco always maintained, we are in position to make prompt shipments of all sizes and types.

Write for new booklet, of particular interest to architects.

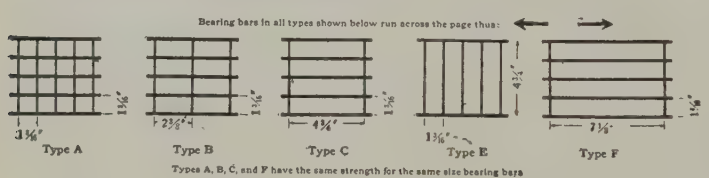
Mitco Interlocked Steel Grating

Mitco, the original interlocked steel grating, is fabricated from carefully selected square edge steel bars. No bolts, rivets or welding are used in its construction. Consequently, Mitco is high in strength and rigidity, as indicated by the accompanying table of safe loads.

TABLE OF SAFE LOADS AND DEFLECTIONS FOR "MITCO" GRATING
SAFE LOADS IN POUNDS BASED ON FIBRE STRESS OF 16,000 POUNDS PER SQ. INCH.
Loads can be safely increased approximately 50% without permanent deformation or undesirable deflection.

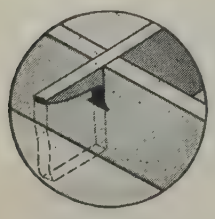
Depth and Type	Bearing Bars: Size Inches	Bearing Bars: Spacing C to C	Cross Bars: Size Inches	Cross Bars: Spacing C to C	Weight Sq. Foot	SPAN IN FEET: 2'0"	2'6"	3'0"	3'6"	4'0"	5'0"	6'0"	7'0"	8'0"	9'0"	10'0"
1" Light C "D"	1 x 1/8	1 1/8"	1/8 x 1/8	4 3/4"	5.5 lbs.	560 06	360 09	250 .14	186 .19	140 .24						
1" C 1" E "D"	1 x 1/8 1 x 1/8	1 1/8" 4 3/4"	1/8 x 1/8 1/8 x 1/8	4 3/4" 1 1/8"	7.8 lbs. 6.3 lbs.	835 208 .06	534 133 .11	370 93 .17	273 68 24	208 52 .31	133 .48	93 69				
1 1/4" C 1 1/4" E "D"	1 1/4 x 1/8 1 1/4 x 1/8	1 1/8" 4 3/4"	1 x 1/8 1 x 1/8	4 3/4" 1 1/8"	9.5 lbs. 6.7 lbs.	1410 352 .05	900 225 .10	627 156 .14	445 111 .18	352 88 .25	225 56 .36	157 .56	111 75			
1 1/2" C 1 1/2" E "D"	1 1/2 x 1/8 1 1/2 x 1/8	1 1/8" 4 3/4"	1 x 1/8 1 x 1/8	4 3/4" 1 1/8"	11.0 lbs. 7.1 lbs.	1875 468 04	1200 300 08	834 208 .11	612 153 .15	468 117 .21	300 75 .32	208 52 .46	153 63	117 82	93 1 04	
1 3/4" C 1 3/4" E "D"	1 3/4 x 1/8 1 3/4 x 1/8	1 1/8" 4 3/4"	1 x 1/8 1 x 1/8	4 3/4" 1 1/8"	12.5 lbs. 7.5 lbs.	2560 640 03	1640 410 .07	1140 285 .10	838 210 .13	640 160 .18	410 103 .25	285 71 .40	210 52 .54	160 70	127 90	103 1 10
2" C 2" E "D"	2 x 1/8 2 x 1/8	1 1/8" 4 3/4"	1 x 1/8 1 x 1/8	4 3/4" 1 1/8"	14.0 lbs. 7.9 lbs.	3340 835 .03	2140 535 .06	1480 370 .09	1090 272 .11	834 209 .15	534 134 .24	371 93 .35	272 68 .47	208 52 .59	165 78	133 96
2 1/4" C 2 1/4" E "D"	2 1/4 x 1/8 2 1/4 x 1/8	1 1/8" 4 3/4"	1 x 1/8 1 x 1/8	4 3/4" 1 1/8"	15.5 lbs. 8.2 lbs.	4220 1055 .02	2700 675 .05	1875 470 .08	1380 345 .10	1055 264 .14	675 169 .21	470 117 .31	345 86 .42	264 66 .54	208 .70	169 86
"MITCO" DRIVEWAY GRATINGS (For Heavy Traffic, Coal "Grizzlies", Etc.)																
2 1/4" C	2 1/4 x 3/8	1 1/8"	2 x 1/8	4 3/4"	36.8 lbs.	8440	5400	3750	2760	2100	1350	940	690	528	416	338
2 3/4" C	2 3/4 x 3/8	1 1/8"	2 1/4 x 1/8	4 3/4"	44.6 lbs.	13900	8880	5640	4530	3470	2220	1540	1130	865	685	555
3 1/4" C	3 1/4 x 3/8	1 1/8"	2 1/4 x 1/8	4 3/4"	51.7 lbs.		12400	7850	6310	4840	3100	2150	1580	1210	955	775
3 3/4" C	3 3/4 x 3/8	1 1/8"	2 1/4 x 1/8	4 3/4"	58.7 lbs.		16500	10470	8410	6440	4120	2862	2100	1610	1272	1031

"D"—Deflection in inches for uniform live load.
Types C and E have same deflection for same spans.
Driveway can also be furnished in Type B having same strength as Type C and weighing approximately six lbs. per sq. ft. more.
For safe concentrated load at center of span multiply tabulated load by span and divide by two. This applies to both tables above.



Types A, B, C, and F have the same strength for the same size bearing bars

Mitco has rectangular openings, providing 90% open area maximum light and ventilation. Because of its rectangular openings with large open area, Mitco is non-clogging, easily cleaned and painted. Furthermore, Mitco surfaces are always smooth and uniform, making walking pleasant and trucking easy.



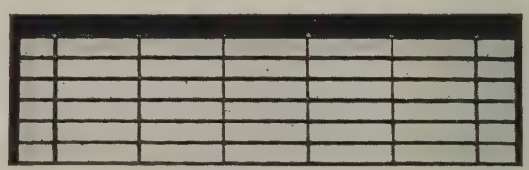
Mitco Lock Joints
Produced under hundreds of tons, hydraulic pressure, Mitco joints insure permanently locked panels, with flush and even surfaces

Mitco Shur-Site Treads

Made of 1-inch type C Mitco Grating, Mitco Shur-Site Stair and Ladder Treads have the same rectangular openings and the same non-clogging, non-slipping surface.

In addition, Mitco Shur-Site Treads have very clearly defined front edges—a deep nosing bar, bent back at an angle under the front of the Tread, makes the edge stand out clearly.

This nosing bar not only provides high visibility but also reinforces the Tread where the greatest strain comes, at the edge.



Mitco Shur-Site Tread
Note the high visibility and strength at the edge, provided by the deep nosing bar

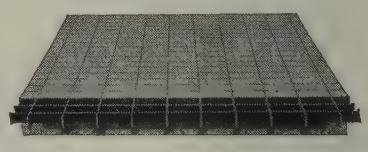
Furnished in five standard lengths and three widths, or in special widths and lengths to meet architects' requirements.

Carrier plates are applied, ready for attachment to stair stringers.

Send for booklet.

Mitco Armorgrids

Used for armoring, or reinforcing, surfaces of concrete or cement floors, platforms and driveways, Mitco Armorgrids insure a practically indestructible surface which will not crack out but will last indefinitely, even under heavy trucking or other severe service. Furnished in convenient sizes, Mitco Armorgrids are easy to install. Write for bulletin.



Mitco Armorgrids
Set on the rough slab, so that the finishing fill of concrete or cement brings the surface flush with the top of the Armorgrid panel, Mitco Armorgrids protect the surface and add greatly to its service life

H. V. BRIGHT

Manufacturer of Turnstile Equipment for Entrances and Exits

1104 Prospect Avenue
CLEVELAND, OHIO

Products

TURNSTILES, including Registering, Coin Controlled, Automatic Pattern and Non-registering Turnstiles.

METAL EXITS or BAFFLE GATES; also hardware for metal or wood Exits including ratchet, dogs, etc.

TICKET CANCELLING MACHINES.

Application and Service

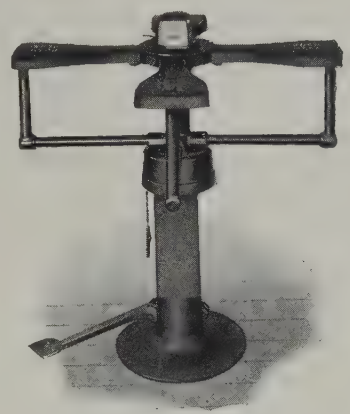
Can furnish turnstiles for any purpose desired, such as swimming pools, museums, libraries, pay-toilet rooms, self-serve groceries, stadia, baseball parks, university or high school athletic fields, amusement parks, expositions, fair grounds, railroads, ferry and boat landings.

This concern has been manufacturing and furnishing turnstiles for more than twenty-five years, and has furnished them for use at many different places including the baseball clubs of both the American and National Leagues, the Sesqui-Centennial and Municipal Stadium at Philadelphia, the Woodland Hills Park Swimming Pool at Cleveland, Grandstand at Illinois State Fair and others.

Suggestions and advice given for arrangement and building of entrances and exits. Write us what you have in mind.

The "Bright" Printing Register

The "Bright" Printing Register for turnstiles furnishes a printed record of the opening and closing numbers of the turnstile register on a record slip, in a convenient form for filing or reference. It eliminates the chance for error in reading and writing down the figures from the register.



Automatic Pattern Registering Turnstile "D"

Can be used for either cash or ticket admissions. It embodies especially desirable features particularly in that the patrons practically operate the turnstile themselves as they go through —the attendant or gatekeeper's duty being to collect the tickets or money. It is not a coin controlled turnstile.

It is equipped with air shock absorbers that check the arms at each quarter turn. Can always be under control of gatekeeper by use of foot lever.

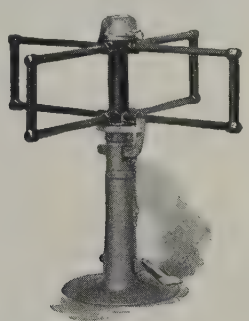
The top broad arms are aluminum, furnished any color desired, the aluminum making for both lightness and strength. The base and center are of gray iron. Both center and arms are black japan finish

Ticket Chopper "K"

The above is suitable for many places where it is desired to cancel the tickets.

This Chopper punches clean holes in the tickets and leaves their surface smooth so that they can readily be counted if desired. Plate glass with heavy brass trimmings is used for the top.

The cabinet can be furnished in any finish desired such as oak, mahogany, white enamel, etc.



Registering Turnstile "A"

This machine is more generally used in connection with tickets and is suitable for many places where a lower-priced Turnstile is desired.

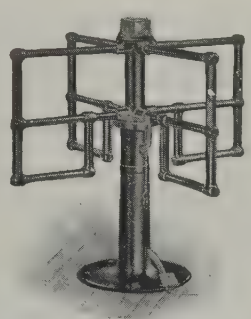
The base is of gray iron, levers of malleable iron, arms of steel tubing and iron castings.

Turnstile "A" is successfully used at many places. It is under control of the gatekeeper or attendant by use of the foot lever. Furnished with either the printing or plain register

Coin Controlled Registering Turnstile

With this Machine, the coin must be dropped into the slot of the Coin Machine cabinet before the arms of the Turnstile will revolve passing the person through. Can be furnished to operate with 50¢, 25¢, 10¢ or 5¢ piece. It is positive in its operation—does not require electric power.

Used by many of the Fair Associations where the admission is a single coin. Being automatic, can be used at entrance to Toilet Rooms.

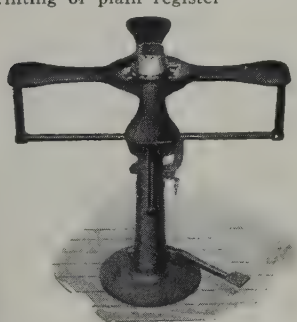


Registering Turnstile "B"

The above Turnstile is equipped with the Drop Arms, an added protection in that it makes it just that much harder for anyone to crawl under the arms of the Turnstile.

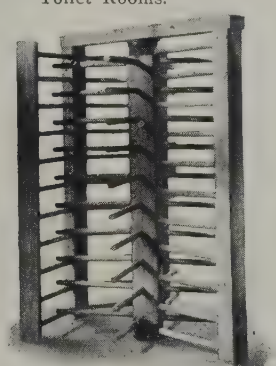
Is suitable for Libraries, Museums, Baseball Parks, Amusement Parks, Swimming Pools, Stadiums, etc.

Can be used for an inside Exit Turnstile if desired



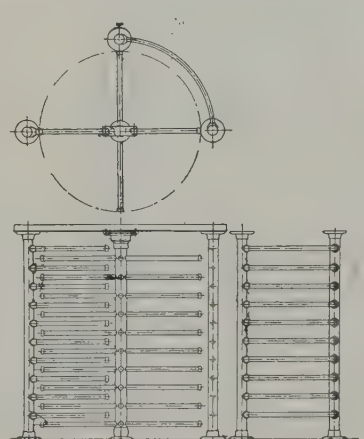
Turnstile "A" with Broad Arms

The above cut shows the Turnstile "A" equipped with the Broad Arms, the idea being to lessen the possibility of two people passing through the Turnstile on one registration



Wood Exit Turnstile or Baffle Gate

The above operates one way only and no attendant is necessary. The Hardware only is furnished for the above Exit, this consisting of the top and bottom castings, ratchet plate, dogs, etc. A blueprint is also furnished giving the dimensions, etc. of the principal wood parts used in the construction so that if desired the complete Exit Turnstile can be built in your own locality



All Metal Exit Turnstile or Baffle Gate

Center post of Turnstile of 4½ in. o.d. iron pipe with arms of 1⅞-in. o.d. iron pipe.

The outside posts carry the baffle and curved guard rails.

Will furnish complete shipped knocked down; or installed and ready for use on job —will furnish hardware only including ratchet, dogs, etc., if desired

PEREY MANUFACTURING COMPANY, INC.

Turnstile Systems and Mechanisms for Registering and Controlling the Movements of the Public

101 Park Avenue, NEW YORK, N. Y.

Where Perey Equipment Is Used

Perey Turnstiles, Passimeters and Baffle Gates are recognized as standard equipment in the following public places:

Swimming Pools, Natatoriums, Bathhouses, etc.—For entrances for collecting admission fees and accurately registering the number of persons entering. For exits, re-checking the number of patrons and preventing the removal of rented property. For interior control, directing the movement of patrons as desired without an excessive number of attendants.

Athletic Stadia, Baseball and Football Fields, Race Tracks, etc.—Perey Passimeters or Coinpassors for entrances and Non-registering Turnstiles or Baffle Gates for exits are regarded as standard equipment everywhere.

Amusement Parks, Expositions and Fair Grounds—Leading enterprises of this character are equipped with Perey Passimeters and Exit Gates at both main entrances and concessions.

Public Parks, Botanical Gardens, Zoos, Museums, etc.—Perey Passimeters are standard equipment for entrances where registration is desired or admission fees charged and Perey Non-registering Turnstiles and Baffle Gates for exits and points where control of the movements of the public most economically is necessary.

Railroads, Street Railways, Elevated Railways, Subways, Ferries, Boat Piers and Landings—Perey Passimeters and Coinpassors are widely used where flat fares are charged and collection can be made at pre-payment or post-payment stations. Perey Non-registering Turnstiles and Baffle Gates are used for non-attendant exits and control points.

Public Lavatories—In railway stations, bus terminals, hotels, baseball parks, arenas, dance halls, rinks, amusement parks, public buildings and elsewhere, public pay lavatories are controlled most effectively and made to pay their upkeep with Perey Coinpassors.

Architects Are Invited to Consult Perey Engineers

Our engineering staff is always ready to advise architects about systems and mechanisms for registering and controlling people in public places and for collecting fares and admission fees.

As originators of the Perey systems of personal registration and control, and fare and admission collection, we are in position to offer authoritative advice, for our experience covers all phases of the subject. As builders of Perey Turnstiles, Passimeters, Baffle Gates, Electric Fare Boxes and Registers, and the Coinpassor, the non-electrical coin controlled turnstile used throughout the world, we can furnish equipment to meet any requirement and any condition.

It is advisable for architects designing plants and structures of the types enumerated, where accurate mechanical registration of people or means of controlling their movements are desired, to consult us in advance of construction to ascertain the most suitable system and mechanism for the purpose, and to plan for its use in the most efficient way.

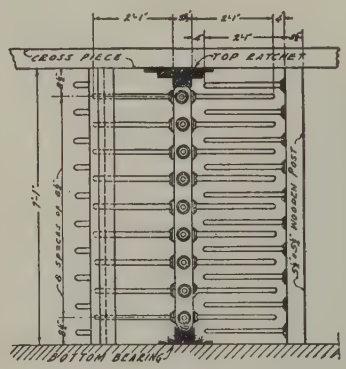
Illustrated below is a typical installation of the Perey Passimeter showing arrangement of cashier's booth, guide railing, etc. We suggest you write us concerning your propositions involving turnstile equipment and let us supply you with data.

A Swimming Pool Entrance Fitted with Perey Standard Passimeters

Here cashiers collect admissions and admit patrons directly without tickets or ticket takers. Every admission registers automatically and must tally with the cashier's receipts

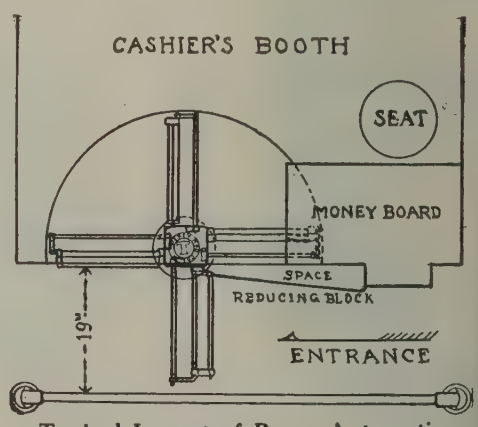
Representative Perey Turnstile Installations

J. P. Magner's Baths and Pool, Rye, N. Y.
Miramar Pool, New York, N. Y.
Westchester County, New York, Park Commission (Swimming Pools)
BMT Subway and Elevated Railway, New York
Philadelphia Rapid Transit Co., Philadelphia
Boston Elevated Railway, Boston
Boston, Revere Beach & Lynn Ry., Boston
Public Service Corporation of New Jersey
Grand Central Station, New York (Lavatory)
South Station, Boston (Lavatory)
Hotel Astor, New York (Lavatory)
City of Chicago, Public Parks
Brooklyn Botanic Gardens
Metropolitan Museum of Art, New York
Fort Lee Ferry, New York
Municipal Ferries, New York
Harvard University (Stadium), Cambridge
Cincinnati Nat'l League Baseball Club
National Council of Y. M. C. A.'s
Luna Park, Coney Island
Riverview Park, Chicago
Kentucky Jockey Club (Race Track)
Tokyo Underground Ry., Tokyo, Japan
Eagle Pass Toll Bridge, Texas
New York City, Public Schools



Perey Baffle Gates

Top and bottom mechanisms only are furnished for these baffle gates, the center post, arms and baffles to be constructed locally to suit individual conditions as to height, spread, etc.



Typical Layout of Perey Automatic Passimeter

POTTER MANUFACTURING CORPORATION

Manufacturers of the Potter Tubular Slide Fire Escape

107 West Washington Street, CHICAGO, ILL.

Product

POTTER TUBULAR SLIDING TYPE FIRE ESCAPE—inspected by the Underwriters' Laboratories, Inc., and listed as standard.

Description

The Potter Tubular Fire Escape is designed especially for schools and hospitals. It consists of a copper-bearing galvanized sheet steel straight tube with entrances from room through doors equipped with panic bolt hardware and exit from horizontal section at ground level. Supporting brackets every three or four sections. The incline of the tube for the school type escape is about 30° and for the hospital type about 35° to horizontal.

Advantages

It is safe, rapid, strong, durable and economical.

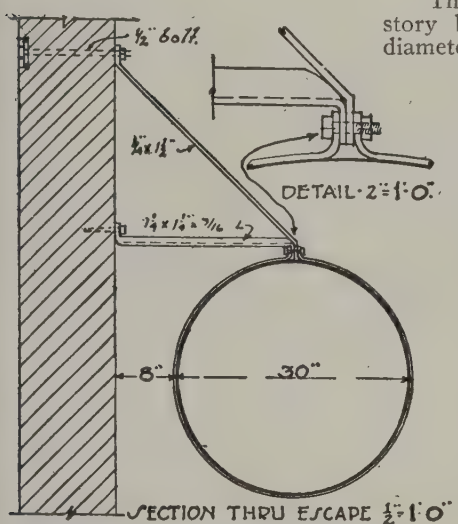
It can be entered direct from the schoolroom, thus permitting quicker exit.

There is no possibility of any one who uses it getting hurt. Slipping, falling, stumbling, pushing and confusion are all eliminated. Being enclosed, the occupants are fully protected from falling obstacles, flames, smoke, ice and snow.

Sizes

The school type for two-story buildings is 30 in. in diameter; for three-story buildings it is 30 in. in diameter from the third floor and 36 in. in diameter from the second floor to the ground.

The hospital type is 36 in. in diameter. This size is recommended for hospitals, as it will accommodate bed-ridden patients on mattress.



Specifications

School Type—Entrance to the escape to be 30 in. wide, 42 in. high; sections to be 30 in. in diameter and not more than 38 in. long and have 1¼x⅛-in. angle iron bands riveted to each end and be joined together by bolting the outside faces of the angle iron rings together with ¼x1-in. stove bolts. A channel iron band is placed over the top of the angle iron bands to make the joint watertight. The elbow shall have a sweep of 8 in. The easement or lower end breaks from the 30° angle to horizontal, is about 6 ft. long, flares from the 30 in. diameter to oval shape 36 in. high by 30 in. wide and rests on a concrete base 16 in. high. The incline of the tube is about 30°.

Lower End of Hospital Type Escape

The lower entrance for the double opening escape is the same size as the upper entrance. The increase in diameter from 30 in. to 36 in. is made in the "Y" joint where the lower entrance connects into the main tube.

Escape is secured to the building with brackets, at least one set for every four sections or fraction thereof, exclusive of the entrance, elbow and easement. Entrance on inside of building to be closed with double doors 15 in. wide, 42 in. high, equipped with panic bolt hardware, operated with push bars on each door, door to swing into the entrance of the escape. An all-metal entrance unit—including doors, casing, threshold, etc.—can be furnished at a slight additional cost.

A horizontal swing bar shall be placed near the top of the entrance, just outside the door, for the occupants to grasp with hands when entering the escape. Swing bar to be ¾ in. in diameter.

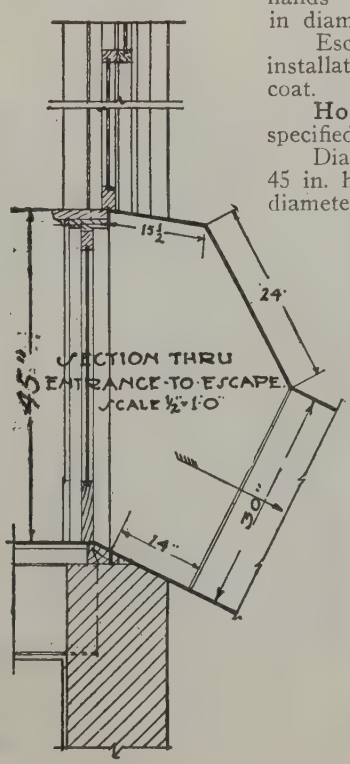
Escapes shall be painted one coat in factory and, when installation has been completed, they shall be painted a second coat.

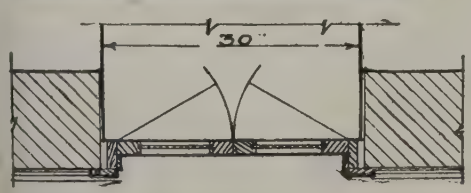
Hospital Type—Same as for school type, excepting as specified below.

Diameter of tube to be 36 in. Entrance shall be 40 in. wide, 45 in. high at inside wall line of building and flare to 36 in. diameter at the outer extremity. No increase in diameter is made where additional floors are connected into the tube. Elbow shall have a sweep of 40 in.

The easement, or lower end, breaks from 35° angle to horizontal and is about 9 ft. long. The easement rests on a concrete base about 4 in. high. The incline of the tube is about 35° to horizontal.

Complete detailed specifications on request.





ACME WIRE & IRON WORKS

Manufacturers of Standard Wire Mesh Partition Panels and Window Guards

TELEPHONE
HOGARTH 4616

12340 Cloverdale Avenue
DETROIT, MICH.

Products

Manufacturers of STANDARD RED RIBBON WIRE MESH PARTITIONS and ENCLOSURE PANELS.

WIRE MESH ENCLOSURES for Cashiers and Clerks.

Also Square Mesh Wire Window Guards; Wire Mesh Guards for Skylights; Steel, Brass and Bronze Grilles and Wickets; other products in Wire Mesh and Light Ornamental Iron Work and manufacturers of Brass, Bronze or Nickel Tubular Railing.

Standard Products

Red Ribbon partition and enclosure panels are carried in stock in sufficiently large quantities to permit a good sized order being shipped in twenty-four hours. They are designed to meet varying conditions and being in standard sections they are *100% salvageable*. They can be added to, from time to time, with the assurance that the new parts may be mingled with the old, with no field work to make parts match.

Being manufactured in quantities, all economies in the way of labor and the machine method of construction is used, keeping costs to a minimum.

It will be noticed that the multiplicity of parts has been avoided, enabling erection in the field by inexperienced help.

Construction Specifications

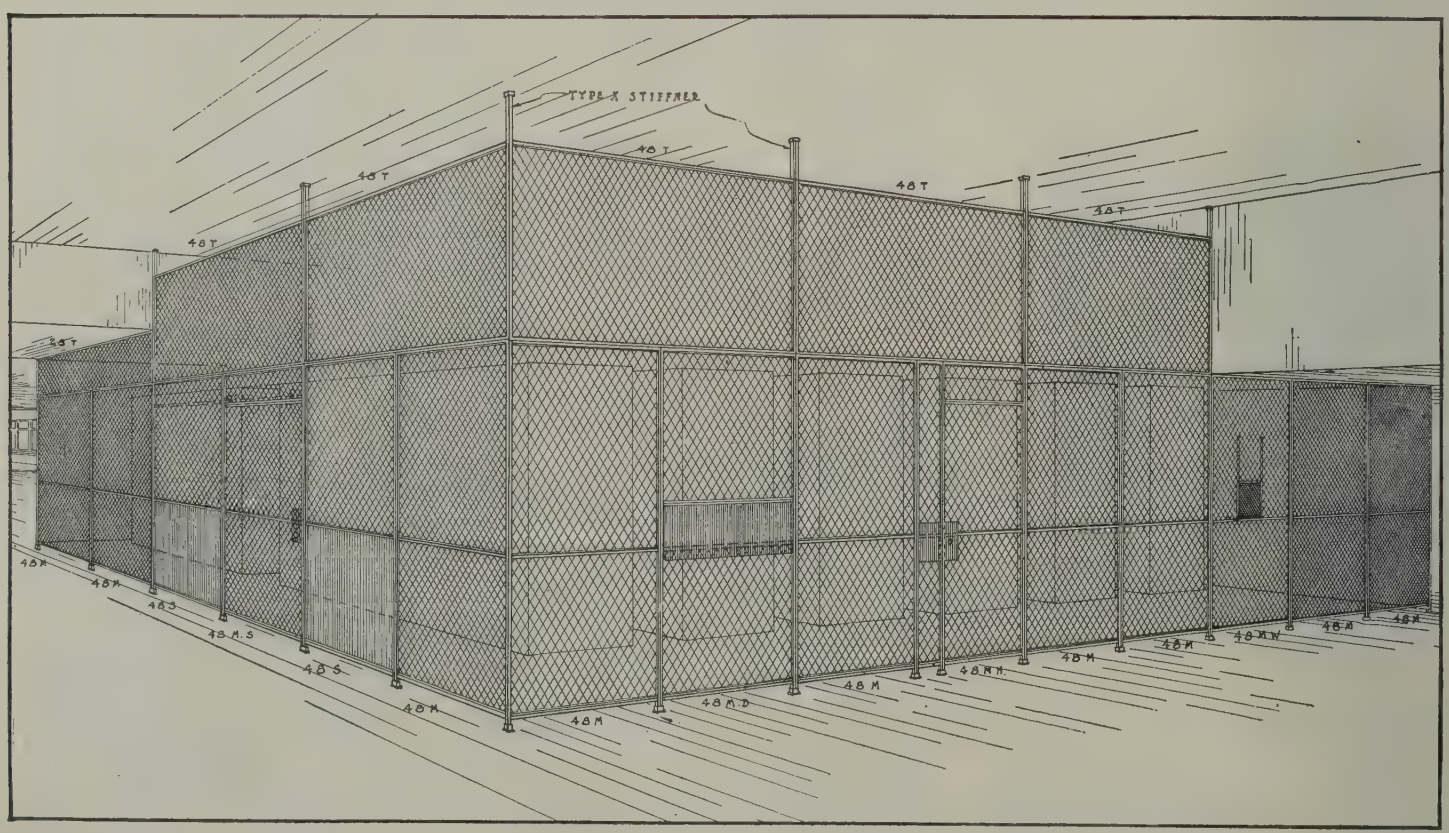
General Specification—Wire is No. 10 W&M gauge, crimped and interwoven to 1½-in. diamond opening mesh, measured parallel with the wire. Mesh is securely clinched into 1x½x⅛-in. steel channel frame. Crossbars are composed of two 1x⅜x⅛-in. channels, riveted together through the mesh; 3-in. sweeping space is provided at the floor.

Standard partition panels with mesh full height are designated as Type "M."

Type "S" panels have No. 16 gauge sheet metal base. Base is welded to the channel framing surrounding it.

All standard panels measure 4 ft. wide and 8 ft. high, excepting at the ends of partition, where a special panel can be provided to fill in the balance of the space.

If height greater than 8 ft. is required, top panels designated as Type "T" are provided, which panels usually span two of the standard partition panels.



Continued on next page

Doors—Sliding doors are equipped with special roller bearing hangers and flat bar track and will fit between any two panels. They have stops, guides, lock protecting plates and receiver for locks. Doors come in 4, 6 and 8-ft. widths. All doors are 7-ft. high opening, and have transom panel. 4-ft. wide doors are arranged to lock with a special bronze flat key claw lock. Because of the width, 8-ft. doors are arranged to lock with padlock (padlock not included).

Hinged doors lock with a Yale No. 042 R night latch with lock-protecting plate. Three steel tight pin butt hinges. Stock doors are 3 ft. wide by 7 ft. high and have a transom panel and side panel arranged to fit into a 4-ft. wide opening.

Windows—Type "SD-MD" is a drop shelf window panel 4 ft. wide, 8 ft. high and will also fit any other panels. The shelf which folds up, closes and locks the opening, is No. 10 gauge steel and has folding arms to stiffen same when used as a shelf.

Type "SW-MW" is a sliding window for use in passing requisitions or other papers through; can also be used for small tool passing, can be locked open at various heights or locked shut.

Top Panels—Type "T" panels are in various heights and designed to cross two base panels acting as a stiffener to the entire partitions. These panels are to permit higher partitions to the ceiling. They will receive the bulk of the cutouts for sprinkler, steam and water pipes for cross beams, etc., eliminating cutting into the more expensive base panels, and when partitions are rearranged are the only panels that it may be impossible to use in a new location because of cuts, etc.

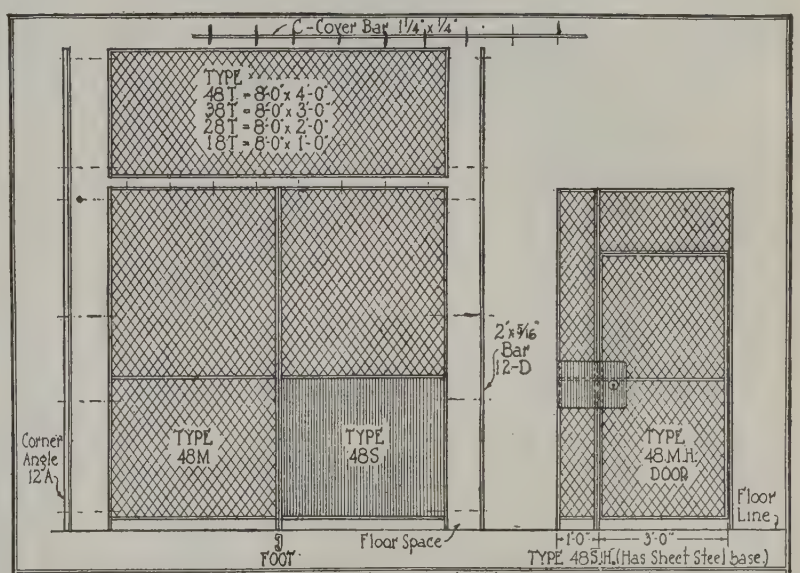
Cap Bars—Cap bars are 1¼x¼ in. and can be fitted to the top of any partition; they act as an excellent stiffener to any partition. No drilling is required to make them fit—they are started in the center of a panel and always end in the center of a panel.

Stiffener Braces—Two types are shown, one for a wooden ceiling, another for concrete. The one for the concrete ceiling recommends itself particularly because it lowers the entire erection cost. A ½ or ⅝-in. hole is punched into the concrete, the bar pounded into the hole and tightened to the vertical member of the partition; no lag screws, bolts, shells or lead packing is used.

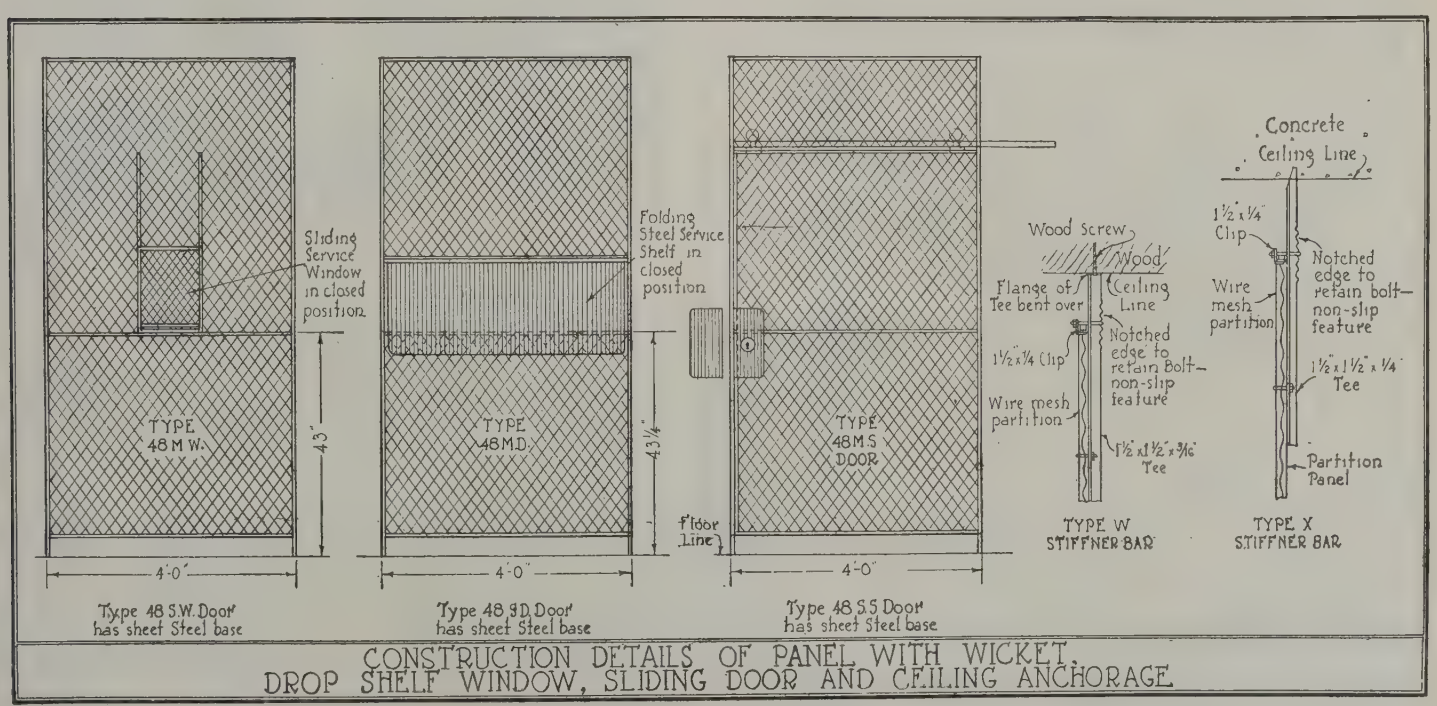
In some cases, a type "D" flat bar is desirable to stiffen panels. Where this is done $\frac{5}{16}$ in. must be added to the length for each bar so used.

Floor Shoes—Of cast iron, can be used on any floor; designed to keep partition from shifting. Are placed after entire partition is lined up. On concrete floors partition can also be anchored or cemented into the floor.

Paint—Standard paint is one dip coat of black asphaltum. Other finishes special.



CONSTRUCTION DETAILS OF STANDARD PANELS.
TOP PANELS AND HINGED DOORS



CONSTRUCTION DETAILS OF PANEL WITH WICKET, DROP SHELF WINDOW, SLIDING DOOR AND CEILING ANCHORAGE

ACORN WIRE AND IRON WORKS

Wire Mesh Enclosure Panels, Wire Cages and Wire Window Guards

TELEPHONE
NORMAL 1895

5906 Lowe Avenue
CHICAGO, ILL.

Products

Manufacturers of ACORN WIRE MESH ENCLOSURE PANELS; CAGES for Banks and Offices; DIAMOND MESH WINDOW GUARDS; COLLAPSIBLE FOLDING GATES; CLOTHING RACKS.

Also manufacturers of Skylight Guards, Machinery Guards; Elevator Enclosures, Wickets and Grilles; Railings for Stairs, Porches, Balconies and Windows; Area Gratings and Sidewalk Doors; Wire Signs.

Complete catalogue sent on request.

Important Recommendation to Architects

It is suggested that architects secure our quotation direct. Copies thereof will be gladly furnished to contractors when this work is to be included in another contract. To be protected against inferior service and workmanship, the architect should include in his specifications:

"As made by the ACORN WIRE AND IRON WORKS, Chicago, *or equal.*"

Acorn Wire Mesh Enclosure Panels

A fireproof partition which allows free circulation of air and unobstructed light is a requisite for every industrial plant.

Acorn enclosure panels give systematic effectiveness—the aim of every factory executive; they eliminate loss of tools and supplies, and do away with petty thievery.

They are 100% interchangeable. They can be rearranged, added to or moved quickly and by inexperienced workmen. They permit the forming of a corner at any intersection and the placing of doors between any two panels.

Material Specifications—***Height***—7, 8, 9 and 10 ft. carried in stock; other heights to order. Can also be increased to any height by adding special panels at top.

Width of Panels—Standard panels are 5 ft. wide. This extra width is used to eliminate the weakness caused by too many connections. It also saves from 15% to 20% installation cost. Special width panels furnished to fill in where necessary.

Cut-outs and Special Panels—Cut-outs, or special size or shape panels furnished to meet special conditions.

Door Sections—Standard door sections are 3 ft., 3 ft. 6 in., and 4 ft. wide, and of height to match partitions. Doors are 6 ft. 6 in. high with transom panel overhead. Door sections interchangeable with other sections. Either sliding or swinging types furnished. Sliding doors up to 4 ft. wide made self-closing without extra cost. Special sizes when necessary.

Locks—Made of brass, operated with pin tumbler cylinders from outside, and recessed knob from inside. Master-keyed locks furnished at slight additional cost. Doors equipped with hasp for padlock instead of regular lock with reduction in cost.

Combination Service Window and Shelf—Shelf swings up, closing opening, and is locked from inside with improved dead locking push bolt. 2 sizes: "A," 15 in. wide, 9 in. high; "B," 24 in. wide, 15 in. high. Each fitted with metal shelf extending about 2 in. on outside, and 9 and 15 in., respectively, on inside. Special service windows furnished to suit requirements.

Hangers—All sliding doors equipped with ball bearing hangers.

Wire, Web and Mesh—No. 10 (⅛-in.) open hearth steel wire used. Entire web in one piece with wires passing through center stiffening bar, eliminating unnecessary joints. Mesh is 1⅝-in. diamond mesh.

Framing and Stiffening Bar—Framing, 1x½-in. steel channel. Center stiffening bar, 1x⅜-in. steel channel securely riveted to frame.

Capping Bar—2x$\frac{3}{16}$-in. steel channel extending from center of one panel to center of next, thereby breaking joints.

Bracing—While capping bars will carry a reasonably long partition, simple methods of bracing can be effected by use of wire strands from top of partition slantwise to ceiling.

Floor Sockets—2½ in. high to allow for adjustment where floors are uneven.

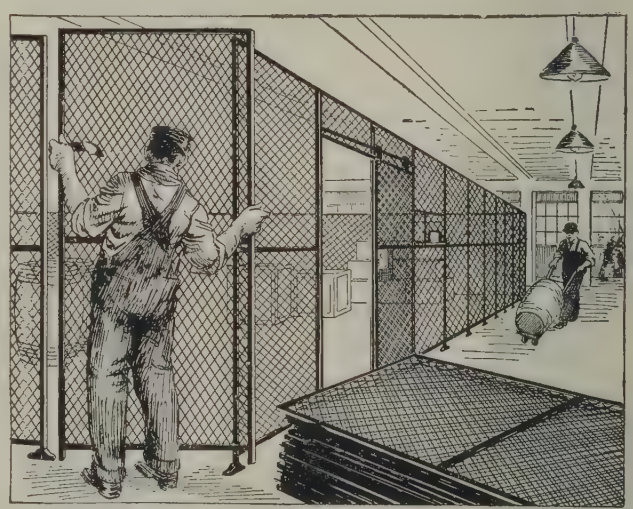
Corner Posts—1x1-in. steel angle with floor socket. This permits the making of corner at any intersection.

Connecting Toggles—In addition to the regular bolts furnished for bolting panels together, 3 special toggles are furnished at each intersection to prevent channels from telescoping or overlapping, thereby overcoming the difficulty otherwise experienced in erection.

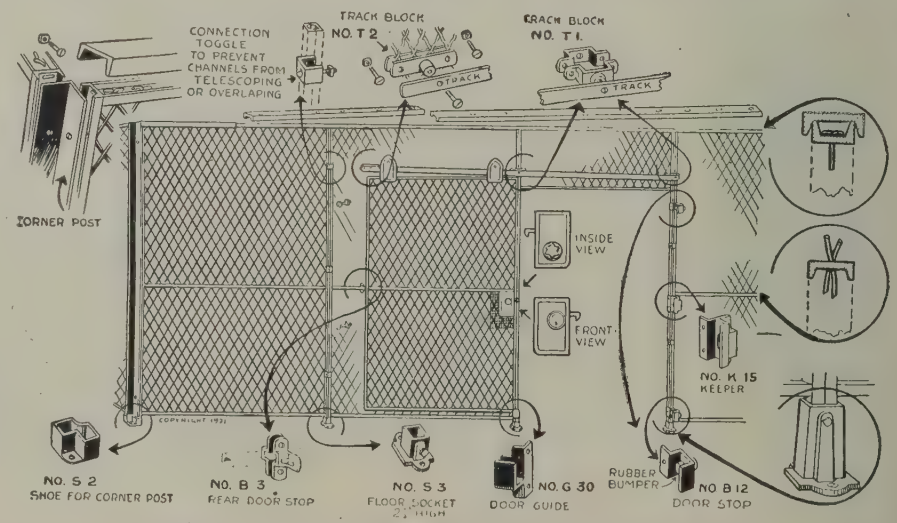
General Hardware—All hardware that is subject to strain is made of malleable iron or wrought steel to prevent breaking. The balance is made of soft gray iron.

Paint—Standard factory green unless otherwise specified. Special colors may be had at slight additional cost.

Erection—Many original and exclusive features make Acorn partitions extremely easy to erect. No experience or special skill is necessary. Diagram and complete setting instructions sent with each order.



Acorn Unit Wire Mesh Enclosure Panels



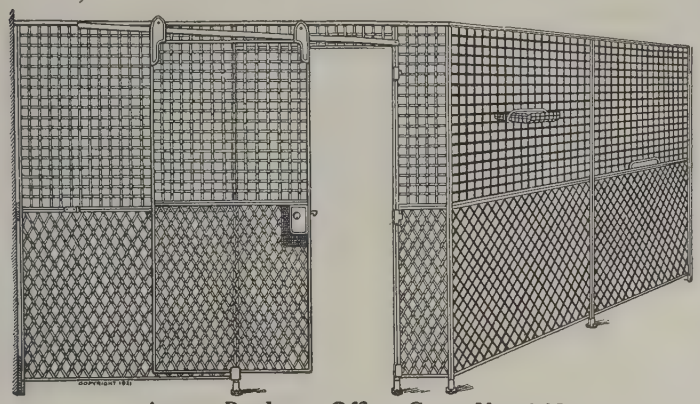
Details of Acorn Unit Sectional Diamond Mesh Partitions

Continued on next page

Cages for Banks, Offices, etc.

The Acorn Wire and Iron Works have developed and are using the press crimp type of construction in bank and office cages (see detail). This type of crimp adds much to the character and distinctiveness of the work. The old type double crimp can still be furnished when it is necessary to match old work.

Press crimp can be furnished in either square or flat wire, but because of its greater utility and rigidity, square wire is recommended (see typical specification below).

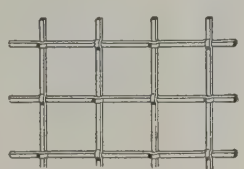


Acorn Bank or Office Cage No. 142

No. 142 cage is commonly used in offices and small banks.

The upper part is made either of ⅛-in. square wire or ¼-in. flat wire, 1½-in. square mesh. The ⅛-in. square wire is preferable because of its greater strength. Wires are pressed at each intersection, making a neat and pleasing appearance. The lower part is made of round wire, 1½-in. diamond mesh.

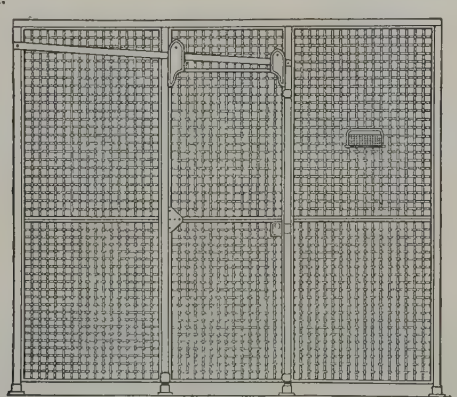
Doors furnished either sliding or swinging type; sliding doors being made self-closing unless otherwise specified. Doors fitted with cylinder locks operating with key from outside and knob from inside.



Detail of Press Crimp Construction

Typical Specifications—Cages shall be of a height to conform to front fixture and shall be made of ⅛-in. square wire, 1½-in. square mesh of press crimped type. Framing to be of 1x½-in. channel, tenoned and riveted at corners. Posts at doors and at each intersection shall be of 1¼-in. square Shelby tubing No. 14 gage in thickness. The same tubing shall be used to finish top of cages. (See Design No. 144, Catalogue 201, Acorn Wire and Iron Works, Chicago.)

Note: If flat wire is specified, ¼x⅛-in. wire, 1½-in. square mesh is recommended.



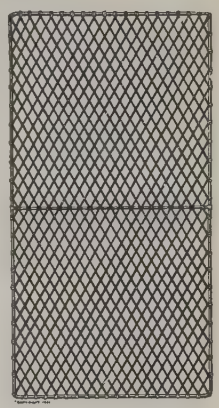
Acorn Bank Cage Design No. 144

Doors to be of sliding gravity, self-closing type hung on ball bearing hangers and fitted with Yale master-keyed cylinders; master keys to be of series different from balance of building.

Pass baskets 8 in. wide, 10 in. long shall be included for each division. Pass baskets 8x8 in. shall be included for the rear of each cage. Basket to be fitted flush with outside of cage.

Acorn Diamond Mesh Window Guards

They permit the opening of windows for ventilation without danger of burglary or damage to material or tools, and safeguard windows against accidental or intentional breaking.

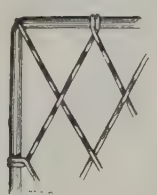


No. 121. Window Guard

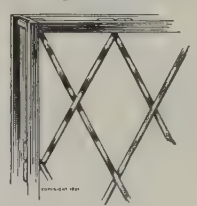
Material Specifications—Made of three principal specifications: 1¼-in. mesh, No. 12 wire; 1½-in. mesh, No. 10 wire; 2-in. mesh, No. 8 wire. The 1½-in. mesh, No. 10 wire is most used, being the meeting point of burglary and glass protection. Guards can be furnished in any wire or mesh desired.

No. H-5 hinge and No. H-6 hasp, of malleable iron, are recommended. They afford an excellent means of fastening and are adaptable to any style window frame by reversing same where necessary. Hinges are fastened to window by lag screws making it difficult to remove from outside. Hasps are locked to a heavy screweye which can not be removed when padlock is in place.

H-5 Hinge and H-6 Hasp



No. 121



No. 122

Details Showing Construction of Screens

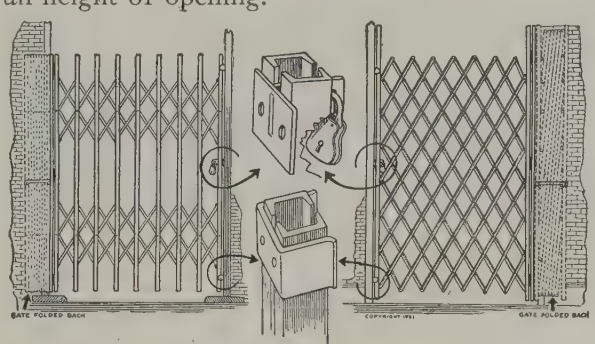
No. 121 guard has round steel frame of ⅛ or ⅜-in. diameter according to size of guard. Furnished in either stationary or hinged type. Hinged type permits washing windows.

No. 122 guard has channel frame varying from ¾ to 1 in. wide. These are satisfactory when designed to fit opening, but are not recommended when outer grooved edge is exposed to view.

Collapsible Folding Gates

These gates form an excellent means of closing off doorways and other openings. They offer protection without interfering with light or air, and when not in use they may be folded back out of the way.

When ordering, give measurement of full width of the opening the gate is to occupy. Always give height of gate from floor. It is also well to give measurement of full height of opening.

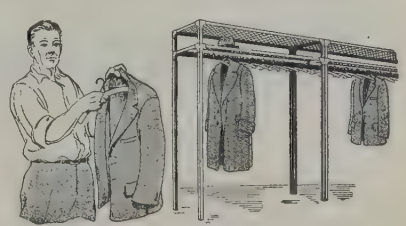


No. 157. Folding Gate **No. 156. Folding Gate**

Note: Gate No. 156 increases in height at the ratio of 1½ in. to each foot in height when gate is folded together. When measuring, be sure that sufficient head clearance is available to take care of additional height. Gate No. 157 remains the same height whether open or closed.

Sani-Robe—The Sanitary Coat and Hat Rack

A sensible, practical, and sanitary coat and hat rack. Made of steel framing with wire mesh shelves. Units are 5 ft. long, 18 in. deep, and 74 in. high. Each provides for 10 garment hangers.



The Sani-Robe

BADGER WIRE & IRON WORKS

1210-1226 25th Avenue

MILWAUKEE, WIS.

Products

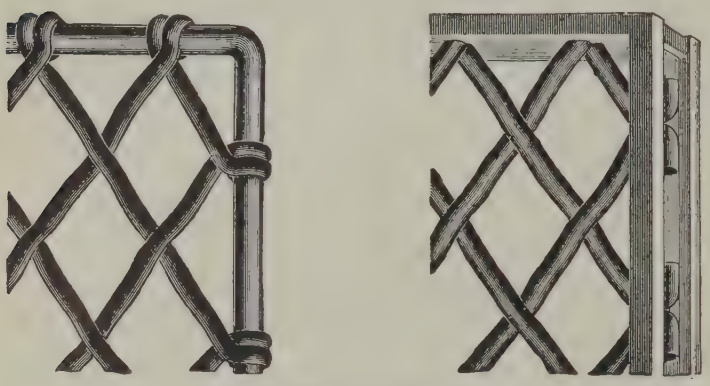
ORNAMENTAL IRON AND WIRE WORK:

Window Guards, Wire Partitions, Railings, Tool Room Enclosures, Fences, Grilles, Panels, Wire Signs, Skylight Guards, Iron Gratings, Folding Gates, Balcony Railings, Sidewalk Doors, Marquises, Fire Escapes, Iron Stairs, Elevator Enclosures, Fireproof Stairway Enclosures, Entrance Gates, Flagpoles and Lawn Furniture.

Service

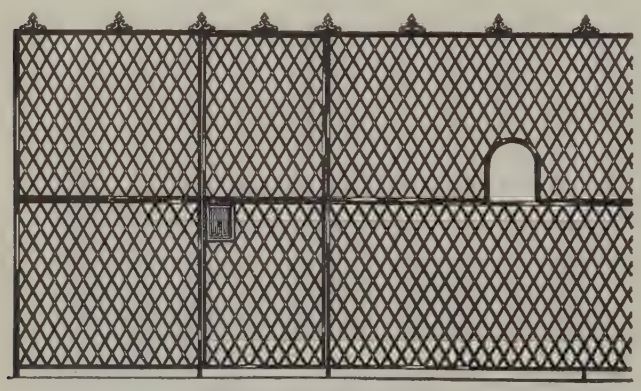
Ornamental iron and wire work according to design to be submitted, or this Company will furnish details of their standard construction. Inquiries will be given prompt and careful attention.

BADGER WIRE & IRON WORKS own and operate a new plant, where, with ample space and facilities, they will be able to give prompt and satisfactory service.



Wire Window Guards

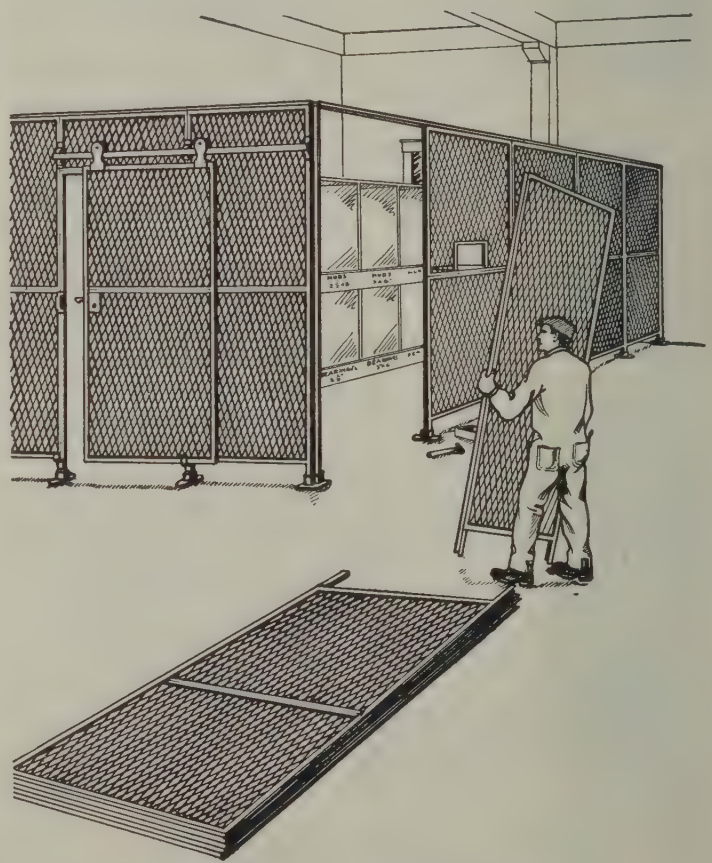
A particular specialty is made of the manufacture of wire window guards and these can be furnished at minimum prices. Inquiries should specify quantities and sizes, as well as gauge of wire, size of mesh and style of frame



Wire Partition

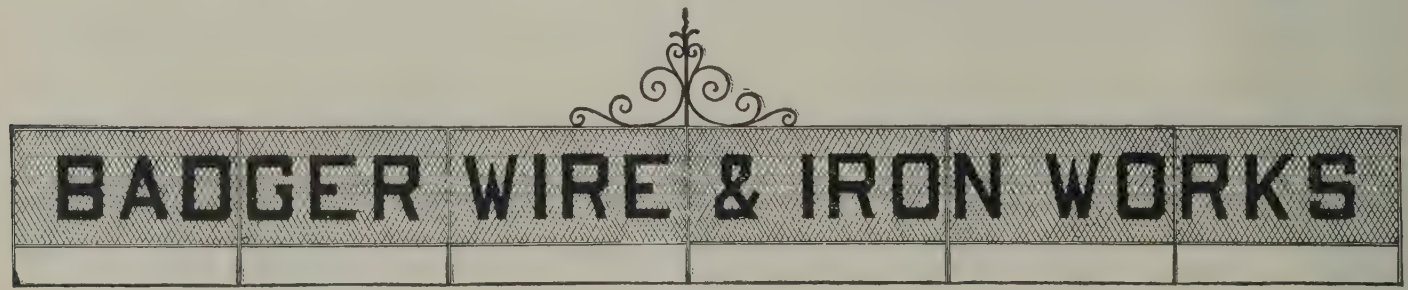
Used extensively where it is desirable to enclose a space effectively without obstructing the light.

Generally made of No. 10 wire, 1½-in. diamond mesh, 1x½x⅛-in. channel frames; cover bar and cast pickets at top as shown



Standard Sectional Wire Partitions

Principally for tool and stock room enclosures. Interchangeable, so that re-arrangement is possible without drilling or fitting. Standard partitions are made 4x7, 5x7, 4x8, and 5x8 ft. They are made of No. 10 wire, 1½-in. diamond mesh, 1x½x⅛-in. channel frames, horizontal bar through center, 1½-in. channel cover bar at top; swinging or sliding doors; also service windows, equipped with necessary hardware



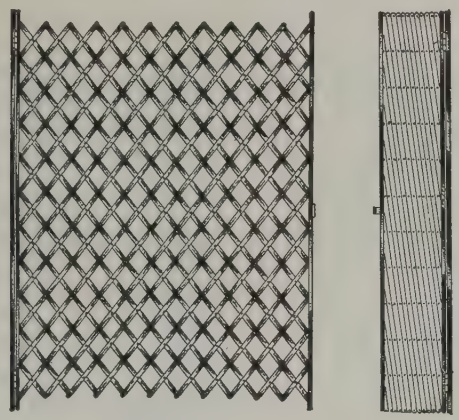
Wire Sign

A specialty is made of the manufacture of wire signs and BADGER WIRE & IRON WORKS have furnished some of the largest in use. In writing for price state length, height and lettering wanted, also the position of the sign so that the proper bracing may be figured. Complete specifications will be submitted in quoting

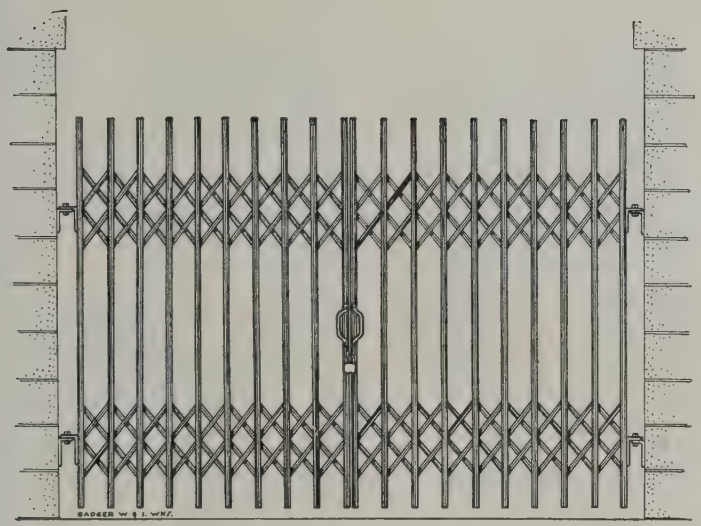
Continued on next page

Folding Gates

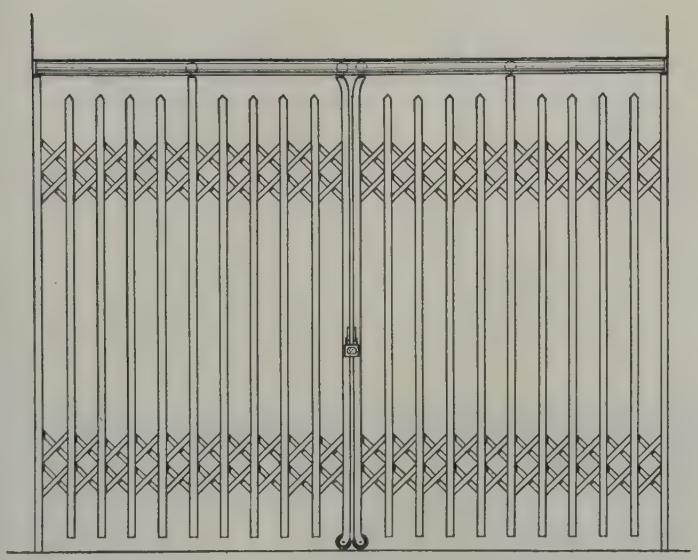
Below are shown three styles of our folding gates.



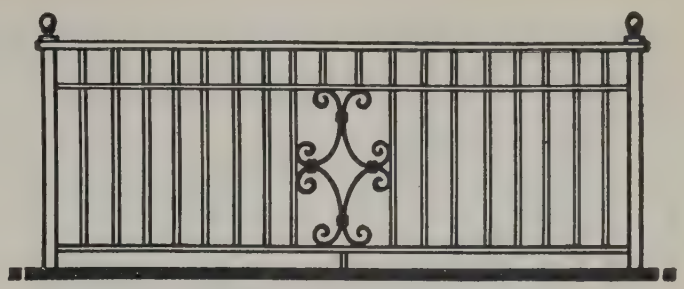
No. 25 Single Folding Gate



No. 27 Double Folding Gate

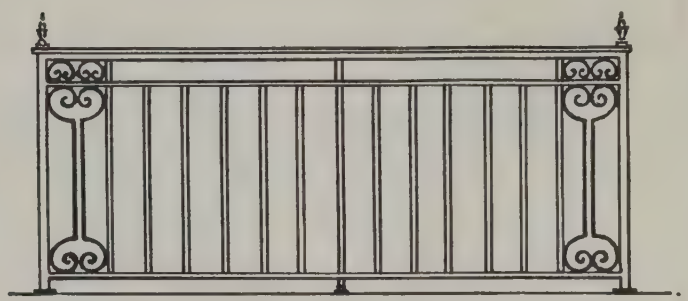


No. 28 Double Folding Gate with Overhead Track

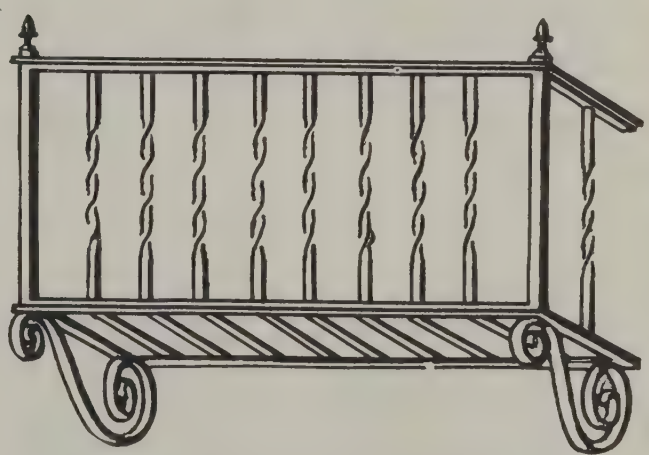


No. 65 Wrought Iron Balcony Rail

No. 66 Wrought Iron Balcony Rail with Cast Ornaments



No. 67 Wrought Iron Balcony Rail



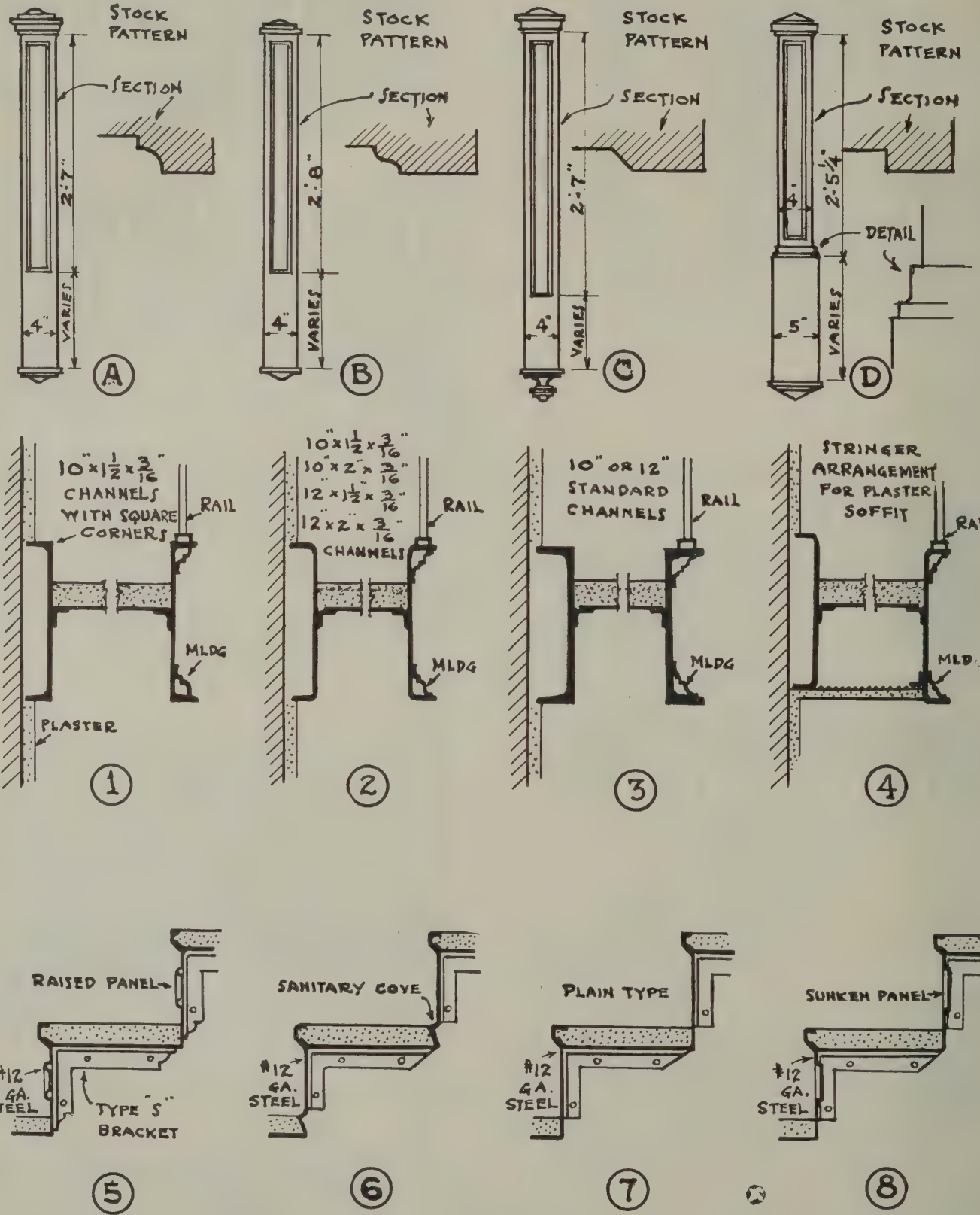
No. 68 Balcony and Railing

Iron Gate and Fence

In this department exceptionally good service is given, and low prices consistent with the quality of the product are quoted.

Catalogue showing a number of styles will be sent on application. Special designs furnished

Continued on next page



BADGER WIRE & IRON WORKS

NEWELS · STRINGERS & RISERS

MILWAUKEE WIS.

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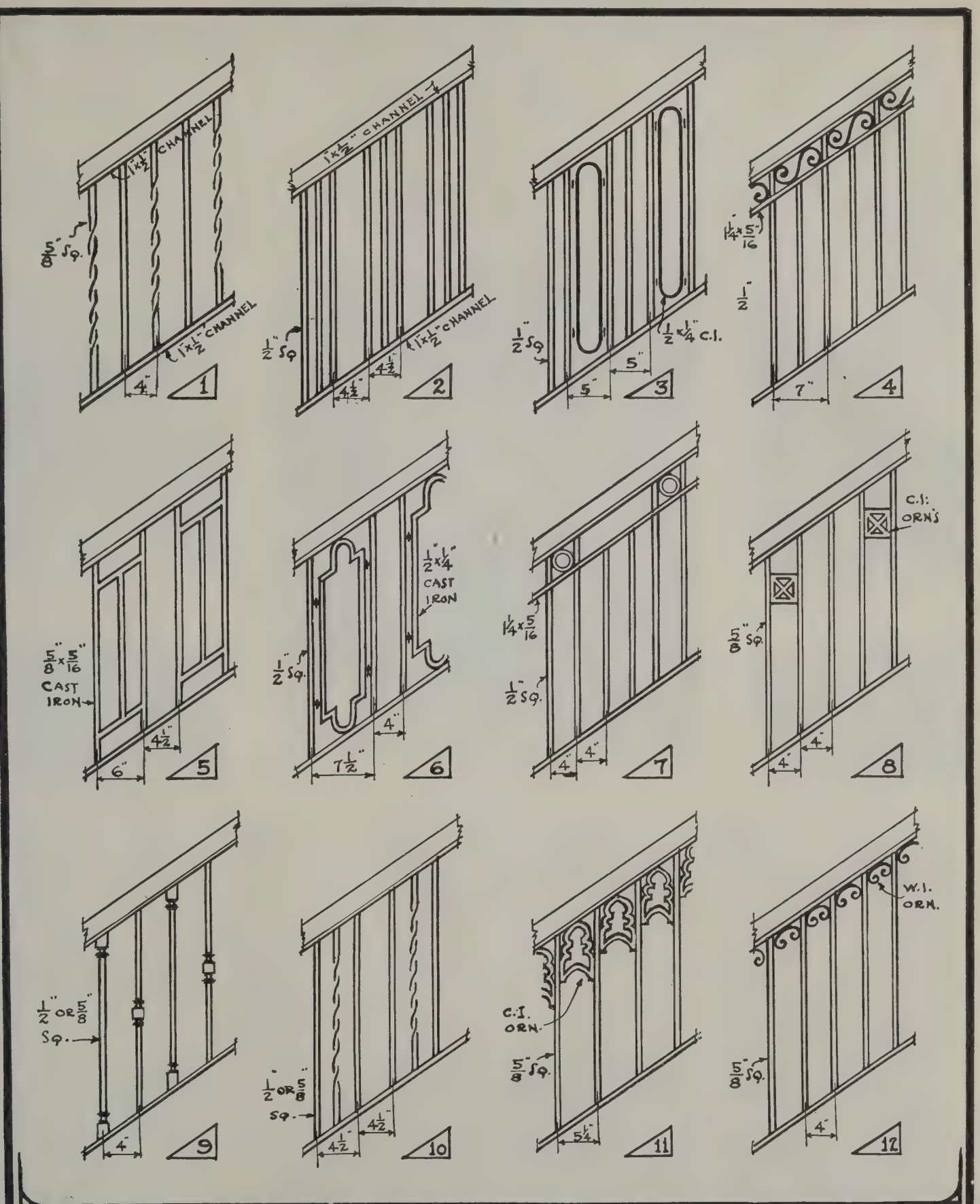


BADGER WIRE & IRON WORKS

~ RAILING · DESIGNS ~

MILWAUKEE WIS.

BARNES WIRE FENCE CO.

Ornamental Iron and Wire Work and Wire Signs

10371 Northlawn Avenue

DETROIT, MICH.

Products

ORNAMENTAL IRON: Balconies, Gates, Grilles, Marquises, Porch Railings, Stair Balustrades, Folding Gates, Door and Window Guards, Gratings, etc.

WIRE WORK: Factory Partitions, Interchangeable Standard Panels, Doors, Service Openings with Folding Steel Shelf, Wire Window Guards, Flat Wire Partitions, etc.

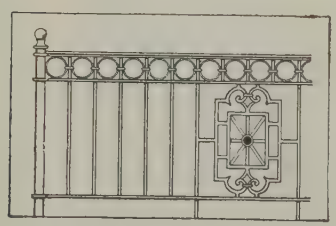
Stair Balustrade
Vertical bars, ½ in. square

Marquise
Powerhouse, Ford Motor Company

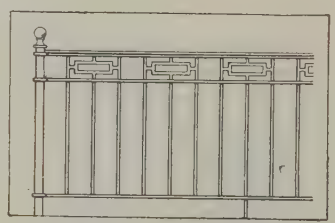
Garden Gates
Pickets, ⅝ or ¾ in. square

Balcony
Vertical bars, ¾ in. square
Scrolls, ⅜ x ⅝ in.

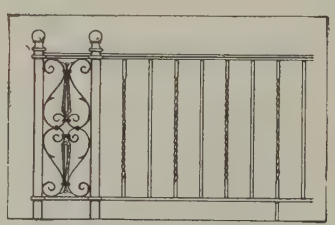
Grille
Scroll work, ⅜ x ¾ in.



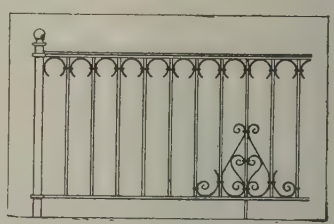
No. 2 Porch Rail



No. 13 Porch Rail

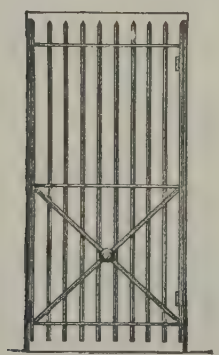


No. 23 Porch Rail

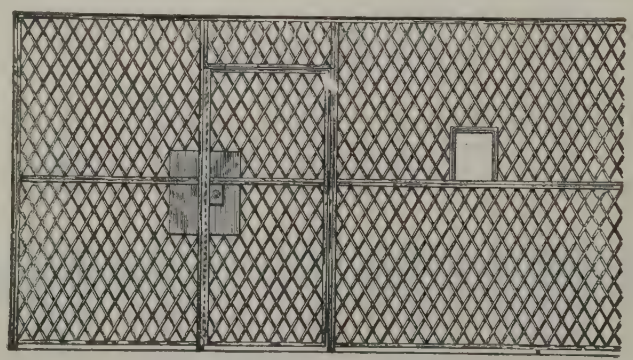


No. 24 Porch Rail

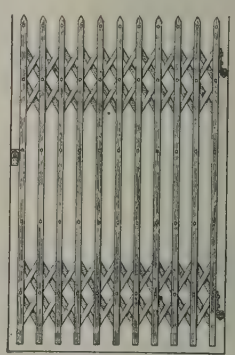
Usually made of ½-in. square bars spaced 4 in. apart with channel rails and half oval cover bar



No. 31 Wrought Iron Bar Gate
Verticals, ⅝ or ¾ in. square



No. 40 Wire Factory Partition
Made of round steel wire crimped and interwoven (varies from 1 to 2 in.) diamond mesh with channel iron frame



No. 50 Wrought Iron Folding Gate
Usually ¾-in. channels with ⅛ x ⅝ in. collapsible bars

W. O. CHAPMAN CO., INC.

General Wire Work, Especially Bank Wire Work Equipped with No-Track Door Hangers

30 Church Street
NEW YORK, N. Y.

Products

General Wire Work of Brass, Bronze and Iron such as Store Room Enclosures, Stock Room Partitions, Window Guards and particularly Bank Wire Work equipped with No-Track Door Hanger.

Experience

We have been in the wire work business for over 30 years and can refer to leading architects and contractors.

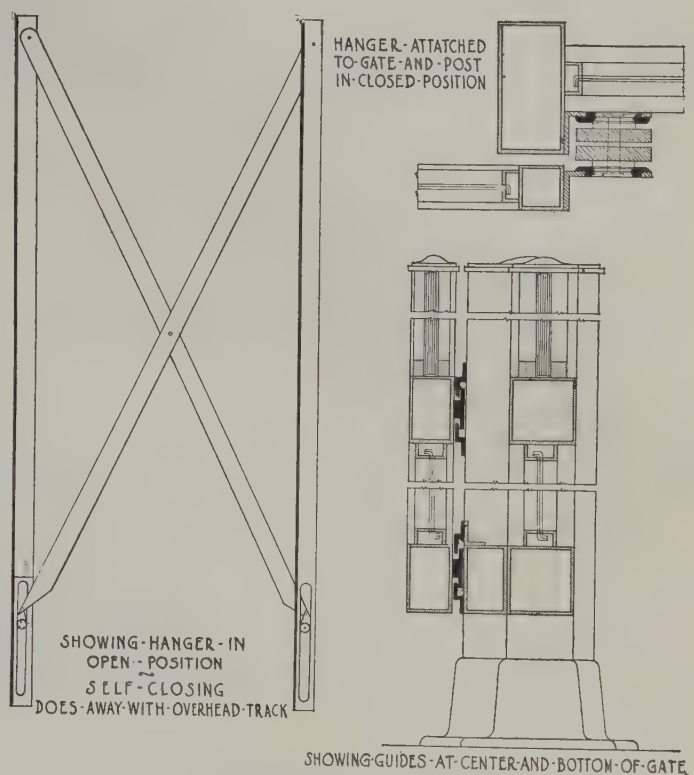
Bank Cage Work a Specialty

We specialize in cage work for banks. We solicit an opportunity to estimate.

No-Track Door Hanger (Patented May 7, 1919 and Feb. 16, 1920)

A new product that does away with the top track of the low type of bank cage work. It is the only thing of its kind in the market. It is self-closing, noiseless, vibrationless and positive in action. Posts cannot be loosened by action of the hanger and there is no cracking of glass. It holds the door firm and rigid up against the posts. When the door is closed the hanger is invisible. See illustration below.

Made for any height door.

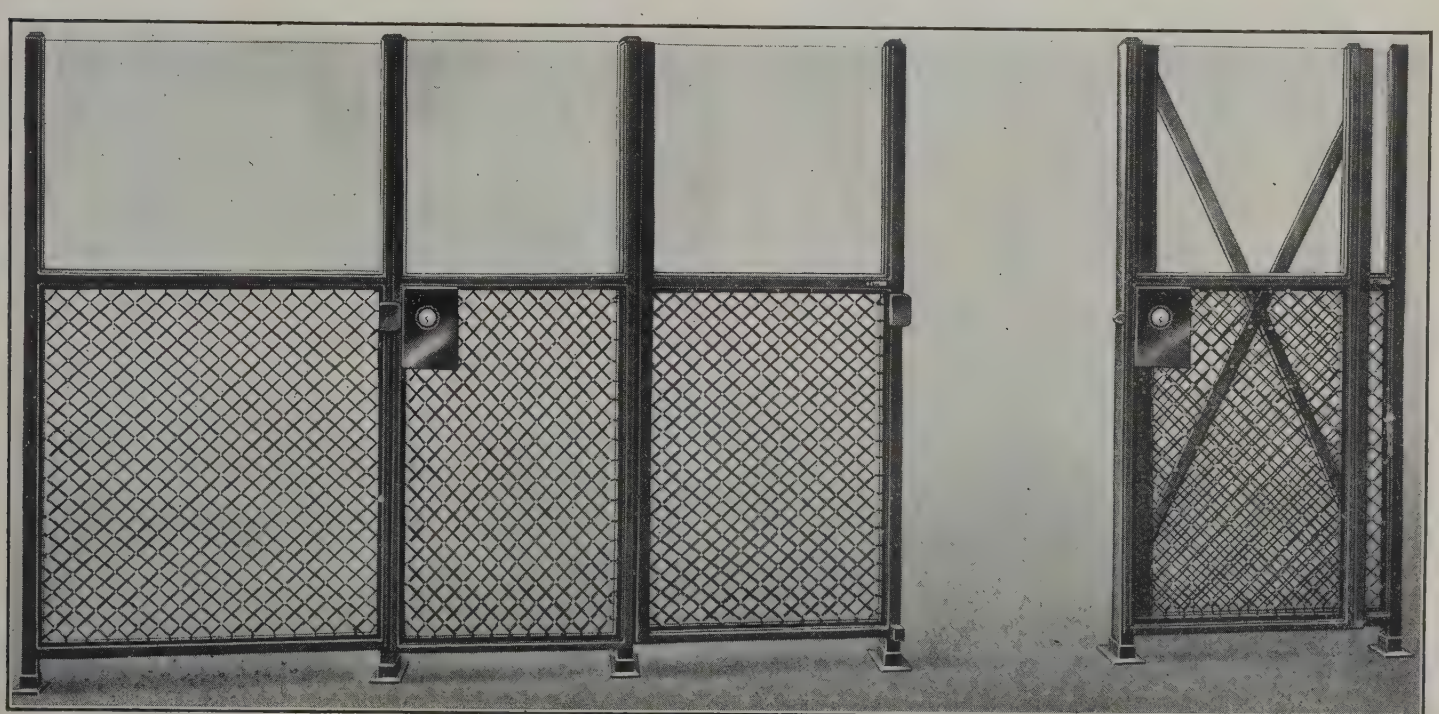


Details of the No-Track Door Hanger

A Few Recent Wire Work Installations

We recently installed the wire work in the following New York, N. Y., banks and trust companies:

Equitable Trust Co.
Bank of the United States.
Liberty National Bank
Chatham & Phenix National Bank
American Exchange Irving Trust Co.
Public National Bank
Farmers Loan & Trust Co.
Staten Island Savings Bank
Bank of Hawaii



Door Closed — Door Open

No-Track Door Hanger (Patented) for Sliding Doors in Low Type Cage Work, Installed in Chemical National Bank, 165 Broadway, New York, N. Y.

ESTABLISHED 1883

THE COLUMBUS WIRE & IRON WORKS CO.

Ornamental and Architectural Wire and Iron Work

MAIN OFFICE AND PLANT
Poplar and Michigan Avenues
COLUMBUS, OHIO

Products

ORNAMENTAL and MISCELLANEOUS IRON and WIRE WORK: including Stair, Balcony and Porch Railings; Grilles; Wire and Iron Window Guards; Entrance Doors and Gates; Steel Folding Gates; Bank Screens; Spiral Stairs; Fire Escapes; Pipe Railings; Area Gratings; Columbus Standard Wire Partitions; Wire Signs; Skylight Guards; Cold Air Screens; Flagpoles, Flag Stands; and many other Light Steel and Wire Products.

We are craftsmen in wrought iron.

Facilities

We will gladly submit designs and specifications for special work. We also furnish estimates on architects' plans and specifications, giving complete estimate on all work required for entire building as covered by ornamental iron specifications.

Our plant covers 22,000 sq. ft. of floor space and is equipped with best of modern metal working machinery. We employ mechanics of long experience.

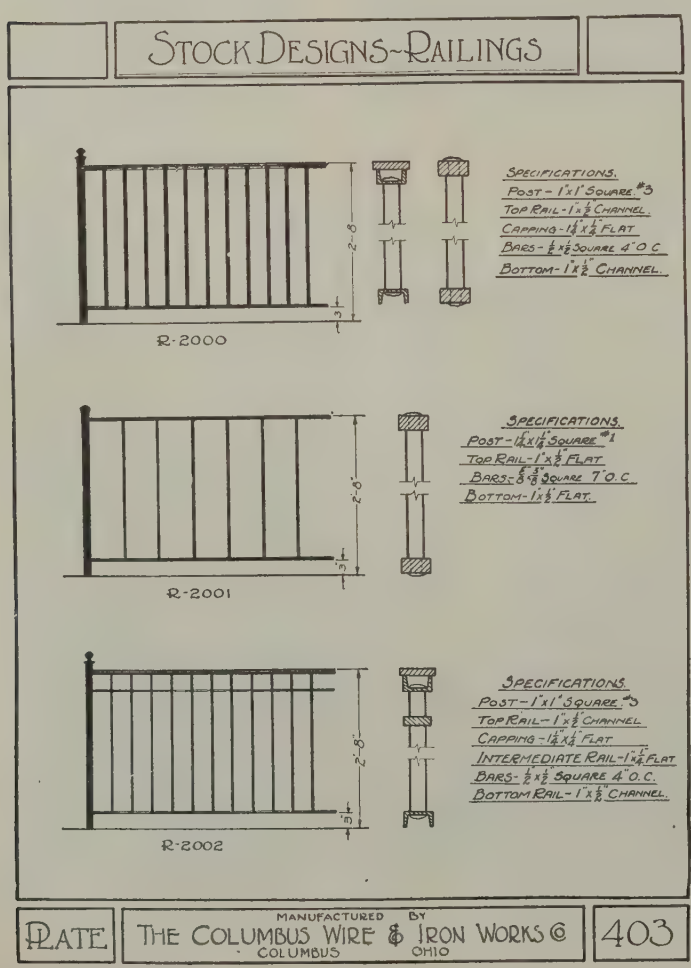
Wrought Iron Railings from Stock

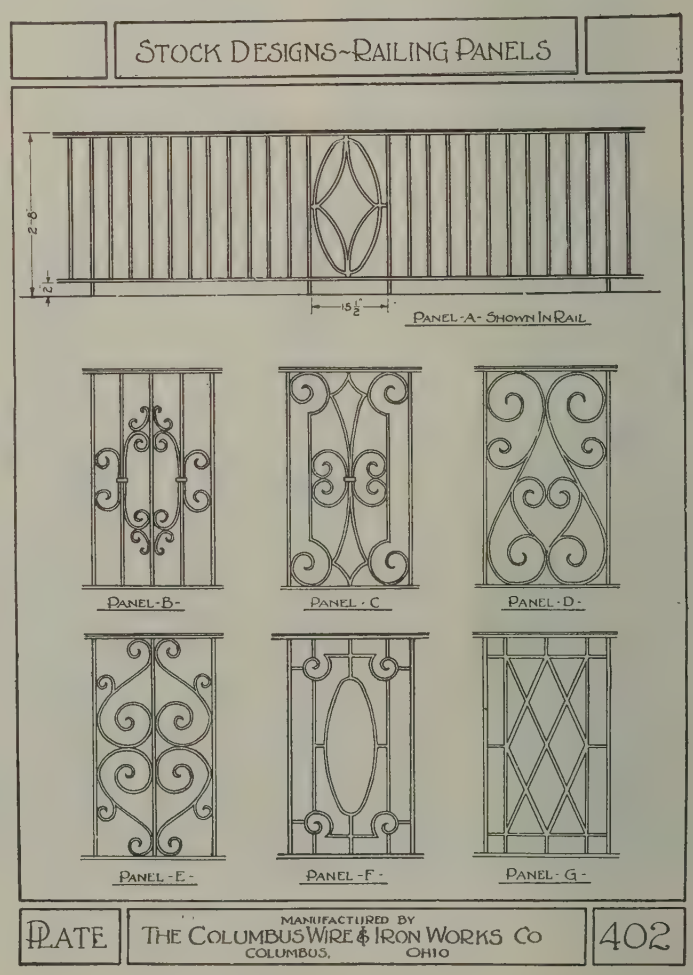
Send for circular showing railings, panels and posts which we can furnish from stock at prices more reasonable than many designs in wood.

Specify iron rails for porches on residences and apartments. They are neat and durable, and easy to erect.

Additional Plates of Stock Designs

For additional plates of our stock designs, refer to your files under "Ornamental Iron and Wire Work," A.I.A.-15d.





GARDEN CITY PLATING & MFG. CO.

Grilles and Wickets, Cage and Vault Work

1430 South Talman Avenue, CHICAGO, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

GRILLES, WICKETS, VAULT and CAGE METAL WORK.

Also Rollers and Disappearing Door Hardware, Store Fixtures, and Showcase Hardware.

For Lighting Reflectors, see page C3451; for Garment Carriers and Adjustable Shelving Devices, see page C3993.

"Garcy" Metal Work Combines Beauty with Permanent Utility

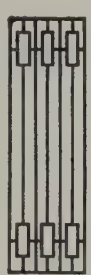
Every installation of "Garcy" metal work, whether in banks, department stores or offices, reflects credit upon the excellence of our grilles and wickets both from the standpoint of beauty as well as strength.

Many of these installations have been in for many years and retain the same luster now that they did the day they were installed—for "Garcy" grilles and wickets will not rust or tarnish.

While offering the utmost in strength and utility, our grilles and wickets show those fine points of expert craftsmanship that add the distinctive dignity so essential to the institution in which they are installed.

Only the very best material of suitable durability and wearing qualities enters into the manufacture of "Garcy" grilles and wickets to safeguard your investment and the "Garcy" reputation.

No. 1319
No. 1318 as above with two crossbars

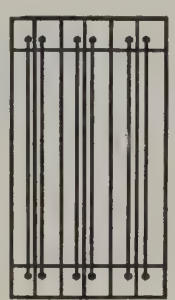


No. 1326
No. 1334 as above with one crossbar
No. 1335 as above with two crossbars

No. 1305
No. 1304 as above, ornaments top and bottom.
No. 1303 as above with ornaments center

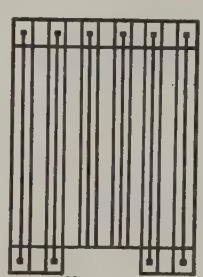
All ornaments made of brass.

No. 1314
Round or square bars



No. 1328
Square bars

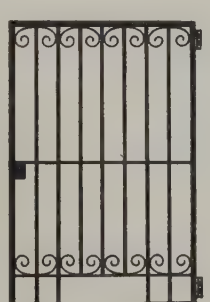
No 1325



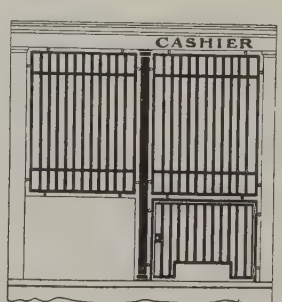
No. 1324
Square bars

No. 1337

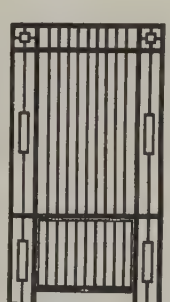
No. 1301 No. 1306 No. 1321 No. 1316
These designs furnished in square or round bars



No. 1389
⅝ in round or square bars



Design No. 1317
Showing side-swinging wicket at bottom of grille. Rosettes connecting grilles and wicket to square post and frame



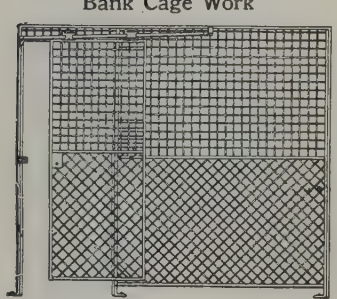
Design No. 1340
Showing upward swinging wicket at bottom of grille

No. 1341
Square bars

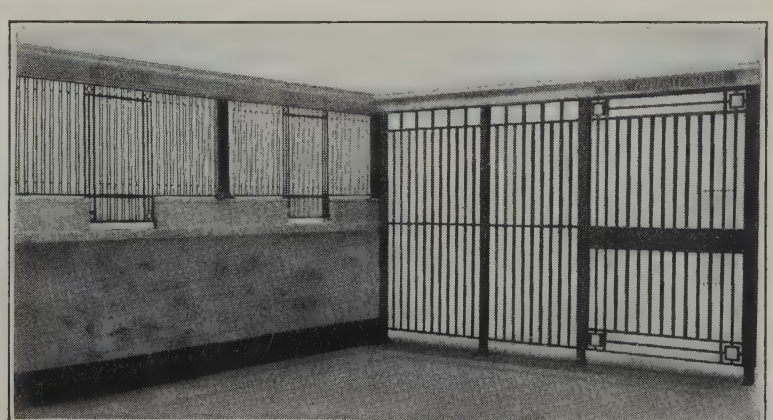
PORTABLE DESK SIGNS—No. D1372. Made of cast brass or bronze raised letters, with metal angle rests, to stand on desk or counter. Any size, any desired lettering

ETCHED SIGNS—No. 239. Made of Sheet Brass Etched. Raised Letters. Black Background. Size 2½ inches wide, length varies. Cashier, Bookkeeper, Teller and others carried in stock

Bank Cage Work



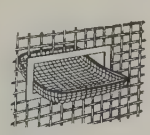
No. 1369. Wire Partition. Dead Black
No. 1368 is above with round wire diamond mesh top and bottom.
No. 1365 is above with flat wire square mesh top and bottom.
Gravity sliding doors. Swinging doors.
Roofs for cages usually made with Round wire No. 10 Diamond Mesh. Channel frame No. 1362



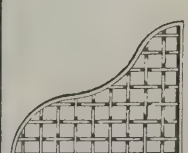
Design No. 1350 Grille and No. 1357 Grille with wicket at bottom.

No. 1358 Vault Partition
No. A1358. Vault Door to match above

No. 1353 Vault Door.
No. A1353. Vault Partition to match above.



No. 1361 Hand Hole
No. 1360 wire basket



No. 1371 O. G. Desk Guard

WILLIAM R. PITT COMPOSITE IRON WORKS

548 West 27th Street
NEW YORK, N. Y.

TELEPHONE
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Products

Manufacturers of FOLDING GATES and GUARDS for every purpose:
"Pitt-Bostwick" Folding Gates
"Pitt" Lazy Tong Folding Gates
"Pitt" Composite Folding Gates
"Pitt" Driveway and Entrance Gates
"Pitt" Car Gates
"Pitt" Folding Window Guards

Pitt-Bostwick Folding Gates to Protect

Banks and trust companies
Homes and apartments
Public school corridors
Storehouses and warehouses
Department stores
Safe deposit companies
Show windows and entrances

Folding Gates and Guards a Specialty

This company is the original manufacturer of the "Bostwick" gate, and the originator of most of the standard folding gates, developing their uses through specialization.

This department is therefore, by training, experience and facilities, prepared to meet the demands of architects, builders and the iron trade.

"Pitt" gates are internationally famous for their quality, and are found in every state and many foreign countries.

The initial cost is not high. They are strong, durable and easy working and take up very little space when not in use.

Quality of Work

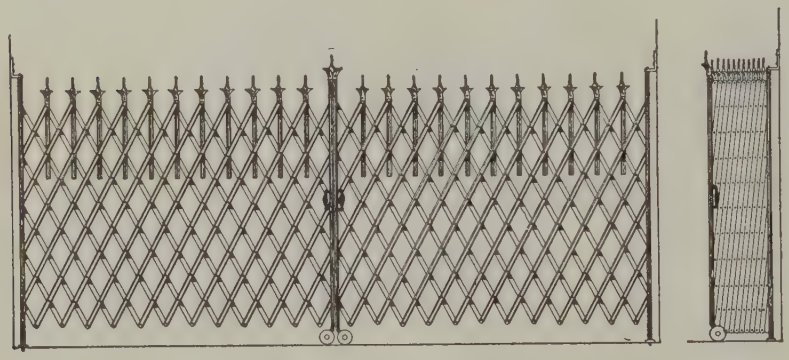
Every "Pitt" product is of the highest grade workmanship and materials, economically produced under modern conditions.

Specifications

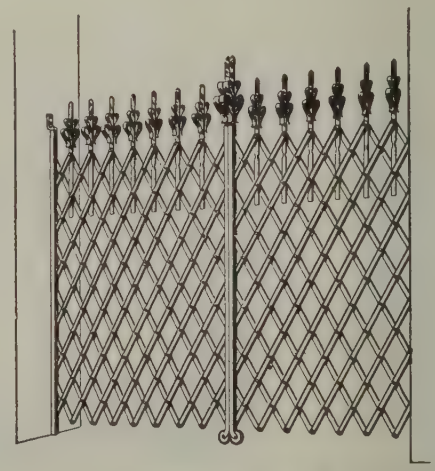
Copy the *number* and *description* of *gate desired* from the illustrations on this and the page following, *or* submit requirements for our advice and special blue *prints* or *designs.*

Estimates

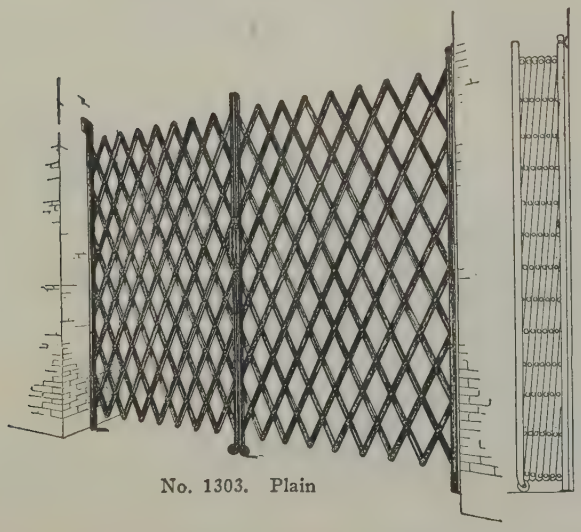
Folding Gates—Send *plans* and *specifications,* or a *sketch* showing *width* and *height,* and *where* gate is to *set.* State *purpose* for which gate is *intended.*



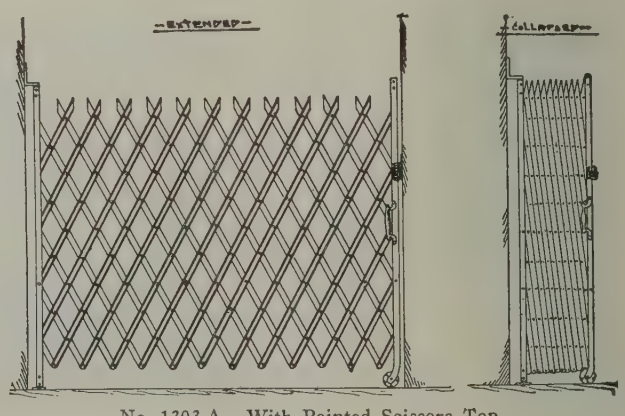
No. 1254-A. With Wrought Pickets



No. 1246. With Ornamental Pickets and Ball Rivets



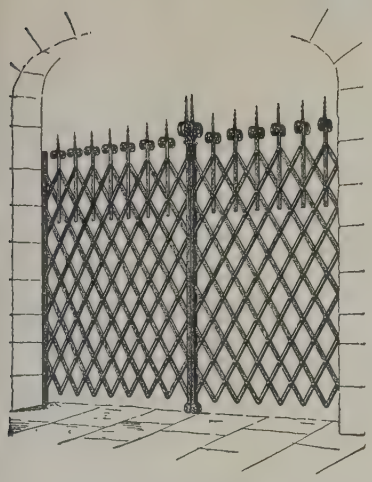
No. 1303. Plain



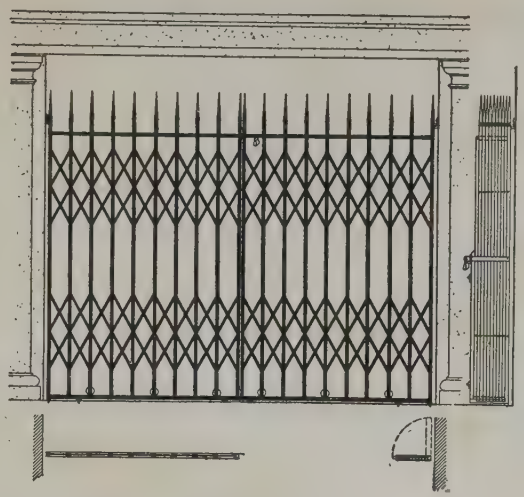
No. 1303-A. With Pointed Scissors Top

"Pitt" Lazy Tong Folding Gates for Entrances, etc.

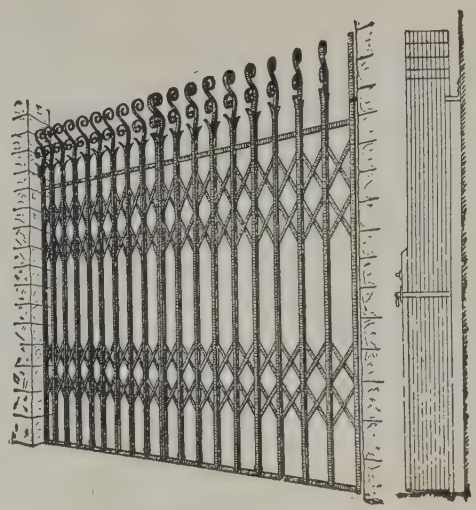
Continued on next page



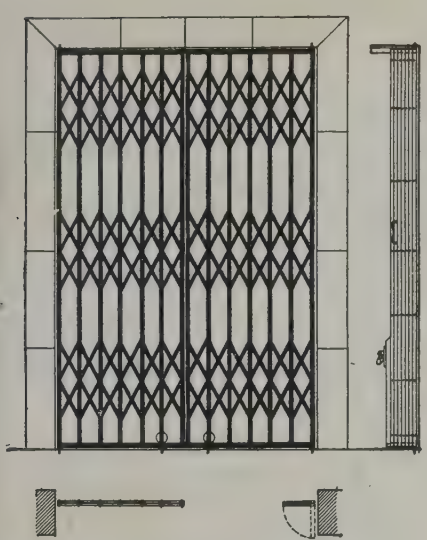
No. 1254. "Pitt" Gate, with Ornamental Wrought Pickets



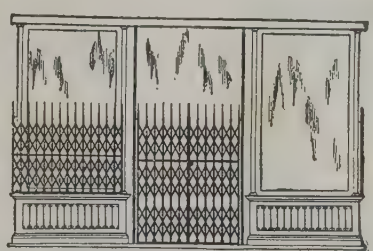
No. 1262-A. "Pitt-Bostwick" Gate with Cast Spear Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



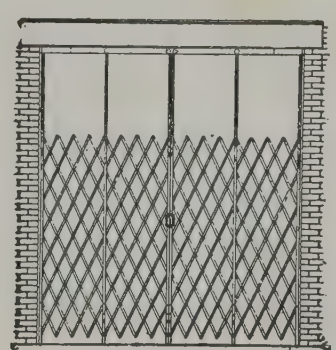
No. 1260. "Pitt-Bostwick" Gate with Ornamental Wrought Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



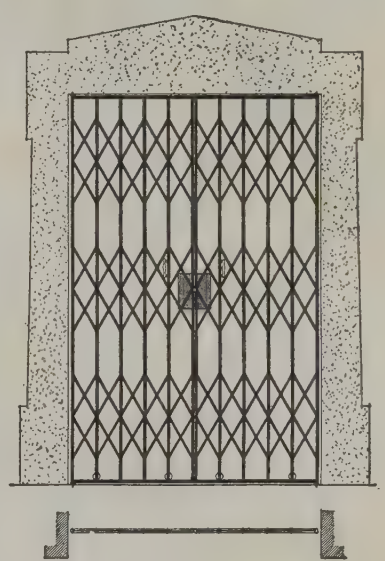
No. 1284. "Pitt-Bostwick" Vestibule or Window Gate with Stationary Top and Hinged Lifting Bottom Tracks



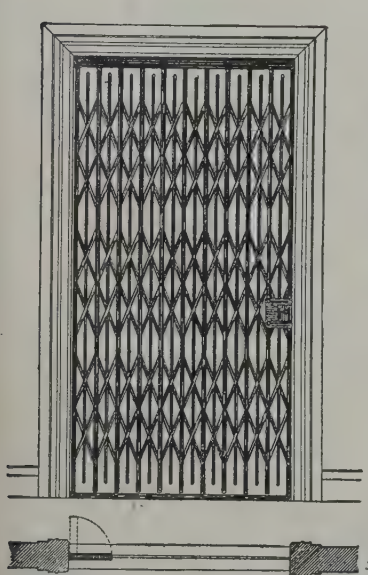
No. 1273. "Pitt-Bostwick" Gate and Window Guard for Store Front



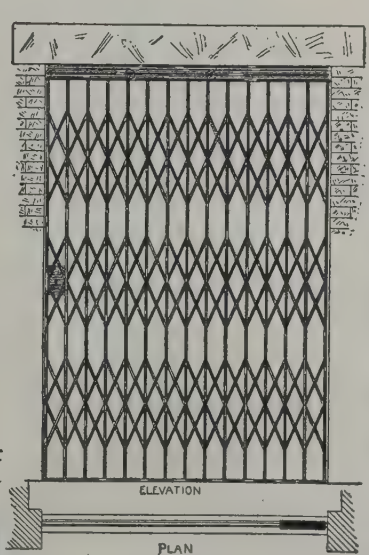
No. 1302. "Pitt" Lazy Tong Gate for Driveway Entrances



No. 1267-A. "Pitt-Bostwick" Guard for Window with Stationary Tracks Top and Bottom

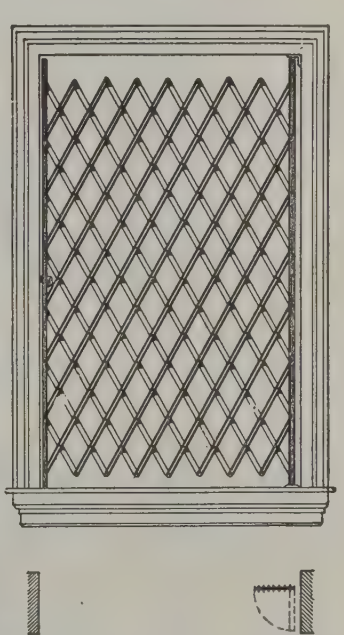


No. 1245. Close Mesh "Pitt-Bostwick" Elevator Gate for Shaft Openings



No. 1261. "Pitt-Bostwick" Folding Elevator Gate

No. 1300. "Pitt" Lazy Tong Folding Elevator Gate



No. 1316. "Pitt" Lazy Tong Guard for Windows. No Tracks

Standard Types of Folding Gates

Special designs submitted on request

ESTABLISHED OVER 25 YEARS

L. E. JONES, Prop.

L. E. JONES WIRE & IRON WORKS

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PLANT 318-322 DAVIS STREET
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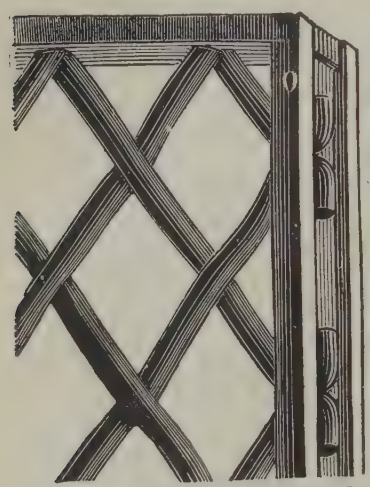
ORNAMENTAL IRON and WIRE WORK: including Window Guards, Elevator Enclosures, Grilles, Folding Gates, Elevator Cars, Sieves, Sand and Coal Screens, Machine Guards, Wire Partitions, Railings, Iron Gratings, Sidewalk Doors, Fire Escapes, Railings and Entrance Gates.

Also Fine Mesh Wire Cloth, Diamond Mesh Fabric, Galvanized Wire Mesh Cloth and Steel Stack Netting.

Facilities and Service

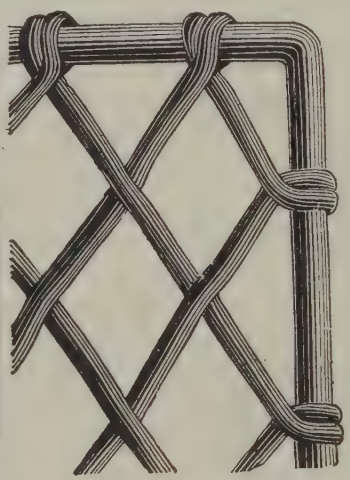
Our plant is fully equipped with facilities to handle any type of ornamental iron work. Our service is prompt and satisfactory.

We are prepared to work up any special designs submitted to us or will be glad to offer our own suggestions when desired. Inquiries are given prompt and careful attention. We have a number of special catalogues covering the various types of work which will be sent on request.



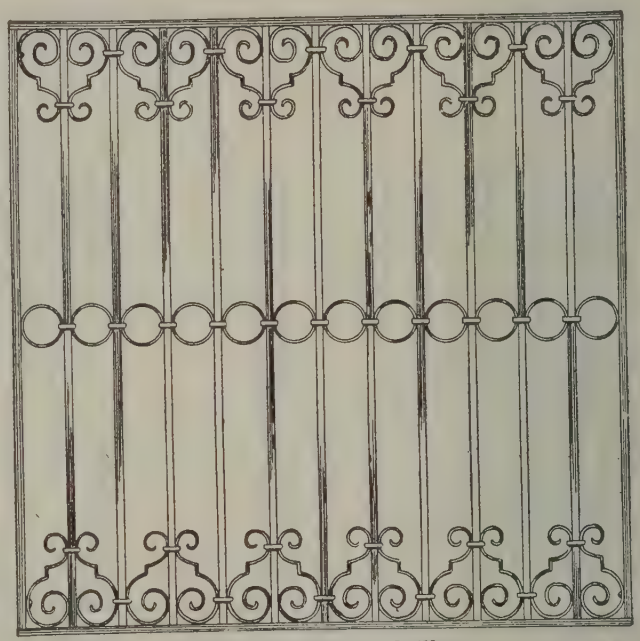
No. 25 Wire Window Guards

These guards are made with channel iron frames. They are strong and substantial, and made to screw in the window jamb, but can also be made to fasten to the outside of frame if so desired



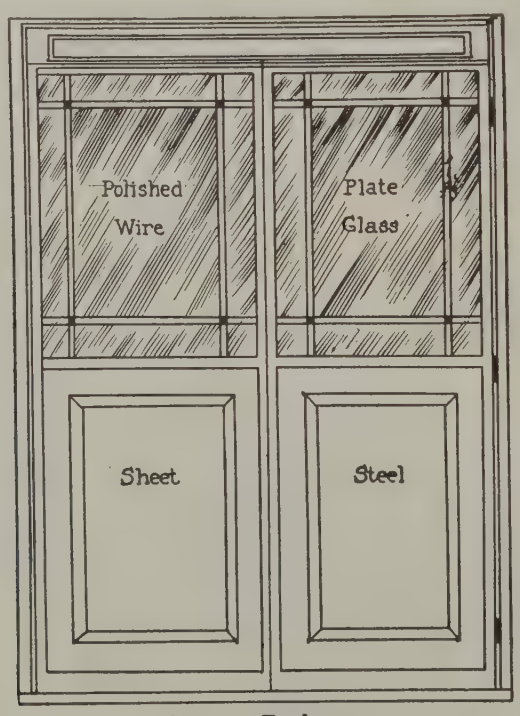
No. 26 Wire Window Guards

This type of inexpensive guard is usually fastened with staples, but they can be furnished with lugs for screw attachment if required.



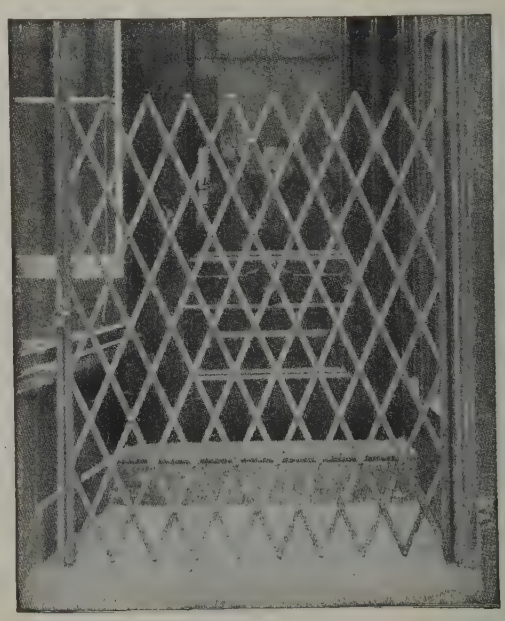
Bank and Office Grilles

Made of iron, steel, brass, bronze and oxidized copper and in any finish. Plain flat grilles, with or without frames for sundry purposes to the more elaborate ornamental types for office, banks, etc. Made to designs submitted to us or specially designed to harmonize with other fixtures



Elevator Enclosures

We make a specialty of all types of elevator enclosures and have equipped some of the largest office buildings in this field. Your inquiries for this class of work are solicited. A special catalogue will be sent on request



Folding Gates

All types and sizes of folding gates. Can be made to fit any opening. For store, factory, elevators, passageways and office entrances, as well as for other miscellaneous uses.

TAYLOR & DEAN

PITTSBURGH IRON AND WIRE WORKS
(ESTABLISHED 1842)

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ORNAMENTAL IRON and WIRE WORK, including Ornamental Grilles, Railings, Entrance Doors and Gates, Fencing, Stairs, Bank Screens; Spiral Stairs, Fire Escapes, Pipe Railings, Folding Gates; Iron and Bronze Lamps; Fireproof Porches.

Designers of SPECIAL HAND WROUGHT IRON or BRONZE FIRE GUARDS.

Also Wire Fencing, Partitions, Tennis Court Enclosures, Tool Room Enclosures, Window Guards.

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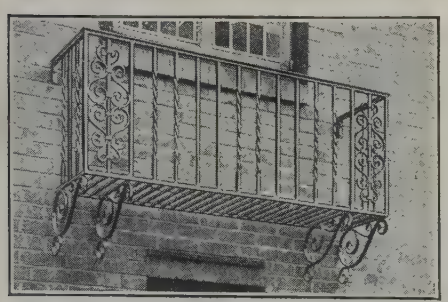
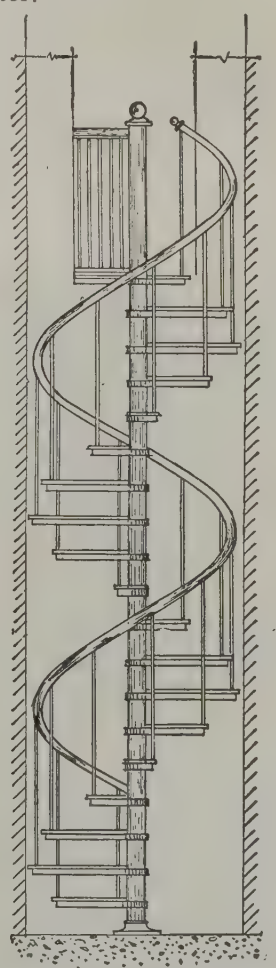
An engineering department is maintained, which is at the service of the architect or owner for supplying information on design and uses of TAYLOR & DEAN products. Estimates and information are freely given.

TAYLOR & DEAN are extensive manufacturers, distributors and erectors of the above mentioned products. Over eighty years' experience makes them well qualified to handle, in an expert manner, any work of this character.

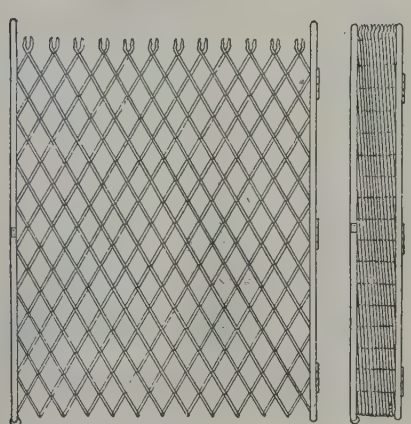


Flower Boxes and Balconies

Bridge and Stair Railing



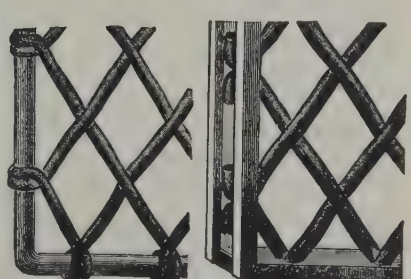
Spiral Stairway



Folding Gate

Good Example of All-steel Stairway and Hand Railing as Used in the Best of Modern Dwellings

Hammered Wrought Iron Garden Fence and Gates



Round and Channel Frame Window Guards

TUCKER & FICKEISEN, INC.

Manufacturers of Wire Mesh Cage Enclosures, Railings, Grilles and Wickets

34 Cliff Street

NEW YORK, N. Y.

Products, Facilities, Service

CAGES and GRILLE WORK for banks and offices.

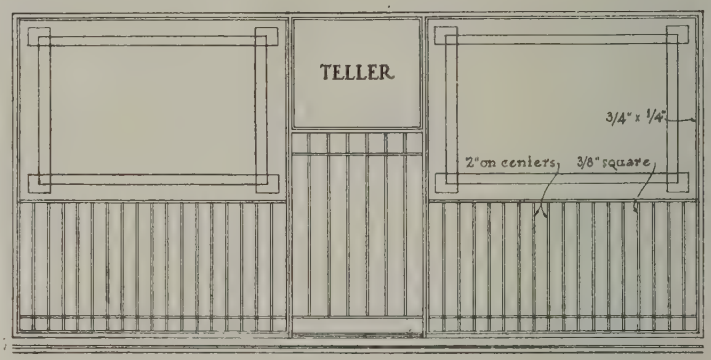
WIRE ENCLOSURES for stockrooms, toolrooms.

WIRE GUARDS for windows, doors, skylights.

BAR GRILLES, WICKETS, and RAILS—in bronze, brass, steel and silver.

Facilities—Our plant is completely equipped with modern machinery for the manufacture of the highest type product in our field.

Service—Accurate working drawings or design sketches prepared for any project. Samples of material or various finishes furnished. Architects' details accurately followed.



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Chase National Bank, New York, N. Y.
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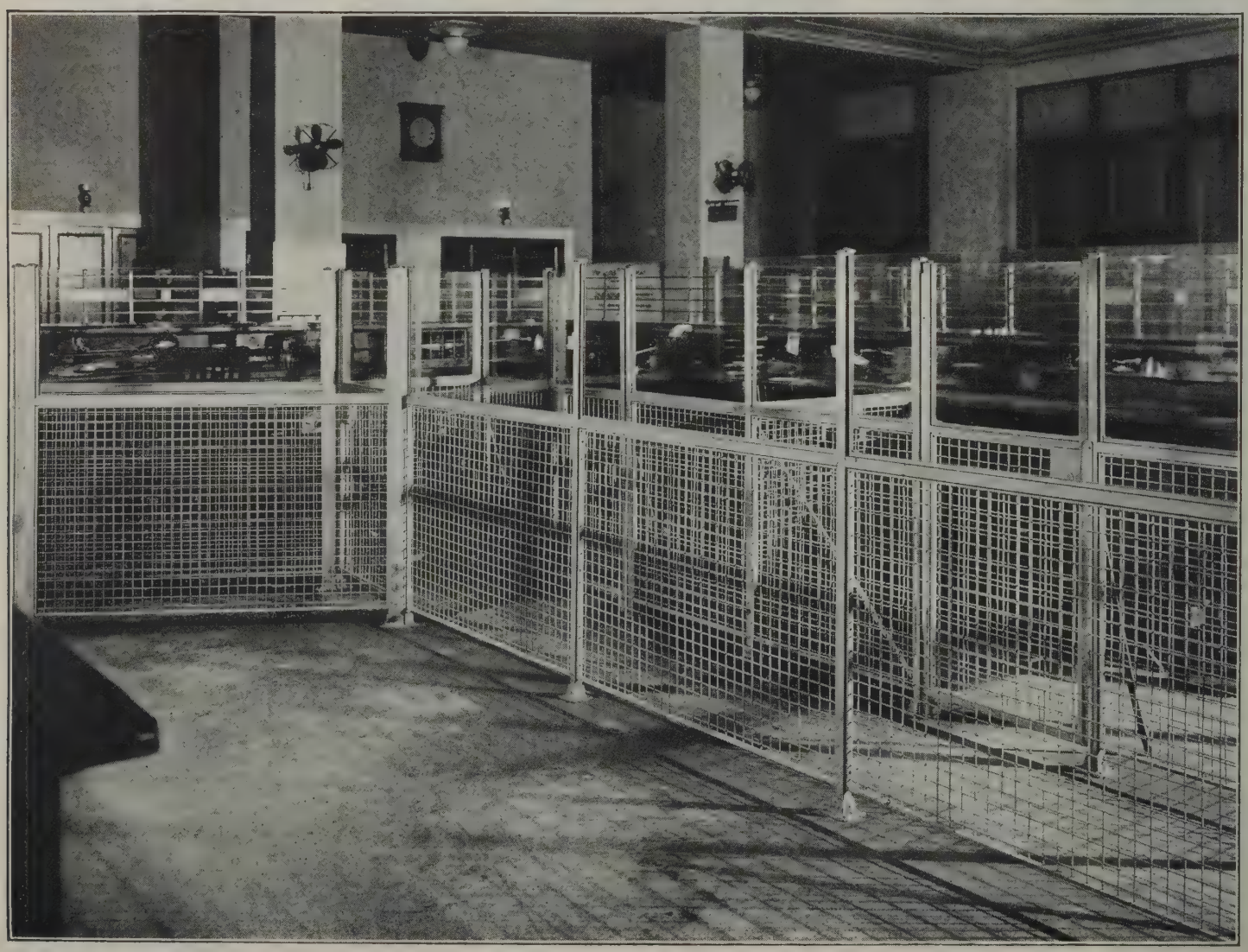
U. S. Mortgage & Trust Co., 73rd St. and Broadway, New York, N. Y.
First National Bank, Altoona, Pa.
Ocean City Title & Trust Co., Ocean City, N. J.
Farmers National Bank, Reading, Pa.
Broad St. National Bank, Trenton, N. J.
Federal American National Bank, Washington, D. C.
Excelsior Trust Co., Philadelphia, Pa.
International Motor Company, New York, N. Y.
Standard Oil Company, New York, N. Y.
Packard Motor Car Company, New York, N. Y.
Uppercu Cadillac Company, New York, N. Y.



WESTERN WIRE & IRON WORKS, INC.

Manufacturers of Steel and Bronze Folding Gates and Wire Mesh Products

1820-1830 South Sangamon Street
CHICAGO, ILL.

TELEPHONE
CANAL 6442, 6443

Products

STEEL and BRONZE FOLDING GATES.
WIRE MESH SKYLIGHT GUARDS.
Also manufacturers of Wire Mesh Storeroom Partitions; Wire Mesh Factory Partitions; Wire Mesh Door and Window Guards; Area Gratings and Sidewalk Doors; Pipe Railings and Iron Window Guards; Ornamental Iron for residences.

For Wire Mesh Bank Cages, Grilles and Wickets for bank cage fronts; Sliding Door Locks and Hangers for bank cage doors, see page A1343.

Steel and Bronze Folding Gates

We have developed an improved vertical bar type of folding gate which is especially suited for school hall corridors and extra wide openings and public spaces.

Fig. 1 shows half elevation of gate both extended and collapsed, also detail of wall connections, locking arrangement and top track. Bottom track is similar. Note compactness of gate and top and bottom tracks when gate is collapsed. Gates are hinged to allow same to swing back against wall or into recess, whichever is desired. Angle hinge bars run from floor to ceiling

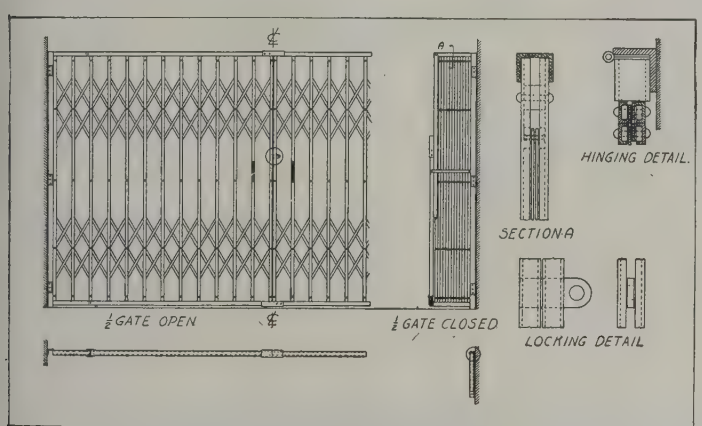


Fig. 1

affording secure anchorage. Top and bottom tracks insure excellent rigidity and prevent swaying when gates are open. Widths up to 22 ft. can be accommodated. Heights up to 7 ft.

Gates can be furnished made of steel, brass or bronze with steel or bronze tracks.

One man can operate gates with ease.

We also manufacture diamond lattice folding gates made of either flat bars or channels.

Construction—Vertical bars consist of two ¾x⅜x⅛-in. channels, riveted together with cast iron separator blocks between. Lattice bars are ⅝x⅛ in.; top and bottom tracks are 1¼x1x⅛-in. channels and hinge bars are 1½x1½x¼-in. angles.

Specification for Folding Gates—Furnish and install double hinged vertical bar type folding gates with folding top and bottom tracks, as manufactured by WESTERN WIRE & IRON WORKS, INC., Chicago, Ill., or equal. Vertical bars to consist of double ¾-in. channels spaced not more than 5 in. o.c. when open. Hinge bars must be securely anchored. Gates to be made of bronze throughout, including bronze top and bottom tracks, and to be polished and lacquered. (Specify steel or bronze for gates or tracks, whichever is desired.) Leave all gates in first class working order.

Wire Mesh Skylight Guards

We present herewith a practical construction of wire mesh skylight guards for ventilated skylights which reduces to a minimum danger of early corrosion usually caused by allowing places for moisture to accumulate.

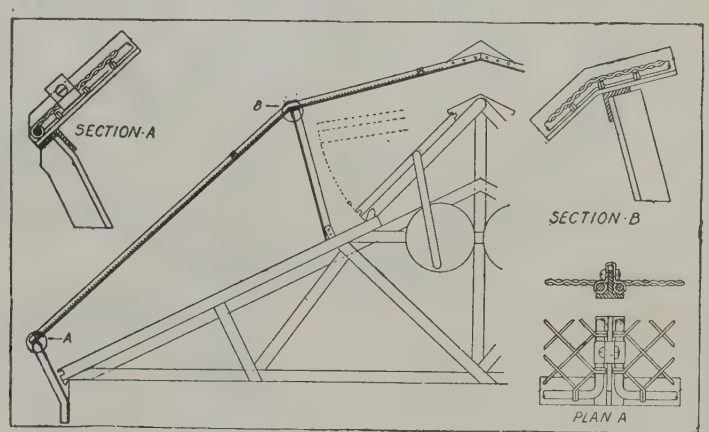


Fig. 2

By referring to Fig. 2 you will notice that supporting angles and tees are placed so that no moisture may collect. Guards are made with ⅜-in. round frames, securely bolted to tees by means of clips which make guards easily removable for repainting and give access to all points.

Be sure to specify whether guards and framework are to be made steel painted, galvanized material, galvanized material painted, hot galvanized after, cadmium plated or bronze wire and frames on painted steel framework. For an enduring job, bronze throughout is recommended.

Specification for Skylight Guards—Furnish over all skylights wire mesh guards made of 1-in. diagonal mesh No. 12 W&M gauge wire with ⅜-in. round rod frames. Weld stiffening rods through center of guards containing over 20 sq. ft. No panel to be larger than 5x8 ft. All guards to be supported on 1¼x1¼x$\frac{3}{16}$-in. angle and tee iron supporting framework as detailed, held not less than 8 in. from glass by means of 1½-in. angle struts at ends and sides and 2x$\frac{3}{16}$-in. flat bar standards over skylight, bolted to lugs placed in skylight construction by skylight contractor. All as made by WESTERN WIRE & IRON WORKS, INC., Chicago, Ill., or equal.

VULCAN RAIL & CONSTRUCTION COMPANY

Manufacturers of Pipe Railings

MAIN OFFICE AND WORKS
Grand Street and Garrison Avenue, MASPETH, N. Y.
BRANCH OFFICE AND SHOPS: 39th Street and A. V. R. R., PITTSBURGH, PA.

Products

PIPE RAILING complete with Fittings, for:
- Stairs
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- Grandstands
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SPECIAL PIPE WORK for:
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- Garment Racks in fur storage rooms
- Table Supports
- Park Shelters

STAIRS and LADDERS with PIPE RAILING for
- Power Plants
- Walkways
- Subways, etc.

For Fire Doors, see page A993.

Standard Pipe Stair and Wall Rail

Specific Information

Complete information, including estimates and preliminary designs for any of the products illustrated, or listed under products, will be promptly supplied on request.

Catalogue sent on application.

Service to Architects and Engineers

We offer to architects and engineers the service of our Engineering Department to advise with them or aid them in any railing problem or in any other problem involving the use of pipe and fittings in construction work.

We Manufacture and Erect Complete Pipe and Bridge Railings

It is not our policy to furnish fittings alone.

For over 25 years we have been manufacturing and erecting pipe railings and bridge railings in all localities.

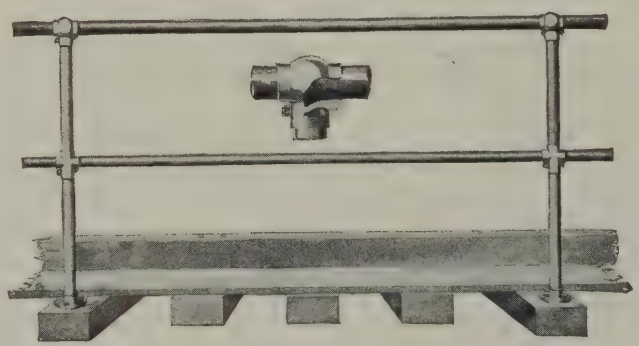
We design railings for any purpose or make them up from architect's specifications.

In many cases these railings are made entirely of pipe and fittings, whereas in other instances they are made of a combination of pipe with bars or other structural shapes.

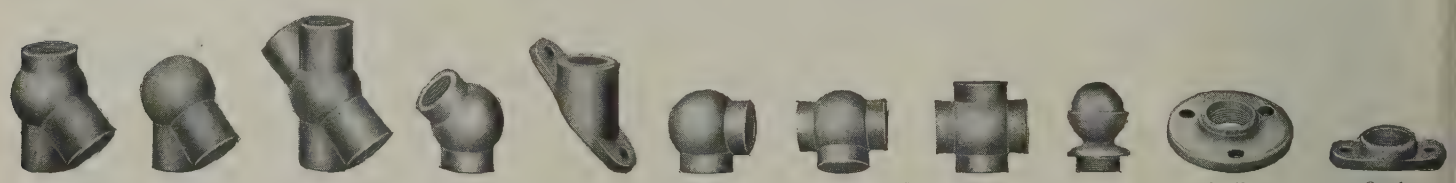
Facilities

Our main plant at Maspeth, N. Y., and branch shops at Pittsburgh, Pa., are both fully equipped to manufacture railing products, having a trained force of skilled and experienced workmen, which insures prompt and efficient execution of all orders.

Both plants are located on main line railroads and have private sidings.



Elevated Railroad Railing Constructed with Special Malleable Iron Fittings Equipped with "Vulcan" Anti-rattler Wedges to Prevent Loosening of Railing Due to Vibration of Structure



"Vulcan" Standard Railing Fittings

Boardwalk Railing with Lamp Posts

Typical Bridge Railing

Continued on next page

In the railings made solely of pipe and fittings a great variety of conditions can be met and a varied effect can be produced by the use of different types of posts. Some of these different posts are indicated on the following page.

A few different types of railings suitable for use on bridges and approaches and made of pipe and steel shapes are indicated on second page following.

We are, as our name states, a pipe rail manufacturer and a construction company. We will undertake the complete design, manufacture, fabrication and erection of any pipe railing job. We will guarantee that all materials will be as specified, and that the finished job will be the highest quality possible in pipe railings, as regards fit and erection. In addition, all work is guaranteed to give the service for which it is installed.

Contracts executed in any part of the United States or Canada.

VULCAN RAIL & CONSTRUCTION COMPANY

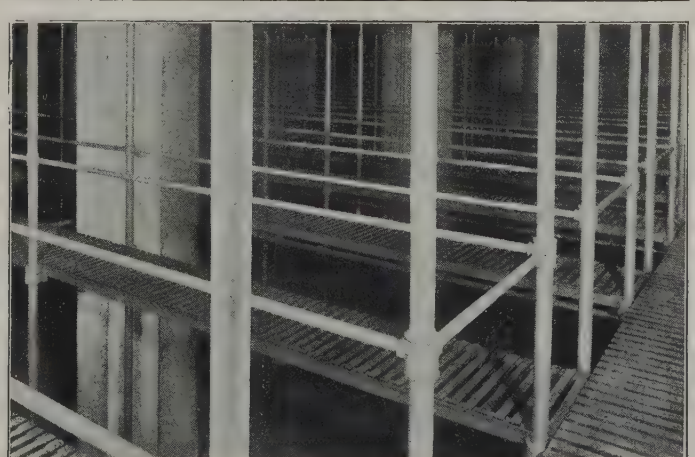
TRADE-MARK

Full Size Sections of Standard Wrought Steel Pipe

GENERAL INFORMATION REGARDING STANDARD WEIGHT PIPE

Nominal size pipe, inches.	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Actual inside diameter, inches.	.49	.62	.82	1.04	1.38	1.61	2.06	2.46	3.06	3.56	4.02	4.50	5.04	6.06
Actual outside diameter, inches	.67	.84	1.05	1.31	1.66	1.90	2.37	2.87	3.50	4.00	4.50	5.00	5.56	6.62
Approximate outside, inches...	11/16 —	7/8 —	1 1/16 —	1 5/16	1 11/16 —	1 15/16 —	2 3/8	2 7/8	3 1/2	4	4 1/2	5	5 9/16	6 5/8
Weight per foot, lb.	.56	.84	1.12	1.67	2.24	2.68	3.61	5.74	7.54	9.00	10.66	12.34	14.50	18.76
List price per ft.	$.06	.08 1/2	.11 1/2	.17	.23	.27 1/2	.37	.58 1/2	.76 1/2	.92	1.09	1.27	1.48	1.92

Grand Stand at Ebbet's Field, Brooklyn, N. Y.
All railings and gates supplied by Vulcan Rail & Construction Company



Fur Storage Rooms, Frederick Loeser & Co., Inc., Brooklyn, N. Y.
Similar racks supplied for cold storage rooms for other large department and fur stores

Continued on next page

Fig. 1 Fig. 2 Fig. 3 Fig. 4

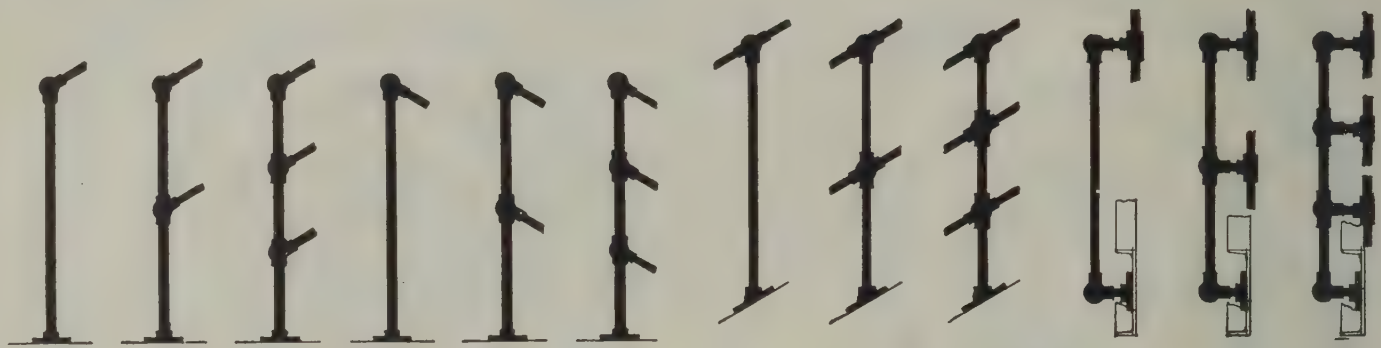


Fig. 5 Fig. 6

Fig. 7 Fig. 8

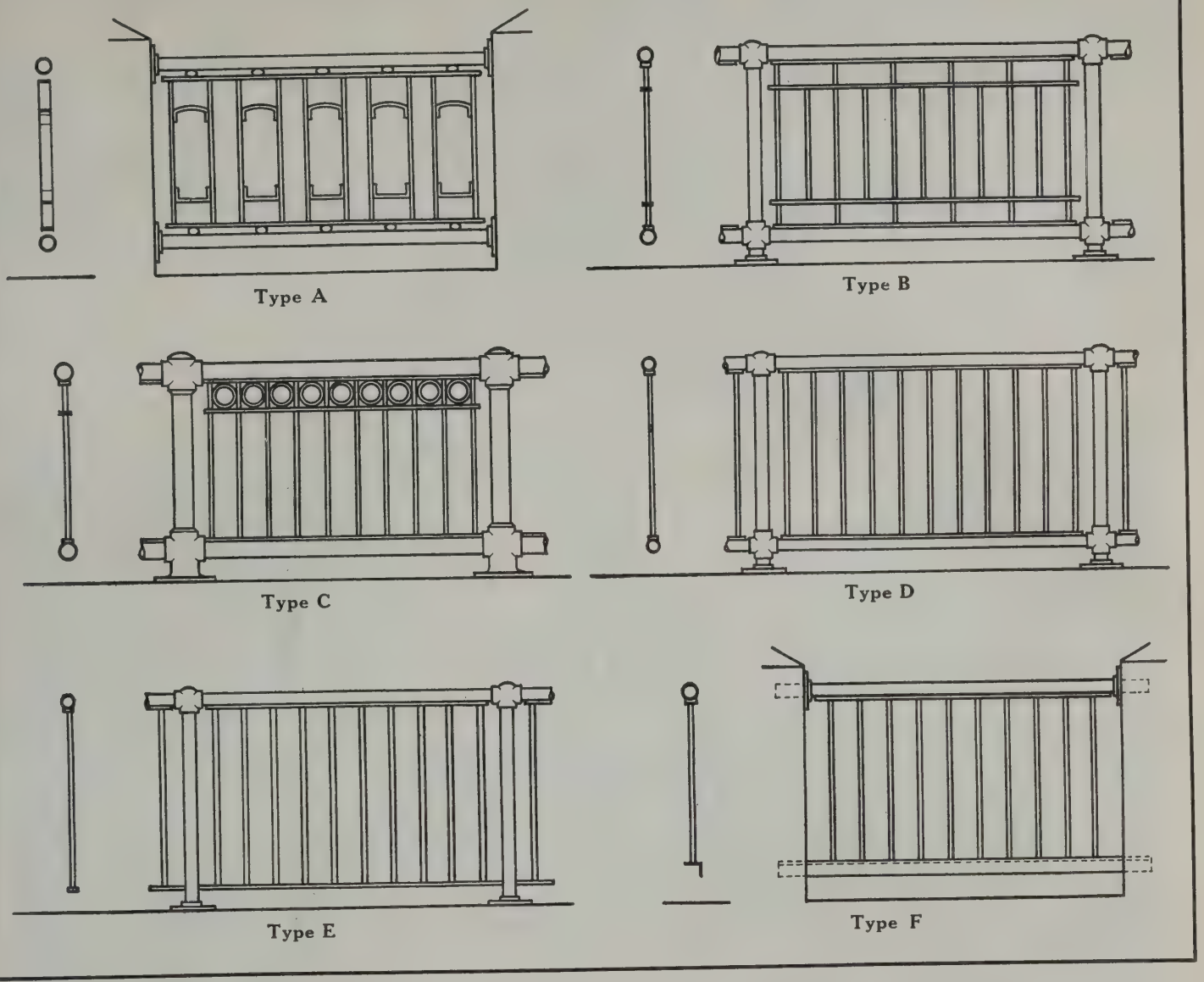
Typical Railing Posts Made with Pipe and Standard "Vulcan" Fittings

Shown above is a group of posts of the types most frequently used in the construction of pipe railing. Although these sketches show posts for one, two and three horizontal rails, the two-line railing is most generally used. However, railing can be made with any number of horizontal rails.

Fig. 1. Level end posts.
Fig. 2. Level line posts.
Fig. 3. Level corner posts (note plan of post).
Fig. 4. Stair landings or platform posts (similar to illustration on our first page).
Fig. 5. Stair starting and landing posts.
Fig. 6. Stair line posts (similar to illustration on our first page).
Fig. 7. Stair landing posts (with side outlets, right or left).
Fig. 8. Stair landing posts where the railings continue level.

Railings with any of the above posts and many others can be quickly made up from the large stock of Standard "Vulcan" Pipe and Fittings continually on hand.

Continued on next page



Various Types of "Vulcan" Bridge Railings

To attempt to show in a small space any considerable number of bridge railing designs is practically impossible, as the various combinations that can be made by the use of pipe, fittings, bars (square and round), flats, channels, angles, etc., is well-nigh inexhaustible.

The designs shown above vary from that in which square or round rods are used for the pickets with a channel top-bar directly under the pipe, and a bar or channel for the bottom member, to more elaborate designs using cast iron posts and introducing rings and other shapes into the railing panels.

Special designs to suit architects' and engineers' requirements will be submitted on request.

Queensborough Bridge, New York, N. Y., Showing Outside Footwalk Railings

We furnished and erected 42,000 ft. of railing, also lamp posts, used along footwalks and car tracks on this bridge

Manhattan Bridge, New York, N. Y., Outside Footwalk Railing

Total of 11 miles of railing furnished and erected by us on this bridge on footwalks, driveway, and elevated tracks

AMERICAN FENCE CONSTRUCTION CO.

Iron Picket Fences—Chain Link Fences

TELEPHONE
MURRAY HILL 4470

S. W. Corner Fifth Avenue and 44th Street
NEW YORK, N. Y.
REPRESENTATIVES IN PRINCIPAL CITIES

Fences and Gates of Standard and Special Design

This company offers a wide and complete choice of designs in standardized fences and gates both of iron picket and chain link wire types. In addition, it is prepared to execute special-design fences and ornamental iron work from architect's designs. Some of our work of this kind is pictured here.

Iron picket fences, because of the infinite possibilities of ornamental design work, are standardized only in respect to the general use of certain "plain" picket fences of the designs detailed on the following page. Ornamental work, special gates, etc., are executed in infinite variety.

Chain link wire fences, however, are a standardized product, as per specification details presented on the following page.

Catalogues, installation views, and blue prints of stock and semistandard designs of iron or wire fence are available for reference. We gladly assist in preparing specifications that enable the economical production of special designs from standard size materials.

AFCO
TRADE-MARK

Other Products

Tennis court enclosures, poultry and kennel runs, arbors and trellises, window guards, interior wire partitions and industrial property chain link fences.

An Afco Design Special Gateway

With double gates 12 ft. wide, 7 ft. high at sides, 9½ ft. high in center; and side gates 4 ft. wide, 6 ft. high. Pickets throughout are ¾ in. square and spaced approximately 5 in. apart, with scrollwork of appropriate size

Estimates and Service

Estimates on either fence materials or fences plus erection will be given, either by this office or local representatives throughout the Eastern, Central and Southern States. The fullest measure of co-operation is available.

Information regarding standard practice in the size of members, dimensions of concrete footings and other such practical data is made available to any who will find it helpful.

Fig. 2, Afco 54A Gate at Private Estate Entrance
Matches fence in detail Fig. 10

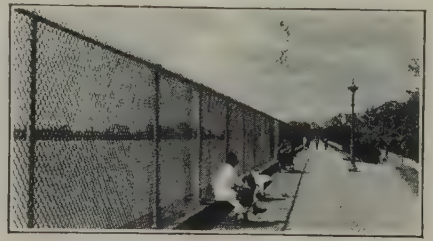


Fig. 3, Afco Chain Link Fence
7 ft. high, guarding a city reservoir

Fig. 4, Special Design Gate and 4-rail Iron Picket Fence
Note ornamental iron gate posts

Continued on next page

Fig. 5, Ornamental Fence
6 ft. high, 1-in. square pickets. An adaptation of the simple design in detail of Fig. 8. Special newel posts

Fig. 6, Afco 200A Fence Surrounding a Church Property
5½ ft. high
See table for specifications

Fig. 7, Afco 300 Fence and Matching Double Walk Gates

Iron Picket Fences and Gates

The standard iron fences are built in varied sizes of pickets, proportionate to specified heights and the duty intended.

Standard designs can be given simple ornamentation to harmonize with the fence's architectural background, such as the row of rings in detail Fig. 10.

Special design work originates with the architect, often with the co-operation of our organization in so far as the specification is prepared to enable the utilization of members in sizes readily available.

Detail Fig. 8	Detail Fig. 9	Detail Fig. 10	Size pickets, in. square	Channel rail size, in.	Height, ft.
No.	No.	No.			
300	200	350	⅝	1½x½	3, 3½, 4, 4½, 5,
301	201	351	¾	2 x⅝	3, 3½, 4, 4½, 5, 6
302	202	.....	⅞	2 x⅝	3, 3½, 4, 4½, 5, 6

Pickets spaced on 5-in. centers.

Afco Chain Link Fences

Standardized fences in heights from 3½ to 10 ft., for the varied requirements of homes, estates, institutions, schools and playgrounds, etc. All are built with Afco Chain Link Fabric of rust-resisting *copper-bearing steel* wire, *galvanized after weaving* by a special hot dip process.

"Guardian" Fence—A medium weight structure for general use either without or with (as Style 913) barb-wire overhang.

Specification—End, corner and gate posts 2½ in.; line posts 2 in.; top rail 1⅝ in.; all outside diameter measurement, standard weight galvanized pipe. Fabric 2-in. mesh chain link of No. 6 or 9 copper-bearing steel wire. Heights, 4, 5 and 6 ft. Set with drive anchors, or in concrete post footings.

Style 913—Same as above but with 3 strands thickset barb-wire on post arms.

Fig. 8, Detail of 300 Fence
3-in. I-beam post, pineapple top

Fig. 9, Detail 200 Fence
1-in. square posts with back brace and ornamental top

Fig. 10, Detail 350 Fence
No. 16B posts, 2-in. square. Ball top

"Bulwark" Fence—A heavy weight standard for schools, institutions or extra high fences.

Specification—End, corner and gate posts 3 in.; line posts 2½ in.; top rail 1⅝ in.; all outside diameter standard weight galvanized pipe. Fabric 2-in. mesh chain link of No. 6 or 9 copper-bearing steel wire. Heights 5 to 10 ft. Set in concrete footings 36 in. deep.

Single and Double Gates

Are of rigid frame construction, being built of tubular members welded at all joints. Standard sizes for either fence, to meet all normal conditions.

Tennis Fence

Two specifications, for private, and for club and professional courts. Either complete enclosure, backstop or backstop and wings, of standard 10-ft. height or to order.

Specifications—***Private Courts***—End, corner and gate posts 2½ in.; line posts 2 in. spaced 8 ft. apart; top rail 1⅜ in.; all outside diameter measurement standard weight galvanized pipe. Fabric 1¾-in. mesh chain link of No. 11 wire. Set in concrete footings 36 in. deep.

Professional Courts—Same as above, except end, corner and gate posts 3 in., line posts 2½ in. outside diameter spaced 10 ft. apart, top rail 1⅝ in.

Afco Chain Link Factory Fence

The heaviest chain link fence, used as a non-climbable barrier where absolute protection is essential. Built on steel angle posts, with integral overhanging arm carrying 3 strands of heavy barbed wire. Set in concrete. Described fully in SWEET'S ENGINEERING CATALOGUE, or printed specification sheets can be had on request.

Fig. 11, Afco "Bulwark" Fence at School Grounds
5 ft. high, 2-in. mesh chain link fabric

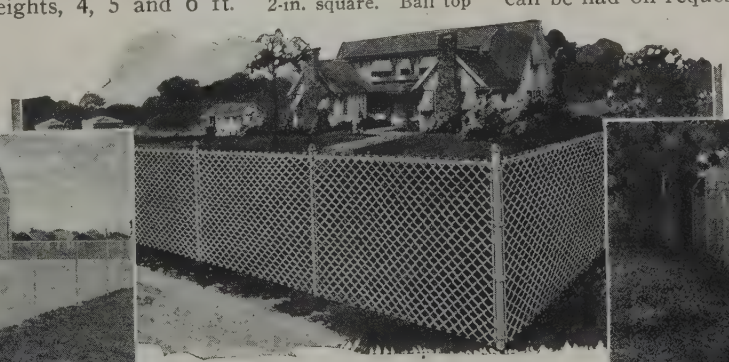


Fig. 12, Afco "Guardian" Lawn Fence
4 ft. high
See specification above for details

Fig. 13, Afco 913 Fence, Non-climbable Chain Link Type

ANCHOR POST FENCE COMPANY

Manufacturers of Wire Fences, Iron Railings and Entrance Gates

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FACTORIES: BALTIMORE, MD., and CLEVELAND, OHIO

Products

ORNAMENTAL IRON ENTRANCE GATES; ELECTRICALLY WELDED RAILINGS and GATES.

WIRE and IRON FENCES of all kinds and in several heights, for country places, residences, parks, playgrounds, institutions, factories, mills, railroads, reservoirs, etc.

TENNIS COURT and ATHLETIC GROUND ENCLOSURES; KENNEL, POULTRY and STOCK PADDOCK FENCES; expert designing and construction of special ENCLOSURES for game, birds, etc.; IRON and WIRE ARBORS, ARCHES and TRELLISES.

TRADE-MARK

Nation-wide Sales and Erecting Service

A chain of Anchor offices located in principal cities in all parts of the United States insures immediate attention to the requirements of architects. We maintain trained crews of erectors who erect fences under the supervision of our main office and branches, thus insuring good workmanship and an economical job. If desired, we will make surveys for grades and measurements and take entire charge of the work. When a customer prefers to do the erecting, tools and necessary instructions are furnished.

Estimates and Catalogues

Estimates given for products delivered and set complete in any part of the country. In requesting estimates, send, if possible, a diagram giving dimensions, location of gates, ends and corners.

For the convenience of architects and their specification writers we have prepared a special folder according to specifications for A.I.A. filing system. It contains a complete set of catalogues, specification sheets with scale drawings, details and dimensions on Anchor Fences, Railings and Gates.

The nearest Anchor office will gladly send you one of these handy folders. Just write for folder "A.I.A. File 14-K."

Ornamental Iron Entrance Gate on the Estate of Asa G. Candler, Jr., Atlanta, Ga.
This installation also includes 5700 ft. of Anchor Chain Link Fence, Type DOA-1, 7 ft. high

Continued on next page

Anchor Garden Gate on Private Estate

Anchor-Weld Railing, Type RA-1
Surrounding residence of H. C. McCrady, Pittsburgh, Pa.

Iron Railings and Entrance Gates

Long experience enables this company to manufacture railings and ornamental gates properly proportioned and designed, and correctly made in all details. Special or stock designs furnished.

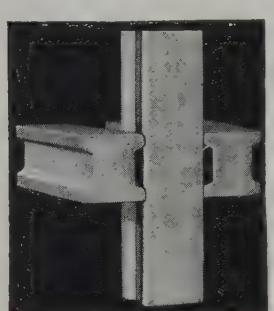
Anchor-Weld Railings and Gates

The ANCHOR POST FENCE COMPANY has secured the right to manufacture railings and gates by the *electric-weld process.* As shown in the illustrations, we use grooved square bars: ½, ⅝ and ¾ in. square. The rails consist of these bars in horizontal pairs the length of a panel. Welded between these pairs, and at right angles to them, are the pickets. All welding is done on the flange sides of rails and pickets.

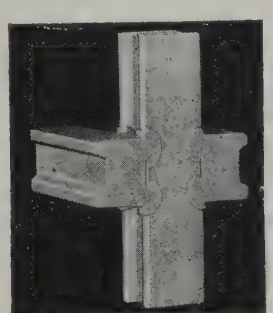
The strength of this type of construction is enormous. Not only does it permit the making of panels as long as 10 ft., but the center support—so necessary with ordinary railings—is dispensed with entirely.

Even when supporting an additional weight of several hundred pounds at the center, the rails show little or no deflection. Pickets can not loosen and fall. Gates, made in the same manner as the railing, require no disfiguring diagonal braces to maintain rigidity.

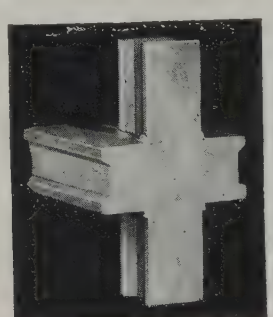
Elaboration is possible: circles, scrolls, ellipses, and other special features may be introduced, double top or bottom rails may be used, and highly ornamental iron posts or brick, stone, concrete, or cast iron columns may be employed.



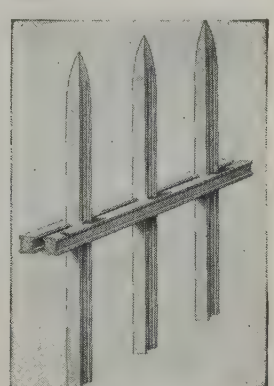
Grooved Square Rods of Open Hearth Steel



Electrically Welded Under Tons of Pressure



Forming One Solid Piece at Each Intersection



Perfect Union of Pickets and Rails

Anchor-Weld Railing, Type RA-3
And single walk gate at St. Mary's School, Elizabeth, N. J.

Anchor-Weld Double Gate
At the factory of The Duratex Co., Newark, N. J.

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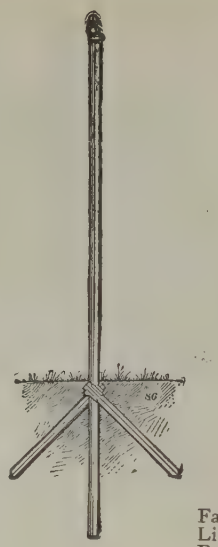
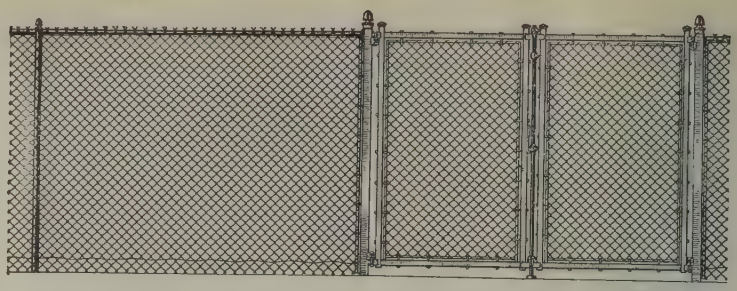
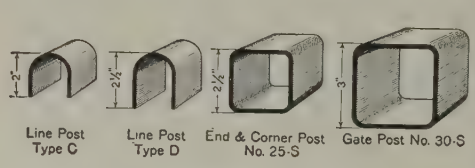
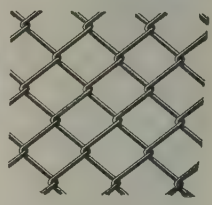
Section of Anchor-Weld Wire Gate with Anchor Square Terminal Post









Chain Link Steel Fence

Fabric.....Copper-bearing steel wire, galvanized *after* weaving
Line posts..High carbon steel, Type C or D, U-bar, spaced about 10 ft.
End, corner and single gate posts.....No. 20-S or 25-S
Double gate posts.....No. 25-S

Anchor Chain Link Fences

It is our contention that a chain link fence should be not only enduring in construction, but attractive in appearance as well. Anchor Chain Link Fences have been designed with these points in mind. Their four exclusive features—(1) high carbon steel U-bar line posts; (2) square terminal posts; (3) drive-anchorage; (4) Anchor-Weld Wire Gates—contribute materially to their exceptional strength and distinction.

Anchor Chain Link Fabric is of best quality copper-bearing steel wire, *galvanized after weaving.* Made of No. 9 and No. 6 gauge wire, the latter being more commonly used. Heights up to 10 ft. The small mesh affords no foothold for climbers and the three strands of barbed wire at the top provide an additional safeguard.

Both top rail of galvanized pipe and barbed wire topping are optional. All parts are heavily galvanized by the hot-dip spelter process.

Anchor Square Terminal Post

An exclusive Anchor feature recently introduced by this company.

Stronger—because of its square shape; unclimbable—no bands or footholds for trespassers to use as a stepladder; more protective—fabric can not be detached from post from outside; better-looking—has no disfiguring fabric-holding bands.

Anchor U-bar Intermediate Posts

These posts are made of heavily galvanized high carbon steel. Mechanical bending tests show that, weight for weight and size for size, these U-shaped posts offer a higher degree of resistance to bending strain across the line of fence than any other form of post.

Anchor Drive-Anchorage

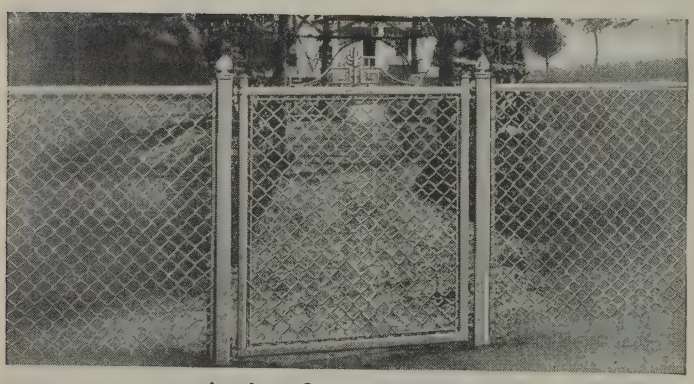
To insure permanent alignment of Anchor Fences we set the posts by our drive-anchor method, as illustrated. Neither frosts, thaws nor the heavy strains to which a fence is subjected can disturb a fence anchored by this method.

Anchor-Weld Wire Gate

The Anchor-Weld Wire Gate is the latest Anchor development. It marks an important improvement in gate construction.

For the frame of this gate we use square tubular steel, which contributes materially to the attractive appearance, strength and rigidity of the entire gate structure. The horizontal and vertical members of the frame are inseparably *butt-welded* together at the corners. So strong is this construction that no diagonal braces are needed.

Anchor-Weld Wire Gates are made in both single and double types, in a variety of widths.



Anchor Chain Link Fence
A lawn type of fence with Anchor-Weld Single Wire Walk Gate

Anchor Chain Link Fence
An installation of Anchor Chain Link Fence, including Double Anchor-Weld Wire Gate

Continued on next page

Anchor Chain Link Lawn Fence, Type AT-1

On the property of T. H. Hogsett, Cleveland Heights, Ohio.
Type AT-1 fences are made in heights of 3 ft. 7 in. and 4 ft. 1 in.

Anchor-Weld Iron Double Driveway Gate

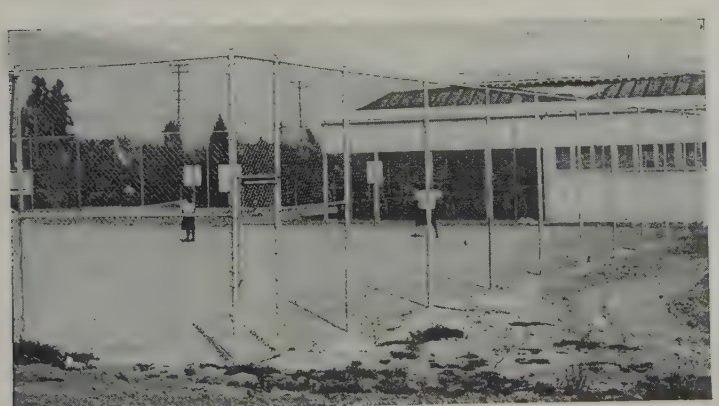
Anchor-Weld Iron Gates are made in both single and double types. Single gate opening: 3 ft. 8 in. Double gate opening: 10 ft.

Anchor Chain Link Fence, Type DO-1

Part of an installation of 2980 ft. at the Soldiers' Home, Noronton, Conn.

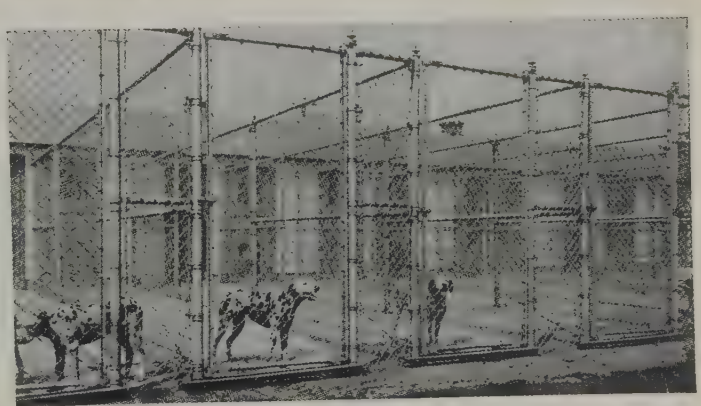
Anchor Chain Link Fence, Type DOA-1

Surrounding the estate of John D. Rockefeller, Sr., Lakewood, N. J.



Anchor Chain Link Tennis Enclosure, Type DT-1

Installed on grounds of high school, Pasadena, Cal. Built up to 12 ft. high, with adequate bracing of corners and firm anchorage. Narrow entrance gates comprised in enclosure proper



Chain Link Kennel Enclosure, Type DT-1

This kennel enclosure offers a clean runway, ample room for exercise and absolutely guards the dogs against escape, injury or theft. Can be furnished with or without covered top

Square Mesh Farm and Pasture Fence, Type CO-5

Similar to the high fence used to enclose cattle pastures.
Made in heights of 3 ft. 6 in., 4 ft., and 4 ft. 10 in. without arms or barbed wire

Chicken Run Enclosure, Type CT-4

Not only better looking but will last two or three times longer than those built with wood framework. Ratproofing is always advisable. A fine wire cloth is buried in the ground so that rats can not burrow under it; a slight charge is made for this addition.
Specification for any size enclosure can be furnished on application

ATLAS FENCE COMPANY

Protective and Ornamental Iron and Wire Fences

37 Verona Avenue, NEWARK, N. J.

Products and Service

ATLAS CHAIN LINK PROTECTIVE and ORNAMENTAL FENCING for every requirement.

Some of our Products:

Arbors	Garden Arches
Arches	Grilles
Tennis Backstops	Home Fences
Baseball Backstops	Iron Gates
Cashiers Cages	Factory Fencing
Cemetery Fences	Poultry Runs
Clothes Posts	Reservoir Fences
Dog Kennels	School Fencing
Estate and Game Enclosures	Tennis Fences
	Tree Guards
Farm Fencing	Trellises
Flagpoles	Window and Skylight Guards
Flower Bed Guards	Wire Partitions and Gates
Folding Gates	Park Fences

ATLAS FENCE COMPANY engineers will be pleased to consult with you and assist in the solution of your fencing or protection problems. They will submit plans and estimates for the most economical handling of the particular difficulty. This service is, of course, without cost and without obligation. We aim to make this a real service and many times it has resulted in saving money to the prospective customer.

Catalogue and further details of any Atlas Fence will be promptly sent on request.

Construction

If a property is worth fencing, it is worth fencing well. Ordinarily fences do not last long enough. Wood fences are inadequate.

Atlas Fences are built for permanence and are not destructible by fire or vandals. Every detail is carefully planned.

Tubular Posts of High-carbon Open-seam—All intermediate posts are made of high-carbon steel (refined) stock in full weight post sections. This not only assures an exceptionally strong post but one that affords most sturdy, rigid and lasting construction. Many old installations attest to the actual fact that this quality post has stood eighteen years (and more) without painting without rusting away. In these old installations it is interesting to note that where they were used in connection with pipe (as top rail) that they far outlast any other material then used. This post is strong in every direction. Its open-seam prevents condensation and insures a dry post at all times. This tubular post makes at neat and attractive post. All posts are made to one of the most rigid specifications. They are real fence posts and are made to meet all requirements—strength, lasting qualities, and pleasing appearances.

End, Corner, and Gate Posts—Are full tubular and all full weight complete with all fittings to receive fabric. The size of post furnished depends upon the height of fence and for gate openings upon the height and width of gates. All bolts and nuts in the assembly of fittings at end, corner and gate posts are composition brass (40% zinc) and non-rusting.

Top Rail—High-carbon steel 1⅝-in. outside diameter full weight open-seam on fences 5 ft. high and over. On fences 4 ft. high (and under) 1⅜-in. outside diameter full weight open-seam top rail is used. Top rail is furnished in full random lengths connected with couplings to insure expansion and contraction. No threaded connections used. Rail passes through line post tops and clamped to end, corner and gate posts.

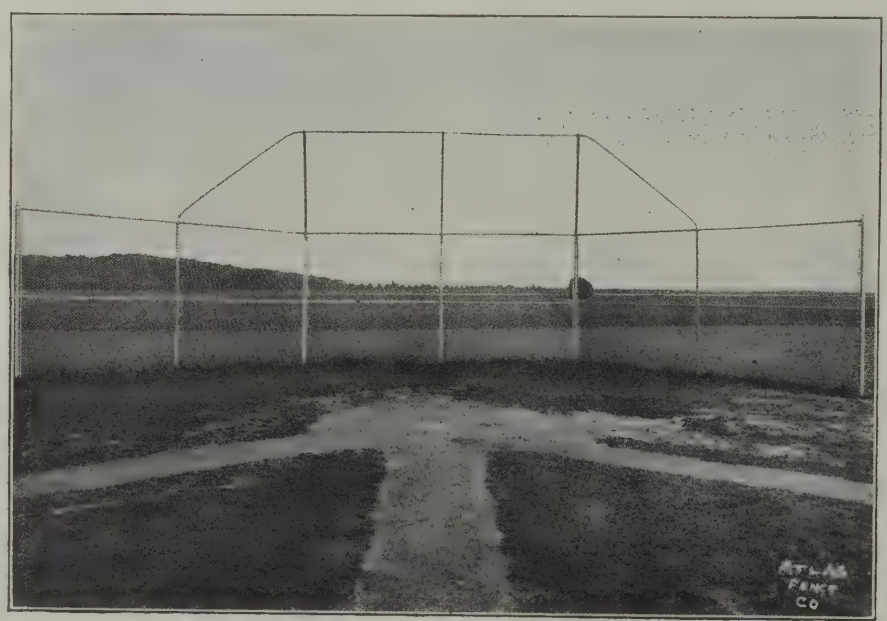
Reg. U. S. Pat. Off.

Braces—End, corner and gate posts neatly fitted with horizontal brace of 1⅝-in. outside diameter in one continuous length to first line post, complete with truss braces and all fittings.

Fabric—Chain link woven in all standard or special meshes and in Washbourne and Moen gauges with double twisted barbed top and bottom selvages for fabrics 5 ft. and over, and for lower widths one selvage is furnished with wire turned back forming smooth selvage and termed "knuckled edge." Attached with aeroplane (aluminum base) metal and non-rusting tie bands and clips.

Reinforcing Cables—A No. 6 coil spring wire cable is used along bottom selvage to which fabric is tied. Where top rail is omitted a coil spring cable of same size is substituted at the top to which fabric is tied.

Gates—Made of 2-in. outside diameter frame, with malleable gusset corners, brass riveted, and filled with fabric to match fence. Equipped with drop bolt combination double latching and locking device, and full heavy duty malleable hinges.



One of Several Backstops Furnished and Installed for the La Salle Military Academy, Oakdale, L. I., N. Y.

Galvanizing—Entire fence (except those parts of brass alloy, aluminum base, etc.) is hot-dipped galvanized.

The fabric can be furnished in two grades, "Special" and "Galvanized After." "Special" is a method of hot-dipping galvanizing wire before weaving but should not be confused with any other method of galvanizing. It is done by the Crapo method, insuring most ductile, uniform and pure zinc coated wire—a wire that can be twisted sharply without cracking or flaking of coating of zinc on wire. This result is very interestingly obtained, and is described in literature that we will be glad to send with samples to any interested inquirer.

"Galvanized After" is a method of weaving bright (ungalvanized) wire in fabric and then galvanizing by hot-dipping woven chain fabric into galvanizing bath. The result is a heavier coating but impossible to insure mechanically even coated fabric.

Concrete Foundation for Posts—All posts are set in round concrete bases composed of 1-3-4 mix. Foundations are 3 ft. deep for 3-in. posts and 4 ft. for 4-in. posts. After holes are dug the posts are set and concrete immediately poured. *Posts are then filled with cement grout to slightly above grade level.* Complete base neatly domed above grade to shed water.

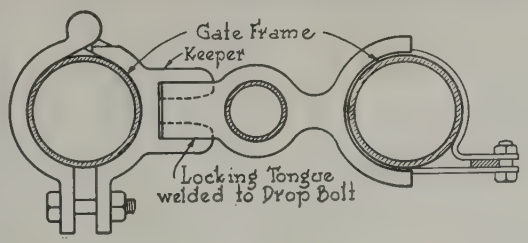
Field Construction

ATLAS FENCE COMPANY maintains a field organization of expert erectors which guarantees complete satisfaction on all installation work. A fence set by them will be true to the survey line; to the grade given and correct in every particular.

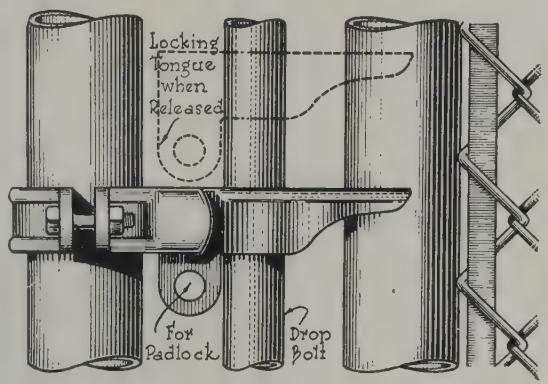
Ornamental Fences

Atlas ornamental and protective fences are made in both wire and wrought iron in various styles. We will be pleased to send any further detailed literature illustrating how attractively the fence problem can be met, where both protection and ornamentation are desired. There are pleasing designs for all types of property. Wire, write or telephone us.

Continued on next page

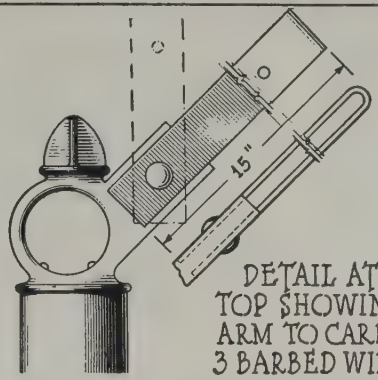


TOP VIEW



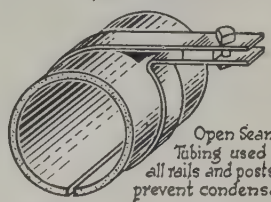
VIEW FROM INSIDE OF GATE

ATLAS POSITIVE GATE LOCK

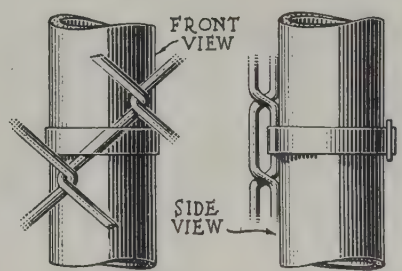


DETAIL AT TOP SHOWING ARM TO CARRY 3 BARBED WIRES

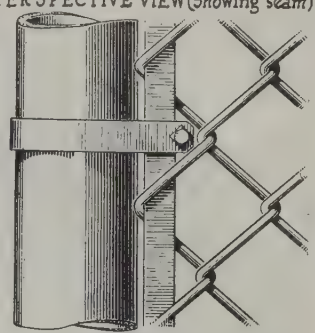
NOTE
Four Point, Close-Set, Two-Ply Barbed Wire furnished for these Arms.



PERSPECTIVE VIEW (Showing seam)

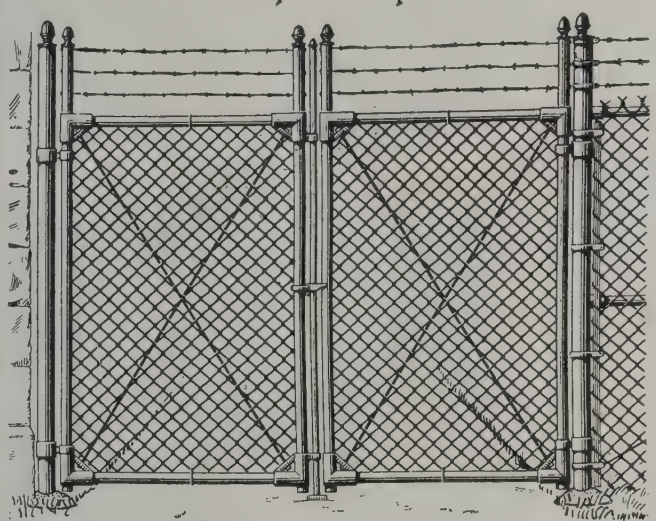


SOLID ALUMINUM FABRIC TIES ON INTERMEDIATE POSTS



FRONT VIEW

FABRIC TIE-TERMINAL POST



FACTORY GATE WITH REINFORCED HEAVY DUTY CORNERS

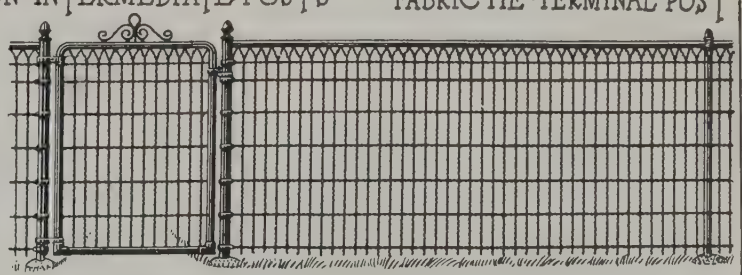


PLATE 158-LF

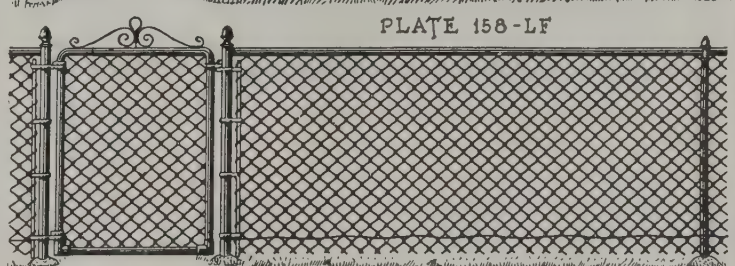
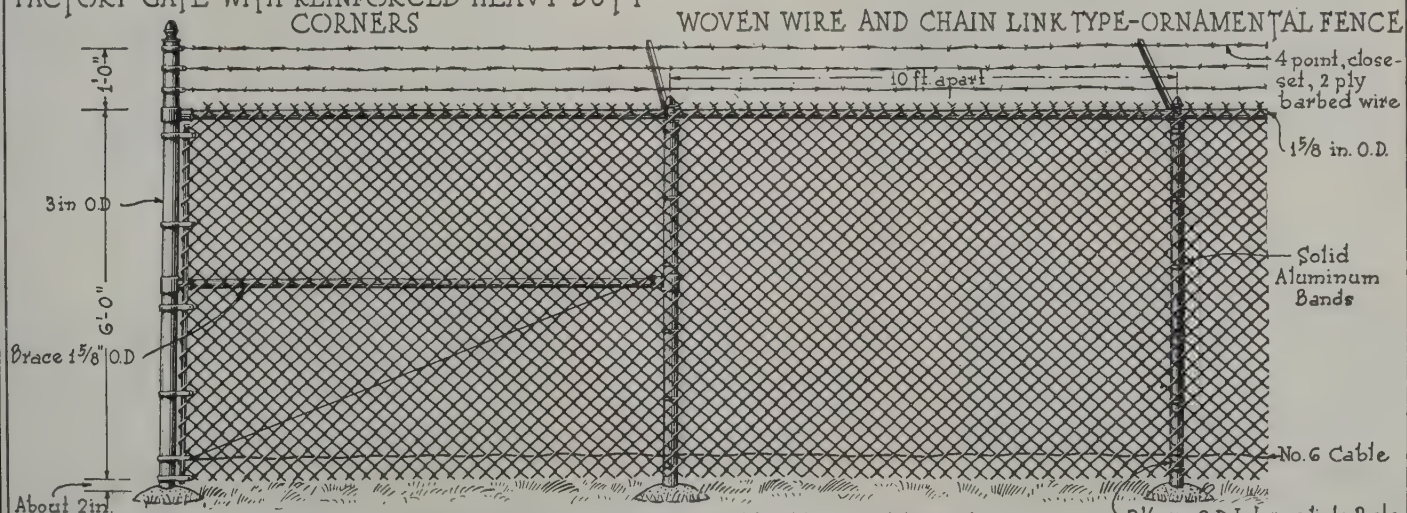


PLATE CL-456

WOVEN WIRE AND CHAIN LINK TYPE-ORNAMENTAL FENCE



CHAIN LINK PROTECTIVE FENCE

ATLAS FENCE COMPANY	~DETAILS OF ATLAS CHAIN LINK PROTECTIVE~ ~WOVEN WIRE AND ORNAMENTAL FENCES~	NOT DRAWN TO SCALE	DRW'G 1

CINCINNATI IRON FENCE COMPANY

Manufacturers of Ornamental Iron and Wire Work

3330 Spring Grove Avenue
CINCINNATI, OHIO

Products

ORNAMENTAL and PLAIN IRON and WIRE WORK of every description and for every purpose.

Steel and Iron Fence suitable for residences, cemeteries, school grounds, parks, etc.; Entrance Gates, Folding Gates, Door and Window Guards, Sidewalk Doors, Grilles, Gratings, Iron Shutters, Wire Window Guards and Partitions, etc.

Estimates

Blue prints on request. Estimates cheerfully given.

Design and Construction

The dominant features of Cincinnati Iron Fencing are its rugged strength, coupled with attractive design.

Rails—Made of channel, angle or flat sections.

Pickets—Square, round, flat or angle, suitable thickness according to height required, pointed or tipped with malleable iron heads.

Posts—Made in large variety of sizes and styles to harmonize with the architectural surroundings.

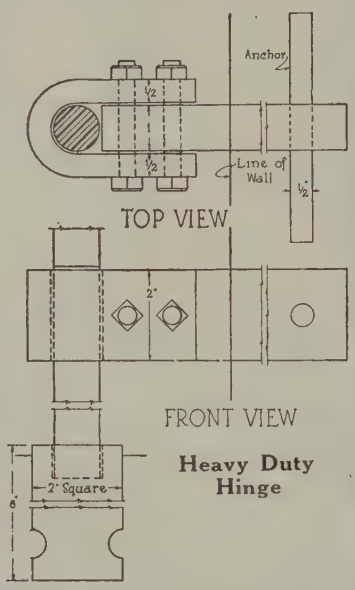
ORNAMENTAL IRON GATES

Special Design "A"

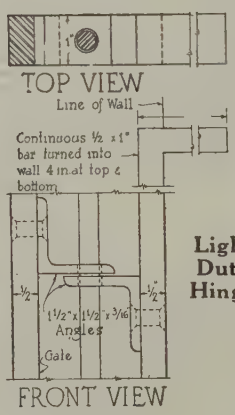
Design No. 326

Design No. 326 (Special)

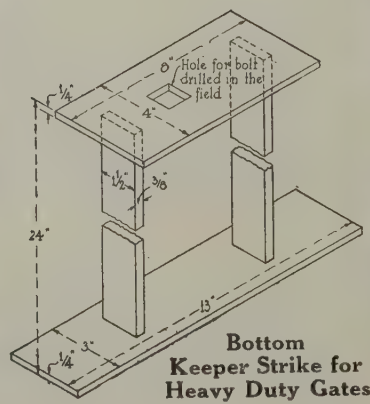
Special Design "B"



Heavy Duty Hinge



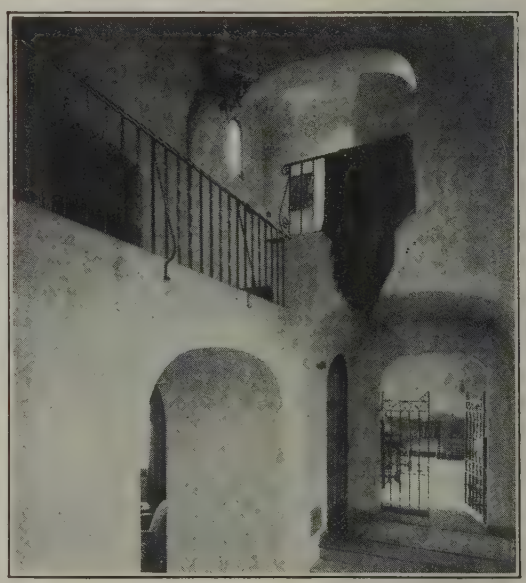
Light Duty Hinge



Bottom Keeper Strike for Heavy Duty Gates

INTERIOR AND EXTERIOR ORNAMENTAL IRON WORK IN STOCK DESIGNS

Design No. 681



Design No. 682

Design No. 680-G Door Grille and 680 Railings

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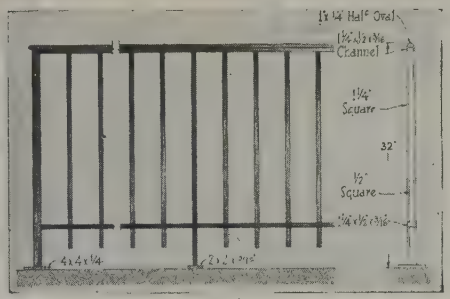
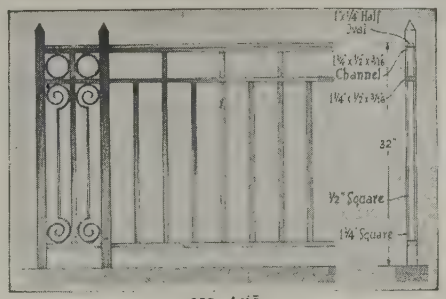


NO 450



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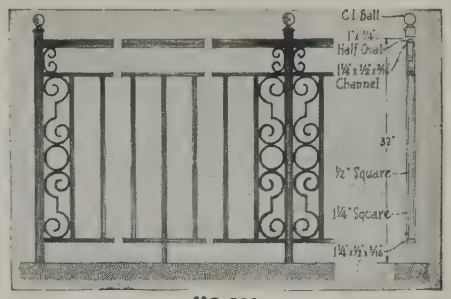


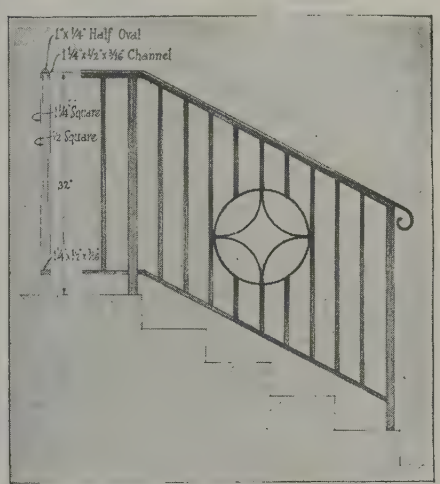
NO. 523

RAILINGS AND FENCE

NO 512

NO. 521

RAILINGS AND FENCE



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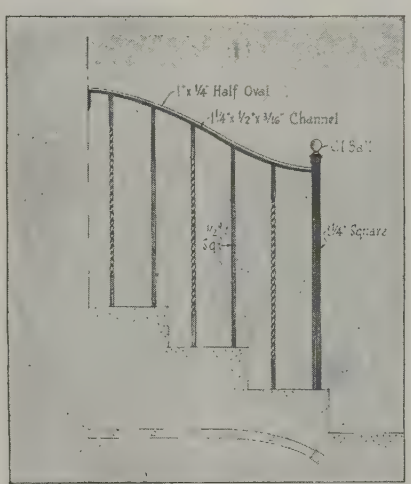

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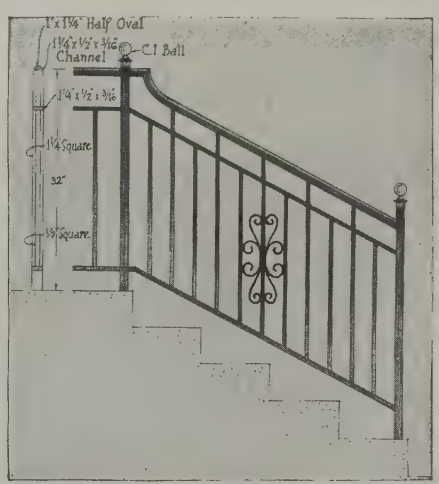
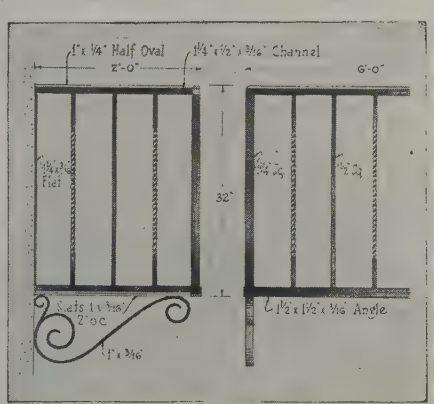


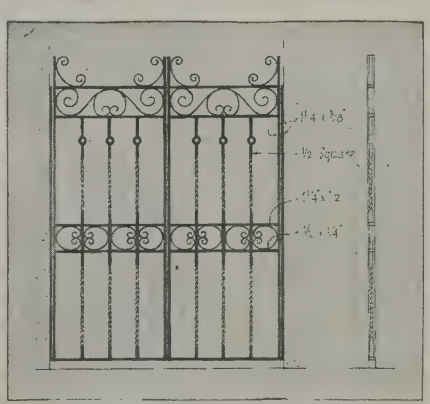
NO. 461

EXTERIOR RAILINGS



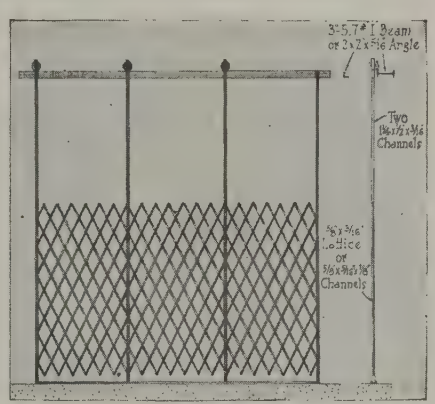
NO 480

BALCONY



NO. 682

INTERIOR GRILLE



NO. 599

FOLDING GATE

CINCINNATI IRON FENCE COMPANY	IRON RAILING, FENCE, BALCONY, GRILLE & GATE CONSTRUCTION & DESIGN.	PLATE 1

CYCLONE FENCE COMPANY

MAIN OFFICES
WAUKEGAN, ILL.

WORKS AND OFFICES
NORTH CHICAGO, ILL. GREENSBURG, IND. CLEVELAND, OHIO NEWARK, N. J.
FORT WORTH, TEX. OAKLAND, CALIF. PORTLAND, ORE.

DIRECT FACTORY BRANCHES

ATLANTA, GA.	DES MOINES, IOWA	INDIANAPOLIS, IND.	MINNEAPOLIS, MINN.	PITTSBURGH, PA.
BUFFALO, N. Y.	DETROIT, MICH.	JACKSONVILLE, FLA.	MILWAUKEE, WIS.	ST. LOUIS, MO.
BALTIMORE, MD.	HARTFORD, CONN.	KANSAS CITY, MO.	MT. VERNON, N. Y.	SYRACUSE, N. Y.
CHARLOTTE, N. C.	HOUSTON, TEX.	MINEOLA, N. Y.	PHILADELPHIA, PA.	TOLEDO, OHIO
CINCINNATI, OHIO				TULSA, OKLA.

PACIFIC COAST DIVISION
OAKLAND, LOS ANGELES and SAN FRANCISCO, CALIF., Standard Fence Company
PORTLAND, ORE., and SEATTLE, WASH., Northwest Fence & Wire Works

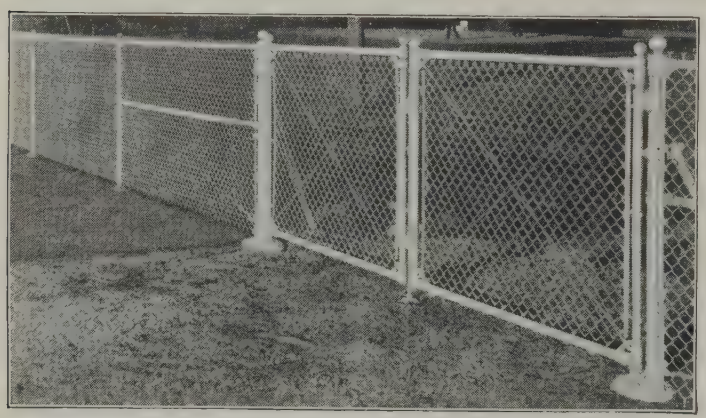
Cyclone Safeguard Chain Link Fence

Specifications—Standard height, 6 ft. Built in heights from 4 ft. up to and including 10 ft. Chain Link fabric is full height of fence.

Fabric—"Galv-After" Chain Link copper-bearing wire heavily zinc-coated (or hot-galvanized) by hot-dip process after weaving. No. 9 or No. 6 gauge wire woven in a 2-in. mesh. On heights 5 ft. and over, both edges of fabric have twisted and barbed finish. On heights 4 ft. and lower, one edge has twisted and barbed finish, the other has knuckled finish and it is recommended that the knuckled edge be placed at top of fence dressed below top rail with the barbed edge at the bottom.

Posts—Hot-dip galvanized. Of standard full weight tubular copper-bearing steel, made by the National scale-free process.

Line Posts—2½-in. outside diameter, weight 3.65 lb. per lin. ft. where fence is 6 ft. and over in height. Where fence is less than 6 ft. in height, 2-in. outside diameter, weight 2.72 lb. per lin. ft.



Cyclone Safeguard Fence

Beautiful and dignified property protection for country estates and homes—also golf grounds and clubs

End, Corner, Angle and Pull Posts—3-in. outside diameter, weight 5.79 lb. per lin. ft. where fence is 6 ft. and over in height. Where fence is less than 6 ft. in height, these posts are 2½-in. outside diameter, weight 3.65 lb. per lin. ft.

Gate Posts—The size and strength of gate posts for swinging and sliding gates have been carefully determined by our Engineering Department. Details upon request.

Post Spacing—Posts are spaced in line of fence not farther apart than 10-ft. centers.

Depth of Posts—Line posts for fence 4 ft. or lower are set 24 in. in concrete base; terminal posts 30 in. In 5-ft. fence, line posts are set 30 in., terminal posts 36 in. In Cyclone Safeguard Fence 6 ft. in height and over, all posts are set 36 in.

Post Setting—Concrete post bases are of proper mixture, size and shape to furnish a foundation and support sufficient to withstand any ordinary strain or shock. A liberal factor of safety is provided.

Post Tops—Hot-dip galvanized. All posts fitted with heavy ornamental ball post tops of malleable iron. The base of these tops fits into the post and a flange carries over the outside to cap the post against moisture.

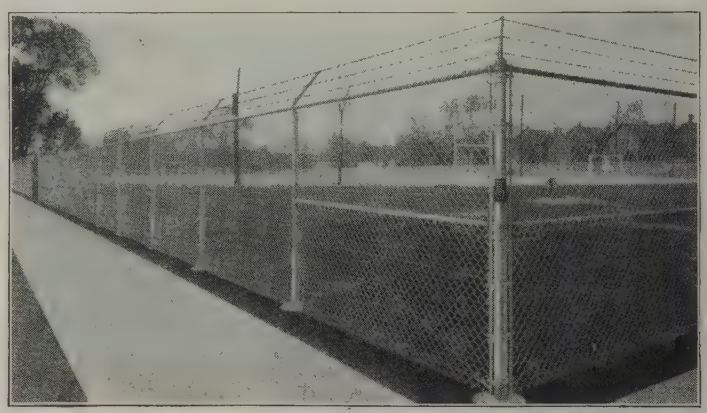
Top Rail—Made by the National scale-free process, hot-dip galvanized. Tubular copper-bearing steel 1⅝-in. outside diameter, weight 2.27 lb. per lin. ft. Provided with expansion rail coupling. Top rail passes through post tops and forms a continuous brace from end to end of each stretch of fence. Top rail is securely fastened to end, gate and corner posts by malleable iron or pressed steel connections.

Braces—Made by the National scale-free process, hot-dip galvanized. End, gate and corner posts are braced by tubular copper-bearing steel braces 1⅝-in. outside diameter, weight 2.27 lb. per lin. ft. Braces are spaced midway between the top rail and ground and extend to the first line post, fastened by malleable iron or pressed steel connections, then trussed from line post back to end, gate or corner post.

Fittings—All copper-bearing materials, hot-dip galvanized. All fittings used in connection with Cyclone Safeguard fencing and gates are malleable, wrought iron, pressed steel or aluminum.

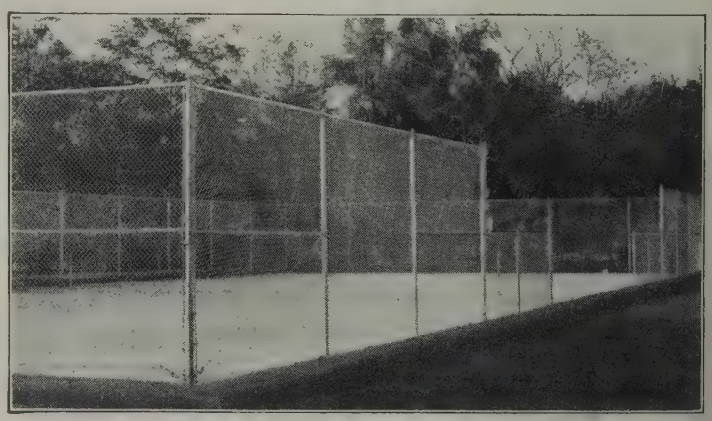
Fabric Bands—Aluminum. Fasten the fabric to line posts and top rail, spaced approximately 14 in. apart.

Finish—All materials entering into the fence construction, except aluminum bands, are heavily galvanized.



Cyclone Invincible Chain Link Fence

Standard height, 7 ft. All copper-bearing materials. Built in heights up to and including 11 ft. Fabric, "Galv-After" Chain Link, heavily zinc-coated (or hot-galvanized) by hot-dipping process after weaving. No. 9 or No. 6 gauge wire woven in a 2-in. mesh. Extension arms carry 3 rows of 4-point barbed wires, 12 in. in or out from fence line. Posts and framework, full weight tubular steel, hot-dip galvanized



Cyclone Tennis Court Enclosures and Back Stops

Framework, tubular copper-bearing steel, hot-dip galvanized. Fabric "Galv-After" Chain Link No. 11 gauge copper-bearing steel wire woven in a 1¾-in. mesh. Standard height, 10 ft.

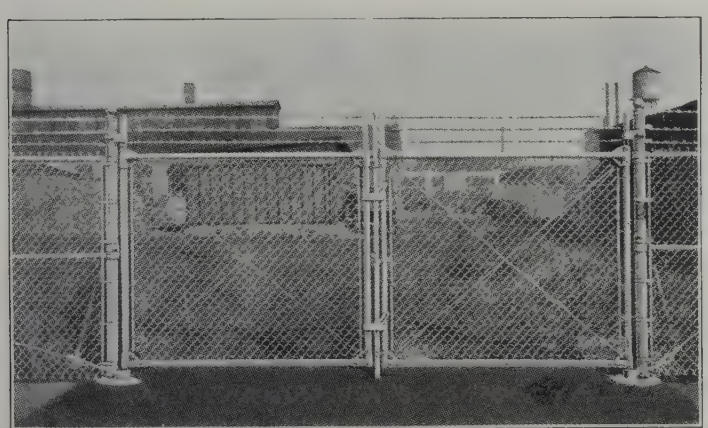
Continued on next page

Cyclone Colonial "Complete Fence"

Standard heights: 36, 42, 48 and 54 in. Framework, tubular steel, hot-dip galvanized. Fabric, style "F." Pickets spaced 3 in. apart at top, 1⅝ in. apart at bottom

Safeguard Fence with Wrought Iron Gate

Standard heights: 36, 42 and 48 in. Framework, tubular copper-bearing steel hot-dip galvanized. Fabric "Galv-After" Chain Link copper-bearing Steel No. 9 gauge. 2-in. mesh



Cyclone Swinging Gates

Either single or double, for Safeguard or Invincible Fence

Wrought Iron Entrance Gate, Pattern No. 501

Cyclone wrought iron fence and entrance gates are built in a variety of heights and handsome patterns from which fencing appropriate for any purpose may be selected

Specifications, Cyclone Swinging Gates

Standard Sizes—Single swinging walk gates built standard for 4-ft. opening. Double swinging gates for driveways built standard for 14 and 18-ft. openings. The standard size for railroad entrance is 18 ft. Where conditions are such that standard sizes can not be used, gates are built to meet requirements.

Frames—Hot-dip galvanized, tubular copper-bearing steel; made by the National scale-free process. On fence having barbed wire top, the end members extend 1 ft. above top horizontal rails, and carry 3 strands of barbed wire.

Stays—Hot-dip galvanized, tubular copper-bearing steel. Made by the National scale-free process. Stays, together with ⅜-in. adjustable truss rods, keep gate absolutely rigid; prevent sagging, buckling and side weave.

Fabric—Cyclone "Galv-After" Chain Link to match fabric used in fence furnished.

Hinges—Hot-dip galvanized. Made of malleable iron. Exceptionally large bearing surface for clamping hinge on gate post. Cyclone swinging gate hinge equipment will carry 100% overload. Bottom hinge is ball and socket pivot type.

Latch and Lock—Hot-dip galvanized. On swinging gates of all types, latch is of the plunger bar type, arranged for padlock locking. Railroad and drive gates are equipped with catch posts to hold gates in open position.

Specifications, Cyclone Sliding Gates

Either single or double, for Safeguard or Invincible Fence.

Standard Widths—14 to 20-ft. opening for driveway. Standard overhead clearance 14 ft.

Overhead Track Support—5-in. channel, weight 6½ lb. per lin. ft. Fastened to gate posts by means of combination special ornamental ball post top cap and channel support.

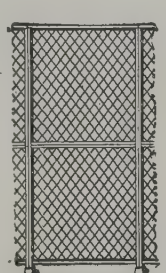
Trolley—Double truck roller bearing type. Very easy to operate. Track completely enclosed.

Wire Work of All Kinds

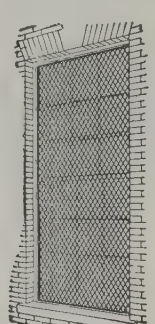
Partitions (Built-in-Sections)—Standard size sections 4 ft. wide by 8 ft. high. Frames are 1-in. channel iron. Fabric is No. 10 gauge wire woven in 1½-in. diamond mesh. Furnished with either swinging or sliding gates. Handholes or wickets provided where needed. Floor flanges furnished for either wood or concrete floors. Sections are interchangeable, movable; can be taken out and used elsewhere—no refitting—no loss. Quick changes in departments can be made at any time.

Send blue print or layout of partition work wanted.

Window and Skylight Guards—Frames are 1-in., ¾-in. channel, or ⅜-in. round iron. Fabric is usually No. 10 gauge wire woven in 1½-in. diamond mesh. Channel iron frames fit into openings. Round iron frames usually allow ¾ in. on all sides for lap. Special guards built with either channel or round iron frames, using size of wire and mesh desired.



Partition Section



Window Guard

Complete Responsibility—Nation-wide Fencing Service

Engineering Counsel—Cyclone Engineers will make a complete study of your fence requirements and submit recommendations, layouts, and estimates of cost.

Cyclone Erection Crews—There are more than 100 erection crews constantly at work installing Cyclone Fence. One of these crews is available for your installation and will handle the work quickly, correctly and economically.

However, if you prefer to have your own workmen install the fence, a Cyclone erection superintendent will be furnished at nominal charge, to direct them.

Diagram, Prices, etc.—When writing for information, prices, etc., send simple diagram of proposed fencing. Give measurements of each stretch and total measurements. State whether single or double swing, or sliding gates are wanted and give size of opening.

© C.F. Co. 1928

ESTABLISHED 1858

J. W. FISKE IRON WORKS

Ornamental Iron, Brass, Bronze, Wire and Zinc Work

69-71 Park Place

NEW YORK, N. Y.

Products

Ornamental Metal Work and Fencing as follows: Ornamental Entrance Doors, Window Guards, Lamps and Lamp Standards; Metal Stairs; Memorial Tablets; Fountains; Iron Railings and Entrance Gates; Woven Wire and Climbproof Chain Link Fencing; Sanitary Stable and Barn Equipment.

Also Brass and Bronze Railings; Andirons and Fire Sets; Fire Escapes; Flagpole Bases; Balls and Trucks; Folding Gates; Leader Shoes; Marquises; Garden and Park Furniture; Sundials; Tree Guards; Wire Partitions.

Fiske Quality

The quality of Fiske products is best evidenced by installations for the United States Government, States, cities and leading commercial organizations, and upon many of America's largest private estates.

Co-operative Service

The J. W. Fiske Iron Works will submit estimates for products either delivered or erected complete. A well organized engineering staff is maintained, and contracts for designing and erection complete are made when desired. Co-operation with the architect, contractor or owner in executing unusual specifications is a specialty.

Entrance Gates, Fencing and Ornamental Iron Work

This company will carry out any design in ornamental entrance gates, iron fencing, window guards, metal stairs and similar work, or will prepare and submit designs for such work.

Illustrations of Work Finished and Installed by J. W. Fiske Iron Works

No. 1—Guarantee Trust Co., Atlantic City, N. J., J. Vaughan Mathis, Architect. Executed by our Bronze Division
No. 2—Entrance Gate, Oakdale, L. I., Ernest Flagg, Architect
No. 3—Wrought Iron and Bronze Stair Rail, designed and executed by J. W. Fiske Iron Works
No. 4—Chain Link Fence, Paterson Parchment Paper Co., Passaic, N. J.
No. 5—Bronze Memorial Tablet
No. 6—Wrought Iron Balcony, George L. Linkletter Residence, Manhassett, L. I., N. Y., H. Stuetzer, Builder
No. 7—Wrought Iron Entrance Rails, Clara Lee Van Vieck Residence, Brooklyn, N. Y., Roland I. Markwith, Architect

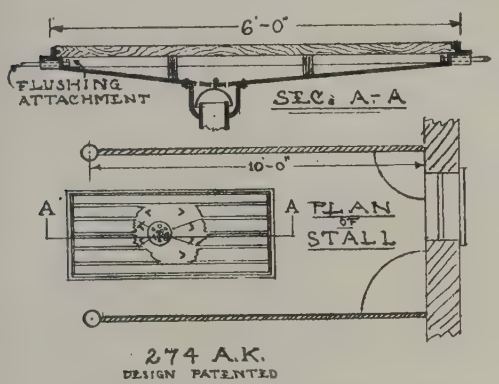
Continued on next page

Sanitary Stable and Barn Equipment

In most of the finest stables in this country Fiske Sanitary Stable and Barn Equipment has been installed. This includes both the privately owned and commercial stables. Hundreds of architects have specified our equipment because they have felt that by so doing they best served the interests of their clients.

On this page a few standard details are shown, the result of more than 70 years of specialized experience in this class of construction. You will find us ready to co-operate when unusual conditions require special treatment.

Our complete catalogue of stable equipment will be sent on request, as well as any special information that may be required.



A Type of Drain Used Where Gutter at Rear of Stalls Is Not Desired

A Few Recent Installations

Borden Farm Products,
J. C. Schaeffler, Architect

Marshall Field, Lloyd's Neck, L. I., N. Y., John Russell Pope, Architect

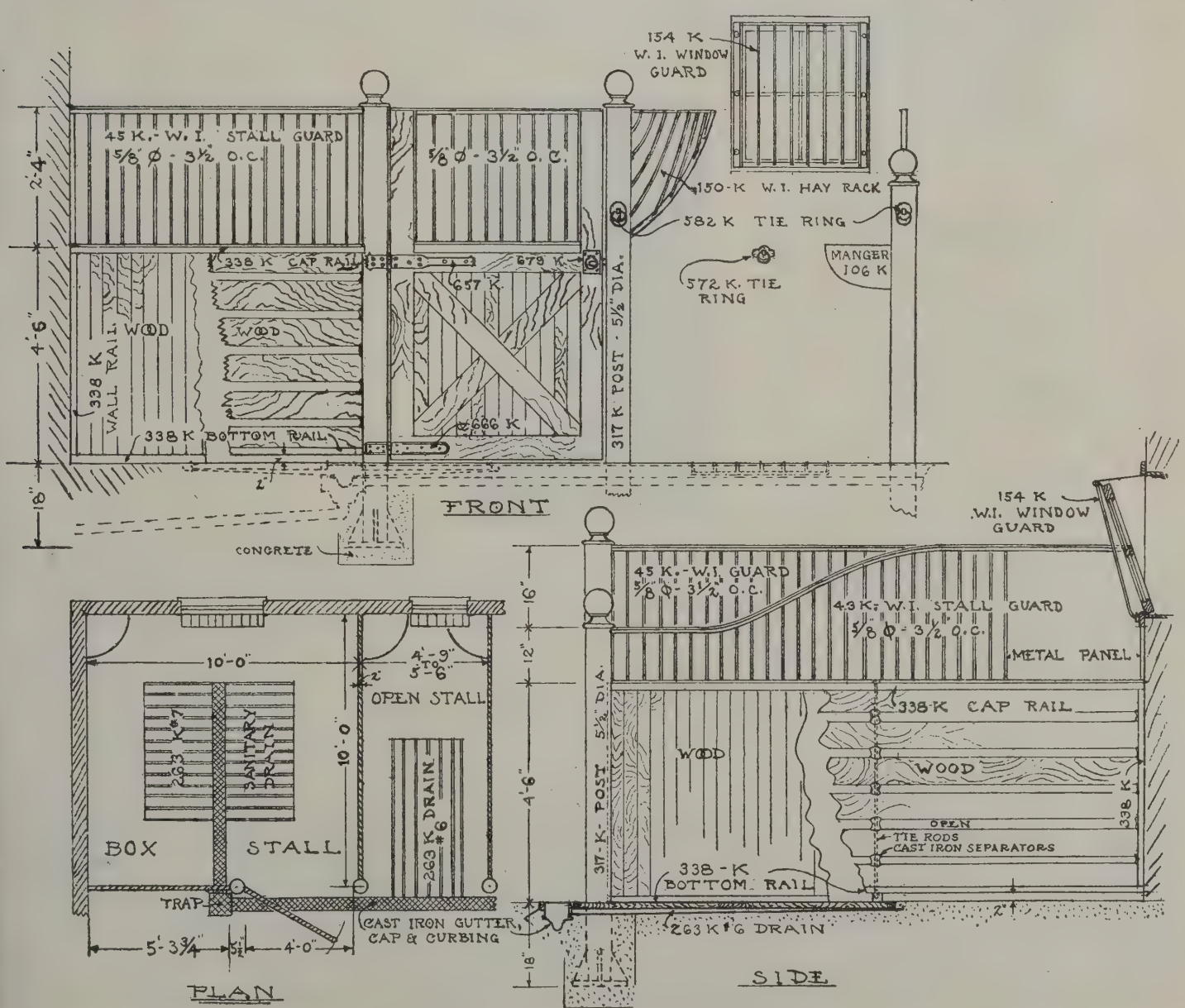
Edsel Ford, Seal Harbor, Me., Duncan Candler, Architect

H. E. Manville, Pleasantville, N. Y.

John J. Raskob, Centreville, Md., T. D. Wadleton, Architect

Harrison Williams, Bayville, L. I., N. Y., Delano & Aldrich, Architects

Interior of Stable, Wm. Ziegler, Jr., Noroton, Conn.
H. P. Knowles, Architect



Standard Details of Fiske Horse Stalls

Continued on next page

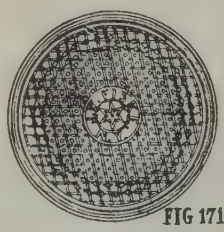


FIG 171 K

CESSPOOL OR COAL HOLE COVER WITH RIM.

Covers are furnished in following diameters

12 in (14 in incl Rim) 20 in (24 in incl Rim)
16 in (20 in " ") 22 in (26 in " ")
18 in (22 in " ") 24 in (28 in " ")

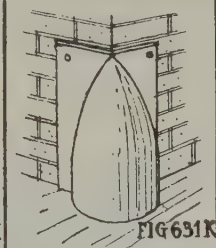


FIG 631 K

CAST IRON WHEEL GUARD

18 in high, 12 in diam

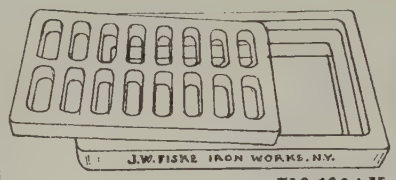


FIG 160 AK

GRATING & FRAME - HEAVY

No 1: 15½ in long, 10½ in wide 2¼ in deep. Grating 13½ in long, 8½ in wide

No 2: 15 in long, 15 in wide 2¼ in deep. Grating 13½ in square, 1 in thick

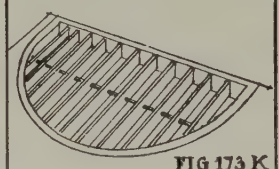


FIG 173 K

WROUGHT IRON GRATING

Any size made to order

Prices given on Application.

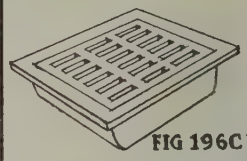


FIG 196 CK

FRAME WITH GRATING - HEAVY

No 1 Frame 12 in x 12 in. - Grating 9½ in x 9½ in

No 2 Frame 16 in x 16 in - Grating 13 in x 13 in

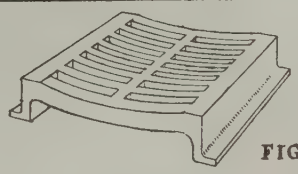


FIG. 159 A K

HIGHWAY CATCH BASIN FRAME & GRATING
(Very Heavy)

24" long, 22½" wide, 5½" deep, Grating only, 20¾" x 20" 2½" thick in center.

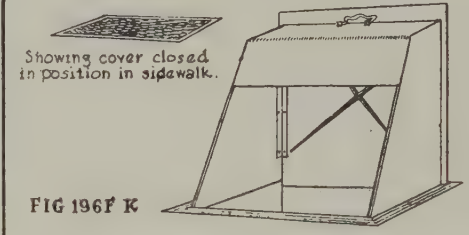


FIG 196 F K

SAFETY COAL HOLE COVER & FRAME

	Cover	Frame
No. 1 -	18" x 18"	23" x 23"
No 2 -	22" x 22"	27" x 27"
No 3 -	30" x 30"	35" x 34"

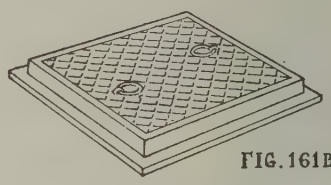


FIG. 161 BK

MANHOLE FRAME & COVER, FOR CONCRETE.

	Top of frame	Depth	Cover
No. 1	12" x 12"	3"	10¾" x 10¾"
No. 2	18" x 18"	3"	16⅜" x 16⅜"
No. 3	26" x 26"	3"	24⅜" x 24⅜"
No. 4	32" x 26"	3"	30⅜" x 24⅜"

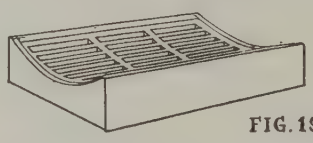


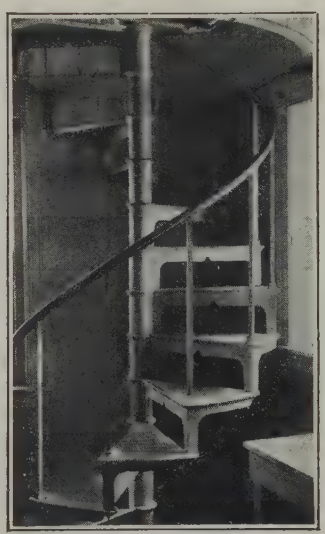
FIG. 196 E K

LIGHT CUTTER BASIN & GRATE

For lawns & carriage drives, not for street use
18" wide x 24" long x 5" deep
Grating only, 16" x 22"

HEAVY GUTTER BASIN & GRATE

For roadways, streets, parks, cemeteries etc
No. 2 - 18" wide x 24" long x 5" deep
Grating only, 16" x 22"
No 1 - 9" x 15" x 3" for use in draining small areas The outlet is so designed that it can be used on 4", 6", 8", or 10" pipe



SPIRAL STAIRS

Furnished for all floor heights with following diameters 4'-0", 4'-6", 5'-0", 5'-6", 6'-0", 7'-0"

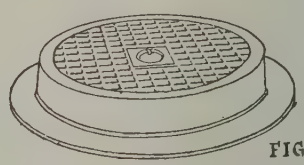


FIG 173 A K

MANHOLE FRAME & COVER

Opening	Depth	Diam. on bottom	Cover
20" (light pattern)	4"	26½"	20½"
20" (deep pattern)	6½"	26¾"	20½"
20" (heavy pattern)	4¾"	27"	20½"
24" (light pattern)	6"	31½"	24¼"
24" (heavy pattern)	6"	31½"	24¼"

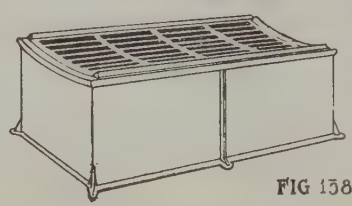


FIG 158 K

ROAD BOX

For public or private roadways, etc.
No. 1 - Top: 25" long, 14½" wide, 10" deep
Grating only 23" long, 13¾" wide
No. 1A - Top: 25" long, 14½" wide, 4" deep
No. 2 - Top: 32" long, 14½" wide, 4" deep

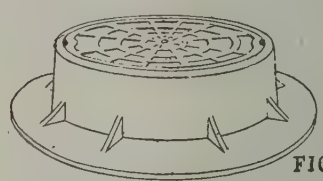


FIG 163 K

MANHOLE FRAME & COVER

Diam. of top - 25"; Diam. of bottom flange - 36"; Diam. of cover, 22½"

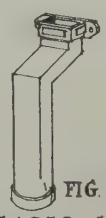


FIG. 761 KK

LEADER SPOUT

Length 2 Feet.
Top made to receive 4x3 in leader. Outlet for 4 in soil pipe, offset 5¾ in.

FIG. 761 HK

LEADER SPOUT

Lengths 12", 18", 24", 30", 36", 48", 60 & 72"

To Receive 2"x3" Leader, 3" Outlet.
To Receive 3"x4" Leader, 4" Outlet.
To Receive 4"x5" Leader, 4" Outlet.

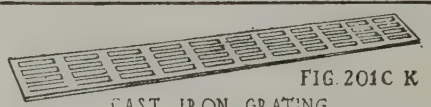


FIG. 201 C K

CAST IRON GRATING

For concrete or iron gutter Width - 5¾

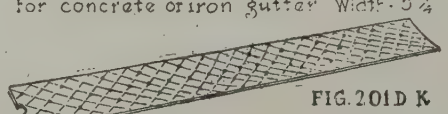


FIG. 201 D K

	Wide	Thick	Wide	Thick
GUTTER COVER,	3½"	⅜"	7"	½"
For concrete gutter	4	⅜"	8"	½"
	5	½"	9"	½"
	6	½"	9"	⅝"

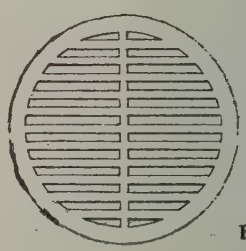


FIG 173 BK

GRATING

To fit in bell ends of soil pipe

Size of pipe	Grating	Size of pipe	Grating
8"	10"	18"	20⅝"
10"	12"	20"	23¼"
12"	14¾"	24"	27¾"
15"	17¾"		

SCS A FEW OF J.W. FISKE IRON WORKS SPECIALTIES AUG 1928

ENTERPRISE IRON & WIRE FENCE CO.

Manufacturers of Fencing and Ornamental Iron

Yandes and 24th Streets

INDIANAPOLIS, IND.

Products

WROUGHT IRON FENCES and GATES.
ORNAMENTAL IRON WORK.

Factory

The factory is divided into two departments. The *fence shop* is equipped with modern machinery and Enterprise patented *caulking* machines for quantity production of standard and special designed wrought iron fences. The *gate shop* is manned by craftsmen experienced in the fabrication of hand-wrought ornamental iron.

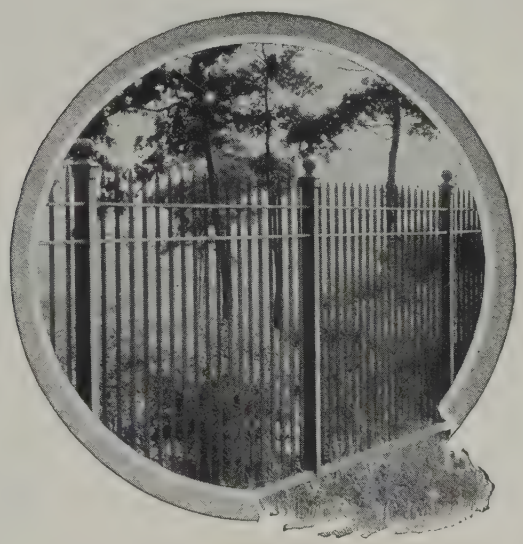
Experience

An experience of over 45 years covers the fabrication of delicate entrance doors, balconies, etc., gates large enough for six motor cars to go through at one time and single contracts for as much as 3½ miles of iron fencing.

Construction

Construction is of wrought iron or common soft steel, at the option of the purchaser. Fittings are the best grade of cast or malleable iron.

Pickets are locked in place by the Enterprise patented *caulking* machines and other joints are mortised and tenoned.



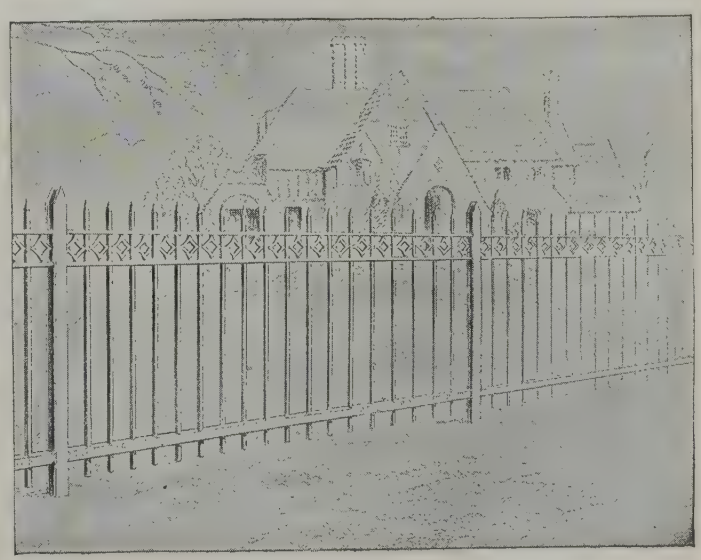
Erection and Installation

This is done by this company or by one of its regularly appointed agents.

Blueprints and Specifications

Will be furnished with the estimates without any charge.

Architectural sketches, such as the one shown below, can be made upon request, at a nominal charge of the actual cost of making such drawing or sketch.



THE STEWART IRON WORKS COMPANY

INCORPORATED

Manufacturers of Iron and Chainlink Fences and Gates

780 Stewart Block

CINCINNATI, OHIO

Products

PLAIN and ORNAMENTAL IRON GATEWAYS and FENCES; CHAINLINK WIRE FENCE.

Also Iron Railings, Iron Grilles, Bronze and Iron Lanterns and Lamp Standards, Lawn Furniture, Folding Gates, Window Guards, General Ornamental Iron and Wire Work.

For Jail and Prison Construction, see page C4158.

Facilities

This company, "The World's Greatest Iron Fence Builders," with its unsurpassed facilities for the manufacture of iron fences and gates, has a factory containing 350,000 sq. ft. of floor space and covering an area of 8 acres; the equipment of the most modern machinery; an experience of more than 42 years; a complete organization of specialists in engineering and landscape architecture, and a large force of skilled mechanics and draughtsmen.

This equipment insures the highest standard of work and enables THE STEWART IRON WORKS COMPANY to give prompt service at proper prices.

Specialties

This company specializes in the building of high grade ornamental iron fences and entrance gates, either from the designs of its own draughtsmen or from drawings and specifications submitted by customers or their architects.

They give particular study to the correct designing, proportioning and construction of enclosures and entrances of country houses and estates, as well as the simpler or more pretentious town house.

Special attention has also been given to designing simple and artistic enclosures for yards in the rear of city and suburban dwellings, providing security and eliminating the feeling of confinement produced by solid fences; with the added advantages of maximum sunlight, elimination of dark corners which conceal rubbish; and making the many small plots of green into a community garden for the enjoyment of all.

From its experience, this firm is qualified to advise as to the type of fence best adapted to particular conditions, and to aid in the most satisfactory and economical solution of fencing problems.

All types of plain and ornamental fences and gates, light or heavy, in iron or chainlink wire, for factories, public institutions, etc.

Decorative Iron Work

At innumerable points in the modern home the architect and builder find the use of interior stair railing, balconies, solarium grilles, terrace railing and other decorative iron work as developed by this company necessary to give the final touch of beauty as well as utility to the interior and exterior.

Designs

The illustrations here are but a few of the many designs shown in this company's catalogues. Plain stock designs are featured in their Catalogue; special ornamental designs in "Book of Designs C."

These catalogues will be sent to architects and prospective purchasers on request.

Designs No. 990, 991 and 992

Designs No. 810 and 811

Design No. 950. Third Rail Type

Designs No. 960, 961 and 962

Continued on next page

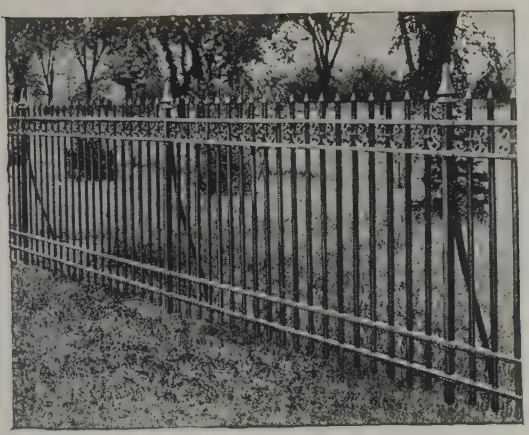
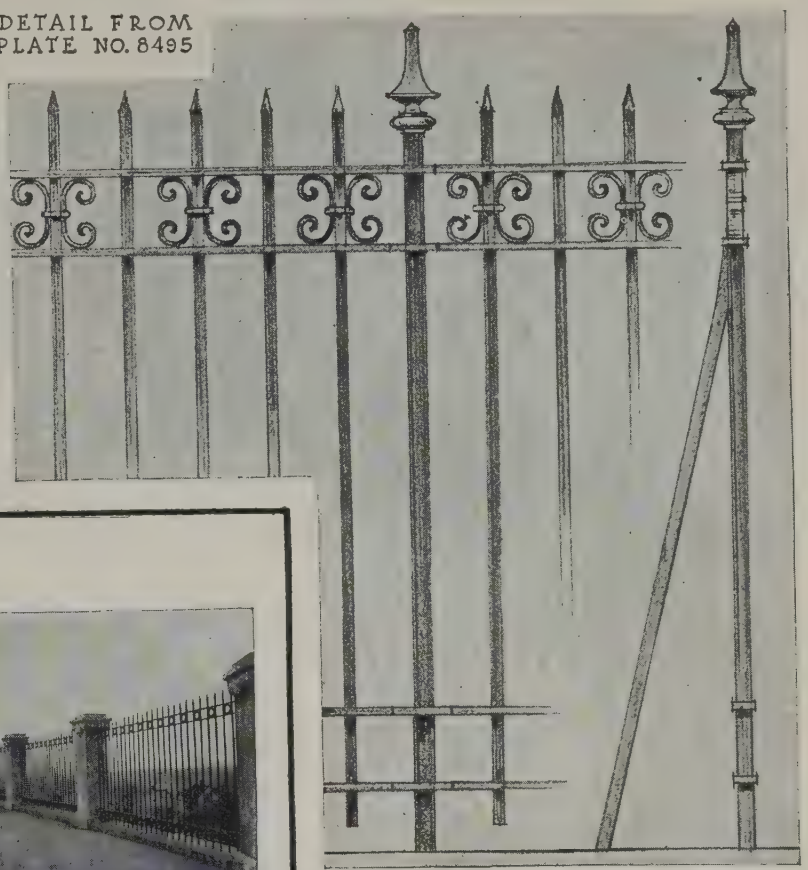


PLATE NO. 8495
ORNAMENTAL IRON FENCE

DETAIL FROM
PLATE NO. 8495



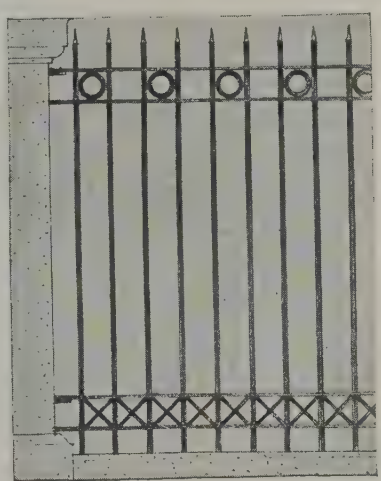
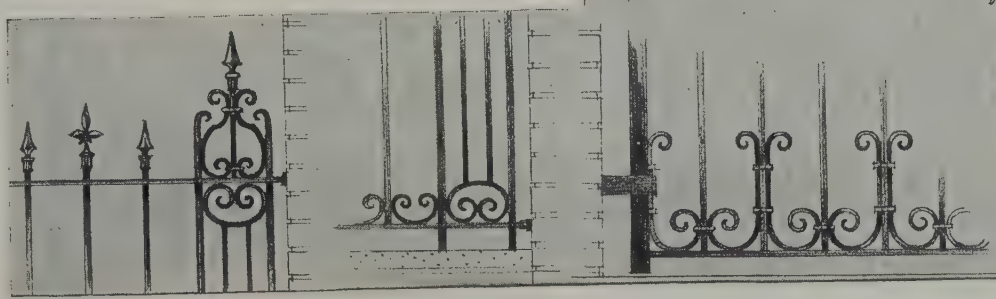


PLATE NO. 8985
ORNAMENTAL IRON FENCE

DETAIL FROM
PLATE NO. 9405

PLATE NO. 9405
ORNAMENTAL IRON ENTRANCE GATE



ORNAMENTAL IRON FENCE AND ENTRANCE GATES.

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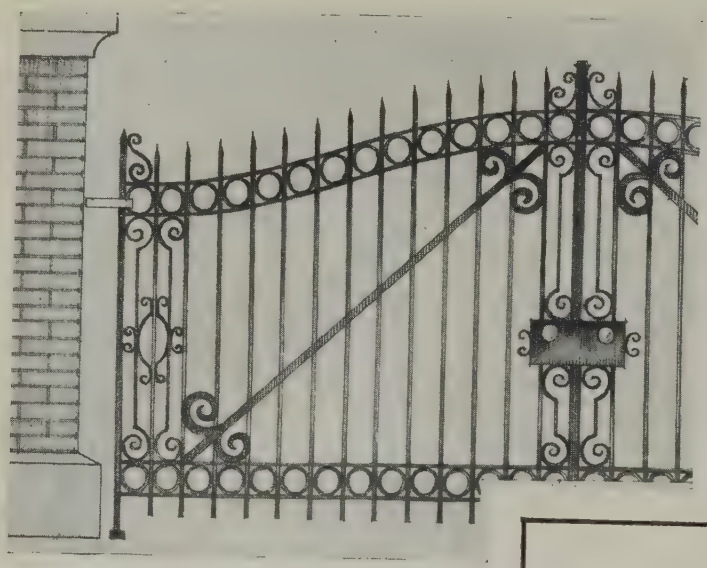
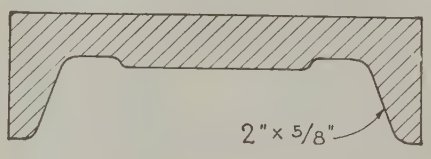


DETAIL FROM
PLATE NO. 54-A

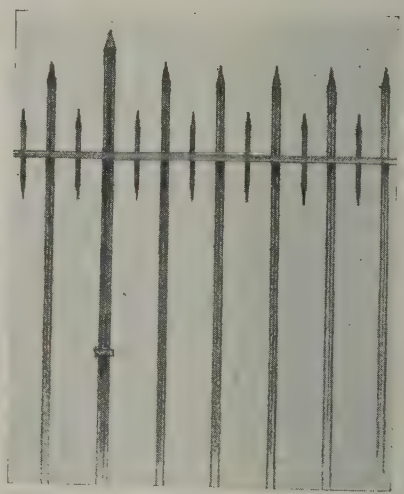
PLATE NO. 54-A
ORNAMENTAL IRON ENTRANCE GATES



NOTE:-
This type of channel is preferable in all cases, but other types are used when specified Our standard patented channels are $1\frac{1}{4}$" x $\frac{1}{2}$", $1\frac{1}{2}$" x $\frac{1}{2}$" and 2" x $\frac{5}{8}$".

DETAIL OF PATENTED THREE-RIB CHANNEL

PLATE NO. 6603
ORNAMENTAL IRON FENCE



DETAIL FROM
PLATE NO. 8237

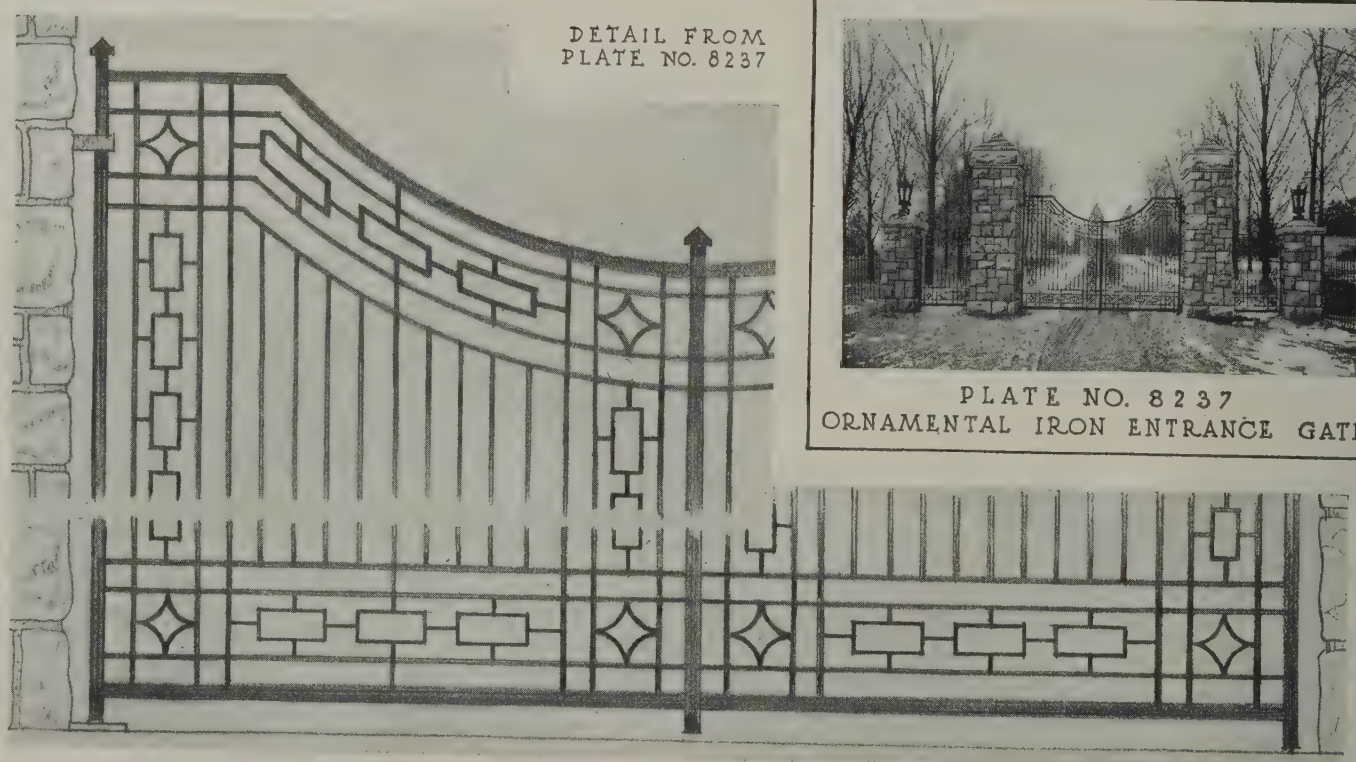
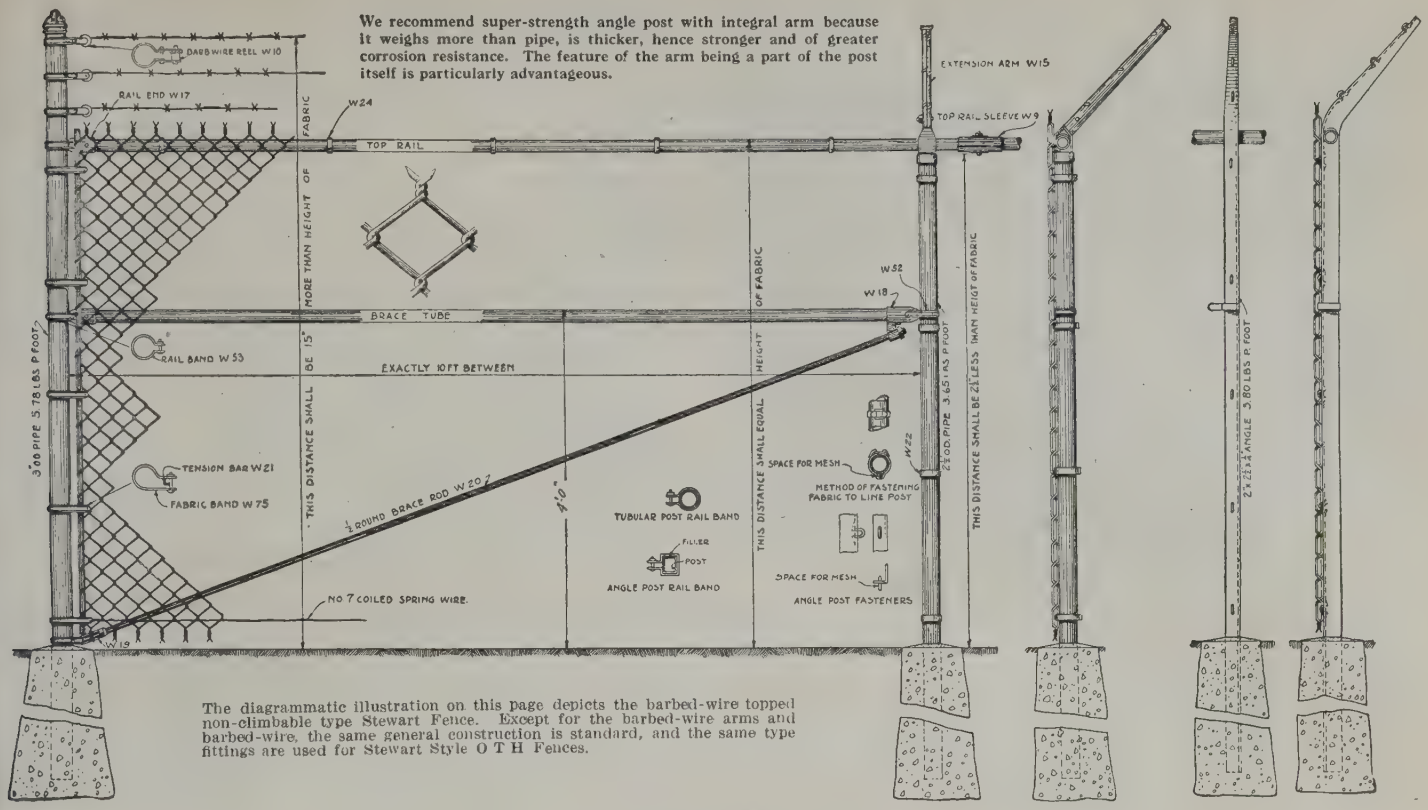


PLATE NO. 8237
ORNAMENTAL IRON ENTRANCE GATE

ORNAMENTAL WROUGHT IRON FENCES AND ENTRANCE GATE

Continued on next page



The diagrammatic illustration on this page depicts the barbed-wire topped non-climbable type Stewart Fence. Except for the barbed-wire arms and barbed-wire, the same general construction is standard, and the same type fittings are used for Stewart Style O T H Fences.

Stewart's Chainlink Wire Fence and Gates

Our product is the result of proven principles of construction which produce a quality unexcelled. We offer a service that has demonstrated its value to a clientele in all parts of the United States and many foreign countries. Our organization of factory salesmen and erecting representatives located at advantageous points affords quick and efficient co-operation to those who place their orders with us.

Fabric, including barbed wire overhang, is hot-dip galvanized *after* weaving; posts, top rail, bolts and other fittings are also hot-dip galvanized, which insures complete rustproofing. The arms for supporting barbed wire overhang lock the strands securely in place and at the same time provide for contraction and expansion.

Standard Type 3T Fence—This type of fence is very generally used where maximum property protection is desired. It is usually 7 or 8 ft. high over all, including either 3 or 5 strands of barbed wire above the fabric. Fabric is either No. 9 or No. 6 gauge wire, 2-in. mesh, with barbed selvages at top and bottom. Intermediate posts are tubular steel, 2½-in. outside diameter or 2½x2x¼ in. angle bars for setting 10 ft. apart, 2 ft. 6 in. below grade. We recommend concrete footings for permanence. Top rail is 1⅝-in. diameter and connected by expansion sleeve couplings. Fabric is attached to posts and top rail with special zinc bands. Bottom of fabric is reinforced with No. 6 gauge coiled spring wire.

This fence is also furnished without barbed wires above (Style OT), in which case we use ornamental No. W-8 post tops. For the sake of economy the top rail is sometimes omitted, and in this case we use the coiled spring wire No. 7 gauge at both top and bottom of the fabric for additional reinforcement.

Stewart's Chainlink Tennis Court Fence—Fabric hot-dip galvanized *after* weaving; framework and fittings all hot-dip galvanized. Furnished in two specifications:

Heavy Construction—Chainlink Fabric 2-in. mesh No. 9 gauge or 1¾-in. mesh No. 11 gauge copper-bearing steel wire; intermediate posts, 2½-in. outside diameter tubular steel (weight 3.65 lb. per ft.) spaced 10 ft. apart, for setting 2 ft. 6 in. deep in concrete; top rail, 1⅝-in. outside diameter (weight 2.27 lb. per ft.); reinforcement wire at bottom of fence and about 4 ft. above grade No. 6 gauge galvanized coiled wire; end, corner, and gate posts 3-in. outside diameter (weight 5.73 lb. per ft.) for setting 3 ft. deep.

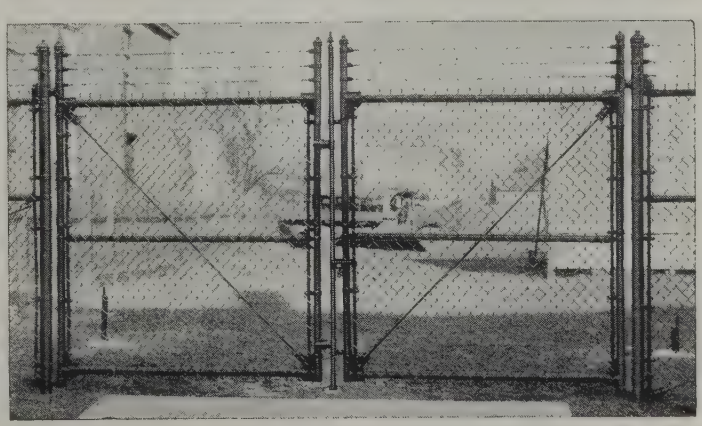
Light Construction—Chainlink Fabric 1¾-in. mesh No. 11 gauge copper bearing steel wire; intermediate posts 2-in. outside diameter tubular steel (weight 2.72 lb. per ft.) spaced 8 ft. apart; top rail 1⅜-in. outside diameter (weight 1.66 lb. per ft.); end, corner, and gate posts 2½-in. outside diameter. Specifications otherwise are the same as for the heavy construction.

Stewart's Chainlink Fabric—Woven of No. 6, No. 9, or No. 11 gauge copper-bearing steel wire hot-dip galvanized *after* weaving. This fabric has a galvanized coating which actually weighs between eight and nine per cent of the finished product, and the coating is approximately five times heavier than that of the regular grade of galvanized wire.

Stewart's Chainlink Lawn Fence—Far superior to the ordinary types of lawn fence. It is stocked in 36, 42 and 48-in. heights, in the 2-in. mesh No. 9 gauge fabric. Intermediate posts are 2-in. outside diameter, spaced 10 ft. apart, for setting 2 ft. 6 in. deep in concrete; end, corner and gate posts are 2⅜-in. outside diameter for setting 3 ft. deep.

Note: Often excellent artistic and practical results are obtained around residences by using the Chainlink Lawn Fence in combination with wrought iron entrance gates.

"Heavy Duty" Gates—Furnished in any width. We also furnish sliding gates. These have 1⅘-in. outside diameter steel tubular frames joined with pressed steel corners. They have horizontal cross member and ½-in. solid round steel brace rods. We guarantee them sagless. Hinges are forged steel, located below the bottom rail and above the top rail, thus rendering maximum efficiency.



"Heavy Duty" Gates

The Double Gate Latch Device—Very simple and effective. It permits opening the left-hand gate independently of the right. It is locked by means of a padlock which can be operated from either side of the gate.

Gate Equipment—Includes a center stop for setting in concrete and automatic backstops to hold the gates in open position.

Stewart's Road Guard Fence—For dangerous embankments, curves and bridge approaches. Woven of No. 6 gauge copper-bearing steel wire into 2-in. mesh fabric, 24 in. high, with knuckled selvages both top and bottom, galvanized *after* weaving. Furnished painted white if desired.

PAGE FENCE ASSOCIATION

215 North Michigan Avenue
CHICAGO, ILL.

MEMBER COMPANIES

Distributing Chain Link Products of the Page Steel and Wire Company, an Associate Company of the American Chain Company, Inc., Bridgeport, Conn.

ALABAMA: BIRMINGHAM—Ingalls Iron Works
CALIFORNIA: LOS ANGELES—Southern California Fence Co.
SAN FRANCISCO—Michel & Pfeffer Iron Works
COLORADO: DENVER—Stearns-Roger Mfg. Co.
CONNECTICUT: NEW HAVEN—The John P. Smith Co.
FLORIDA: JACKSONVILLE—Jacksonville Supply Co.
TAMPA—Tampa Marine Co.
GEORGIA: ATLANTA—J. R. Whitman
SAVANNAH—Savannah Iron & Wire Works
IDAHO: BOISE—Burnham Mfg. Co.
ILLINOIS: CHICAGO—Chicago Fence & Wire Co.
INDIANA: INDIANAPOLIS—The Hoosier Fence Co.
IOWA: DES MOINES—Des Moines Steel Co.
KENTUCKY: LOUISVILLE—Logan Co.
LOUISIANA: NEW ORLEANS—Orleans Steel Products Co.
SHREVEPORT—The Meriwether Supply Co.
MARYLAND: BALTIMORE—Horace T. Potts & Co.
MASSACHUSETTS: BOSTON—C. A. Gates & Co.
MICHIGAN: DETROIT—Barnes Wire Fence Co.
MINNESOTA: MINNEAPOLIS—Crown Iron Works Co.
MISSOURI: KANSAS CITY—Kansas City Wire & Iron Works
ST. LOUIS—Sears and Piou
NEBRASKA: LINCOLN—Gate City Iron Works
OMAHA—Gate City Iron Works
NEW YORK: BINGHAMTON—Titchener Iron Works, Inc.
BUFFALO—Buffalo Fence Construction Co.
FORT EDWARD—Newton & Hill
NEW YORK—Brook Iron Works, Inc.
TROY—Fred K. Blanchard, Inc.
WATERTOWN—Thos. H. Bradley
NORTH CAROLINA: CHARLOTTE—General Equipment Co.
OHIO: ASHVILLE—J. S. Roof
CINCINNATI—The Davis & Siehl Co.
CLEVELAND—The Betz-Pierce Co.
TOLEDO—Toledo Fence & Post Co.
WASHINGTON C. H.—W. W. Wilson & Son
ZANESVILLE—The F. Wilking Sons Co.
OKLAHOMA: TULSA—Tulsa Fence & Post Co.
OREGON: MEDFORD—Gaddis & Dixon
PORTLAND—Gaddis & Dixon
PENNSYLVANIA: PHILADELPHIA—Horace T. Potts & Co.
PITTSBURGH—Stewart-Holland Co.
SCRANTON—The Bittenbender Co.
TENNESSEE: CHATTANOOGA—James Supply Co.
MEMPHIS—Miller-Cochran Co.
NASHVILLE—Logan Co.
TEXAS: DALLAS—Columbia Fence & Wire Co., Inc.
HOUSTON—Vincent A. Tozzi Co.
SAN ANTONIO—Southern Steel Co.
UTAH: WOODS CROSS—Burnham Manufacturing Co.
VIRGINIA: DANVILLE—Vass-Mobley Hardware Co.
RICHMOND—Richmond Machinery & Supply Co.
WASHINGTON: SEATTLE—Gaddis & Dixon
SPOKANE—Spokane Culvert & Tank Co.
WEST VIRGINIA: PARKERSBURG—Parkersburg Supply Co.
WISCONSIN: MILWAUKEE—A. F. Wagner Architectural Iron Works

CANADA

NIAGARA FALLS—Dominion Chain Co., Limited

Products

Chain Link Fencing for protection and ornamental purposes of every description.

Wrought Iron Fencing for industrial, institutional and residential purposes.

Industrial Fencing for factories, mills, refineries, railroads, power stations, mines, yards, etc.

Fencing for city, state and national institutions, including schools, parks, playgrounds, prisons, hospitals, etc.

Enclosures for athletic fields, tennis courts, baseball grounds, amusement parks, aviation fields, automobile parking enclosures, etc.

Also manufacturers of Page "Hi-Way" Guard; Panel Partitions, made of Page Chain Link fabric, for factories, offices, warehouses, stockrooms, etc.; Fencing and Entrance Gates of copper-bearing steel for residences, estates, country clubs, etc.; Page Chain Link Specialties: Window and Skylight Guards, Display Signs, etc.

TRADE-MARK

The first wire fence ever made was designed by J. Wallace Page in 1883. For 45 years Page fences have been standards of good fence design

Only Page Drawn Wire Meets with Page Specifications

To assure the high standards for uniformity and strength set by Page engineers, every bit of wire used in Page products is rolled and drawn and galvanized in the Page mills. The most rigid inspection guarantees only perfect material being used.

All Page fabric is heavily galvanized after weaving by a special Page hot-dip process that assures a uniform coat of zinc—approximately five times heavier than ordinary galvanizing.

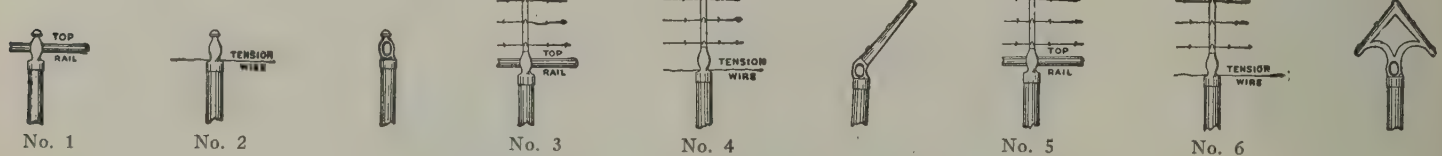
Tests, carried on both in the laboratory and in actual service, prove that the heavier coat of zinc results in a more durable fence, especially when the base metal is uniform and of high quality.

There Is a Page Distributor Near You

In each district of the United States and Canada there is a responsible firm of fence engineers that carries complete stocks of Page products and specializes in fence construction. This assures expert performance of the work all the way through, and gives the advantage of consultation with men of long experience in the erection of fences.

Estimates gladly furnished on receipt of rough sketches of proposed work, or complete detailed designs will be drawn up, if desired, and estimates supplied.

Get in touch with the distributor nearest you, as listed above, or write direct to Association Headquarters for interesting literature.



No. 1 No. 2 No. 3 No. 4 No. 5 No. 6

Six Styles of Page Protection Fence from which to Choose

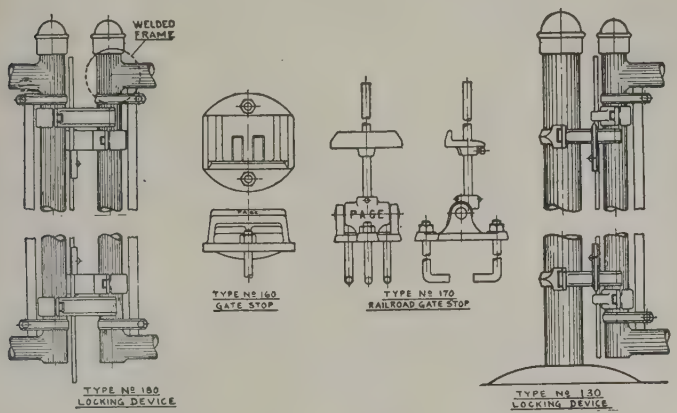
No. 1. Style 0-TR No barbed wire—using top rail.
No. 2. Style 0-W No barbed wire—using tension wire.
No. 3. Style 3-TR Three strands of barbed wire—using top rail.
No. 4. Style 3-W Three strands of barbed wire—using tension wire.
No. 5. Style 5-TR Five strands of barbed wire—using top rail.
No. 6. Style 5-W Five strands of barbed wire—using tension wire.

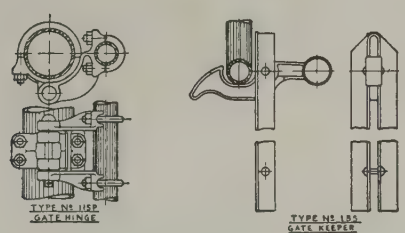
Continued on next page

Complete Mechanical Drawings

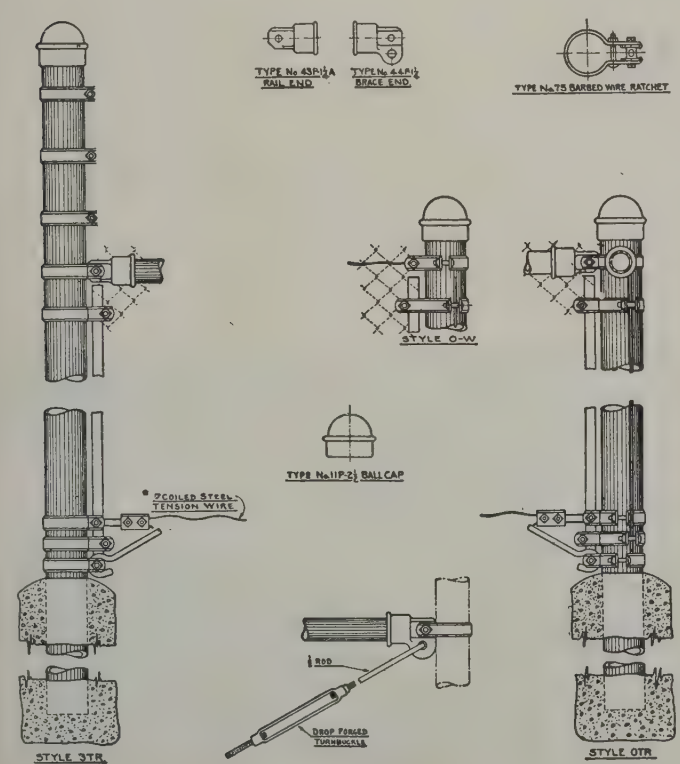
Complete mechanical drawings and specifications available to all who request them.

All fittings are heavily galvanized with best grade of zinc obtainable.



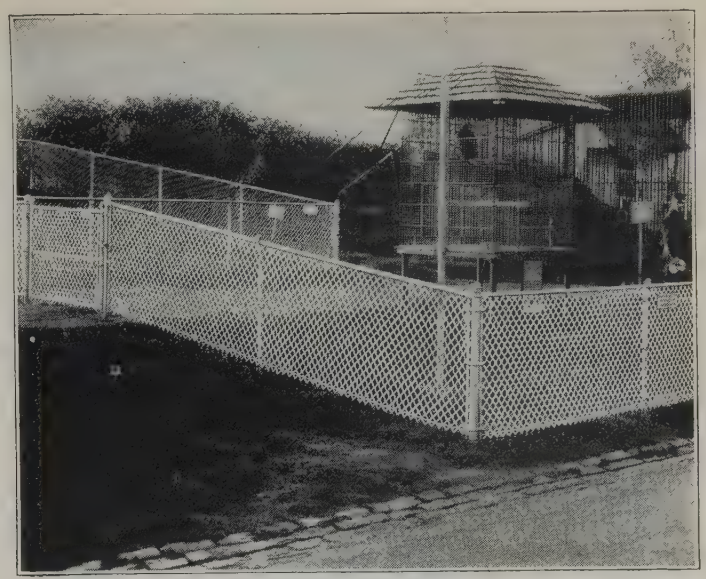


Our latest catalogue gives detail drawings and specifications for *all* Page Chain Link Fence Fittings. A copy will be sent on request.



Shown above are just a few of the fittings to Page Protection Chain Link Fence and detail drawings of only two of the six standard styles available.

Details of the six styles are shown by line drawings on the preceding page.



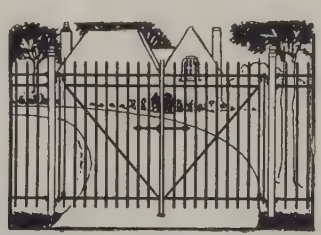
Page Chain Link Fence Offers Permanent Protection for Zoological Gardens and Other Park Property

Page Wrought Iron Fence

Shown below are the four most widely adopted styles of Page Ornamental Wrought Iron Fence. This durable fence is furnished in 8-ft. panels with ⅝-in. adjustment, and in six different heights ranging from 37 to 72 in. Pickets are spaced on 4 or 5-in. centers, and in ½, ⅝ or ¾-in. size; have forged points and are securely locked into wrought iron channel rails. Line posts may be either 3-in. I-beam or solid bar as specified. Standard sizes of drive gates are 10, 12 and 14 ft.; walk gates, 3, 3½ and 4 ft. All gates are fully equipped with attachments for lock, center stop, keeper, hinges, etc.

Wrought iron is "the most enduring of all metals" which results in Page Ornamental Wrought Iron Fence, made under Page supervision and in accordance with the high standards of Page craftsmanship, being desirable wherever dignified protection is needed.

Style 1000



Style 2000

Style 3000

Style 4000

Page Ornamental Wrought Iron Gates

Page Panel Partitions

For inside protection in warehouses, stores, garages, shop superintendents' offices, etc. Page panel partitions have no equal in the provision of stock control, light, ventilation or full vision.

Continued on next page

Specifications for Page Chain Link Fence

Line of Fence

Chain Link Fabric—Shall be of copper-bearing steel containing not less than 20/100 of 1% copper and galvanized after weaving. Usual specifications for factory fence are 2-in. mesh No. 6 or No. 9 gauge (W&M). Residential, 2-in. mesh No. 9 and 2-in. mesh No. 11 W&M gauge. Tennis court construction, 1¾-in. mesh No. 11 W&M gauge.

Line Posts—Shall be of hot galvanized copper-bearing steel pipe and furnished in: 2-in. outside diameter, weight 2.717 lb. per ft. for fences under 6 ft. high and 2½-in. outside diameter, weight 3.652 lb. per ft. for fences 7 ft. high and over. Posts are spaced on 10-ft. centers and set 3 ft. deep in bell shaped concrete footings crowned at the top to shed water and prevent rusting.

Top Rail—Shall be 1⅝-in. outside diameter copper-bearing steel pipe hot galvanized, weighing 2.272 lb. per ft. in random lengths, the average of which shall not be less than 15 ft.

Expansion Sleeve—(No. 1027 P 1⅝.) Shall be extra long to give a rigid connection and to provide for expansion and contraction in connecting lengths of top rail. Shall be made of pressed steel heavily galvanized.

Intermediate Post Tops—(No. 15-24-25-30-45.) Shall be made of heavily galvanized malleable iron and fitting over posts to exclude moisture. To be used with top rail or tension wire, as specified. Post tops for styles of fence calling for barbed wire shall be provided with stamped iron extensions.

Fabric Bands—(No. 1020.) For attaching fabric to line posts shall be made of rustless zinc alloy. These can not be removed without a tool and leave posts free of drilling.

Tension Wire—To prevent forcing fabric between posts, all Page Fence shall be provided at the bottom with a No. 7 gauge double-galvanized high carbon steel coiled wire.

All "W" styles of fences shall be provided with this same type of wire at the top to support the fabric instead of the top rail.

Terminal Posts

3-in. outside diameter—weight 5.79 lb. per ft.—end, gate and corner posts.

4-in. outside diameter—weight 9.10 lb. per ft.—gate posts.

6⅝-in. outside diameter—weight 18.97 lb. per ft.—gate posts.

All the above shall be hot galvanized copper-bearing steel pipe and of sufficient length to set 3 ft. in bell shaped concrete footings. End and gate posts for styles of fence provided with barbed wire shall extend 1 ft. above fabric—to provide support for barbed wire.

Gate, End and Corner Post Tops—(No. 11-26-31-46.) Of same design as intermediate post tops. Terminal posts for fences with barbed wire shall be supplied with top equipped for barbed wire.

Brace and Tension Bands—(No. 1001-1002-1006-1007.) Shall be of unclimbable beveled edge steel type provided with ⅜-in. square shouldered, hot galvanized carriage bolts which can not be removed from the outside.

Brace Assembly—(Rail end No. 43 P 1¼ A, brace end 44 P 1¼, and brace rod No. 1030.) All end and gate posts shall be furnished with one complete brace assembly as follows: 1 piece 1⅝-in. outside diameter copper-bearing steel pipe for brace, weighing 2.272 lb. per ft., which shall be used as a compression member, ½-in. diameter steel brace rod with drop forged turnbuckle, to be used as a tension member, 1 malleable iron rail and brace with necessary brace bands, and bolts for attaching to post. Corner posts shall be furnished with two complete brace assemblies.

Tension Bars—(No. 1046.) A tension bar of ⅜x¾-in. flat bar shall be run through the first spiral picket in a roll of fabric and secured to the post by means of tension bands. This method of terminating the fabric is to distribute the strain evenly over its entire length, and thus avoid the distortion of the fabric at the bolts.

Gates

Frames—Shall be of 2-in. outside diameter copper-bearing steel pipe construction weighing 2.717 lb. per ft. with intermediate braces of 1⅝-in. outside diameter copper-bearing steel pipe weighing 2.272 lb. per ft. All joints shall be welded making a rigid and watertight frame.

Gate Filler—Frames shall be filled with fabric to match that in the line of fence and shall be furnished with or without barbed wire—as specified. When barbed wire is specified, ratchets shall be furnished on the gate extension to provide a means of keeping the wire taut at all times.

Hinges—(No. 115.) Shall be of the double clamping offset type allowing the gates to swing back parallel with the line of fence and shall be made of malleable iron and forgings heavily galvanized.

Latches—(No. 130 and No. 180.) Shall be of the eccentric double locking type which engages stops securely bolted to gate frame at both top and bottom. Lever handle is drop forged steel insuring the greatest strength possible without additional weight. Lock bars are of steel, the lower one sufficiently long to extend down when locked, engaging an extra heavy malleable iron non-freezing gate stop for drive gates and a disappearing type of stop for railroad gates. Either stop shall be securely fastened to a large concrete footing in the center of the opening.

Keeper—(No. 155.) Each gate frame shall be furnished with a keeper, the purpose of which is to automatically catch and hold the gate when swung open.

Auxiliary Brace—(No. 1047.) With all gate posts for single gates 12 ft. wide or double 24 ft. wide and over, there shall be furnished a diagonal or strut brace of 2-in. outside diameter copper-bearing steel pipe with necessary brace end and band for attaching to post. This brace shall be set inside and at right angles to the fence line to relieve the strain on the gate post when the gates are in an open position.

All gate fittings shall be heavily galvanized with the best grade of zinc.

The Nonclimbable Barrier Provided by Page Chain Link Fence in This Typical Installation Affords Ample Protection

Page Chain Link Fence with Barbed Wire Attached Insures Outlying Property Against Trespassing

MICHIGAN CEDARCRAFT COMPANY

Manufacturers of Rustic Equipment

GREENBUSH, ALCONA COUNTY, MICH.

Products

"CEDARCRAFT" RUSTIC FENCING.

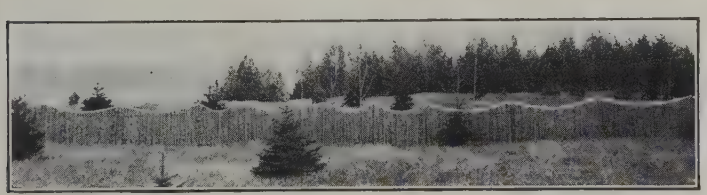
Also, Bird Homes, Bridges, Cabins, Ferneries, Rose Arbors, Summerhouses, Swings, Golf Covers; Furniture for the lawn, porch, home and club; all manufactured from Michigan White Cedar.

"CEDARCRAFT"
TRADE-MARK

"Cedarcraft" Fence Primitive

The aristocrat of all fencing. Pronounced by landscape architects the most beautiful fencing on the market.

Left in the natural bark, no other fence offers just that same blending effect with nature's background, and the curved top of this fence which is brought into relief by the soft silver gray tone of the sharp edged (not pointed) tops of the pickets presents a graceful appearance obtainable by no other means.



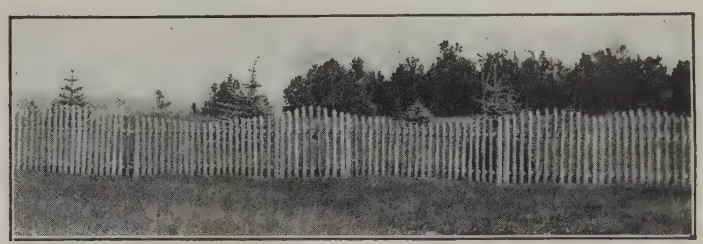
"Cedarcraft" Fence Primitive

Produced in three designs, under-curve, over-curve and alternate over-curve and under-curve sections, with several different type gates from which to choose.

Height of under-curve sections: maximum, 48 in.; minimum, 39 in. Height of over-curve sections: maximum, 57 in.; minimum, 49 in.

"Cedarcraft" Picket Fence

Posts, rails and pickets used in this fence are without the bark and the natural wood develops through weather seasoning into the well-known silver gray tone.



"Cedarcraft" Picket Fence

For one who desires a stained fence, either Forest Brown or Forest Green may be ordered.

Produced in under-curve, over-curve and alternate under and over-curve sections.

The illustration shows an assembly of under-curve and over-curve sections.

Height of under-curve sections: maximum, 42 in.; minimum, 36 in. Height of over-curve sections: maximum, 48 in.; minimum, 42 in.

Service and Catalogues

All fencing shipped complete with posts, ready for erection by inexperienced labor.

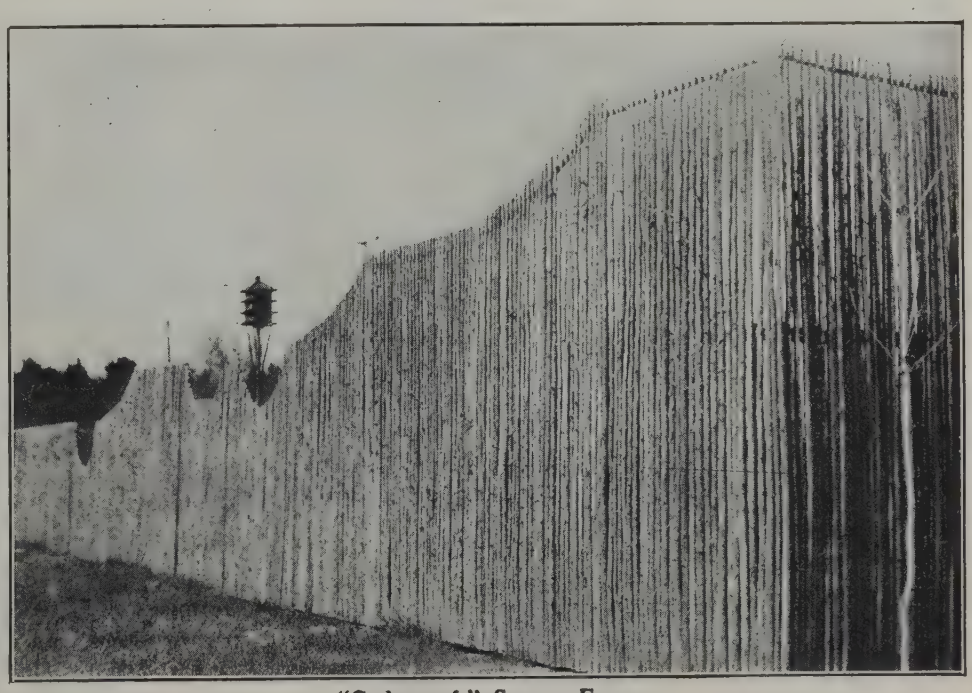
Take up your fencing problems with us. Illustrated catalogue will be gladly sent to you.

Illustrated catalogues on our other products also furnished upon request and estimates submitted on special designs.

"Cedarcraft" Screen Fence

A fence in the natural bark. Illustration shows a composite view of 6, 8, 10 and 12-ft. heights, with graduated sections. Note the screen effect. Produced in straight top or under-curve design.

Similar in construction to the "Cedarcraft" Fence Primitive, its obviously durable construction (which causes it to sturdily withstand the elements) combined with its individual appearance have solved many fencing problems. In addition to being a distinct embellishment to the grounds, it affords privacy and can be used to eliminate disturbing or unsightly views on one's own or a neighboring property, and it is as effective in winter as summer. Among the purposes to which individuals and clubs have adapted it is its use at tennis courts.



"Cedarcraft" Screen Fence

ESTABLISHED 1860

ROBERT C. REEVES CO.

Manufacturers and Distributors of Wooden and Wire Fences

187 Water Street, NEW YORK, N. Y.

Products

Dubois Woven Wood Fence—a closely woven fence made in France of split chestnut saplings.

Cleft Chestnut Fence—similar to Dubois, with saplings spaced 1 in. apart.

Reeveshire Hurdle Fences and Gates.

Old-fashioned Post and Rail Fence.

Copperweld Chain Link Fence.

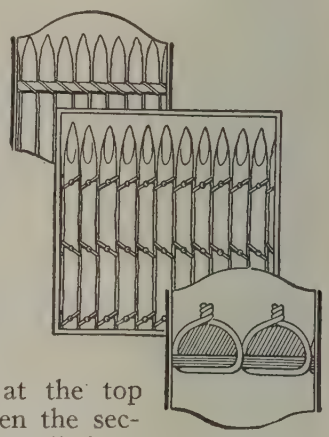
Dubois Woven Wood Fence

No other fence is quite like this one. It is made of split, live, chestnut saplings, closely woven together and bound to horizontal bracings with heavy, rust-proof Copperweld wire. The work is all done by hand. So perfectly are the saplings matched that outsiders cannot see through.

Its uses are many and varied. Originally it was designed to give privacy and seclusion to old French gardens and to hide famous estates from the public's gaze. But today it serves in all sort of ways, from screening a neighbor's garage, or shutting off a laundry yard or service entrance to making a metropolitan roof garden look like the real thing.

Dubois is not only extremely serviceable, but it adds a touch of rustic charm wherever used. It is a beautiful fence, harmonizing with almost any type of architecture. The saplings are a natural brown in color, which mellows as time goes on to a lovely silver-gray.

One of the great advantages of Dubois is its extreme economy over a long period of years. It literally lasts a lifetime, and you do not have to paint it as you do other fences. Nor does it require other forms of upkeep expense. This makes it an ideal choice for practically any type of duty: country, suburban, or city. It is also moderate in cost.



Sizes and Erection—Dubois is now made in four sizes, 6 ft. 6 in., 4 ft. 11 in., 3 ft. 10 in., and a special 18-in. height for trimming flower beds and garden paths. It comes in sections 5 ft. wide, and is shipped ready to erect against a framework of posts and cross-pieces which any carpenter can supply. The posts should be placed about 8 ft. apart. The stringers are fastened at the top and 1 ft. above ground. Then the sections of Dubois are simply nailed to them. It is a job almost anyone can do.

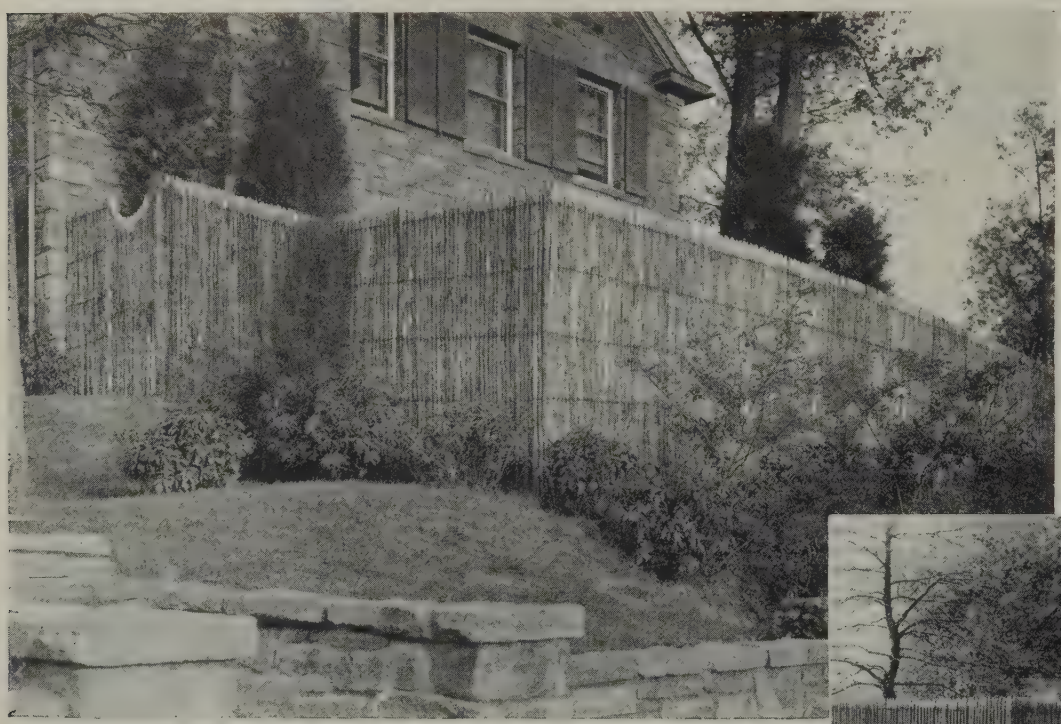
A special framework of mortised and tenoned posts and cross pieces made of Michigan cedar, finished to harmonize with the sylvan aspect of Dubois, can be supplied when desired. Gates, either curved or straight at the top, are furnished to match the fencing.

Cleft Chestnut Fence

Like Dubois, except the saplings are spaced 1 in. apart. Meets the demand for a fence both artistic in character and very moderate in price. This style of fencing comes in 16-ft. rolls, in three heights, 6 ft. 6 in., 4 ft. 11 in., and 3 ft. 10 in. It does not afford the same degree of privacy as Dubois, but there are many places where it can be used, and at a desirable saving in cost.

Literature

For further details, send for free album of Dubois illustrations specially prepared for architects and landscape architects. Folders describing other Reeves fences with prices also sent free on request.



Above:

Capturing Privacy in a Crowded City for a Side Yard

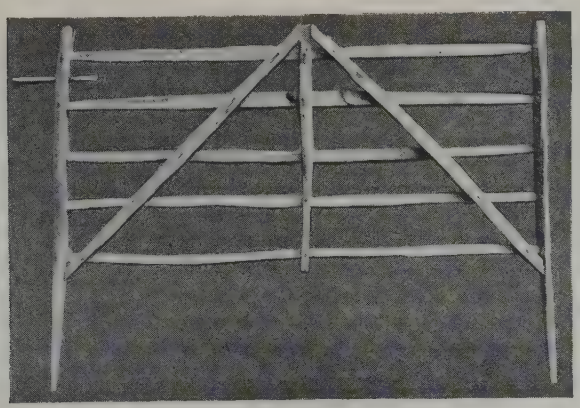
Right:

The Laundry Yard and Its Usual Details Effectively Hidden

Continued on next page

Reeveshire Hurdle Fence

An adaptation of the cleft chestnut hurdle fence which has been used in England for centuries. It is made of split chestnut timber, constructed in sections or hurdles, each hurdle being 8 ft. 3 in. long. At each end is a 6-ft. post which extends 18 in. into the ground,



A Section of Reeveshire Hurdle Fence

making the fence 4 ft. high. The posts of one hurdle lock easily with those of adjoining hurdles by means of wooden pins which are supplied. This makes for exceeding strength, as no one post is required to support alone a strain on its particular hurdle.

The hurdles are made in three styles, 4, 5 and 6-bar, all of which are the same length and height, the difference being in the spacing between the bars.

Uses—Reeveshire Hurdle Fence is something more than an enclosure—it is decidedly an artistic fence, possessed of unusual rustic charm, and blends well with

A Strong Pasture Fence

many types of architecture. Recently there has been an increasing demand for it as a boundary fence for large estates, a division fence in the suburbs, or to accentuate the setting for a residence of the English farmhouse or similar type.

The 4-bar hurdles are suitable for enclosing pastures for cattle where a close fence is unnecessary.

The 5-bar hurdles make an ideal fence for paddocks or pasture for spirited horses and are used for this purpose on the estates of many of the leading horsemen of this country. Hurdle fencing is easily seen by colts and they will not injure themselves by running against it.

The 6-bar hurdles make a very close fence and are particularly suited for enclosing pastures or pens for sheep or pigs.

Erection and Removal—Reeveshire Hurdle Fence is easily set, requiring no digging of post holes. Two men can place from one to two hundred sections in a day. A hole is made in the ground with a crowbar and the end posts are driven in. The hurdles are then locked together with the wooden pins. It is easily taken down and transferred from one plot to another, and during the winter months may be compactly stored.

Reeveshire Hurdle Fence Gates—Made with 4, 5 or 6 bars to conform to the three styles of fencing. Stocked in 10-ft. lengths with extra braces. Furnished to order in any desired length.

Reeveshire Portable Post and Rail Fence—Much heavier than Reeveshire Hurdle Fence though of the same length and height when set. Posts extend 2½ ft. in ground. Generally used as permanent fences in hunting districts.

Old-fashioned Post and Rail Fence

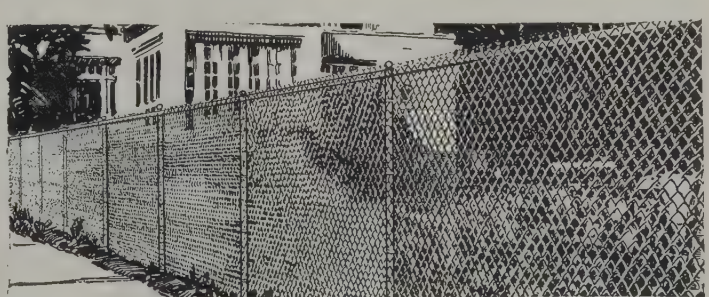
An authentic Early American post and rail fence for farm use. Made of split chestnut. Ideally suited for erection in hunting country.

Old-fashioned Post and Rail Fence

Copperweld Chain Link Fence

Enduring Copperweld Fence offers permanent protection and eliminates painting and the usual maintenance and replacement costs. Beautifies as it protects.

We are prepared to give you complete service—from the first plans to the final erection. Literature and prices on request.



Copperweld Chain Link Fence

Service to Architects

Our Service and Advisory Department will gladly assist in the solution of any fencing problem. Our 68 years of experience place us in a position to make specific suggestions as to the adaptability of fencing to special requirements.

ALUMINUM COMPANY OF AMERICA

Manufacturers of Aluminum and Aluminum Alloys

PITTSBURGH, PA.

Product

ALUMINUM for ORNAMENTAL METAL WORK.

For Aluminum Roofing, see page A508; for Aluminum Paint, see page B2034.

Aluminum for Ornamental Metal Work

Aluminum is applicable to ornamental metal work ranging from the finest grades to the commercial grades and forms. Because of its light toned permanent color, high resistance to corrosion, non-staining properties, light weight, uniformity, and easy working properties, it is finding increasing use in the architectural field for general sheet metal and ornamental metal purposes.

Aluminum Casting of Grille in Fifth Church of Christ, Scientist, Cleveland, Ohio

Physical Characteristics of Aluminum

Color—The permanent silvery gray color makes aluminum very desirable as a decorative material and the various alloys furnish a considerable range in strength and workability.

Resistance to Corrosion—The resistance of aluminum to atmospheric corrosion is very good, as is witnessed by installations of varied forms ranging in location from tropical to high latitude conditions.

Light Weight—Aluminum has a specific gravity of approximately 2.8 and weighs $\frac{1}{10}$ lb. per cu. in. As this is one-third the weight of other commonly used metals, ease of erection is a natural consequence.

Will Not Discolor Adjoining Materials—Aluminum forms no colored salts and does not discolor surrounding or supporting structures from drip or splash of watershed.

Strength—Specifications of aluminum range from fully annealed 2S0 pure metal (12000 lb. per sq. in. tensile strength, 25% elongation in 2 in., Brinnell hardness, 22) to special 17S alloy (65000 lb. per sq. in., 20% elongation in 2 in., Brinnell hardness, 92).

Easily Worked—Aluminum machines easily and is capable of taking and holding a high polish.

Two Aluminum Castings Like This Are at the Entrance to the St. Louis Civil Courthouse, St. Louis, Mo.
The castings are 11 ft. high, 19 ft. long and 12 ft. wide

Cost

The cost of installing aluminum is of course dependent on the design and quality of work, and compares with the cost of installing high grade materials.

Actual cost of aluminum per unit of weight is divisible by three for comparison by bulk with cost of other similarly used metals.

Marketable Forms

Aluminum and aluminum alloys are obtainable in the form of ingots, sheets, rods, bars, tubing, rivets, bolts, extruded moulding, and structural shapes for fabrication.

Literature

The following booklets will be mailed on application:

Aluminum Casting Alloys
Strong Aluminum Alloys
Machining Wrought Aluminum

AMERICAN BRONZE CO.

Ornamental and Architectural Bronze Work

OFFICE AND FACTORY
1316-1318 West 63rd Street
CHICAGO, ILL.

Products

ORNAMENTAL and ARCHITECTURAL BRONZE WORK, which includes: Monumental Bronze Work; Doors; Memorial and Commercial Tablets; Cast Bronze Letters, Numerals and Signs for buildings; Stair Rails; Brackets, Grilles and Wickets; Thresholds; Flagpole Bases; Fountains; Clocks; Check Desks; Bronze Inkwell Stands combined with Reflectors; Name Plates, or anything in Ornamental and Architectural Bronze.

ILLUMINATED SIGNS made in cast bronze and drawn metal.

Service

All work is made to order, in any size or shape. Architects' special designs and ideas will be carefully followed.

Work made and shipped complete, ready for erection, to any part of the country.

Prices

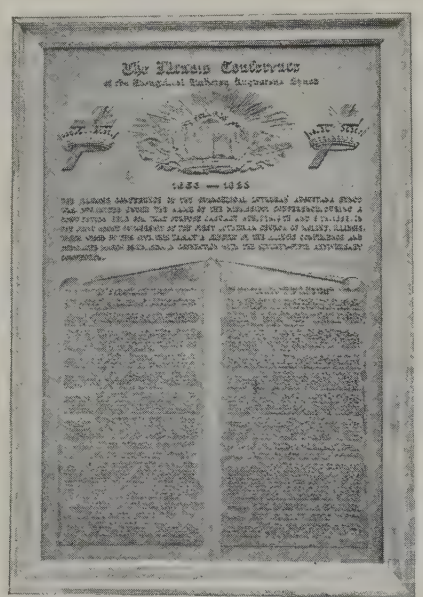
Quotations submitted promptly upon receipt of specifications.

Catalogues

Obtained on application.

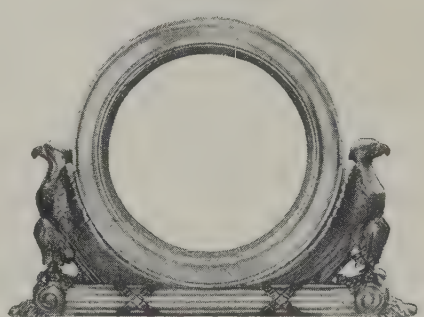
Cast Bronze Illuminated Sign with Glass Face

May be had in either ornamental or plain design, and in any size



Solid Cast Bronze Tablet Erected at First Lutheran Church, Moline, Ill.

3 ft. 5½ in. x 5 ft.



Solid Cast Bronze Clock Frame Erected in the Bank of Harvey, Ill., and the Farmers State Bank, Valparaiso, Ind.

30x24 in.

Built-up Bronze Door, Lake Shore Towers Building, Chicago, Ill.

Includes jambs, push and pull bars, cast bronze grille and glass. Size, 3 ft. 4 in. x 7 ft. 4 in.

Bronze Entrance Doors Constructed for the Pickering Lumber Building, Kansas City, Mo.

5 ft. 4 in. x 9 ft. 5 in.

Cast Bronze Directory Board Measuring 36x14½ in., with Space for Removable Bronze Plates Made for H. Dalsey, Architect, Chicago, Ill.

THE AMERICAN BRASS COMPANY

Manufacturers of Extruded Bronze, Brass and Copper for Ornamental and Structural Purposes; Wire, Rods and Tubes

GENERAL OFFICES
WATERBURY, CONNECTICUT

MILLS AND FACTORIES

ANSONIA, CONN. TORRINGTON, CONN. WATERBURY, CONN. HASTINGS-ON-HUDSON, N. Y.
BUFFALO, N. Y. DETROIT, MICH. KENOSHA, WIS.

CANADIAN MILL: ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

OFFICES AND AGENCIES

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NEWARK, N. J., Military Park Building
BOSTON, MASS., Statler Building
PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., Widener Building
PITTSBURGH, PA., Oliver Building
CLEVELAND, OHIO, Union Trust Building
DAYTON, OHIO, Third National Building
CINCINNATI, OHIO, Dixie Terminal Building
CHICAGO, ILL., 111 W. Washington Street
ST. LOUIS, MO., Planters Building
NEW ORLEANS, LA., Hibernia Bank Building
SAN FRANCISCO, CAL., Russ Building

Products

ANACONDA from mine to consumer

ANACONDA ARCHITECTURAL BRONZE, BRASS AND COPPER for ornamental and structural purposes as used for over twenty-five years by leading fabricators of ornamental and structural metal work, including Cornices, Pilasters, Grilles, Wickets, Counters, Door and Window Trim, Screens, Hand Rails, etc.

For Anaconda Sheet, Roll and Strip Copper, see page A509; for Anaconda Brass and Copper Pipe and Anaconda Copper Service Tubes, see page C2701.

Extruded Architectural Bronze Shapes

In the extrusion process, a bar of bronze is forced under hydraulic pressure through a hardened steel die of the proper cross section. The resulting product obtained is of a homogeneous texture, very strong and durable, and in every way superior to a bronze casting. There are no pocked surfaces, porosities or any of the defects frequently found in castings.

The tensile strength of Anaconda Extruded Architectural Bronze is never less than 45,000 pounds to the square inch.

The edges are sharp and clean, so that the exact detail of the architectural design is obtained.

Standard Patterns and Special Designs

Recently a large number of dies made up during the past twenty-five years for the production of extruded bronze shapes from designs by many leading American architects have been released for general use. The availability of these dies saves the expense of special die making, thereby reducing the cost of fine bronze work.

We recommend a careful study of our catalogue of available standard shapes, a copy of which will be sent on request.

Cold Drawn Shapes

When light mouldings and shapes are required with walls 1/8 inch or less in thickness, the drawn process is used to produce Anaconda Bronze Shapes.

These cold drawn shapes are used for a great variety of architectural purposes, such as interior trim, window frames, showcases, store fronts, etc.

Colors

Anaconda Architectural Bronze Shapes, whether made by the extrusion process or cold drawn, have a natural golden color. After exposure the metal darkens and assumes the characteristic color of bronze. For interior use, the metal can be artificially colored to obtain any effect desired.

Estimates and Co-operative Service

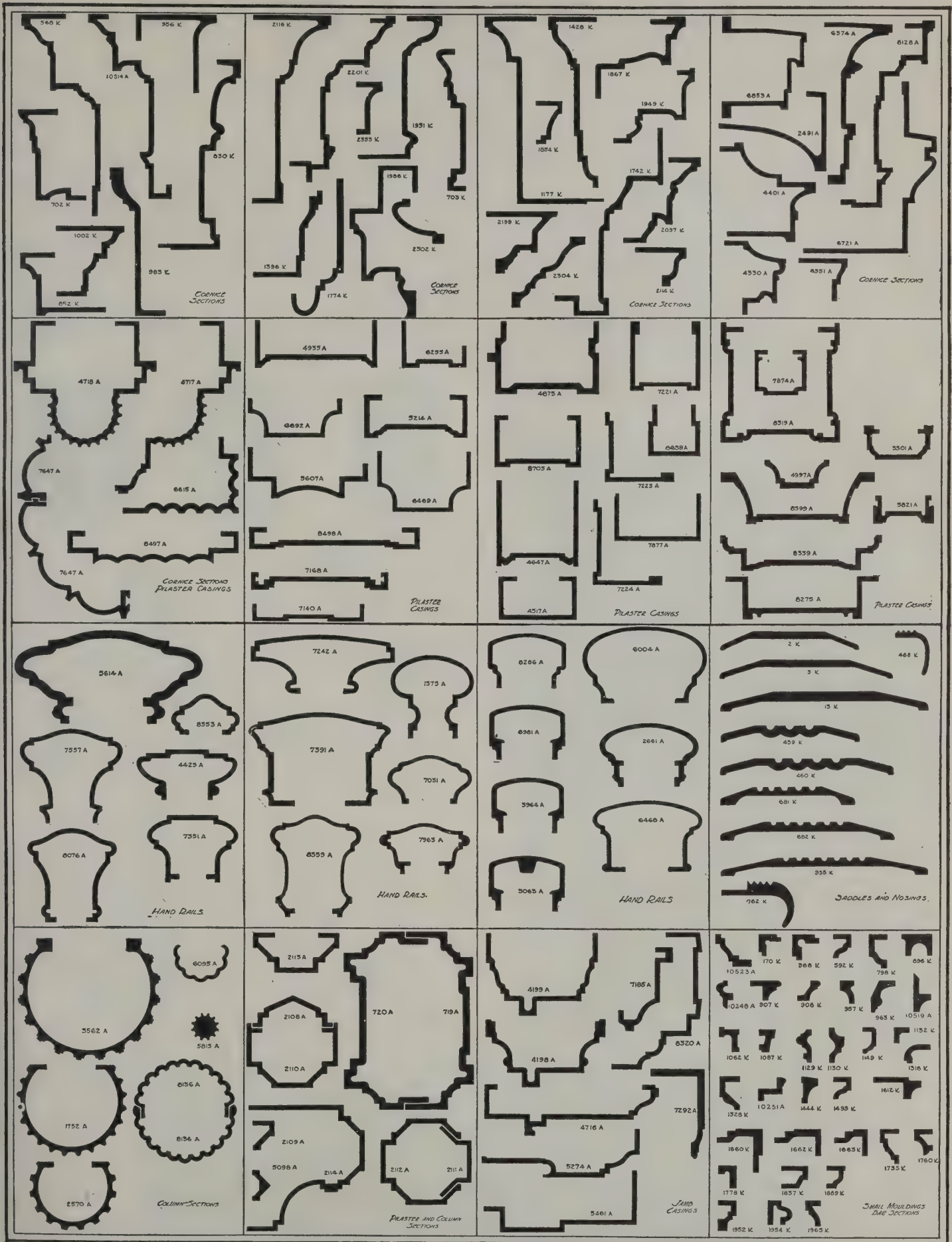
THE AMERICAN BRASS COMPANY offers full co-operation in furnishing estimates and determining the suitability of Anaconda Metals for various uses. While estimates can usually be prepared from detailed blue prints and specifications, a representative of THE AMERICAN BRASS COMPANY will be sent at any time to consult with architects or fabricators whenever such consultation is requested.

Facilities

THE AMERICAN BRASS COMPANY is equipped for extensive production of Anaconda Architectural Shapes. The Company has complete facilities for serving the East from its mill at Ansonia, Conn., and the West from its mill at Kenosha, Wis.

Inquiries or orders should be sent to the nearest mill.

Continued on next page



AMERICAN BRASS COMPANY	TYPICAL ANACONDA ARCHITECTURAL BRONZE SHAPES REPRODUCED FROM CATALOGUE OF AVAILABLE SHAPES. NUMERALS INDICATE DIE NUMBERS	DRAWING NO. 1 SCALE: 3 IN. EQUALS 1 FT.

ARCHITECTURAL METAL PRODUCTS, INC.

FORMERLY THE PROBERT SHEET METAL CO.

Manufacturers of Marquise

COVINGTON, KY.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

For Metal Covered Doors, see page A911

Marquise for All Classes of Buildings

Many years of experience in the manufacturing of marquise for all types of buildings have given us a great fund of practical knowledge on the subject. We design and construct marquise for theaters, hotels, banks, apartment houses, etc. We furnish and erect, any place in the country, all standard steel framing and use galvanized Armco ingot iron or sheet copper on all marquise furnished by us. We also build marquise according to architects' plans.

In our well illustrated marquise catalogue which we will gladly send on request, are shown many of our representative installations. Marquise suitable for buildings of all kinds are included. From these, suggestions of design and practice can be obtained.

Our engineering and architectural departments are composed of men who have specialized on marquise and are especially capable to solve any problem relating to their design or installation. They are at all times ready to submit sketches and estimates.

When making inquiries, give the following information: width of marquise across front of building and projection over sidewalk; select design from our catalogue or submit sketches; whether wiring is required on underside; specify reading of fixed letter signs; type of construction of building.

Signs, when furnished, are made as an integral part of the marquise with cornices, brackets and all mouldings applied. Wiring is complete with leads ready to connect to wiring in building. Letters furnished as follows:

No. 1 No. 2 No. 3

Interchangeable Letters for Marquise Signs

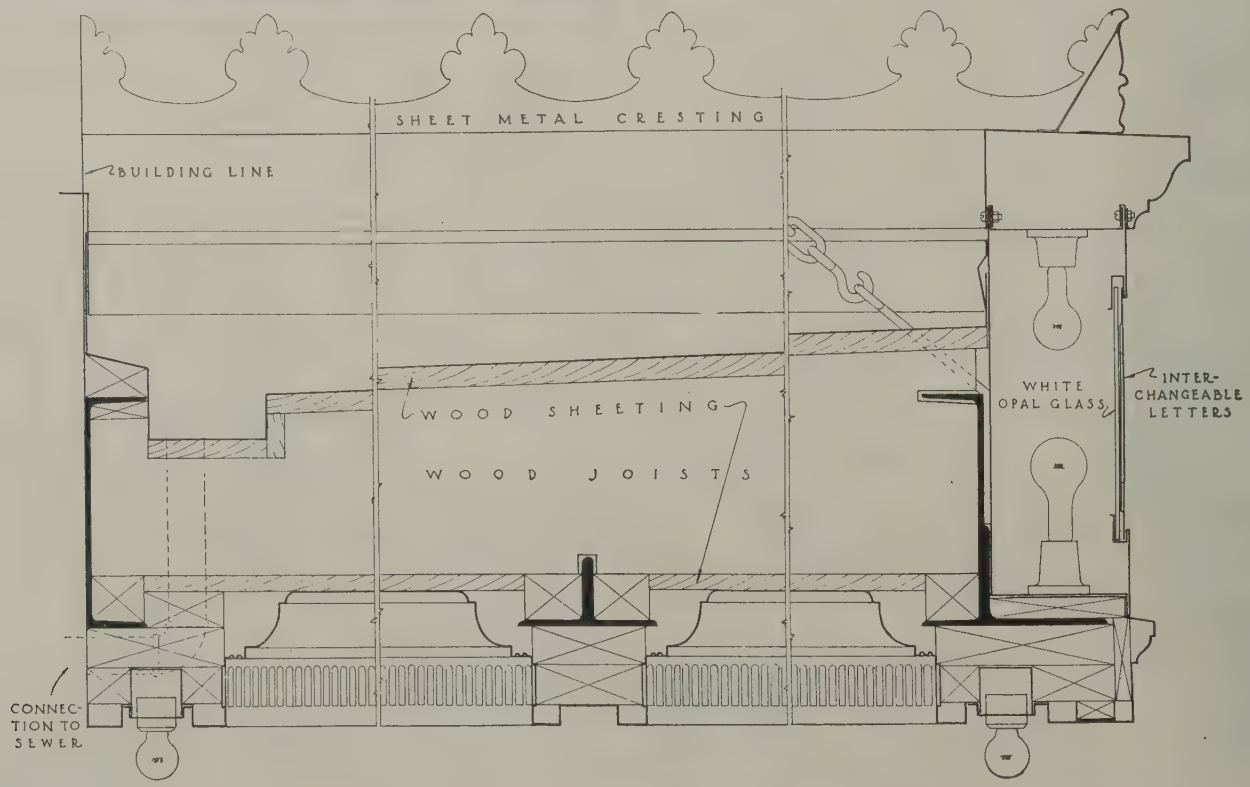
No. 1, a raised glass letter contained in a special frame, sizes from 4 to 12 in. No. 2 has a raised channel of metal outlining the letter, the metal being the only part removed for changing the reading. No. 3, similar to No. 2, either copper or zinc with bright facing on outline of letter. Nos. 2 and 3 in 8 and 12-in. sizes only.

Letters for interchangeable letter signs are furnished in sets of the proper assortment. "In," "and," "the," periods, quotation marks and sufficient blank spaces in assorted sizes are included.

Letters similar in construction to Nos. 1 and 2 and the exposed bulb channel type are furnished for signs having fixed letters

Designs and Catalogue

We have a very complete and comprehensive marquise catalogue which will be sent on request or, should it be preferred, our architectural department will supply a design which will fit the architecture of the building if a front elevation drawing is sent to us.



ESTABLISHED 1878 INCORPORATED 1899

C. H. BUCK & CO., INC.

Cast Bronze Letters and Tablets

BOSTON, MASS.

Products

STOCK CAST BRONZE LETTERS in Architectural, Gothic and Scotia Styles.

TABLETS, Cast or Fabricated, for banks, churches and memorials.

METAL SIGNS and NAME PLATES.

DESK SIGNS.

Cast Bronze Letters

Style "A" is carried in more than 20 sizes, from 1 to 15 inches high and in condensed, regular and extended widths. Included in the various fonts are the long-tail "R" and broad "C," "G," "O" and "Q."

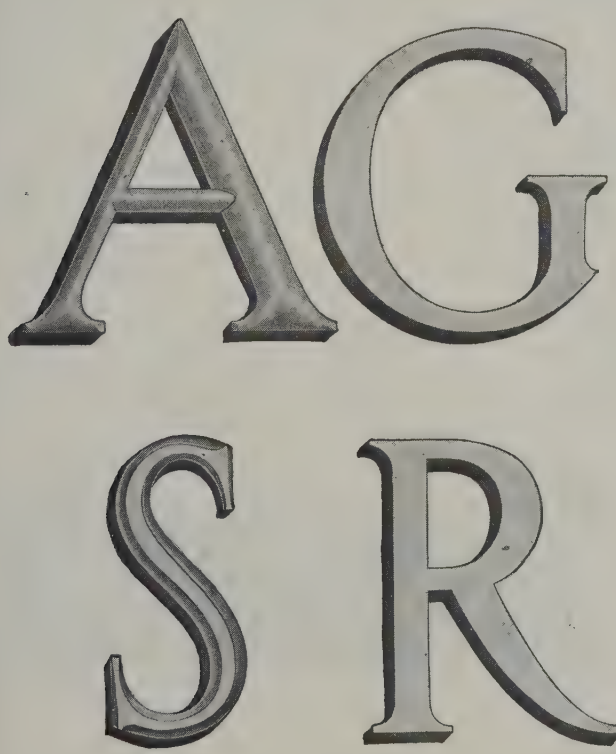
All letters are drilled and tapped on the back, ready for immediate shipment. Face and edges of letters larger than 6 inches are sand finish.

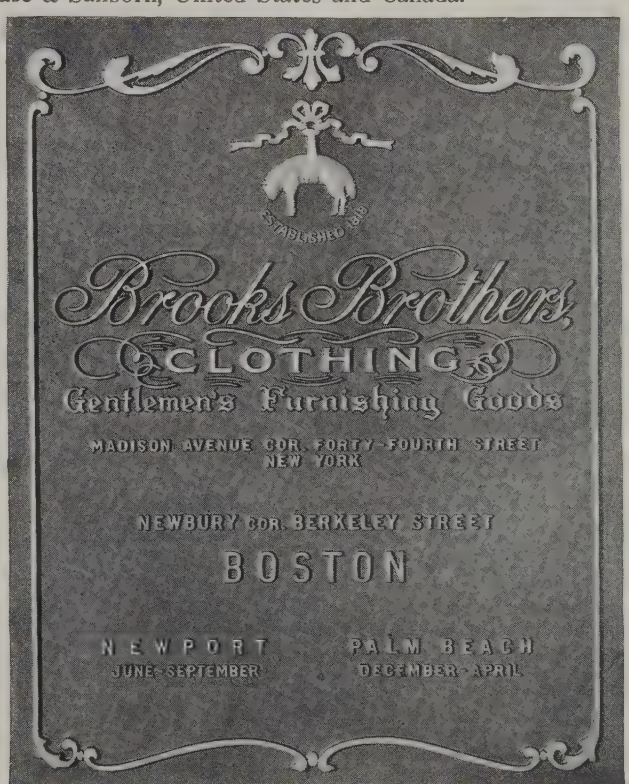
We carry what is probably the largest stock of letters in this country and are in a position to make immediate shipments to any part of United States and Canada.

Customers

Users of special and stock cast bronze letters and tablets:

Union League Club, San Francisco, Cal.
Riverside Trust Co., Hartford, Conn.
National Shawmut Bank, Boston, Mass.
Old Colony Trust Company, Boston, Mass.
Atlantic National Bank, Boston, Mass.
Federal National Bank, Boston, Mass.
First National Bank, Boston, Mass.
City Departments, Boston, Mass.
Chelsea Trust Co., Chelsea, Mass.
Safety Fund National Bank, Fitchburg, Mass.
Old Lowell National Bank, Lowell, Mass.
Besse System Stores, New England and other States
Liggett Drug Co., New England and other States
United Shoe Machinery Corp., New England and other States
Jackling Gymnasium, University of Missouri
First National Bank, Poughkeepsie, N. Y.
Andrew J. Lloyd Co., Boston and Worcester, Mass., and Providence, R. I.
The Outlet Department Store, Providence, R. I.
City of Rutland, Rutland, Vt.
Hawaiian Trust Co., Honolulu, T. H.
Chase & Sanborn, United States and Canada.





J. G. BRAUN COMPANY, INC.

Plain and Ornamental Steel Mouldings

537-541 West 35th Street NEW YORK, N. Y.
609-621 So. Paulina Street CHICAGO, ILL.
1088 Howard Street SAN FRANCISCO, CAL.

Products

Rolled Steel Mouldings, Plain and Ornamental.
Pipe and Tubing, Square and Rectangular.
Ornaments, Wrought and Stamped.
Colonial Hardware.
Perforated Sheets.
Step Nosing and Stair Edging.
Baluster Collars.
Also Fence Pickets and Balls.
For Casement and Window Sections, see page A1072.

Uses

Our various products find application in a great many ways; a few of which are mentioned:

Balconies	Stairs and rails
Bank screens	Store fronts
Canopies	Ticket booths
Casement windows	Elevator cabs and fronts
Directory boards	Entrance doors
Fascias	Register grilles
Marquises	Radiator covers, etc.
Partitions	

Catalogues and Service

Catalogue No. 25 illustrates mouldings, tubings, pickets, balls, etc. It also contains interesting ornamental iron detail.

Supplement No. 1 to Catalogue 25 just off the press shows all new items recently added to our line.

Catalogue No. 18, drop forged and wrought ornaments.

Catalogue No. 20, stamped iron and brass ornaments.

Catalogue No. 26, perforated sheets for radiator enclosures, grilles, etc.

Catalogue No. 28 of Colonial Hardware, ornamental hinges, forged nails, lanterns, forged wall decorations.

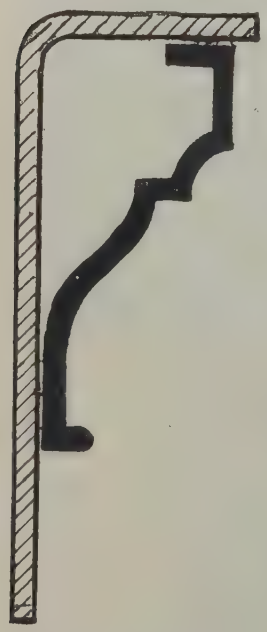
Our Service Department is prepared to assist in arising problems.

Lengths

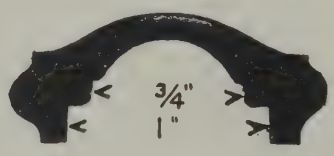
Our moulding and tubing is furnished in warehouse lengths of from 12 to 20 ft. We have facilities to cut to specified lengths.

STEEL MOULDINGS

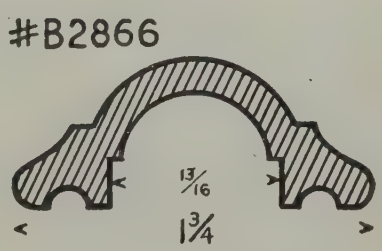
We show below a few of the new sections added to our stock lately. Particular attention is called to a series of new handrails in steel and bronze, and to a set of scribes and facings in the modern manner. Supplement No. 1 to Catalogue No. 25 illustrates these fully.



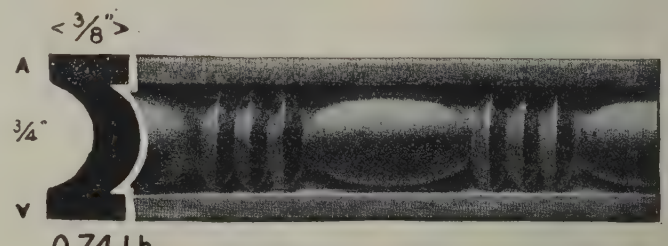
No. 1186 Moulding
For use with Bent and J&L light stringer channel



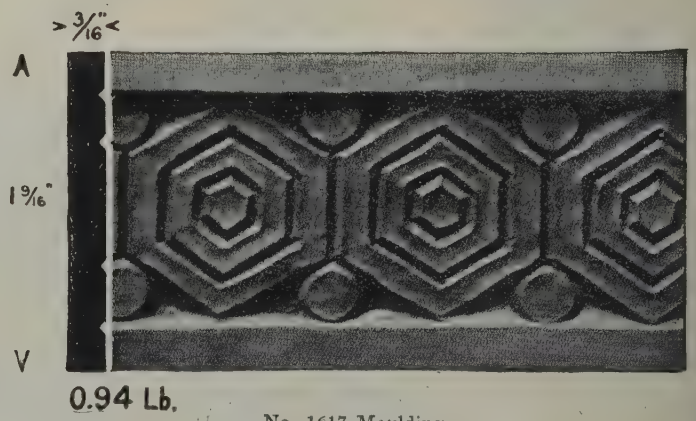
No. 1247 Steel hand rail



No. B2866 Architectural bronze hand rail



No. 1618 Moulding



No. 1617 Moulding

Steel Mouldings

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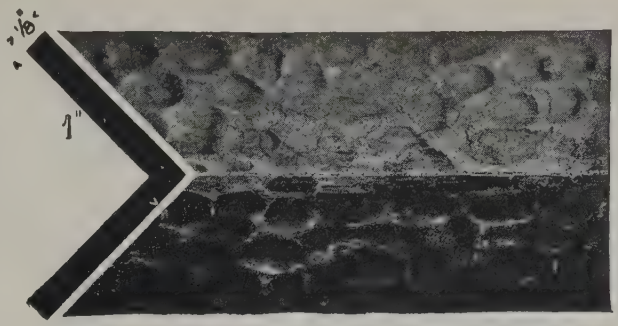
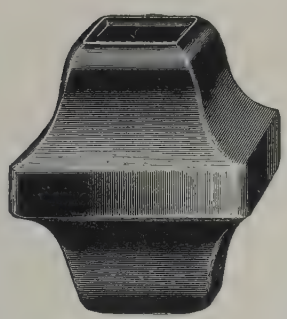
No. 1606. Furnished in widths from ⅝ to 1½ in.



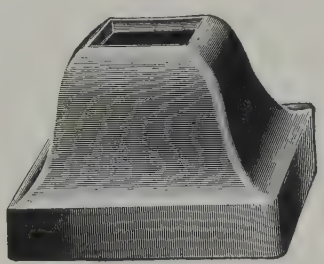
No. 1610. Furnished in widths from ⅝ to 1½ in.

Steel Mouldings

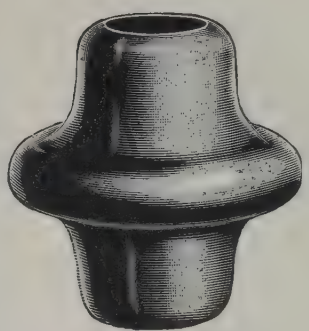
Type M, for ½, ⅝ and ¾-square rods



Type K, for ½ to ¾-in. square rods



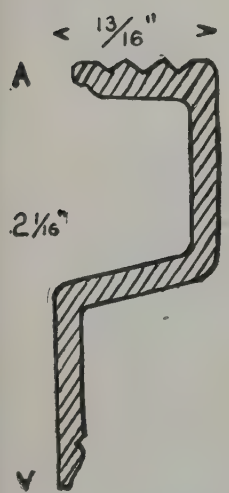
Type I, for ½ to 1¼-in. square rods



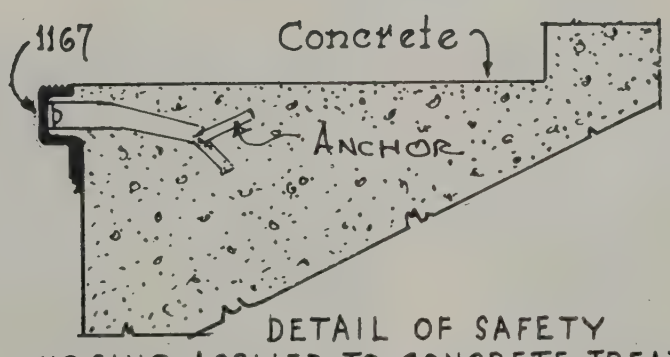
Type L, for ½ to ⅞-in. round rods

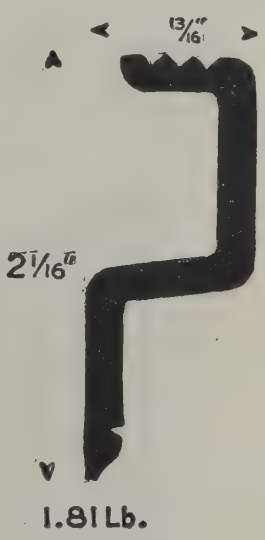
Type O and P for ½, ⅝ and ¾-in. round and square rods

Baluster Ornaments



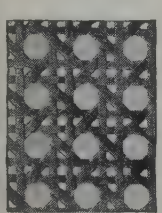
No. B2810, Architectural bronze nosing





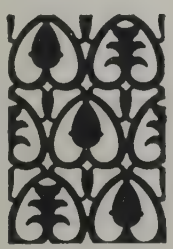
No. 1167, Nosing

Safety Stair Nosings

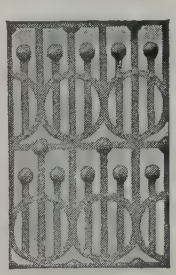


P2023

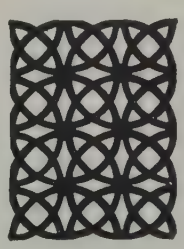
P2007



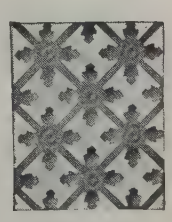
P2012



P2014



P2010



P2022

Perforated Sheets (¼ actual size)

For use with radiator covers and grilles, registers, ventilators, window screens, etc. Furnished in steel sheets 3 ft. 3 in. x 6 ft. 7 in. or cut to size. Will take painted or plated finishes

CHICAGO ARCHITECTURAL BRONZE CO.

TELEPHONE
RAVENSWOOD 8945

4740-4742 North Clark Street, CHICAGO, ILL.

Products

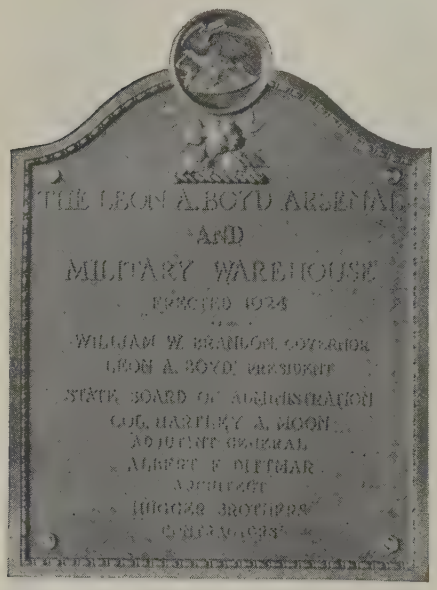
Manufacturers of high grade ARCHITECTURAL BRONZE WORK, including:

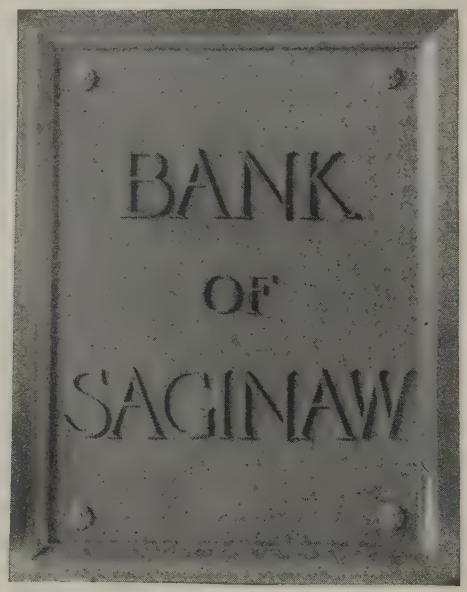
Memorial Bronze Tablets and Honor Rolls.
Bank Counter Screens, Grilles, Wickets and Gates.
Brass and Bronze Railings.
Bronze Lamps.
Cast Bronze Signs and Desk Name Plates.
Mausoleum Doors and Equipment.
Bas-relief and Statuary.
Bronze Entrance Doors and Grilles.
Thresholds and Kick Plates.
Cast Bronze Letters.
Window and Door Grilles.
Special Bronze Ornaments.
Check Desks.
Directory Frames.
Lamp Standards and Brackets
Clock Cases.
Urns and Vases.
Vault Grilles.
Altar Railings.
Bronze Fences and Gates.
Swimming Pool Ladders.

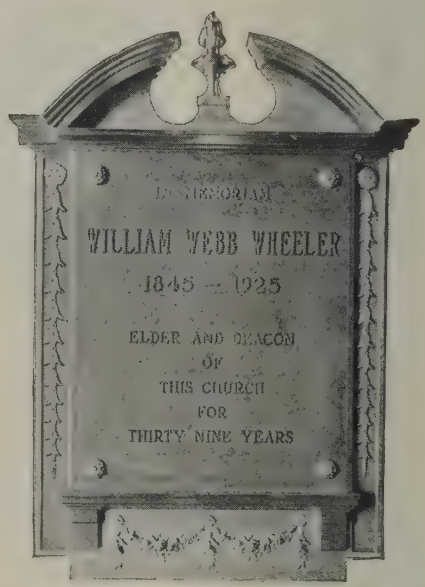
Facilities

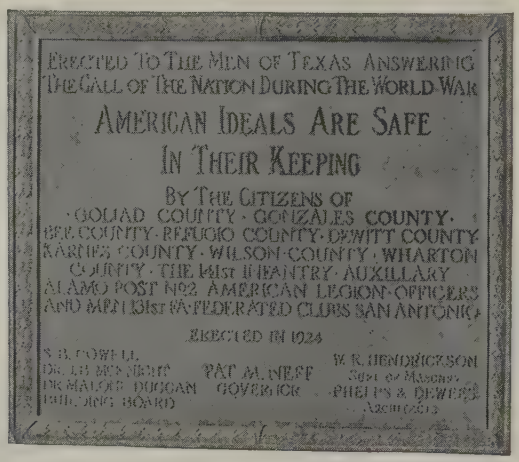
The shops of the CHICAGO ARCHITECTURAL BRONZE Co. are equipped for the exclusive manufacturing of high grade bronze work, from the plainest to the most ornate.

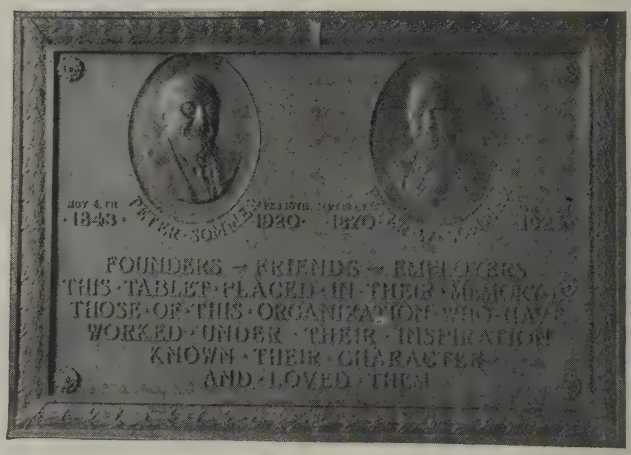
Competent designers and sculptors are on the staff. Skilled chasers give exceptional care to finishing.

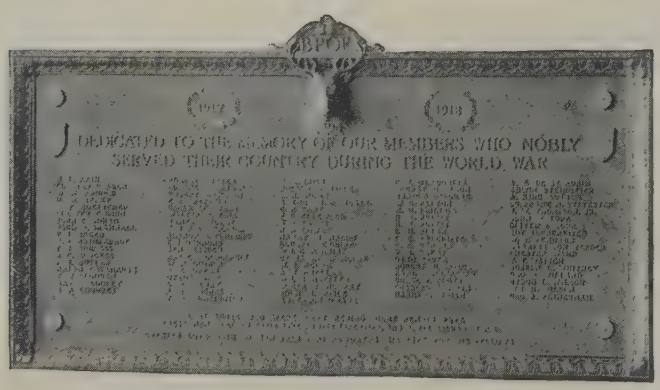


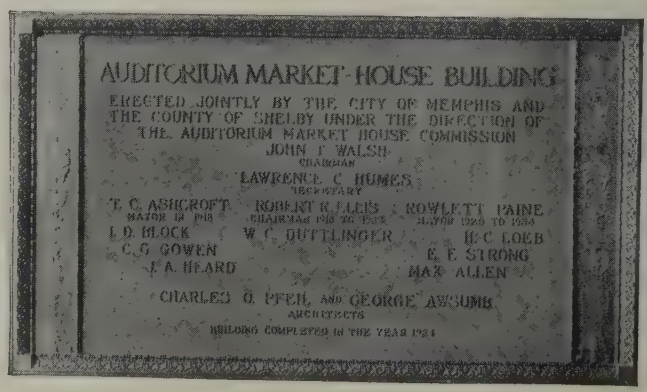












Examples of Signs and Tablets Made by the Chicago Architectural Bronze Co.

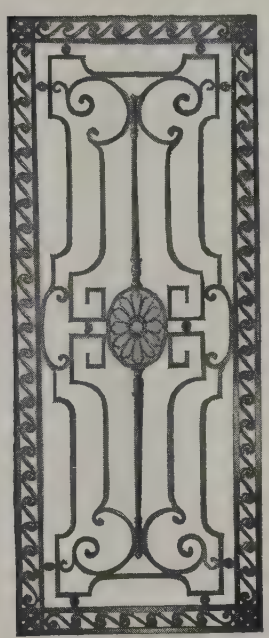
Continued on next page

Bronze Wicket

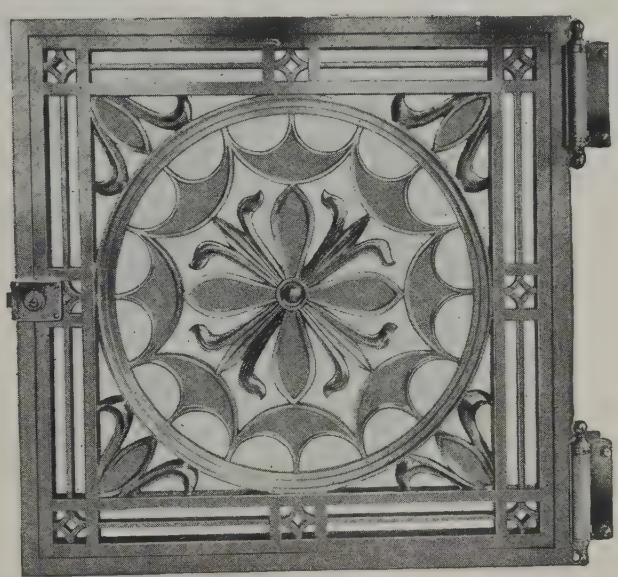
Cast Bronze Standing Lamp

Cast Iron Lamp Standard

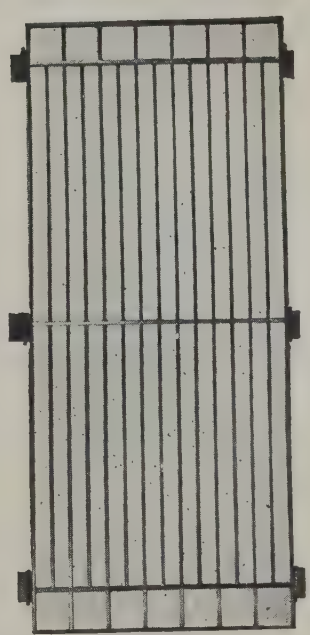
Bronze Safe Deposit Grille



Bronze Grille



Solid Cast Bronze Gate



Bronze Grille

Bronze Doors

Bronze Doors

ESTABLISHED 1844

THE CINCINNATI MFG. CO.

Ornamental Bronze and Iron Work

MAIN OFFICE AND FACTORY
Corner Evans and Gest Streets
CINCINNATI, OHIO

Products

High grade ARCHITECTURAL and ORNAMENTAL WORK in BRONZE, BRASS and IRON, including:

Metal Work for Banks; Mausoleum Bronze; Memorial Tablets and Bronze Signs; Wire and Iron Work; Railings; Wickets and Grilles; Tubular Railings; Window Guards; Machinery Guards; Collapsing Gates; Wire Partitions.

For Kalamein and Hollow Metal Doors and Elevator Enclosures and Cars, see pages A932-933.

Experience

This company, organized in 1844, has had extensive experience in ornamental bronze and iron work. We are in position to handle any proposition in this field regardless of the size or the requirements of speed in delivery.

Facilities

Our plant and equipment is entirely modern and complete in every detail. It consists of foundry, machine shop, pattern shop, blacksmith shop, plating and polishing plants, baking and japanning ovens, drafting department, modeling and sculpture department, iron and wire working department, and chasing department.

Also compressed air and air brush equipment, sand blast, spot and acetylene welding, wood finishing on steel, draw bench work, heavy press work and heavy brakes and shears.

In addition, there is a large stock of materials, ample capital and skilled workmen at your service.

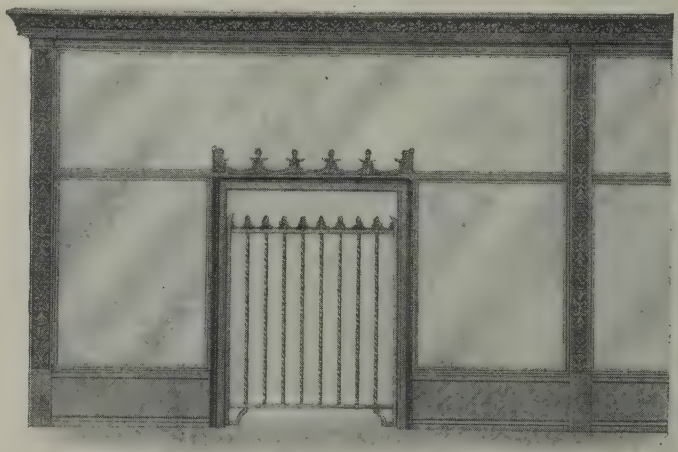
Bank Work

This is a big department with us. We can furnish everything in the way of bronze and iron ornamental work that is used in bank construction. Some of the work executed from architects' drawings and our designs is as follows: bronze doors and transoms, counter screens, grilles, railings, counter rails, deposit rails and grilles, vault rails, gates, wickets, hand rails and railings, guard rails, clock faces, calendars and check racks, desks and tables, directory boards, desk guards, teller cages, name plates, cast bronze signs and tablets and window guards.

Our illustrated bank catalogue No. 50 gladly sent on request.

Bronze Wicket, Houston Post-Dispatch, Houston, Tex.
SANGUINETT, STATTS & HENDRICK, Architects
Executed by THE CINCINNATI MFG. CO.

Bronze and Glass Counter Screen, Fifth-Third National Bank, Cincinnati, Ohio
Hinged shutters behind wickets act as money guards when open
WERNER & ADKINS, Architects
Executed by THE CINCINNATI MFG. CO.



Bronze and Glass Counter Screen, Guarantee Title & Trust Co., Columbus, Ohio
FRANK L. PACKARD, Architect
Executed by THE CINCINNATI MFG. CO.

Continued on next page

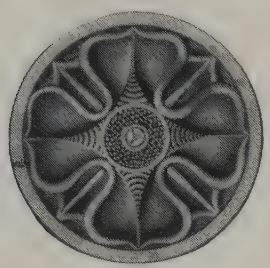
Mausoleum and Memorial Bronze

This company designs, models and casts bronze mausoleum doors, window grilles, gates, catacomb handles and rosettes, tee handles, floor lifts, ceiling hangers, frames for glass panels, vent grilles, memorial and honor roll tablets, insignia, wreathes, urns and vases.

Estimates, Designs and Co-operation

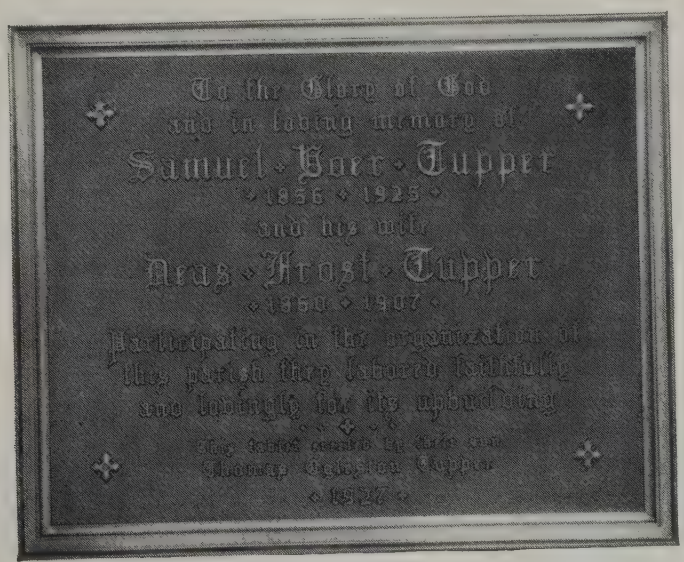
We are glad at all times to furnish estimates from architects plans and specifications.

We will also submit original or stock designs, plans and suggestions and co-operate in every way to assure the best type of work for the particular job. Be free to call on us at any time.



No. 511
Catacomb Rosette

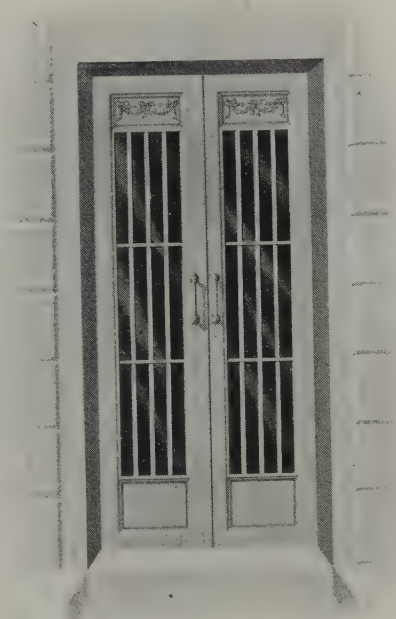
Infantry Insignia



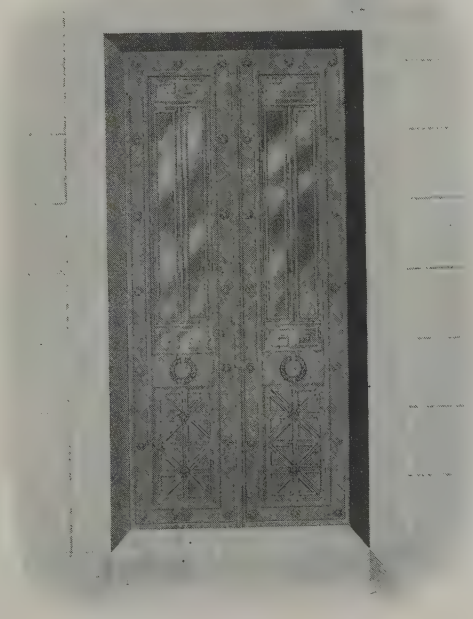
Cast Bronze Tablet

Bronze Tripod

Cast Bronze Urn



No. 786. Mausoleum Door



No. 798. Mausoleum Door

ORNAMENTAL BRASS AND BRONZE

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway, NEW YORK, N. Y.

MIDWESTERN OFFICE
Landreth Building
ST. LOUIS, MO.

CANADIAN OFFICE
67 Yonge Street
TORONTO, ONT.

PACIFIC COAST OFFICE
Architects Building
LOS ANGELES, CAL.

Ornamental Uses

Brass and bronze are the standard metals for ornamental uses. They can be finished in various colors and require no painting or maintenance.

The scientific knowledge and practical experience of our Research and Building Service Departments are at your disposal. We will be glad to consult with you on all problems pertaining to the uses and applications of Copper, Brass and Bronze.

Literature

"Ornamental Bronze—Store Fronts and Entrances"—Thirty-two plates of contemporary work in ornamental bronze for commercial buildings. Sent to architects without cost. 8½x11 in.

"Coloring Copper and Brass"—Pamphlet-size booklet giving formulae for cleaning and coloring copper, brass and bronze. Sent free.

"Directory of Manufacturers"—Over 100 manufacturers of more than a score of brass and bronze products. Sent free. 6x7½ in.

Bronze Clock
Over the entrance to the Schwarzenbach Building, Fourth Avenue at 32nd Street, New York, N. Y.
WILLIAM ZORACK, Sculptor

Decorative Figure
Over the entrance to the Burroughs Wellcome Building, 9 East 41st Street, New York.

Why Ornamental Bronze

The art of display is being employed to great advantage in modern American architecture, especially for commercial or semi-commercial buildings. Bronze grilles, decorative doorways, arches and figures are factors in determining the appeal of a building to prospective buyers and renters. The simplest elevation may be given great distinction by fine bronze work. In stores or shops a skillfully designed bronze entrance feature, such as the two illustrated here, will attract many shoppers.

For balustrades, bank cages, grilles, mail boxes, railings—in fact, for all ornamental features—solid bronze is the logical metal to use. Nothing else lends itself so well to the artistry of perfect craftsmanship—witness the fact that it was the metal chosen by the fine Italian workmen for those exquisite works whose beauty has never been even approximated until the present generation of American craftsmen. In bronze, details can be delicately wrought, sharply incised or crisply undercut. It is strong and permanent.

With no other metal is it possible to get the range of color that is possible in ornamental bronze. It remains beautiful after years of exposure and need not be painted for it does not rust.

In the last few years bronze craftsmanship in the United States has taken great strides. Today our work is the finest in the world. Architects have found it distinctly to their advantage to make use of this art wherever possible in the buildings they design.

We are constantly in touch with the newest developments in ornamental bronze work and have particularly valuable data on its finishing and maintenance. For full information consult the technical staff of the COPPER AND BRASS RESEARCH ASSOCIATION.

ESTABLISHED 1878

CROWN IRON WORKS COMPANY

Manufacturers of Ornamental Iron and Bronze Work

MINNEAPOLIS, MINN.

Products

ORNAMENTAL IRON and BRONZE WORK.

Scope

Ornamental iron and bronze of every description for buildings.

Facilities

Our plant consists of modernly equipped shops and departments: such as modeling, pattern shop, foundry, machine and finishing shops.

Territory

We are prepared to furnish and erect our work in the United States and Canada.

Service

The Engineering and Estimating Departments are always at the service of architects and contractors.

References

Half a century of uninterrupted business progress, with a reputation for fair dealings and high class craftsmanship.

Following are given a few of the many buildings and architects for which we have furnished ornamental iron, and additional references will be furnished on request.

Mines Building, Music Building, Engineering Building, Millard Hall, Anatomy Building, Library Building, Administration Building, Physics Building and the Cyrus Northrup Memorial Auditorium, University of Minnesota—C. H. Johnston, Architect

Valley National Bank and Liberty Building, Des Moines, Iowa—Proudfoot, Bird & Rawson, Architects

General Hospital for State University of Iowa, Iowa City, Iowa; Memorial Union Building, Iowa State College, Ames, Iowa—Proudfoot, Rawson & Souers, Architects

Republic Bank Building, Dallas, Tex.—C. D. Hill & Co., Architects

Baker Hotel, Dallas, Tex.—Preston J. Bradshaw, Architect

Hilton Hotel, Dallas, Tex.—Lang & Witchell, Architects

Allen Building, Dallas, Tex.—J. N. McCammon, Inc., Architects

Dallas National Bank, Dallas, Tex.—Coburn, Smith & Evans, Architects

Harris County Criminal Court Building, Houston, Tex.—Hedrick & Gottlieb, Architects

Baker Building, Baker Arcade Building and Roanoke Building, Minneapolis, Minn.—Larson & McLaren, Architects

Woodbury County Courthouse, Sioux City, Iowa—William L. Steele and Purcell & Elmslie, Associated Architects

World Herald Building, Omaha, Neb.—Thos. R. Kimball, Architect

Liberal Arts Building and Residence Hall, Marygrove College, Detroit, Mich.—D. A. Bohlen & Son, Indianapolis, Ind., Architects

Hotel Pere Marquette, Peoria, Ill.—Horace Trumbauer and Hewitt & Emerson, Associated Architects

Bismarck Hotel, Chicago, Ill. (Cast Bronze Elevator Doors)—C. W. and Geo. L. Rapp, Architects

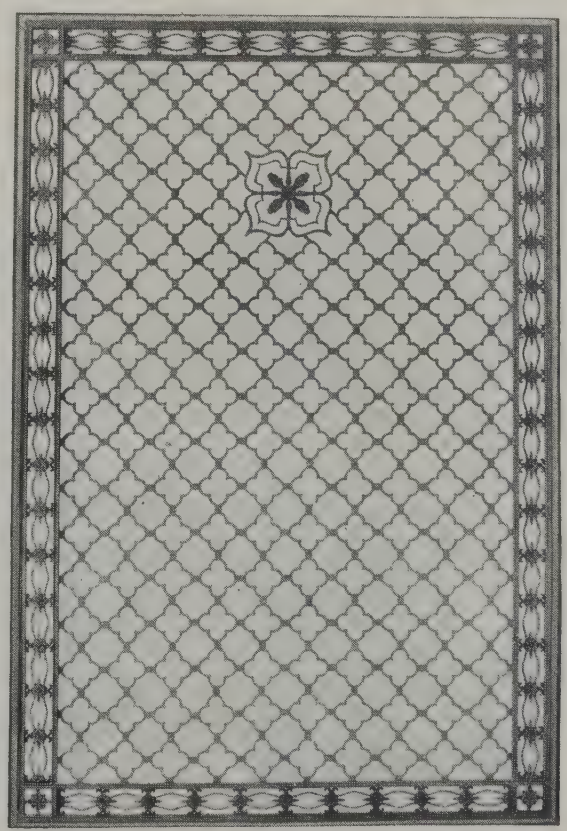
Francis Palms Building and State Theater, Film Exchange Building and Fox Theater, Detroit, Mich.; Fox Theater, St. Louis, Mo.—C. Howard Crane, Architect

Electric Refrigerator Co. Building, Detroit, Mich.—Smith, Hinchman & Grylls, Architects

Minnesota Theater, Minneapolis, Minn.; Fisher Theater, Detroit, Mich.—Craven & Mayger, Architects

Maccabees Building, Detroit Trust Co. Addition, First National Bank Addition, and Fisher Building, Detroit, Mich.—Albert Kahn, Inc., Architect

C.I. Grille, 7 Feet 6 Inches in Diameter



C.I. Grille, 5 Feet 6 Inches by 8 Feet

DETROIT MAUSOLEUM EQUIPMENT WORKS

CHARLES BOVENSIEP, PROPRIETOR

Designers and Manufacturers of U. S. Standard Bronze Doors and Bronze Equipment for Mausoleums; Bronze Tablets and Honor Rolls

Fourteenth Avenue and Baker Street
(Post Office Box 574)
DETROIT, MICH.

Products

BRONZE DOORS for Public and Private Mausoleums.
CAST BRONZE TABLETS and HONOR ROLLS.
CAST BRONZE LETTERS for Building Exteriors in any style, size or shape.

Also manufacturers of Window Grilles and Frames for Glass; Catacomb Handles and Rosettes; Ceiling Hangers; Ventilators; Gates and all Bronze Equipment used in mausoleum construction; Decorative Bronze Work of all kinds; Bas-reliefs.

Bronze Mausoleum Doors

Construction—Doors are all of the "built-up" type construction. Standard thickness is 1 in., although they can also be made 1⅛, 1¼ and 1⅜ in., or thicker.

Bronze sheets not lighter than No. 14 gauge are riveted with $\frac{3}{16}$-in. bronze rivets placed 3 in. on centers to each side of a substantial core or framing of *solid bronze*. Rivet heads are perfectly countersunk on both sides and hand finished smooth with door surface.

Equipment—Cast bronze door frames or jambs are used occasionally, but doors are usually hung direct to granite jambs. Arranged to swing inward or outward as may be required. Hinges are of heavy cast bronze of the pivotal type.

Cast bronze threshold at bottom. Slam bar over center joint. Slide bolts at top and bottom of left-hand door. Heavy handle on each door.

Rear of grille openings is fitted with plate glass shutters fitted with hinges and turn button lockers. A device at bottom of shutters holds them securely at any angle when opened for ventilation.

Lock is of special heavy type, all-bronze, four tumblers, operating with flat german silver keys. Three keys are furnished.

All screws, bolts and expansion jackets are furnished by us.

Finish—Doors are usually finished in a light statuary bronze finish. The door stiles and all flat parts are hand rubbed with fine emery and pumice to a soft satin finish. The cast ornate parts are given a sanded finish with crevices and recessed portions in a darker tone. All outlines are hand tooled clean and sharp.

Workmanship—Doors are constructed by carefully trained skilled mechanics in a thorough, painstaking manner. Miters, joints, and all connections are neat and accurate. Applied ornaments are all secured from rear of door or "blind screwed."

Guarantee—These doors are constructed of best U. S. Standard Bronze. They are absolutely rigid, level and true, and beautifully finished. They are guaranteed to endure practically for all time.

All work is carefully boxed to insure safe delivery.

Service—All work is made to order, in any size or shape. Architects' special designs and ideas will be carefully followed. The usual time required for execution is 4 to 6 weeks.

Our many years' experience in this field is at your service.

Catalogue—On application.

Illustration No. SW1351

Illustration No. SW1352

Illustration No. SW1332

U. S. Standard Bronze Doors for Mausoleums

Continued on next page

Cast Bronze Letters

The style letter illustrated is most generally used and we have adopted it as our standard.

When writing for prices send a scaled sketch showing size of letters desired and length of space where the letters are to be set.

Letters can be made flat face, rounded face, incised face, convex or with any other section.

Usually bronze letters are fitted with bronze washers on the rear, so the backs of letters set ½ to 1 in. from surface of wall.

Architects' details for special designs and shapes will be carefully followed.

General Specifications for Architects—Letters to be cast of best U. S. Standard Bronze of size indicated on plans. To be finished in fine sanded statuary bronze and fitted with substantial bronze anchors on rear for cementing to brick, stone, tile, etc. Special cement and liquid to be furnished for setting.

Spacing of letters to be approved by architect before setting.

-BRONZE- LETTERS-

Illustration No. SW1292

Individual Cast Bronze Letters for Buildings

Standard Roman architectural style. Pyramid section

Cast Bronze Tablets

We make a specialty of bronze memorial tablets. These are furnished in stock patterns or are made from architects' details.

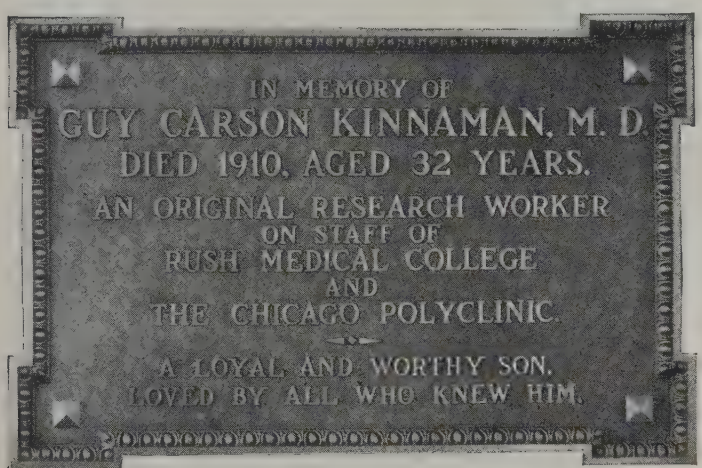


Illustration No. F1501

Typical Design for Bronze Memorial Tablet

Size was 24x18 in. Ornamental border

General Specifications for Architects—Tablets to be cast in one piece of best genuine U. S. Standard Bronze averaging not less than $\frac{3}{16}$-in. thickness in body. Lettering to be heavily raised and of appropriate size and arrangement. Rubbing or full size detail to be furnished for architect's approval.

Face and edge of border and face of lettering to be finished in a fine satin hand burnish. Background or lettering field to have a finely pebbled surface, finished in dark statuary bronze. The outlines of all lettering and borders to be carefully hand tooled clean and sharp. Furnish bronze expansion screws with non-corroding lead expansion jackets for attaching tablet to wall. Heads of screws to be covered with neat rosette with threaded stem entering head of screw.

Note: If tablet is placed indoors, specify "To be heavily lacquered with best quality lacquer." If placed outdoors, specify "To be waxed or oiled."

Note: Background of tablet can be finished in a "Hand Hammered" surface at additional cost.

Illustration No. SW1246

Typical Design of Bronze Tablet for Hotel

Flat raised border and raised lettering. Made in any shape or size desired. This tablet was 36x18 in.

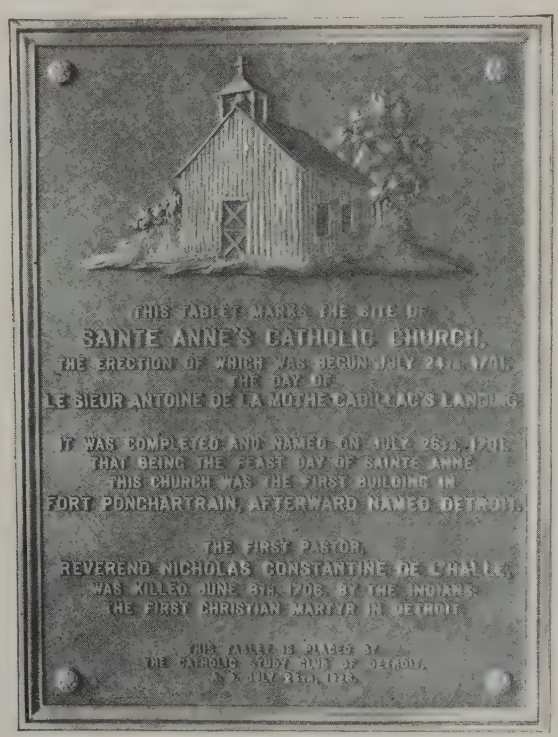


Illustration No. SW1500

Typical Design of Bronze Historical Tablet

Moulded border. Block style raised lettering. Bas-relief of old church. Size was 21x28 in. Any size or shape made to order

ELLISON BRONZE COMPANY, INC.

ESTABLISHED 1911

Architectural and Decorative Products in Cast and Hollow Bronze

JAMESTOWN, N. Y.

REPRESENTATIVES IN:

BALTIMORE, MD.	CLEVELAND, OHIO	MINNEAPOLIS, MINN.	SCRANTON, PA.
BIRMINGHAM, ALA.	DETROIT, MICH.	PHILADELPHIA, PA.	SOUTH BEND, IND.
BOSTON, MASS.	HARRISBURG, PA.	PITTSBURGH, PA.	SYRACUSE, N. Y.
BUFFALO, N. Y.	HARTFORD, CONN.	ROCHESTER, N. Y.	TOLEDO, OHIO
CHARLOTTE, N. C.	KANSAS CITY, MO.	ST. LOUIS, MO.	TULSA, OKLA.

WASHINGTON, D. C. WILKESBARRE, PA. YOUNGSTOWN, OHIO

Products

ORNAMENTAL BRONZE WORK, which includes:
Architectural and Decorative Castings.
Bank Screens and Fitments.
Bulletin and Directory Cases.
Check Desks.
Display Cases.
Doors and Entrances.
Elevator Cabs.
Elevator Fronts.
Grilles and Guards.
Hollow Bronze Doors and Partitions.
Lamps.
Letters and Figures.
Mausoleum Equipment.
Memorial Tablets.
Plaques.
Seats.
Signs.
Store Fronts.
Urns and Vases.
Ventilators.
Window Frames and Casements.
Special Hardware.
For Door Ventilators, see page B1471.

Equipment

Our equipment comprises a most completely equipped establishment, devoted exclusively to the manufacture of bronze products.

Facilities

These include designing, engineering and drafting departments, modeling and pattern departments for plaster, wood and metal patterns.

We have also a completely equipped foundry, machine shop, chasing and finishing departments, and a special hardware department.

This complete organization, covering a lifetime of experience and personal supervision, offers expert engineering and drafting service requiring a minimum of supervision on the part of the architect.

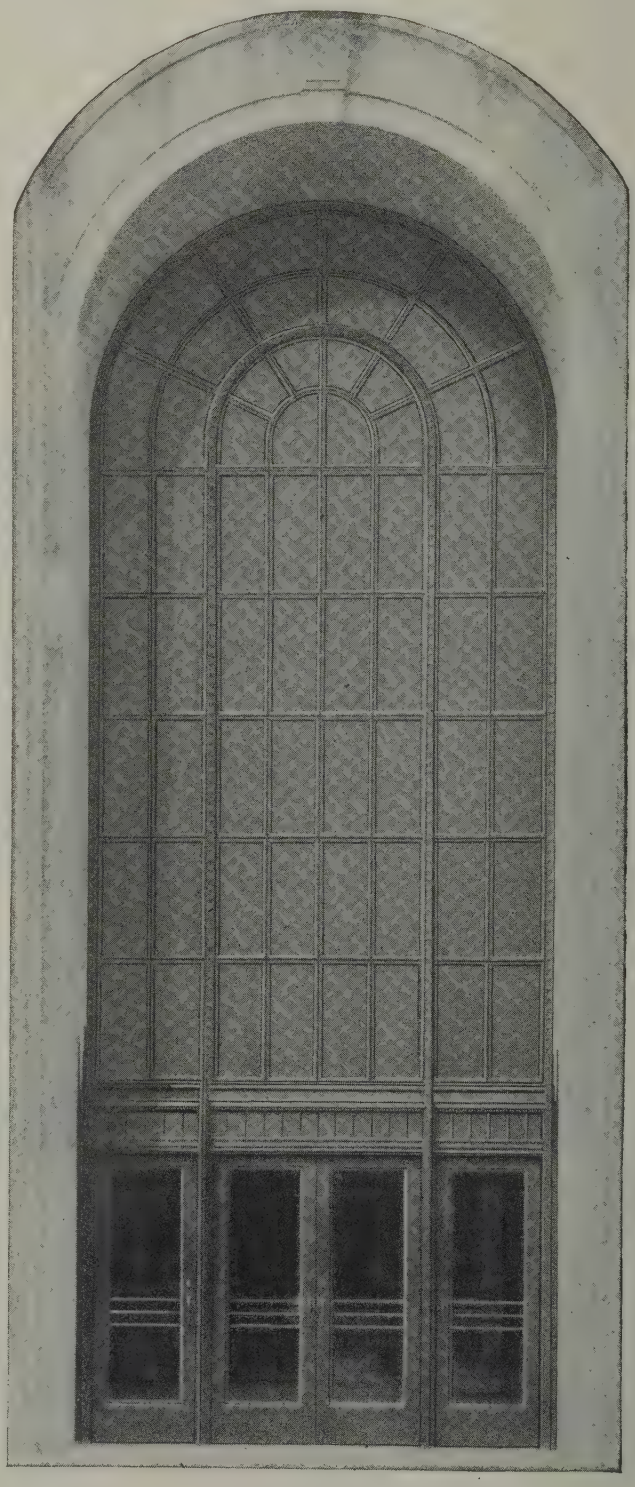
References

Any bank or banker in Jamestown, N. Y.

Dun or Bradstreet Mercantile Agency, New York, N. Y.

Literature

Gladly mailed on application. Send for a list of our installations.



Bronze Entrance
Pennsylvania Power & Light Company Building
Allentown, Pa.

HELMLE, CORBETT & HARRISON, Architects
HEGEMAN-HARRIS CO., INC., General Contractors

ESTABLISHED 1904

FEDERAL BRONZE COMPANY

Architectural Bronze Work of Every Description

TELEPHONE
ASTORIA 9400

Court and Ridge Streets
LONG ISLAND CITY, N. Y.

25 Years' Manufacturing Experience

There is no substitute for experience. This is especially true in architectural bronze work, because when an architect specifies bronze he is calling for the highest grade materials, and therefore requires and expects the highest quality workmanship.

For 25 continuous years the FEDERAL BRONZE COMPANY have been executing architectural bronze work for high class buildings of all descriptions, such as: banks, office buildings, private residences, etc.

Our work is executed from architects' details or from special designs submitted by our own designing department.

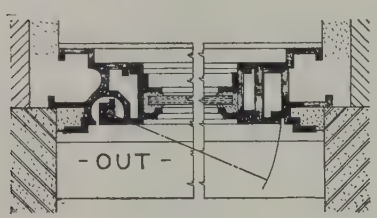
Architectural Bronze Work

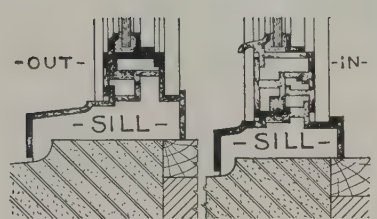
We have executed most every kind of difficult work in bronze for architects and especially solicit the following:

- Entrances
- Marquises
- Store fronts
- Grilles
- Elevator fronts
- Bronze letters
- Counter screens
- Check desks
- Tablets
- Directory boards
- Gates
- Vault grilles

Our Delivery and Erection Is Prompt

We are equipped for rapid production and delivery. Erection can be arranged whenever building is ready.





Typical Details of Federal Bronze Casements

Federal Bronze Windows (Patented)

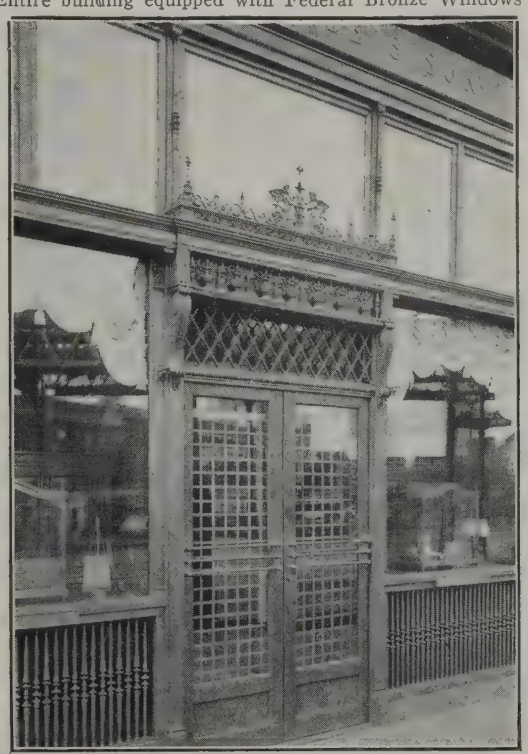
Made of *heavy gauge extruded bronze* to meet any building requirement.

Our *three-point contact* construction makes these windows absolutely *weathertight and dust-proof.* Our patented *concealed hinges* produce a clean, flush surface, without projections—beautiful and distinctive.

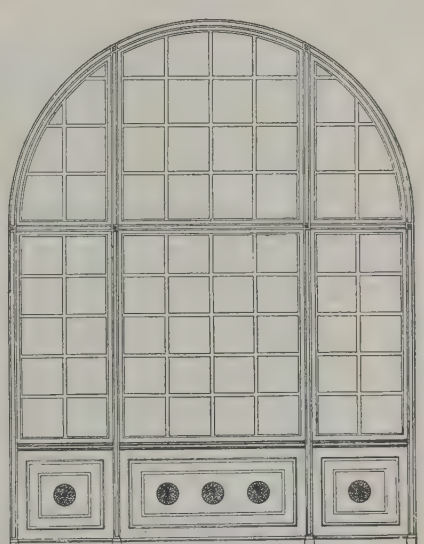
Capitol of Porto Rico, San Juan, Porto Rico
RAFAEL CARMOEGA, A.I.A., San Juan, Porto Rico, Architect
Entire building equipped with Federal Bronze Windows

Exterior View of Federal Bronze Casements

Directory Board by Federal Bronze Company
For inside or outside installation



Bronze Doors, Grille Work and Front by Federal Bronze Company



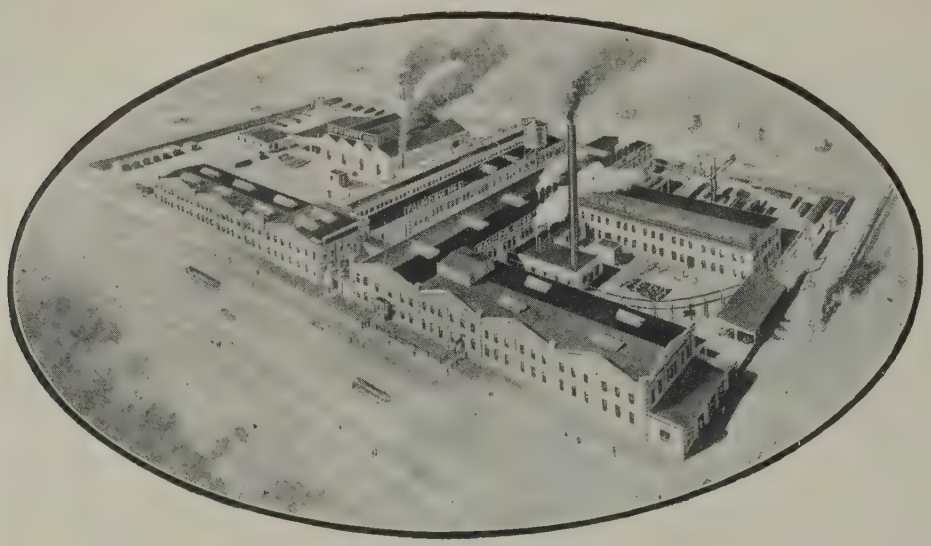
"Federal" Bronze Window Made for First National Bank, Bethlehem, Pa.
VISSCHER & BURLEY, N. Y., Architects

FLOUR CITY ORNAMENTAL IRON CO.

MINNEAPOLIS, MINN.

REPRESENTATIVES

CHICAGO, ILL., S. I. Kaufman, Builders Building
DETROIT, MICH., John D. Stege & Co., U. S. Mortgage Building
CLEVELAND, OHIO, H. L. Walters Co., 2341 Carnegie Avenue
ST. LOUIS, MO., H. C. Uhlenhaut, 2144 Railway Exchange Building
KANSAS CITY, MO., Day K. Smith, Midland Building
SALT LAKE CITY, UTAH, F. A. Porter Co., Kearns Building
HELENA, MONT., Raymond C. Grant, Power Block Annex



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Architectural and Ornamental Bronze and Iron Work, including:

Stairs	Marquises
Railings	Electroliers
Elevator Enclosures	Lamp Standards
Elevator Cars	Gates and Fences
Store Fronts	Bronze Tablets and Signs
Entrances	Bronze Sash and Windows
Bank Counter Screens	Bronze Memorials
Grilles	Memorial Tablets

Facilities

Our plant is one of the largest and is equipped with every modern appliance available for our peculiar needs. Every step, from preparation of details, patterns, models, casting, fitting, assembling and finishing to erection and completion, is handled by our own organization. Only by such unified effort and control can a uniformly high standard for the final product be maintained.

Finishes

Suitable finishes for bronze have long been known and used, but iron has been merely a background or surface for successive coats of paint, to the detriment of its character as metal and the eventual obliteration of all ornamental detail. To obviate this we have developed various finishes in oven baked enamels which, being thin and translucent, protect the surface without obscuring its metallic character.

References

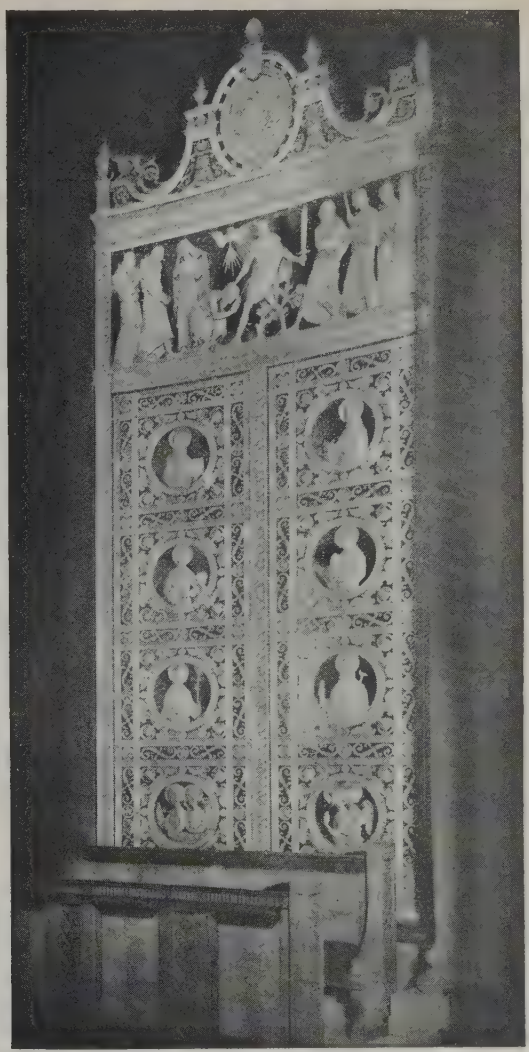
From contracts in process or lately completed the following list is selected to indicate the character and scope of our activities:

Buildings	Architects
Civic Opera House, Chicago, Ill.	Graham, Anderson, Probst & White
Insurance Exchange, Chicago, Ill.	
Pittsfield Bldg., Chicago, Ill.	
Indiana War Memorial, Indianapolis, Ind.	Walker & Weeks
N. W. Ohio Natural Gas Co., Toledo, Ohio	Mills, Rhines, Bellman & Nordhoff
Lamson Store, Toledo, Ohio	
Mayo Clinic, Rochester, Minn.	Ellerbe & Company
Garfield Schwartz Residence, Rochester, Minn.	
Exchange Bank Bldg., Tulsa, Okla.	Weary & Alford Co.
American Commercial & Savings Bank, Davenport, Iowa	
Jackson City Bank, Jackson, Mich.	
Farmers & Mechanics Bank, Ann Arbor, Mich.	Fry & Kasurin
Sears, Roebuck & Co., St. Louis, Mo.	Nimmons, Carr & Wright
Stormfeltz Residence, Detroit, Mich.	Richard H. Marr
Harper Hospital, Detroit, Mich.	Albert Kahn
Greater Penobscot,* Detroit, Mich.	Smith, Hinchman & Grylls

*For this building we made 875 cast iron spandrels covered with lead by a special metal spray process which forms an impervious coating. These spandrels have all the advantages of cast lead with the economy and strength of cast iron.

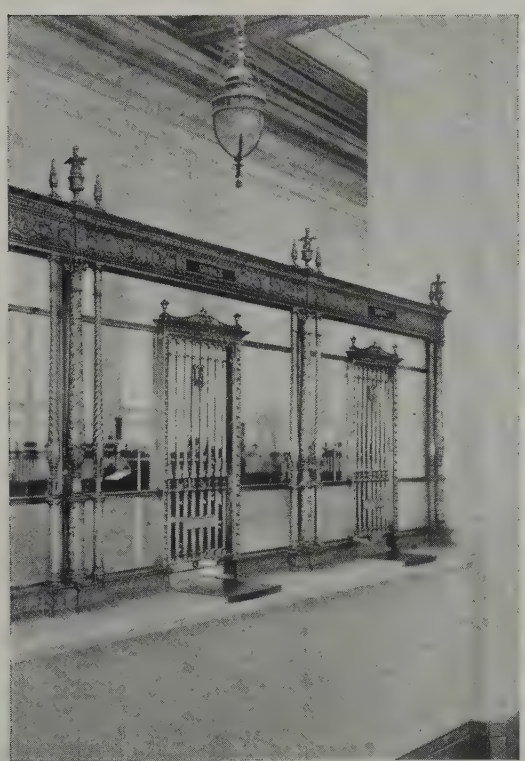
Continued on next page

Bronze Elevator Doors, Insurance Exchange, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects



One of Seven Ambulatory Screens

The seven openings in the semicircular arcade, separating the sanctuary from the ambulatory in the Cathedral of St. Paul are filled with pierced bronze screens each some 10x25 ft. in size. These screens are composed of vertical stiles, transom bar and cornice surmounted by a rich crest. The seven transom panels form a frieze depicting events in the life and ministry of St. Paul, his martyrdom being shown in the illustration. The vertical panels below the transom bar, with four divisions each are filled with medallions representing prophets, apostles, martyrs and doctors of the church, the lower tier just above the choir stalls representing the angel choir.



Bank Counter Screen of Cast Iron with Natural Half Polished and Polychrome Baked Enamel Finish, Merchants Bank, Cedar Rapids, Iowa
WEARY & ALFORD CO., Architects

Detail of Lower Compartment of One Panel Cathedral of St. Paul, St. Paul, Minn.
MAGINNIS & WALSH, Boston, Mass., Architects

AUGUST FEINE & SONS COMPANY

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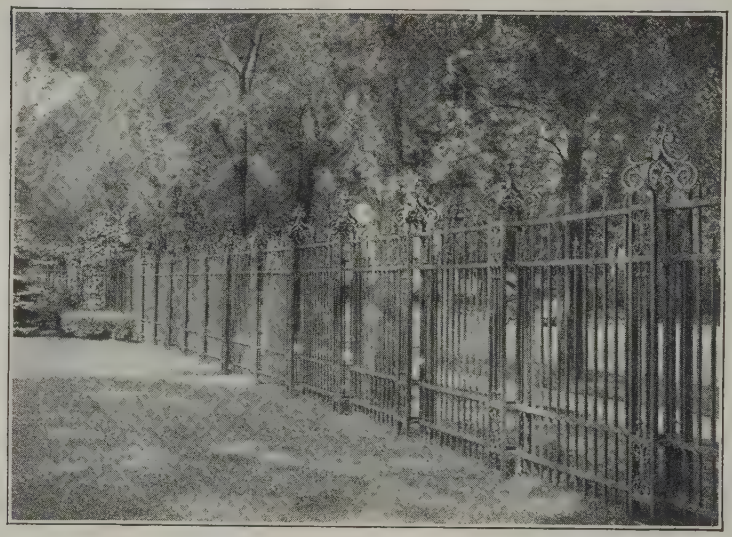
BUFFALO, N. Y.

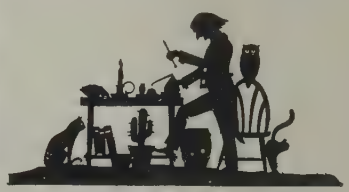
General Office and Light Iron Plant, 140-152 Terrace, corner Erie Street
Structural Steel Plant, Baraga Street and D. L. & W. R. R.

Silhouettes, Weathervanes
or
Street Post Ornaments
Illustrating the life of celebrities after whom the streets are named



Fence Section, A. F. Laub Residence, Buffalo

Silhouettes, Weathervanes
or
Street Post Ornaments
Illustrating the life of celebrities after whom the streets are named



Products of Light Iron Plant

ORNAMENTAL IRON WORK: Ornamental Grilles; Railings; Entrance Doors and Gates; Fences; Lanterns and Lantern Brackets; Balconies; Marquises; Porte Cocheres; Stairs; Spiral Stairs; Elevator Enclosures; Fire Escapes; Pipe Railings; Folding Gates; Bank Partitions; Day Gates for safety vaults; Balustrades; Flagpoles; Store Fronts; Vent Grilles.

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Entrance Door, August Feine Residence, Buffalo

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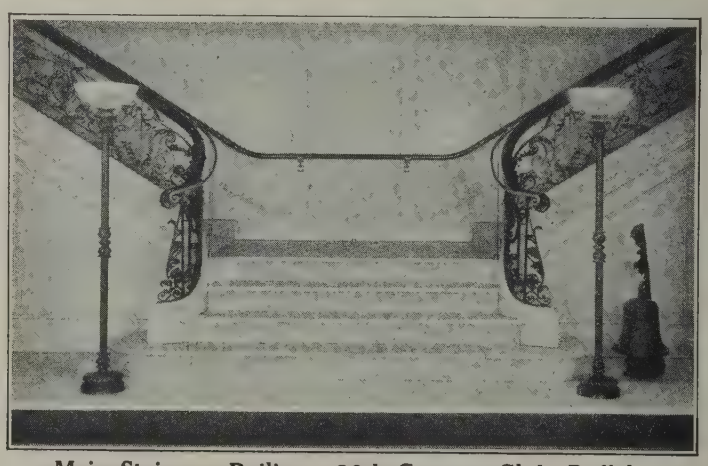
Our plants are equipped with every modern facility, and a force of skilled craftsmen, ably directed, is at all times ready to perform with despatch whatever work we may be favored with by architects and others.

Porte Cochere, Lafayette Hotel, Buffalo



Main Staircase Railings, 20th Century Club, Buffalo

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Prudential Insurance Co., Newark, N. J., Cass Gilbert, Architect
Mutual Benefit Life Insurance Co., Newark, N. J., J. H. & W. C. Ely, Architects
Municipal Building, East Orange, N. J., J. H. & W. C. Ely, Architects
New York County Courthouse, New York, N. Y., Guy Lowell, Architect
New York State Capitol Building, Albany, N. Y., S. W. Jones, Architect
City Hall Annex, Philadelphia, Pa., Philip H. Johnson, Architect
National Academy of Sciences, Washington, D. C., B. G. Goodhue Associates, Architects
Rochester Savings Bank, Rochester, McKim, Mead & White, Architects
Barnett National Bank, Jacksonville, Fla., Uffinger, Foster & Bookwalter, Architects
Mitsui Main Building, Tokyo, Japan, Trowbridge & Livingston, Architects
Chase National Bank, New York, N. Y., Graham, Anderson, Probst & White, Architects
Chemical National Bank, New York, N. Y., Walker & Gillette, Architects
First National Bank, Boston, Mass., York & Sawyer, Architects
Packard Building, Philadelphia, Pa., Ritter & Shay, Architects
Phillips Office Building, Butler, Pa., Janssen & Cocken, Architects

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Pasadena War Memorial, Pasadena, Cal.
LEE LAWRIE, Sculptor

Main Entrance Doors, East New York Savings Bank
HOLMES & WINSLOW, Architects

A Few Representative Installations of Our Distinctive Metal Work

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Cleveland Terminal Station, Cleveland, Ohio
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State Bank Building, Chicago, Ill.
Foreman National Bank Building, Chicago, Ill.
} Graham, Anderson, Probst & White, Architects
Kinney Building, Newark, N. J., Cass Gilbert, Architect
Nebraska State Capitol, B. G. Goodhue Associates, Architects
New Jersey Bell Telephone Building, Voorhees, Gmelin & Walker, Architects
New York Central R. R. Building, Warren & Wetmore, Architects
Providence Co. Courthouse, Jackson, Robertson & Adams, Architects
Grant Office Building, Pittsburgh, Pa., H. Hornbostel, Architect
Reynolds Building, Winston-Salem, N. C., Shreve & Lamb, Architects
Lefcourt National Building, New York, N. Y., Shreve & Lamb, Architects
National City Bank, New York, N. Y., McKim, Mead & White, Architects
Royal Bank of Canada, Montreal, Can., York & Sawyer, Architects
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Bank of America, New York, Trowbridge & Livingston, Architects
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Candelabra	Marquise
Canopies	Mausoleum Doors
Check Desks	Pulpits
Counterscreens	Railings
Crosses	Signs
Directories	Store Fronts
Doors	Tablets
Ecclesiastical Wares	Ticket Booths
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Elevator Doors	Windows (Double Hung)

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Architects and contractors may secure desired information regarding bronze and its uses, suggested treatments, prices, et cetera, upon request.

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Peacock Jewelry Shop, Chicago, Ill.	Holabird & Roche
West Phila. Title & Trust Co.	Davis, Dunlap & Barney
R. L. Dodge Residence, New York, N. Y.	Harry Creighton Ingalls
Consolidated Gas Co., Boston, Mass.	Parker, Thomas & Rice
Salada Tea Building, Boston, Mass.	Densmore, LeClear & Robbins
Institute for Savings, Woonsocket, R. I.	Thomas M. James Co.
New York Title & Mortgage Co.	Horace S. Luckman
Phenix Bank, Providence, R. I.	Jackson, Robertson & Adams
Mechanics Savings Bank, Worcester, Mass.	Frost, Chamberlain & Edwards
Himes Memorial, Washington, D. C.	Horace W. Peaslee
Hall Free Library, Cranston, R. I.	Geo. Frederick Hall
Beth Israel Hospital, Boston, Mass.	Densmore, LeClear & Robbins
Lawrence Trust Co., Lawrence, Mass.	Thomas M. James Company
Greenleaf & Crosby Co., Jacksonville, Fla.	Marsh & Saxelbye
Brooklyn Lodge of Elks	McKim, Mead & White
Elgin Clock, Pure Oil Bldg., Chicago, Ill.	
Hillcrest Mausoleum, Springfield, Mass.	Samuel M. Green Company

Entrance Doors, Salada Tea Co. Building, Boston, Mass.

DENSMORE, LECLEAR & ROBBINS, Architects

These doors were cast in bronze from models by HENRY WILSON, sc. Each leaf was cast complete in one piece

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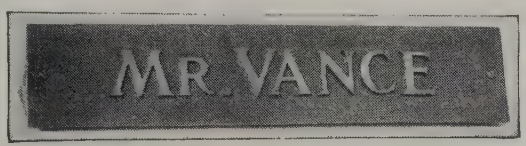

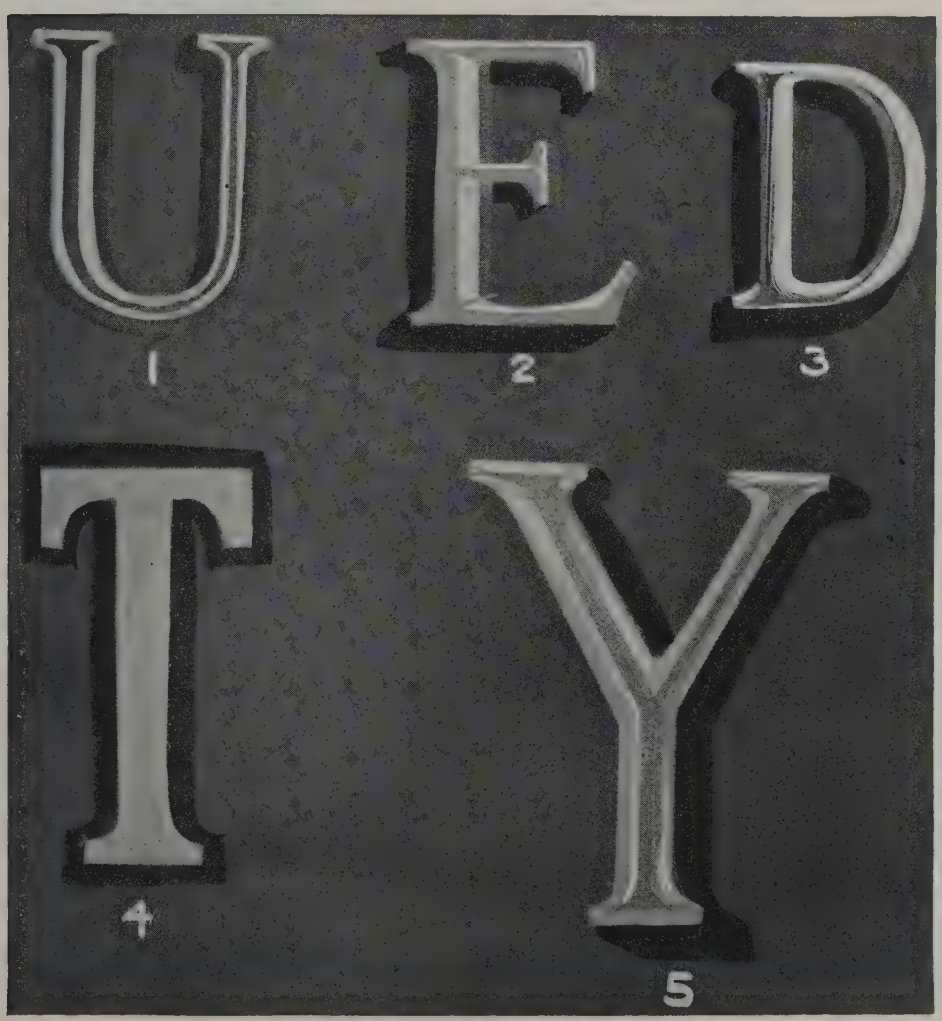

The Five Types of Bronze Letters
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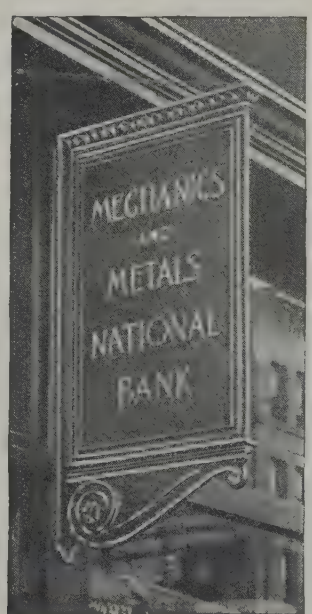

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- Emblems
- Traffic Towers

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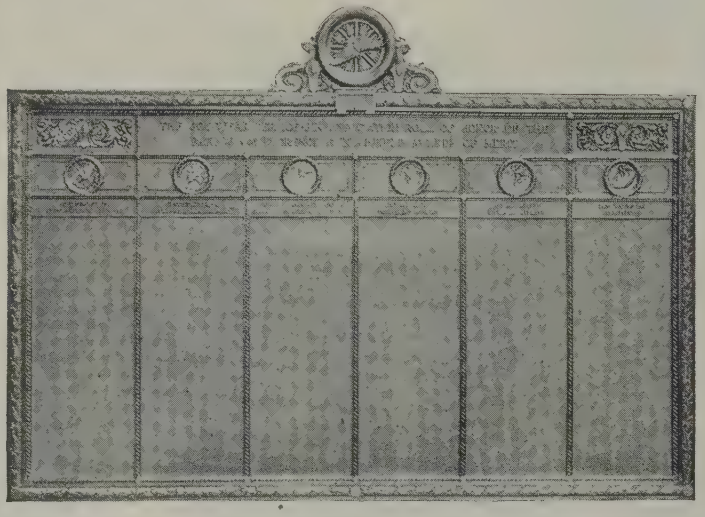
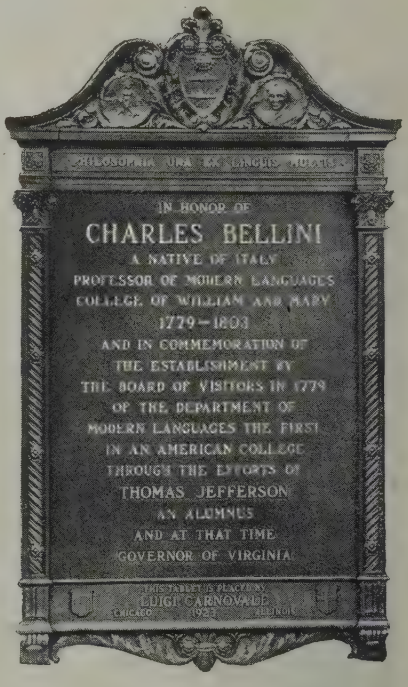
Union Trust Co., Cleveland, Ohio	L. Kent Moatz
United Banking & Trust Co., Cleveland, Ohio	Walker & Weeks
Broad Street Trust Co., Philadelphia, Pa.	Ritter & Shay
L. K. Liggett Building, Dayton, Ohio	Schenck & Williams
Public Auditorium Building, Cleveland, Ohio	Herman Kregelius
Farmers Bank, Mansfield, Ohio	Althouse & Jones
Traffic Tower, Cleveland, Ohio	City of Cleveland
First National Bank of New Castle, New Castle, Pa.	Simons, Brittain & English, Inc.
Allen Memorial Medical Library, Cleveland, Ohio	Walker & Weeks
Cleveland Trust Co., Lorain, Ohio	Alfred G. Hall
First National Bank of Lansdale, Lansdale, Pa.	Tilghman-Moyer Co.
Richmond Trust Co., Philadelphia, Pa.	Sigmund Laschenski
Richland Savings Bank, Mansfield, Ohio	Althouse & Jones

Cast Bronze Lamp, Memorial Cemetery, Toledo, Ohio
Over all height, 22½ ft.

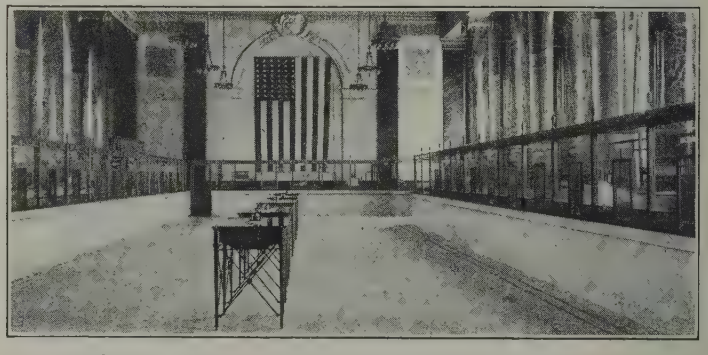


Bronze Tablet Erected at Goodyear Tire & Rubber Co., Akron, Ohio
Size, 7 ft. 6 in. x 5 ft.



Cast Bronze Tablet

Banking Room, Union Trust Co., Cleveland, Ohio
L. KENT MOATZ, Architect, Cleveland, Ohio



Bank Screen, United Bank, Cleveland, Ohio
WALKER & WEEKS, Architects, Cleveland, Ohio

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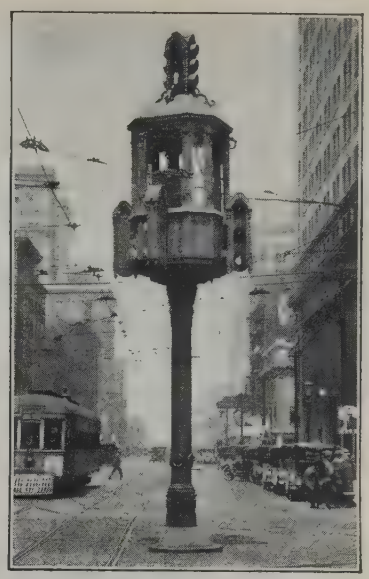
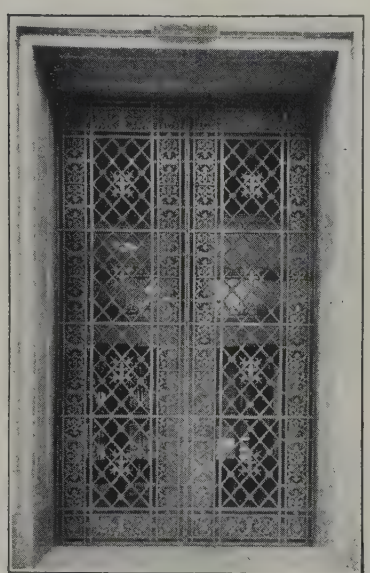
Cast Bronze Entrance Doors, United Artists Building, Detroit, Mich.
HOWARD CRANE, Architect

Calendar Stand



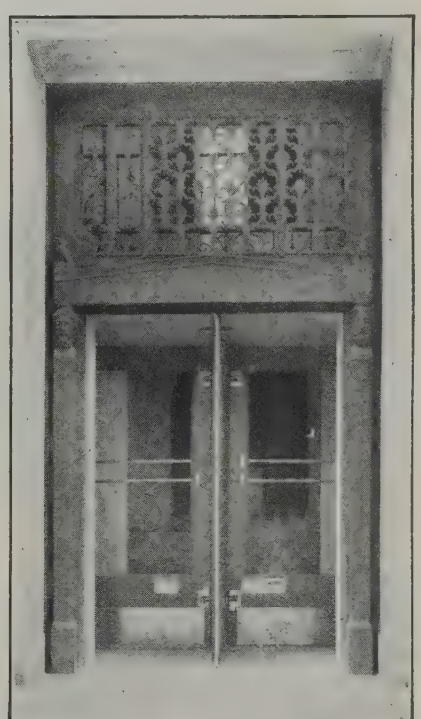
Bronze Traffic Tower, Cleveland, Ohio
Over-all height, 27 ft.

Entrance, Union Trust Co., Cleveland, Ohio
L. KENT MOATZ, Architect

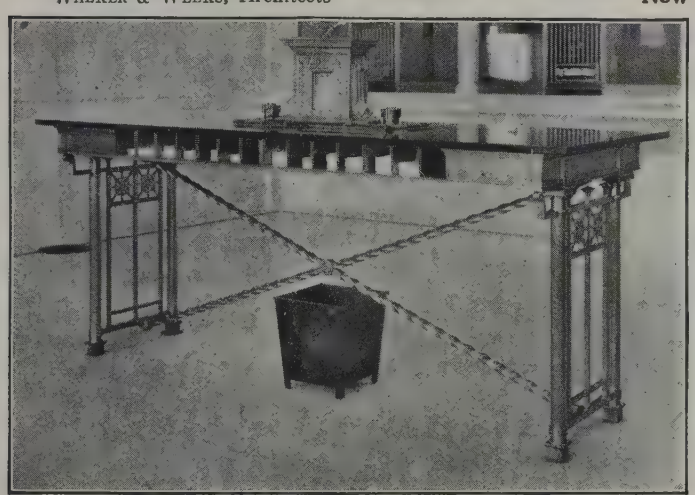


Bronze Entrance Doors, United Bank, Cleveland, Ohio
Size, 8 ft. 6 in. x 15 ft.
WALKER & WEEKS, Architects

Entrance First National Bank of Lawrence County, New Castle, Pa.



Bronze Entrance, Allen Memorial Medical Library, Cleveland, Ohio
WALKER & WEEKS, Architects



Bronze Check Desk

Bronze Store Front, Swetland Building, Cleveland, Ohio
A. C. WOLF, Architect

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Cast Bronze
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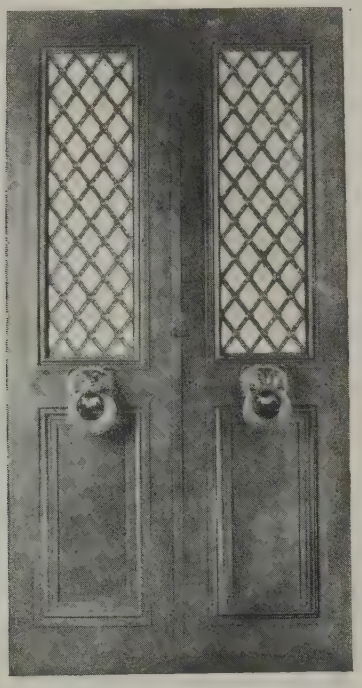
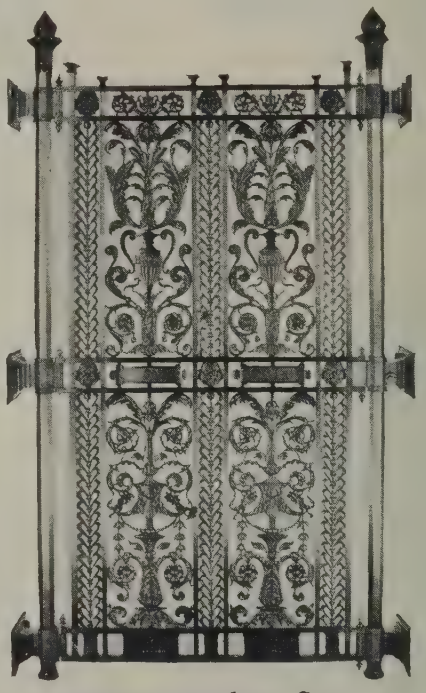
We are equipped to handle any size contract and special work in bronze and iron pertaining to the building trades.

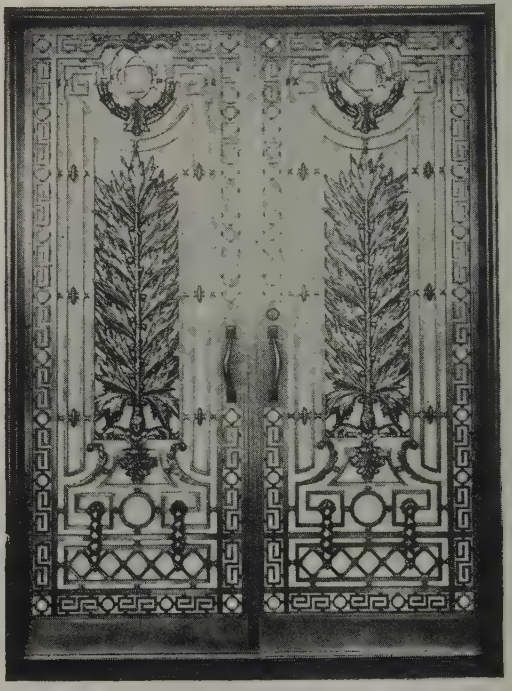


Cast Bronze Mausoleum Doors



Bronze Mausoleum Gate

Cast Bronze Grilles and Rail, Central Mfg. District Bank, Chicago, Ill.



Entrance Doors, Oak Grove Mausoleum, St. Louis, Mo.
LOVELL & LOVELL and T. P. BARNETT, Architects

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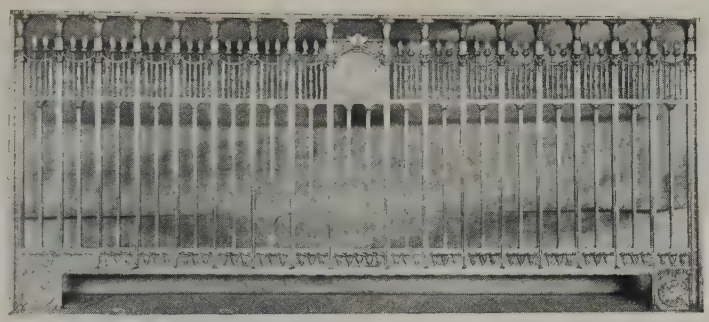
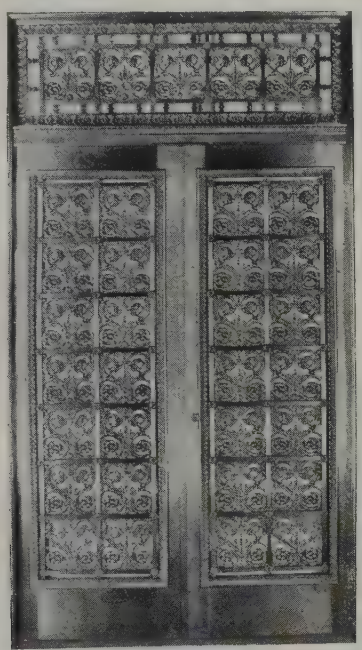


Cashier's Grille, Illinois Athletic Club, Chicago, Ill.
W. Gibbins Uffendell, Inc., Architect

Cast Bronze Vault Grilles, Stock Yards National Bank, Chicago, Ill.



Entrance to Private Room, Rosehill Mausoleum, Chicago, Ill.
Lovell & Lovell, Architects

Bronze Flagpole Base, Scottish Rite Temple, Nashville, Tenn.
Asmus & Clark, Architects

Cast Bronze Exterior Tablet

Cast Bronze Elevator Entrance Doors

Cast Bronze Honor Roll and Memorial Tablet

Cast Tablet
Frederick C. Hibbard, Sculptor

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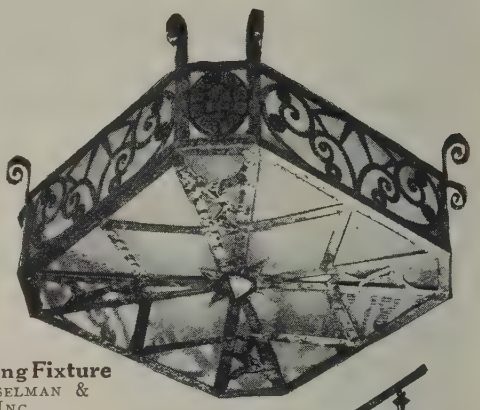
We design and execute hand wrought iron and bronze work of the better type, specializing in gates, railings, bank screens, lanterns, special hardware, etc.

Our half polished work can be made rustproof at small extra cost.

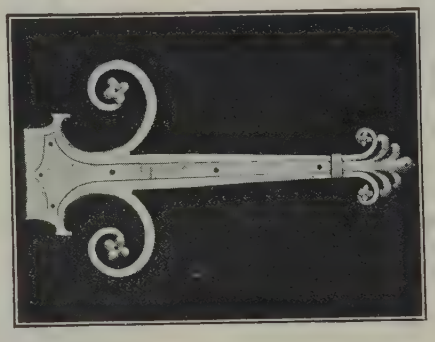
Architects usually include this type of work under a special allowance based on our preliminary estimate.



Modern Style Ceiling Fixture
Designed by HASSELMAN & SALTERINI, INC.

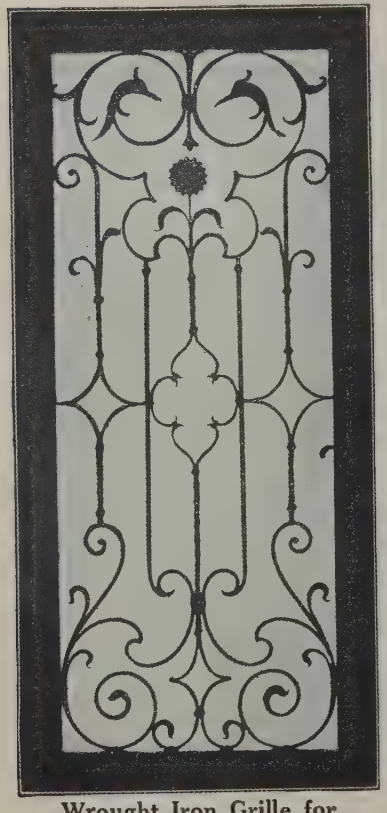
Baptistry Gate, St. Gregory's Church
McGILL & HAMLIN, Architects

Wrought Iron Bracket Fixture

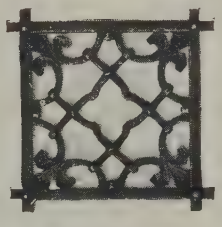


Leaf of Wrought Iron Strap Hinge
Treated to make it absolutely rustproof

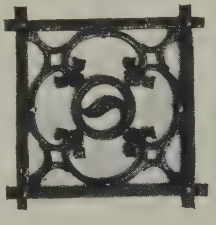
Main Stair Railing, Van Buren Residence, Newport, R. I.
H. T. LINDEBERG, Architect

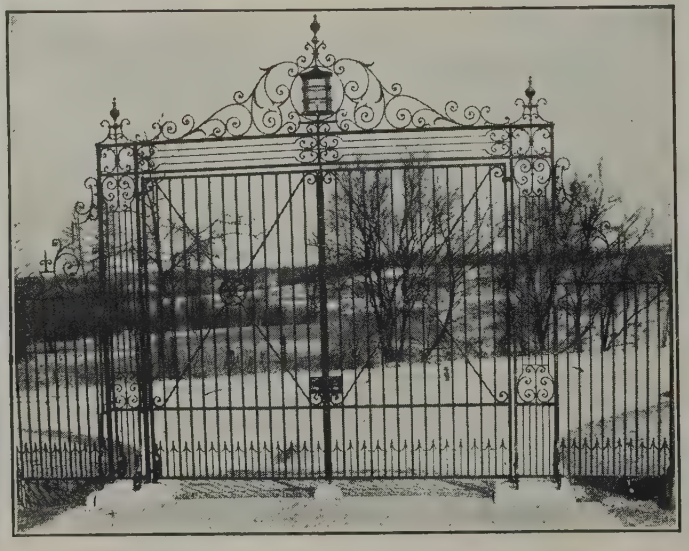


Wrought Iron Grille for Spanish Residence

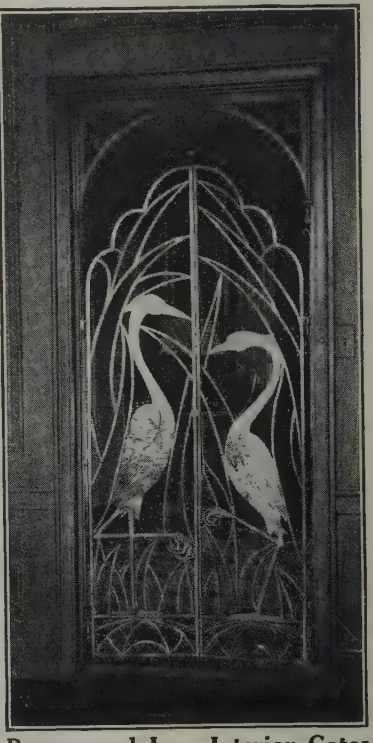


Wrought Iron Grilles





Main Entrance Gates to the Percy Pyne Estate
CROSS & CROSS, Architects



Bronze and Iron Interior Gates
Designed and executed by HASSELMAN & SALTERINI, INC.

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Special Wrought Iron Work.

Special Cast Iron Work.

Steel Stairs of all types.

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We specialize in bronze doors for bank and office buildings and mausoleums.

The illustrations show some of our standard types.

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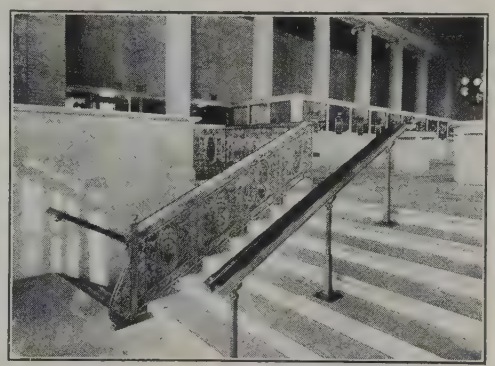
Our plant is equipped to handle large contracts as well as small.



Ornamental Cast Bronze Railings

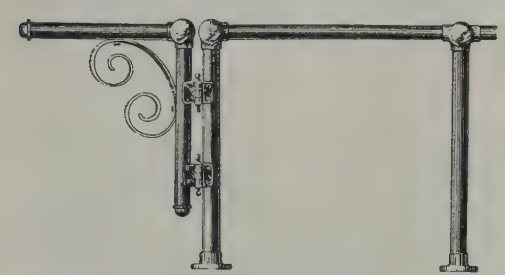
Mausoleum Doors

We have many different designs.

Write for catalogue.

Cast Bronze Doors

Also extruded doors. All designs.



Single Rail with Gate

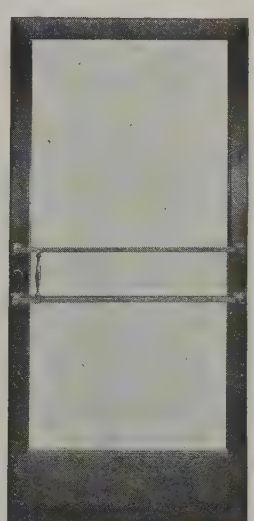
Double Rail

Brass and Bronze Railings

For all purposes. Usually made of 2, 2½ or 3-in. tubing. Can also be furnished in iron

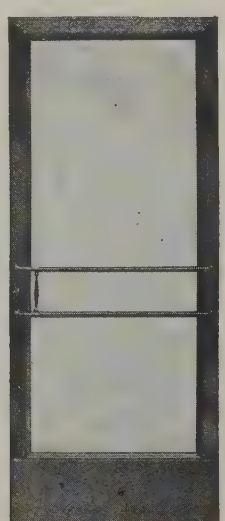
Mausoleum Doors

We have many different designs. Write for catalogue



Bronze Tubing Door

Standard stiles 1½x3-in. and 2x3 in.



Cast Bronze Door

Also extruded doors. All designs

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We specialize in bronze store fronts

Des Plaines State Bank Building, Des Plaines, Ill.

We specialize in bank interiors, both bronze and iron

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WIRE WORK: including Guards; Gates; Partitions; Railings.

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A long established firm with a modern plant, equipped to execute contracts in any section of the country in a prompt, efficient and accurate manner. Skilled erection crews.

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Catalogue and photographs showing many designs sent on request. Advise as to your requirements.

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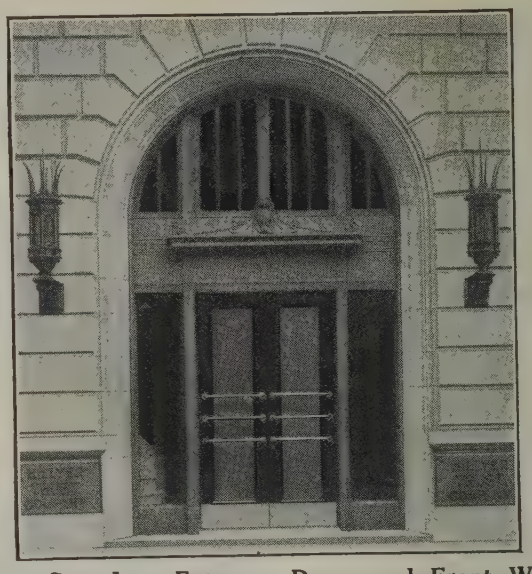
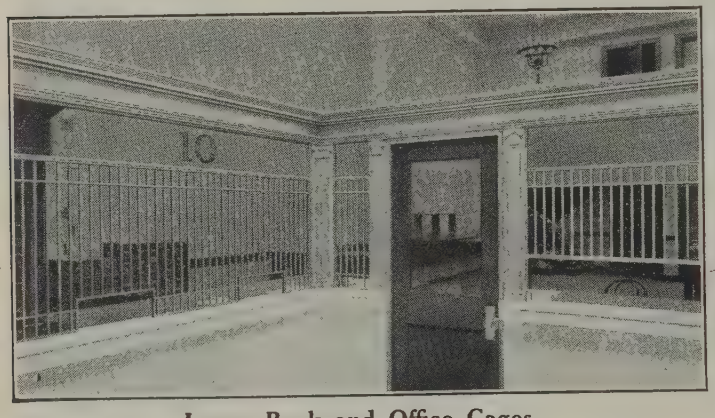
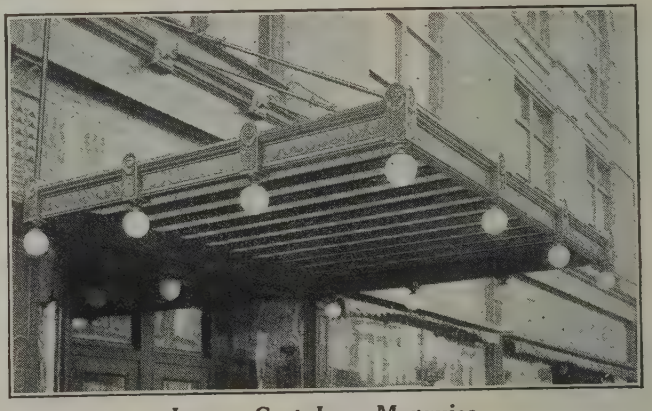
Ornamental gates, railings and balconies can be made of wrought iron, brass or bronze in any finish.



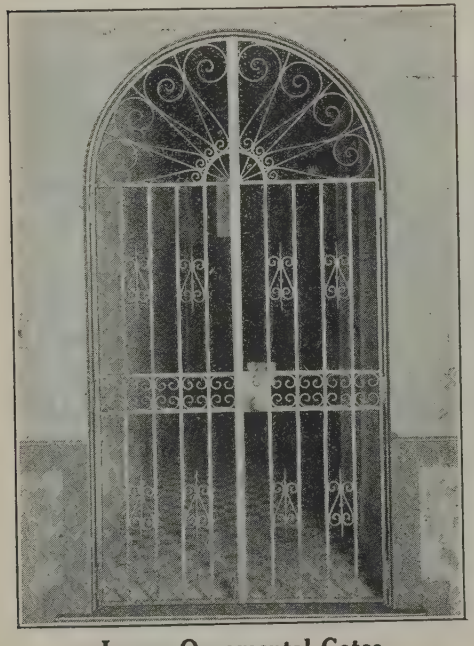
Logan Cast Iron Entrance Doors and Front Work



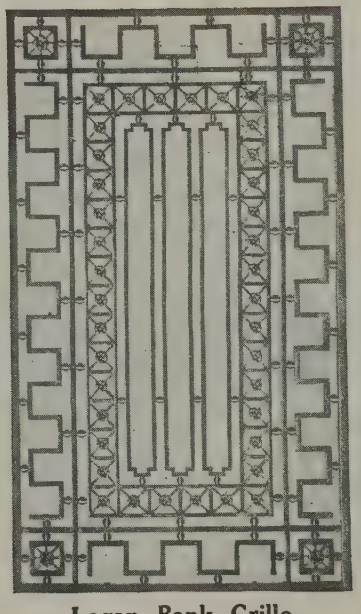
Logan Bank and Office Cages



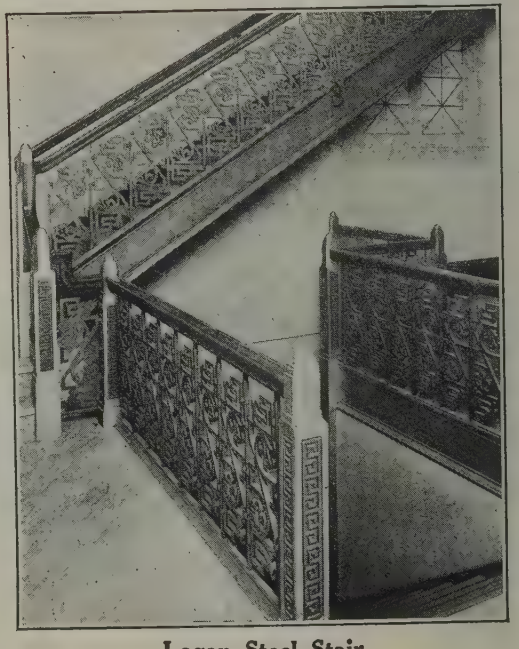
Logan Cast Iron Marquise



Logan Ornamental Gates



Logan Bank Grille



Logan Steel Stair

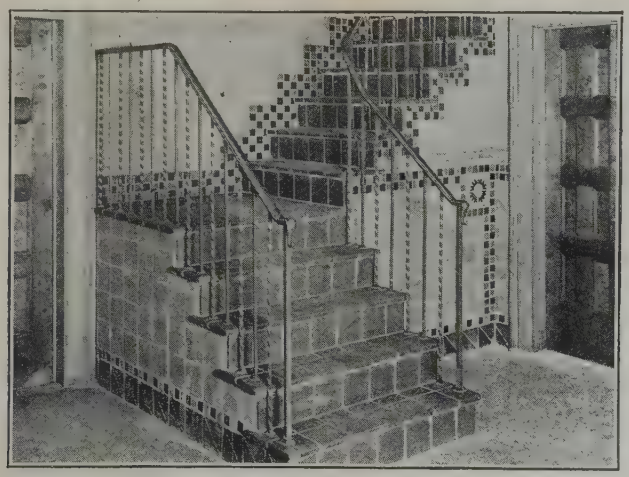
Continued on next page

Elevator Enclosures and Cabs

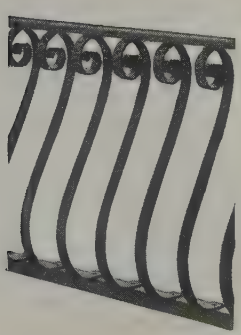
Made up to suit architects' design.

Pipe Railings

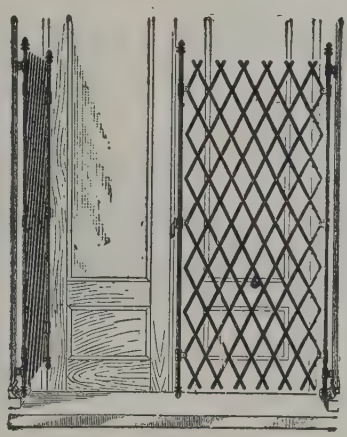
Made up either level or for stairs—of steel pipe or brass tubing.



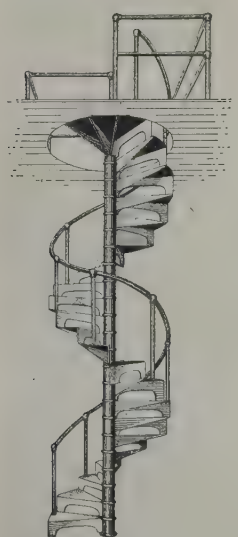
Logan Metal Railing



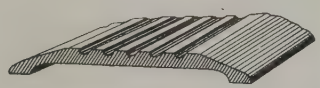
Logan Iron Fencing



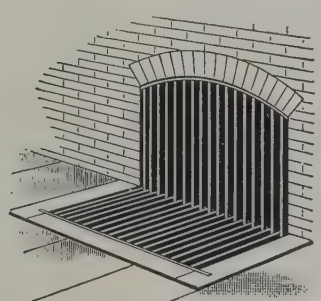
Logan Folding Gate



Logan Spiral Stairs



Logan Threshold
Made of iron, brass or bronze



Logan Sidewalk Grating and Window Guard

Wire Work

Wire Door and Window Guards—Are made any size and of either round iron or channel iron frames.

A special booklet showing different size meshes with wire shown to full size, sent on request.

Wire Partitions—These standard partitions, of No. 10 wire in 1½-in. mesh woven to 1-in. channel frames, are 4x8 ft. in size and are adapted principally to stockroom enclosures. Special sizes can be made.

Standard Step Fire Escapes

These fire escapes are made to comply with any city or state law. Give a sketch of arrangement and give location of windows to be connected.

Special catalogue and specifications of many types sent on request.

Logan Spiral Slide Fire Escapes

This escape, made entirely of steel, consists of a smooth galvanized spiral slide enclosed in a cylinder 5 ft. in diameter, equipped with automatic entrance and exit doors.

It rests on its own foundation and does not depend on the building walls for support. It may be erected either on the exterior of a building, as shown in the accompanying illustration, or incorporated within the walls of the building as detailed below.

Advantages—It has no steps; consequently there is no stumbling or falling.

Being wholly enclosed, it is impossible for rain or snow, smoke or fire to enter.

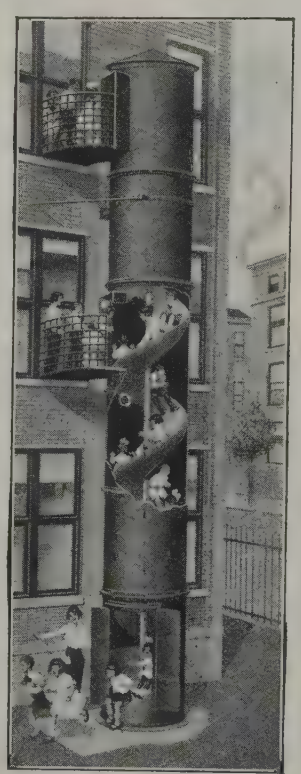
Capacity—Over 150 persons a minute, which is the equal of 3 ordinary stairways.

Specifications—The fire escape shall be the Logan Spiral Slide made by Logan Co., Louisville, Ky., or equal. It shall be placed on a concrete foundation.

The escape proper shall be entirely of steel, 5 ft. diameter, placed as shown on plans, and shall have one entrance at each floor above the first.

The cylinder shall be of No. 12 U. S. Standard gauge sheet steel, for the first 18 in.; the next 6 ft. of No. 14 gauge, and the remainder of No. 16. The spiral slide shall be of No. 16 gauge galvanized sheet securely attached to a center core of 3-in. inside diameter standard black pipe.

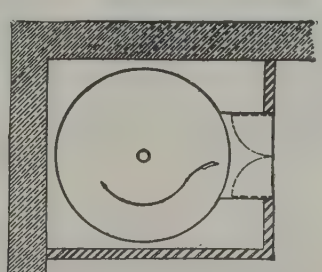
An enclosed vestibule shall be provided at each entrance with entrance doors in two leaves each, arranged to swing in, and provided with torsion springs of phosphor bronze. Doors shall be set away from cylinder far enough to clear same when swung open.



The "Logan Spiral" as Installed on Exterior of Building

Exit doors shall be in two leaves opening outward and provided with brass automatic inside latch with touch-plate to operate by pressure by the smallest child.

The entire escape shall be manufactured in assembled sections about 7 ft. high, with an angle ring at the top and bottom of each section. It shall be set up at the factory to insure proper fitting, and each section properly marked to correspond with a setting diagram to be furnished by manufacturers.



Entrance to Logan Fire Escape—Interior Installation

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For Bronze Windows, see page A1178: for Stone Mantels, see page B1786; for Tile and Swimming Pools, see page C3883.

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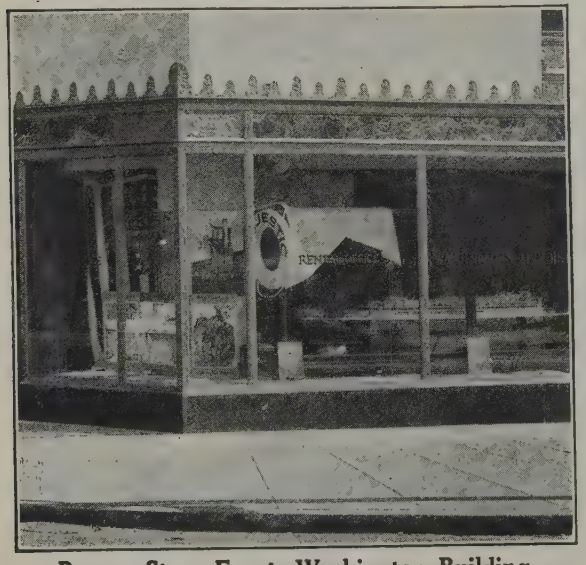
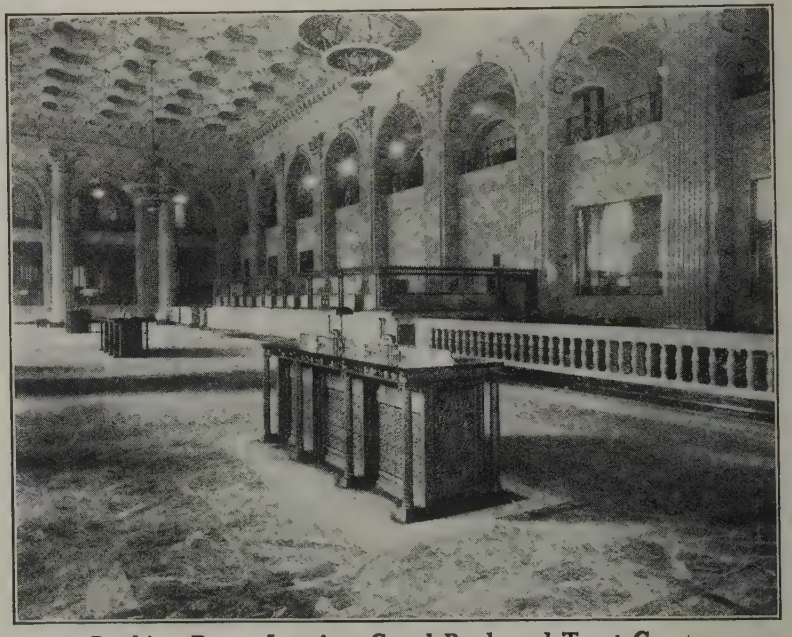
To the architect, WM. H. JACKSON COMPANY offers more than 100 years' experience combined with unlimited manufacturing facilities.

Bronze Main Entrance Door, Canal Bank & Trust Co., New Orleans, La.
EMILE WEIL, INC., Architects

Bronze Store Front, The Barclay, 48th Street and Lexington Avenue, New York, N. Y.
CROSS & CROSS, Architects



Bronze Store Front, Washington Building, Washington, D. C.
COOLIDGE, SHEPLEY, BULFINCH & ABBOTT, Architects



Banking Room Interior, Canal Bank and Trust Co., New Orleans, La.
EMILE WEIL, INC., Architects

JAS. H. MATTHEWS & CO.

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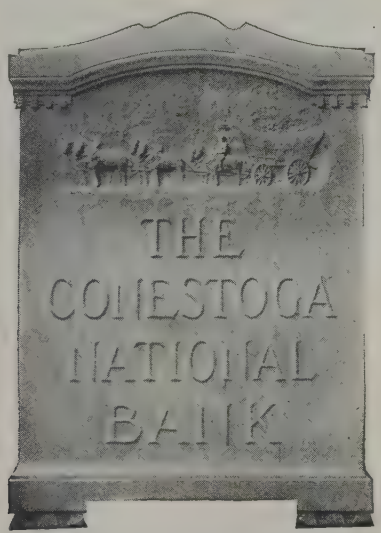
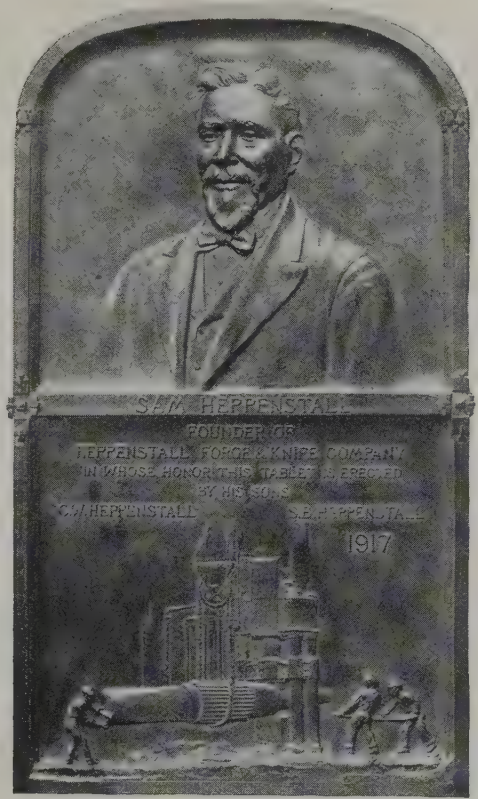
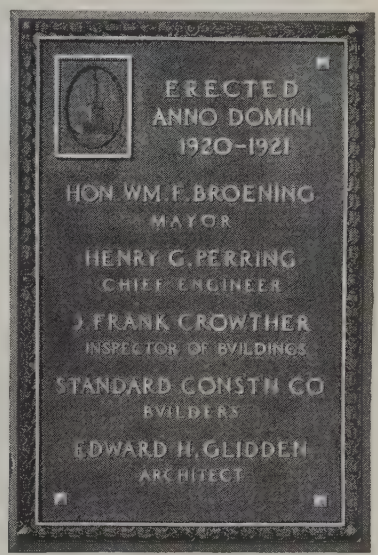




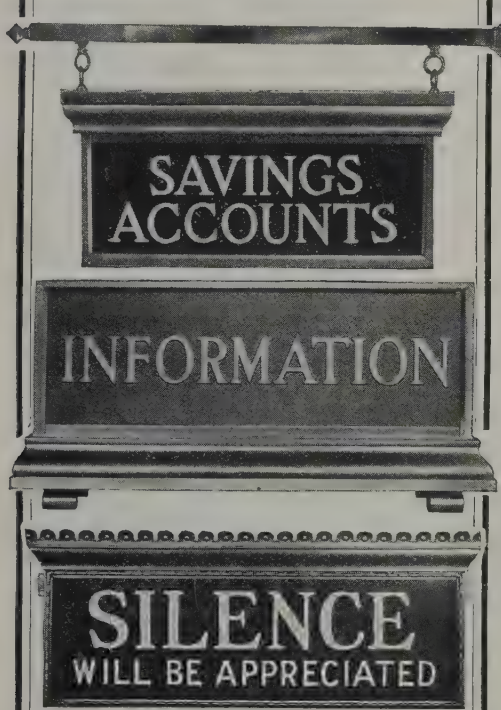
Facilities

We have on our staff the highest type of designing and sculptural talent. We work either from the architect's design, our own design, or from a combination of our many "master" border and letter designs. Sketches and photographs, and full size lay-outs furnished without obligation.



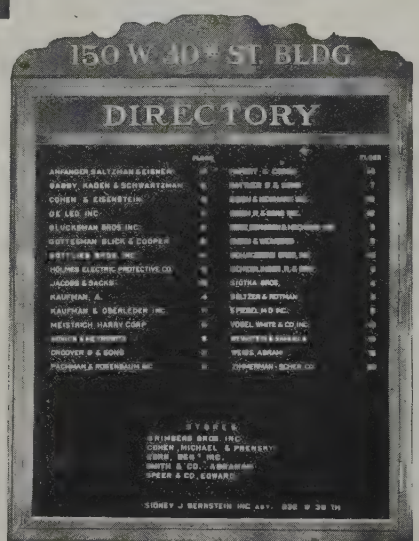
WRITE FOR SPECIAL CATALOG

BRONZE ILLUMINATED INTERIOR SIGNS



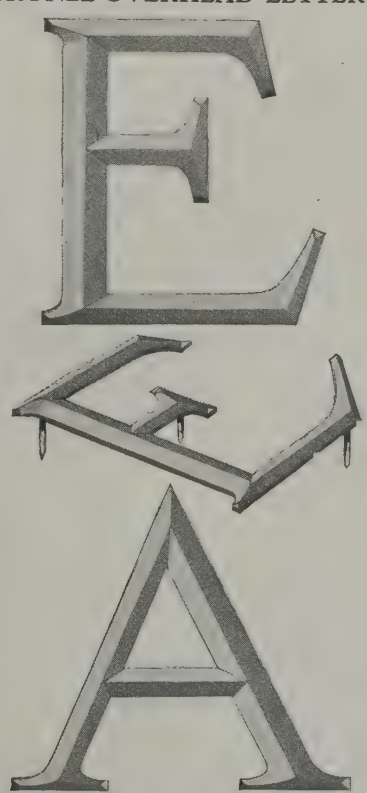
It is always well for the architect to arrange for interior directional signs in his plans and specifications. Matthews have special facilities for making these beautiful interior signs. Send for fully descriptive catalog.

BRONZE BUILDING DIRECTORIES



We can make any size and style of building directory—from simple wood frame directories to highly ornate solid cast bronze directories. Tell us approximately your need and we will send suggestions and special catalog.

BRONZE OVERHEAD LETTERS



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Our works embrace modeling rooms and studio, complete foundry for handling plain and difficult "process" castings, finishing and chasing departments, and coloring rooms.

Life Size Bronze Bas Relief Placed at Richmond, Va.
RAYMOND A. PORTER, Sculptor

16 Ft. High Bronze Baptistry Screen Placed at Cathedral of St. John the Divine, New York, N. Y.
CRAM AND FERGUSON, Architect

11 Ft. High Bronze Doors, St. Charles Borromeo Seminary, Philadelphia, Pa.
PAUL MONAGHAN, Architect

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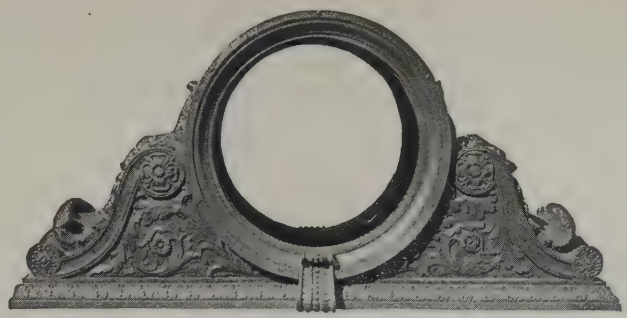
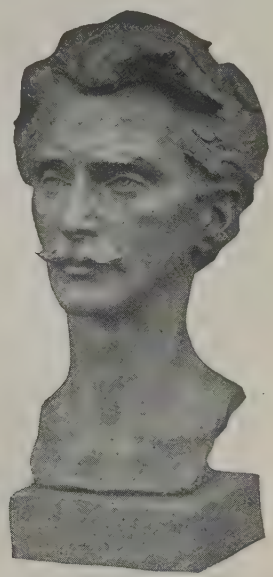


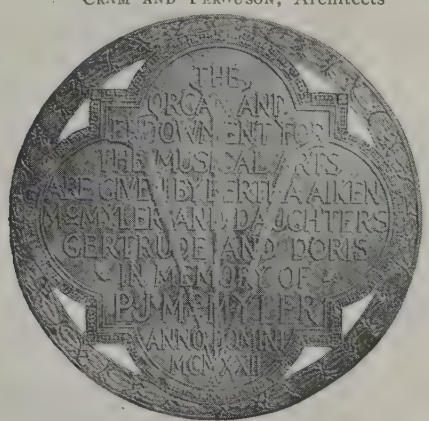
4 Ft. Diam. Bronze Clock Case, State Building, Columbia, S. C.

Bronze "Don Quixote"

Pair of Bronze Altar Gates, St. Florian's Church, Detroit, Mich.
CRAM AND FERGUSON, Architects



Life Size Bronze Bust
RICHARD RECCHIA, *Sculptor*



Bronze Floor Tablet Placed at Cleveland, Ohio

8 Ft. Bronze "Pilgrim Maid" Placed at Plymouth, Mass.

Bronze Candlesticks and Crucifix, Group of 32 Pieces Made for the House of Studies, Weston, Mass.
MAGINNIS & WALSH, Architects

Sculptured Bronze Mausoleum Door Placed at Manchester, N. H.
LUCIEN GOSSELIN, Sculptor

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Store Fronts and Grilles.
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Name Plates and Letters.
Mausoleum Doors and Fittings.
Window Grilles and Guards.
Safe Deposit Grilles and Partitions.

Michaels' Patented Sliding and Casement Sash, in bronze, which is being specified by nationally renowned architects on account of simplicity of design, practicability, permanence, and special weatherstripped feature.

Cage Partition Work in square, round or flat wires, square or diamond meshes, channel or tube frames, hollow panel or glass construction, in painted, baked enamel or plated finishes.

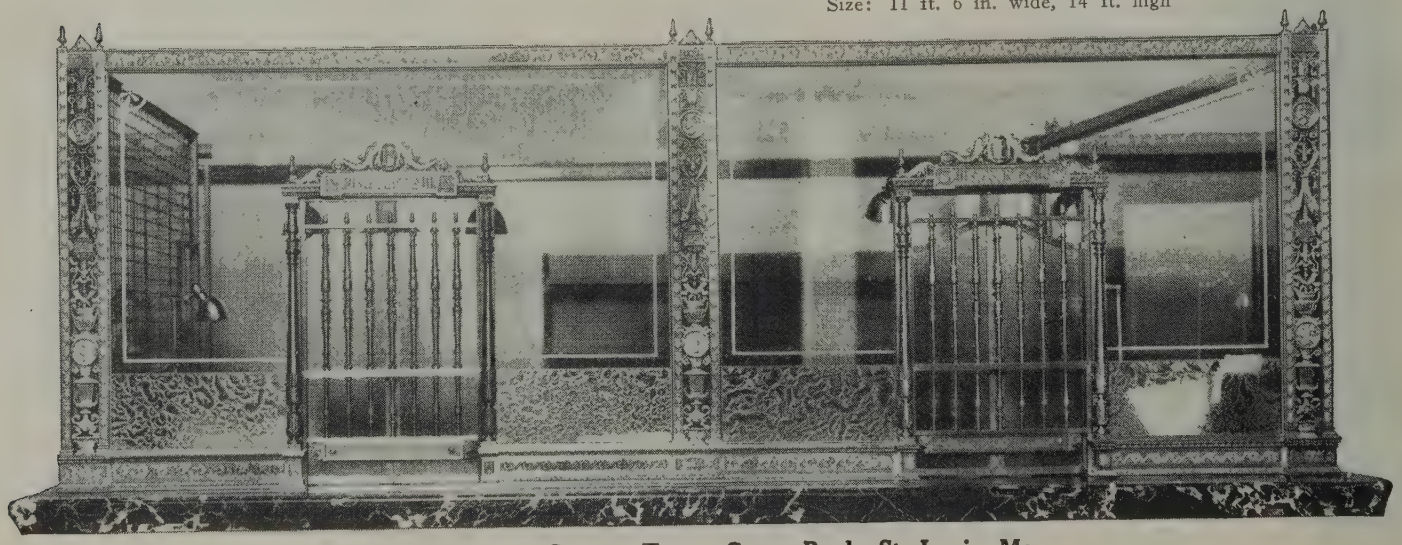
Finishes

We are equipped to produce any hardware, commercial or special finish to suit individual tastes. Samples submitted for approval before completing products.

Service

Estimates cheerfully furnished, catalogues sent upon request. Architect's details faithfully executed. Complete engineering and drafting service. Shop drawings and details submitted for approval on all contracts.

Cast Bronze Entrance and Sliding Doors, Erie Trust Company, Erie, Pa.
DENISON & HIRONS, Architects, New York
Size: 11 ft. 6 in. wide, 14 ft. high



Bronze Counter Screen, Tower Grove Bank, St. Louis, Mo.
ST. LOUIS BANK BUILDING & EQUIPMENT CO., Architects

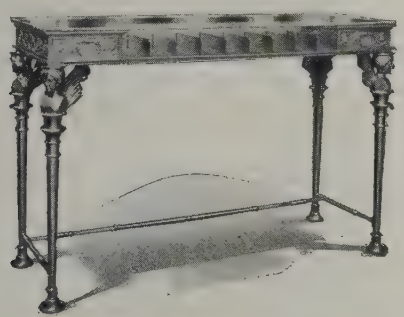
Continued on next page

Architects are invited to use, without extra cost, any of our numerous ornamental stock patterns (designs to correspond with all styles of architecture). No order too large or complicated for our careful execution. Complete erection service in all parts of the country. Agents in all large cities.

Facilities and Experience

Our new plant of over 130,000 sq. ft. of floor space, modernly equipped and especially adapted for designing, modeling and manufacturing distinctive metal work, includes complete estimating, engineering and drafting departments, modeling studio, pattern shop, bronze foundry, fitting, assembling and finishing departments, chasing and engraving departments, polishing, buffing and electroplating department, baking enamel ovens, extensive machine shop, wrought iron and wire mesh departments, electric and acetylene welding and brazing departments, chemical laboratories and acid etching department. Large stock of bronze, brass and iron rods, tubes, channels, angles, sheets and mouldings on hand at all times, and on account of our central location we can secure the very best deliveries on mill shipments.

Our present organization of skilled craftsmen was selected individually, for their architectural and mechanical ability to do artistic and exacting workmanship, by our president, whose forty years of practical experience reflects in our unexcelled products.



Bronze Check Desk, American Exchange National Bank, Greensboro, N. C.
ALFRED C. BOSSOM, Architect, New York

Cast Bronze Directory Board, Garfield State Bank, Chicago, Ill.
BURNHAM CO., Architects, Chicago, Ill.

Cast Bronze Wicket, Washington Trust Company, Washington, Pa.
HOPKINS & DENTZ, Architects, New York

Cast Bronze Floor Plaque, National Bank of Chester County, West Chester, Pa.
TILGHMAN-MOYER, Architects, Allentown, Pa.
4 ft. diameter

Cast Bronze Store Front and Tablets, Sherman-Leachman Co., Columbus, Ohio
SNYDER, BABBITT & MATTHEWS, Architects, Columbus, Ohio

ESTABLISHED 1857

JAMES McKINNEY & SON

Makers of Fine Architectural Cast Iron

925 to 939 Broadway

ALBANY, N. Y.

Products

Architectural Gray Iron Castings; Front Work, Entrance and Window Frames; Spandrels; Fascias; Cornices; Marquises, Frames and Pendants; Stairwork; Balusters, Newels, ornamental and plain, Risers and Treads; Columns; Pilasters; Panels; Saddles, Door and Elevator; Cast Iron Grille Work.

Also miscellaneous Castings, such as: Cleanouts, Coalhole Covers, Wheel Guards, Gratings.

Also Ornamental Wrought Iron, including hammered and high lighted finish, required in architectural treatment of building as well as in connection with cast iron work.

Facilities

Fully equipped plant including drafting, engineering and designing department. Pattern department and foundry familiar with all kinds of carved pattern work, intricate cored work for all architectural purposes. Complete fabricating plant for fitting cast iron work with all necessary steel and iron work for shipping work ready for erection if required.

Service

Private siding and location of Albany on direct overnight water route to New York and South, and direct rail routes to New England, West, Southwest and South make delivery convenient and prompt to customers.

Large pattern stock of ornamental details effects economies in design. Ability to furnish plain and carved patterns, fitted as well as unfinished castings make for completeness of service.

Estimates from adequate blue prints quickly furnished and solicited.

Reputation

Over seventy years of experience, and pattern makers, molders and fitters trained for this special work, have made our products well known for the quality of their ornamentation and finish.

Three Examples Where Architectural Cast Iron Combines Beauty, Character and Permanence

THE MIDWEST METAL ART CO.

244-254 Butler Street, CINCINNATI, OHIO

Products

Designers and makers of FINE LIGHTING FIXTURES, GRILLES, ENTRANCES, STAIRCASES and other Architectural Metal Work of Character.

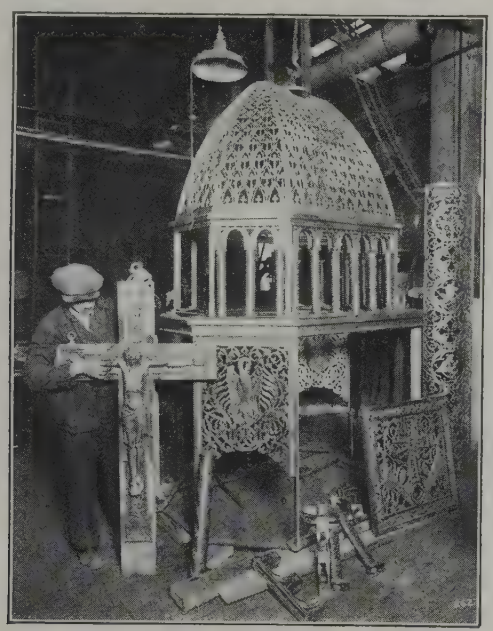
Equipment and Experience

We specialize in the finer types of architectural metal work and are thoroughly equipped to create and produce designs from simple hand forged hinges to the most elaborate and ornamental chandelier or grille.

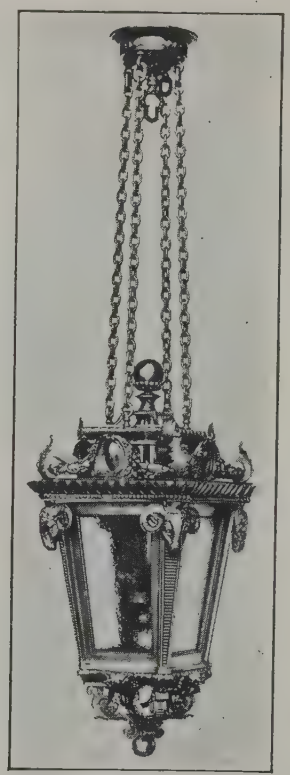
We maintain a designing department, bronze and brass foundry, modeling department, pattern shops, plating rooms, blacksmiths' forges, assembly shops, decorating rooms, etc., all operated by skillful, competent craftsmen.

These facilities assure architects and decorators of the finest type of service in producing work from their own designs or from plans and designs created by our craftsmen.

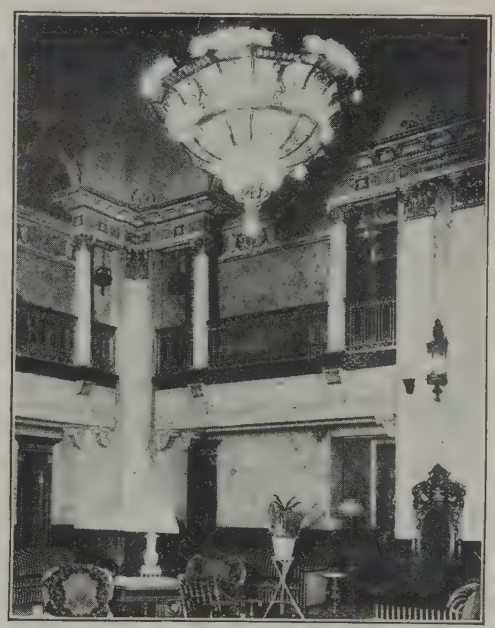
Catalogues of our recent installations and references from architects will be sent on request.



Brass Baldicino

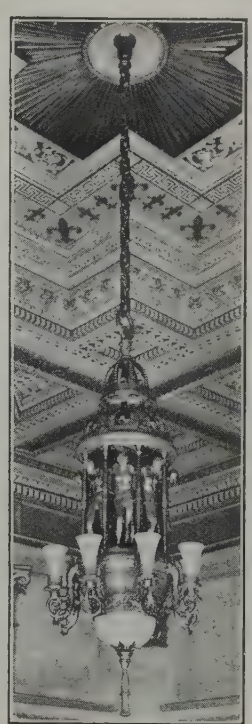


Bronze Lantern

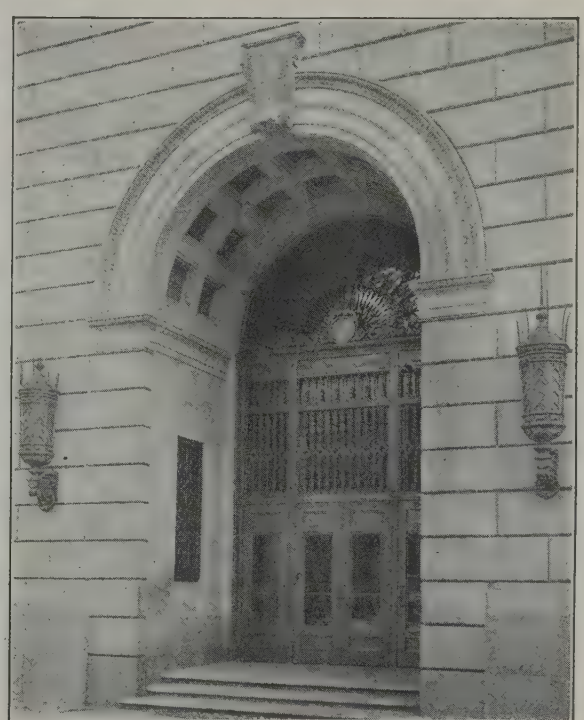


Wrought Iron Fixtures and Railing

Wrought Entrance and Lantern



Bronze Fixture



Bronze Entrance and Lanterns

MOYNAHAN & DUCHENE, INC.

Ornamental and Architectural Metal Products

2658-2662 Porter Street
DETROIT, MICH.

Products

Manufacturers of ORNAMENTAL and ARCHITECTURAL BRONZE, BRASS, IRON, STEEL and WIRE PRODUCTS, including:

Bank Counter Screens and Cages, Balconies and Balcony Rails, Entrance Doors, Marquises, Mausoleum Doors and Equipment, Grilles, Memorial and Commercial Tablets, Ornamental Gates and Fences, Stairs and Stair Rails, Tubular Railings, Window and Door Guards.

Service

Our designing, engineering and estimating departments are available for service at all times.

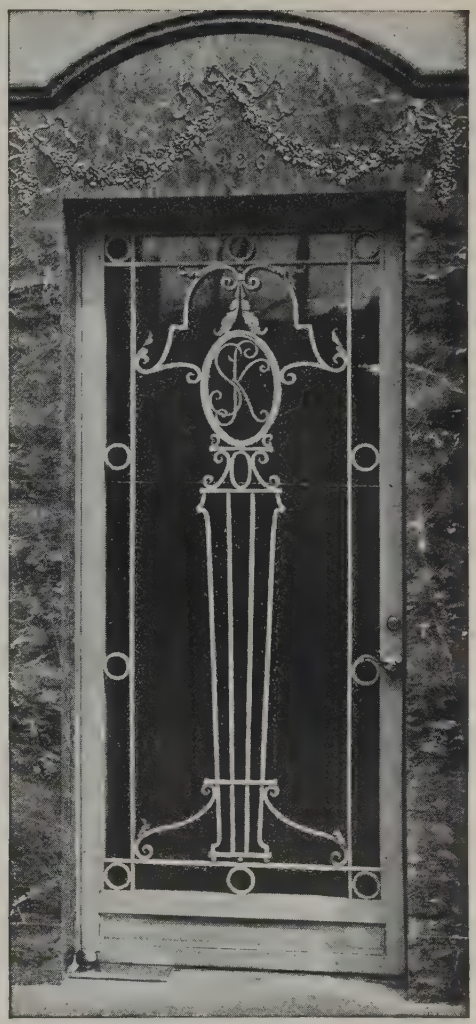
Detail of Bronze Counter Screen

Continued on next page

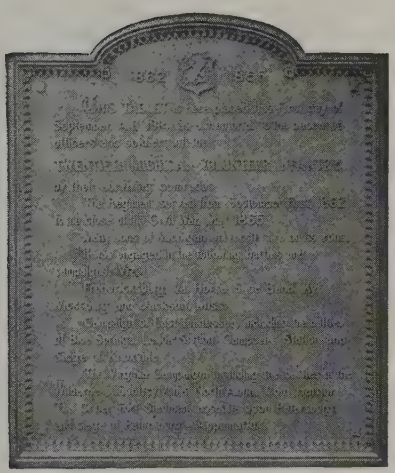
Period and Modern Work

We are prepared to do ornamental metal work in all metals, either in period or modern designs.

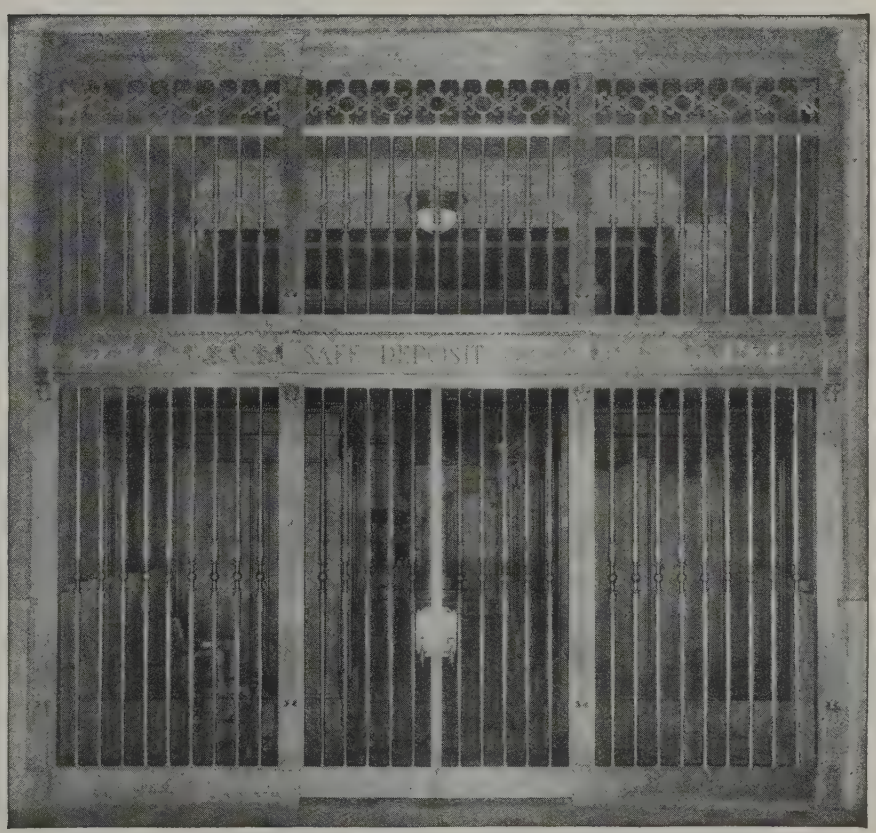
Stair Rail



Entrance Door



Memorial Tablet



Safe Deposit Vault Grille

Commercial Tablet

JULIUS MOCK & SONS, INC.

Manufacturers of Ornamental Iron Work

No. 771-785 Rutland Rd.

BROOKLYN, N. Y.

Products

ORNAMENTAL and MISCELLANEOUS IRON WORK for theatres and other building construction, manufactured to architects' designs, including: Driveway Gates, Entrance Doors, Railways, Grilles, Iron Fences, Stairs, Gratings, Balconies, Guards, Sidewalk Doors, Foyer Gates, Fire Escapes, Marquises, Stair Railings, Steel Doors, Porch Railings, etc.

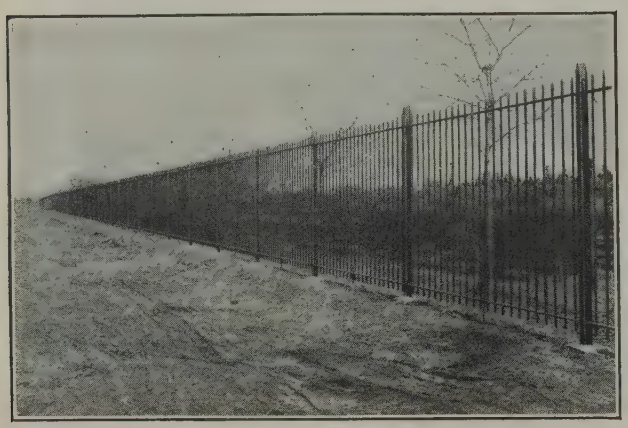
We also manufacture Genuine Hand Forged and Hammered Wrought Iron Work for fine residences and other buildings, such as: Interior Gates, Stair Rails, Grilles, Foyer Gates, Entrance Gates, Railings, Baptistry Gates, etc.

Iron Stairs

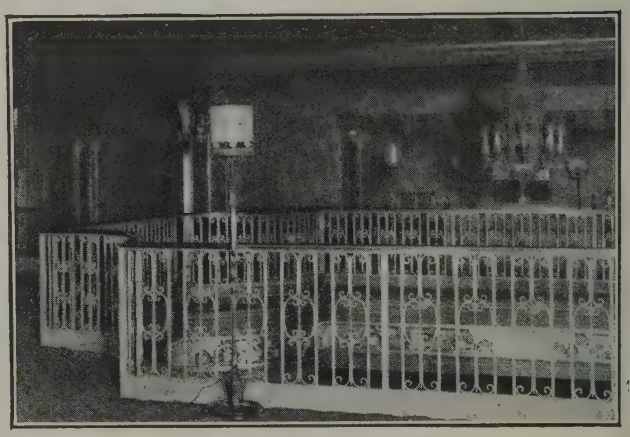
Interior Stair Rail

Interior Gates

Entrance Door



Plain Iron Fence



Theatre Railing

NORTH AMERICAN IRON WORKS, INC.

116-130 57th Street
BROOKLYN, N. Y.

Products

ORNAMENTAL and MISCELLANEOUS METAL WORK:

Access Doors	Pipe Bends, special
Art Smithing	Pipe Railings
Barn Equipment	Racks
Coal Doors and Chutes	Radiator and Vent Grilles
Entrance Doors	Railings
Fountains	Sidewalk Doors, waterproof
Garden Furniture	Stairs
Lamp Posts	Stable Equipment
Marquises	Steel Partitions
Park Furniture	Tree Guards

N.A.I.W. ELEVATOR DOORS and FRONTS.

Ornamental Metal Work

The NORTH AMERICAN IRON WORKS, INC., is equipped and prepared to produce ornamental metal work in iron, steel, brass, bronze, aluminum, etc., from the plainest to the most ornate designs. The architect is offered a foundry and general metal shop service that is unusual in its broad scope. Distinctive, exacting and quality work is produced as well as the usual routine items of such shops. Architects often desire an unusual piece of work made in a creditable manner, and this company has equipment which enables it to produce work that essentially embodies craftsmanship.

Low operating costs and the convenient location of the plant make for attractively moderate estimates. The combination of highest factory craftsmanship and reasonable cost has been highly favorable to the architect.

Items that have a common use are made in standard styles and sizes and are carried in stock. The company is also prepared to suggest and make up designs for various kinds of work. On request, the Engineering Department will gladly make a study of special conditions, and prepare drawings carrying out every detail with accuracy.

Inquiries and correspondence are solicited with architects, decorators and engineers on their problems concerning any design for any style of architecture or for special purposes.

Lamp Post
Base, 10⅜"
Height, 9' 9⅞"

Decorative Cast Iron Grille for Radiator Screens
Hotel Lincoln, New York

N.A.I.W. Elevator Doors

These doors are made of substantial material to resist heavy duty, are of good architectural design and are sold at a price conforming with the purpose for which they are to be used.

N.A.I.W. Doors are manufactured by a special process from a single plate of metal, formed with stiles, rails and panels to conform with the architect's designs.

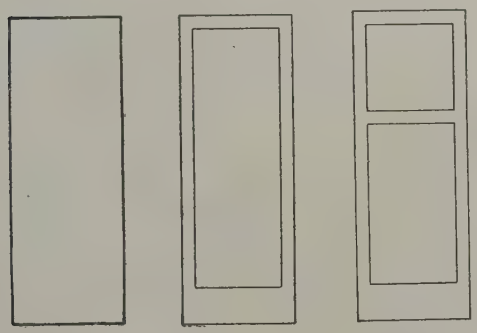
Made of One Basic Piece—N.A.I.W. Doors are made in one basic section as shown in Section W, and in 3 basic styles.

Style A, flat face.
Style B, single panel.
Style C, double panel.

These styles can be varied in section to suit architects' designs:

(1) by attaching two sections back to back, panel lined with asbestos and stiles with cork (Section Y); (2) by applying, on the inside face, a steel panel with asbestos lining (Section Z).

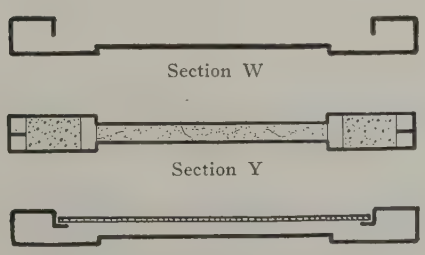
Panel offset can be moulded.



Style A Style B Style C

Standard Styles of Doors

N.A.I.W. Elevator Doors
Warwick Hotel, New York, N. Y.
A 36-story building



Section W
Section Y
Section Z

Standard Sections of Doors

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Architectural and Ornamental Brass, Bronze, Steel and Iron

CINCINNATI, OHIO

BRANCHES

CHICAGO, ILL. NEW YORK, N. Y. ST. LOUIS, MO.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

ARCHITECTURAL AND ORNAMENTAL METAL WORK of every description, including Cast, Formed, Extruded and Built-up Fixtures, Hardware, etc., of Brass, Bronze, Copper, Electroplated Steel and Wrought Iron, comprising the following:

Altar Railings
Balconies
Balustrades
Bank Partitions
Bank Screens
Brackets
Building Directories
Bulletin Boards
Cabs (elevator)
Cages (woven)
Cafeteria Fixtures
Canopies
Check Desks
Collapsible Gates
Cornices
Counter Screens
Desks (check)
Directories
Doors (solid, hollow and kalamein)
Door and Window Guards
Door Pulls
Elevator Enclosures
Entrances
Fittings (all kinds)
Foot Rails
Frames (lobby)
Gates (all kinds)
Guards
Hand Rails
Kick Plates
Ladders (brass)
Lamp Standards
Letters (cast)
Marquise
Mausoleum Doors, Gates and Grilles
Memorial Plates
Mouldings
Nameplates
Newels
Nosings and Edgings
Office Rails and Partitions
Pilasters
Plates (brass, bronze)
Pool Stairs
Posts (brass, bronze)
Push and Pull Plates
Railings (all kinds)
Registers
Rope Rails
Safety Treads
Sills
Slide Poles
Stair Rails
Standards (cast)
Tablets (bronze)
Thresholds
Ticket Booths
Treads (stair)
Tubing (all kinds)
Turnstiles
Velour Ropes
Ventilators
Wickets (all kinds)
Wire Guards and Cages
Woven Wire Work

For Cast, Extruded, Kalamein and Hollow Bronze and Steel Doors, see pages A972-975.

For Bronze Windows, both double hung and Casement types, see pages A1282-1283.

For Bronze Store Fronts and Awning Bars, see pages B2227a-2227f.

Manufacturing Facilities

THE NEWMAN MANUFACTURING CO. has one of the largest plants in the United States devoted exclusively to the fabrication of ornamental brass and bronze. We manufacture anything from a bank installation to memorial tablets and brass theatre rails. Our workmen are highly skilled craftsmen who can take a blue print and materialize it into a work of art.

Estimates—Service

Prompt service on all estimates. Special attention paid to the needs of architects in the way of figures, photos and special data.

The company is always willing to co-operate with architects in the matter of suggesting suitable sizes, designs, etc., and for this maintains a splendid Drafting Department, which is always at your service. Glad to submit suggestive sketches with estimates of cost at any time.

Literature

Ask for these catalogues and bulletins for your files:

(1) Store Hardware and Thresholds
(2) Building Directories
(3) Theatre Fixtures
(4) Grilles and Wickets
(5) Bank Installations
(6) Marquise and Canopies
(7) Bronze Tablets and Letters
(8) Railings
(9) Bronze Check Desks
(10) Bronze Store Fronts

Partial List of Installations

Banks

Federal Reserve Bank, Cincinnati, Ohio
Commonwealth Bank, Baltimore, Md.
Federal Reserve Bank, Oklahoma City, Okla.
Richmond Trust Co., Richmond, Va.
Jefferson Bank, St. Louis, Mo.
Canton National Bank, Baltimore, Md.
Stockgrowers & Ranchers Bank, Reno, Nev.
Pearl-Market Bank, Cincinnati, Ohio
Bank of California, Seattle, Wash.
Citizens Trust Co., Canonsburg, Pa.
Security National Bank, Tulsa, Okla.
Bank of Perkasie, Perkasie, Pa.
Community State Bank, Chicago, Ill.
First National Bank, Darby, Pa.
Eagle Savings & Loan Co., Cincinnati, Ohio
First National Bank, Latrobe, Pa.
Fruitgrowers National Bank, Smyrna, Del.
Federal Land Bank, New Orleans, La.
Commercial National Bank, San Antonio, Tex.
First National Bank, Tulsa, Okla.
First National Bank, Robinson, Ill.

Theaters

Palace Theater, Youngstown, Ohio
New Stanley Theater, Philadelphia, Pa.
Albee Theater, Cincinnati, Ohio
Rialto Theater, Omaha, Neb.
Grand Victory Theater, Detroit, Mich.
Loew's Theaters, New York, N. Y.; Washington, D. C.; Memphis, Tenn.; Indianapolis, Ind.; St. Louis, Mo.
Ascher Bros. Circuit (15 theaters)
Lubliner & Trinz Circuit (10 theaters)
Balaban & Katz Circuit (4 theaters)
Jones, Linick & Schaefer Circuit (6 theaters)

Miscellaneous

Hotel Sinton, Cincinnati, Ohio
Museum of Art, Baltimore, Md.
Keystone Bridge, Philadelphia, Pa.
Harrington Building, Columbus, Ohio
Crane Co. Exhibition Building, Atlantic City, N. J.
Wyoming Consistory Temple, Cheyenne, Wyo.
Traffic Tower, Newark, N. J.
Mesa County Courthouse, Grand Junction, Colo.
American Insurance Co., Newark, N. J.
Community Mausoleum, Tiffin, Ohio
Atlas Life Insurance Building, Tulsa, Okla.
St. Coleman's Church, Cleveland, Ohio
Municipal Office Building, Baltimore, Md.

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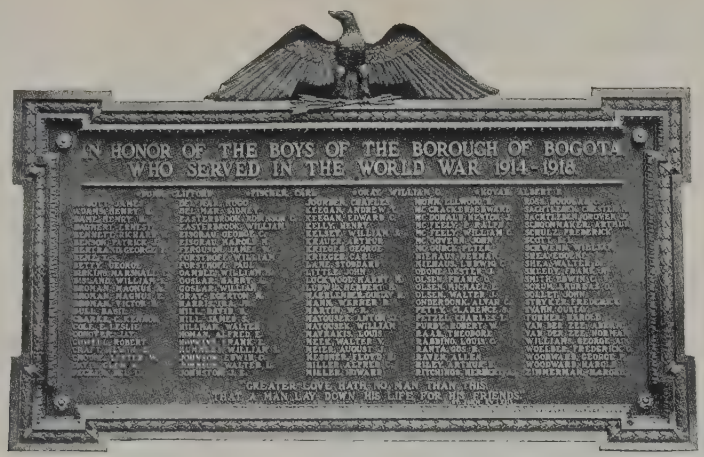


Cast Bronze Tablet, Design 225

Cass Avenue Bank, St. Louis, Mo.
St. Louis Building Equipment Company, Architect

Bank Installations

Newman bank fixtures of brass, bronze and electro plated steel are famous for their quality all over the world. Upon request, we will send blue prints of stock design counter screens with suggestions and estimates of cost. Or, we will quote in accordance with specification on such separate items as grilles, wickets, rails and gates, check desks, doors, safety deposit vault enclosures, cages, signs.

Send for our General Catalog No. 2, our Grille & Wicket Bulletin, Check Desk Bulletin and Marquise Bulletin. They contain a wealth of ideas for architects and general contractors.

Theatre Fixtures

Ornamental bronze ticket offices, extruded bronze and kalamein brass lobby frames, vent grilles, marquise of copper and galvanized steel and brass rails. Plush-covered rails, velour ropes with brass posts and beautiful bronze and brass balustrades. We have specialized in the manufacture of these for nearly a half century.

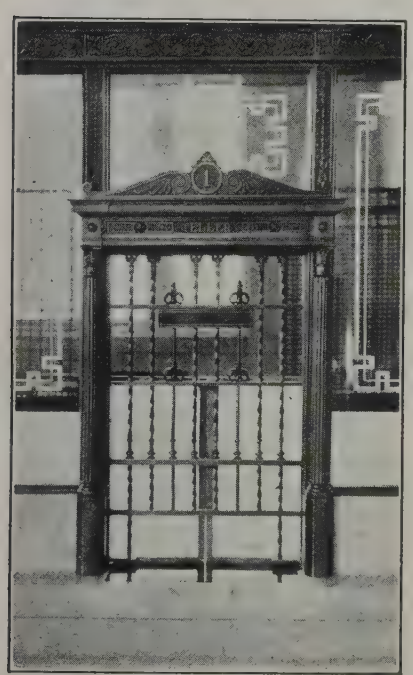
$20,000.00 Bronze Traffic Tower, Newark, N. J.
Nathan Harris, Architect

Bronze Tablets

Write for Newman's Bronze Tablet Catalogue illustrating and pricing cast bronze memorial tablets, bank signs, school tablets, letters, name plates, etc. This catalogue is a gold mine of suggestions and data for your files.

General Bronze Work

As specialists in designing and executing not only bank installations, but bronze entrances, theatre equipment, church supplies, memorial tablets—in fact anything from a threshold to a hundred thousand dollar installation of ornamental bronze, we welcome the opportunity to furnish suggestions for work that will adequately express the spirit of a designed environment. Our various catalogues will tell you more. Our Engineering Service Department will be glad to co-operate with you and design in detail any specific item you have in mind.



Bremen Bank, St. Louis, Mo.

Sussex & Merchants National Bank, Newton, N. J.

E. F. Albee Theatre, Cincinnati, Ohio

OREGON BRASS WORKS

Manufacturers of Bronze Drinking Fountains

Second and Everett Streets
PORTLAND, ORE.

Bronze Drinking Fountains

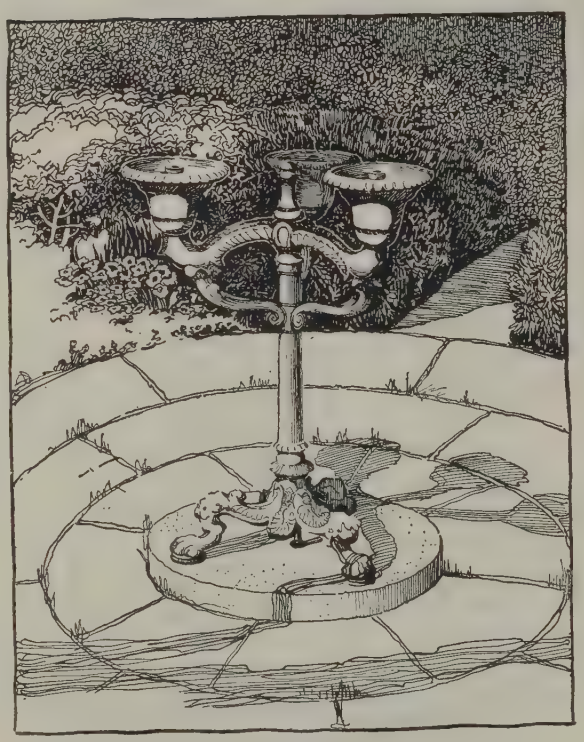
We produce the very finest bronze fountains at from one-third to one-half the normal cost of manufacturing a single fountain of special design.

This saving is effected by manufacturing in quantities, and by thus eliminating the modeling and pattern work (amounting to from one-half to two-thirds of the total cost) necessary in producing fountains each of different design.

It is thereby possible to work out the mechanical design and to improve patterns to give more satisfactory results when a design is being reproduced.

Materials

Only the best statuary bronze or yellow brass castings and brass pipe are used. No iron or steel is used. Castings are made from hand chased patterns to insure fine detail. All coloring is done by chemical processes.



Series P
Design 120

Finish

All standard hardware finishes can be matched. Sample of finish required should be furnished if possible.

Special Designs

Through our experience in specializing in the manufacture of fountains, we are in the best position to execute orders for fountains of special design.

Installation

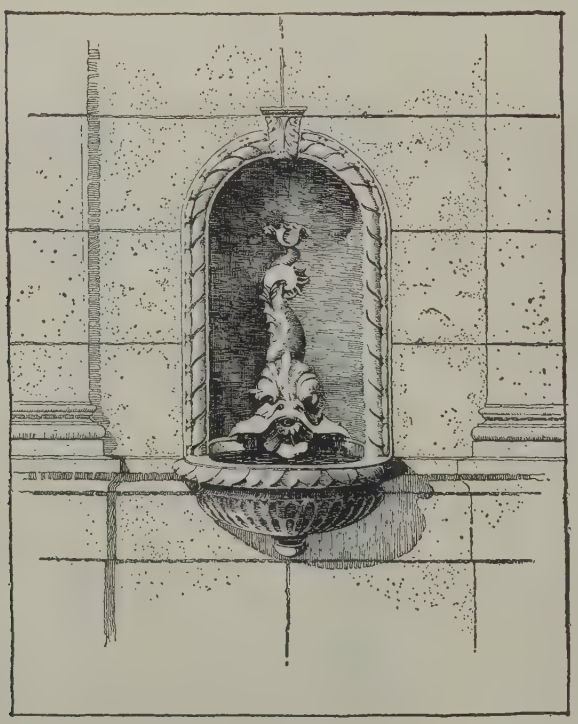
All fountains are furnished with bolts for fastening and with brass pipe to extend below the floor. Installation should be done by the plumber.

Guarantee

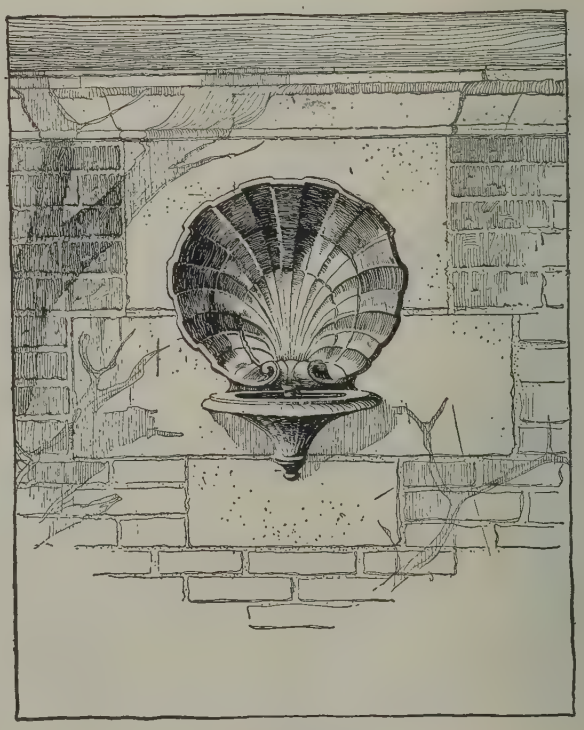
Our fountains are guaranteed in every respect. If not entirely satisfactory, they may be returned at our expense.

Prices

Quotations given upon application. Specify finish desired when requesting quotation.



Series W
Design 255



Series W
Design 205

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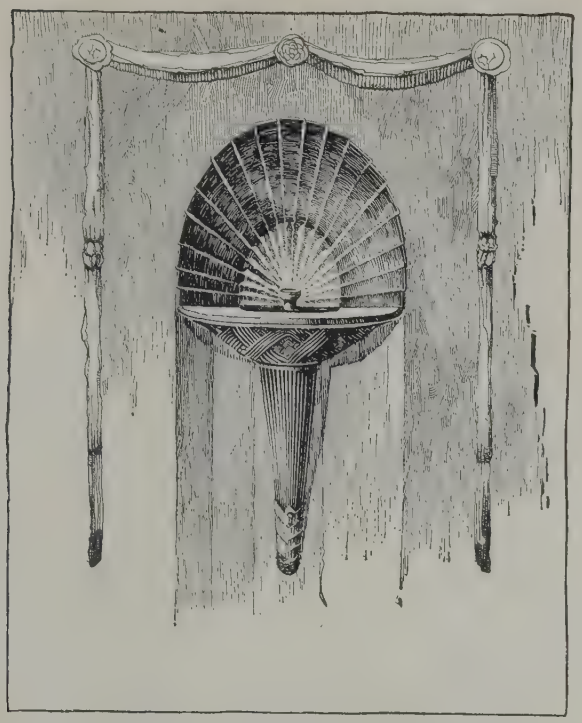
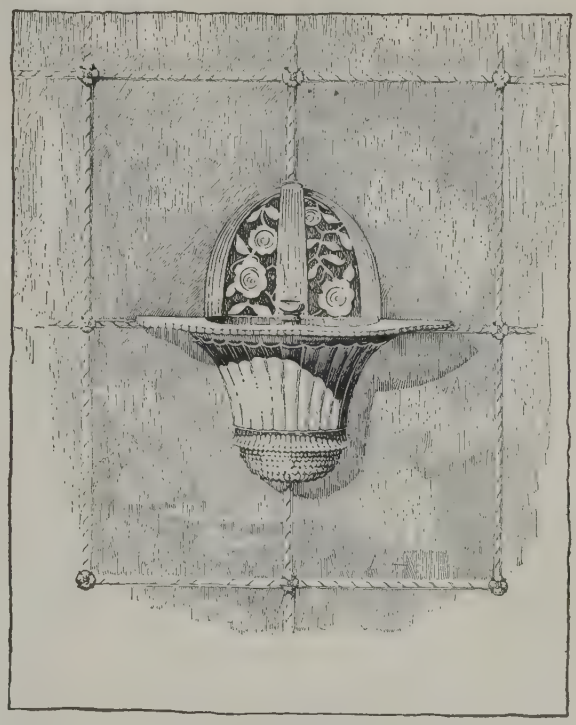
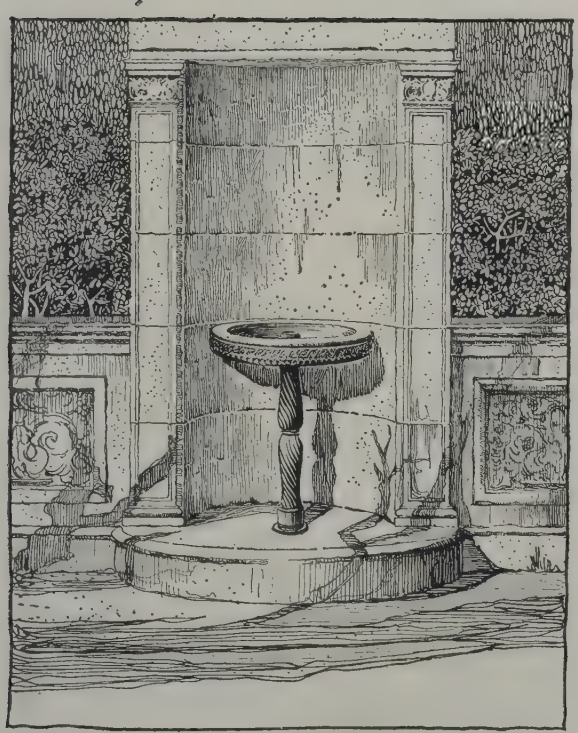


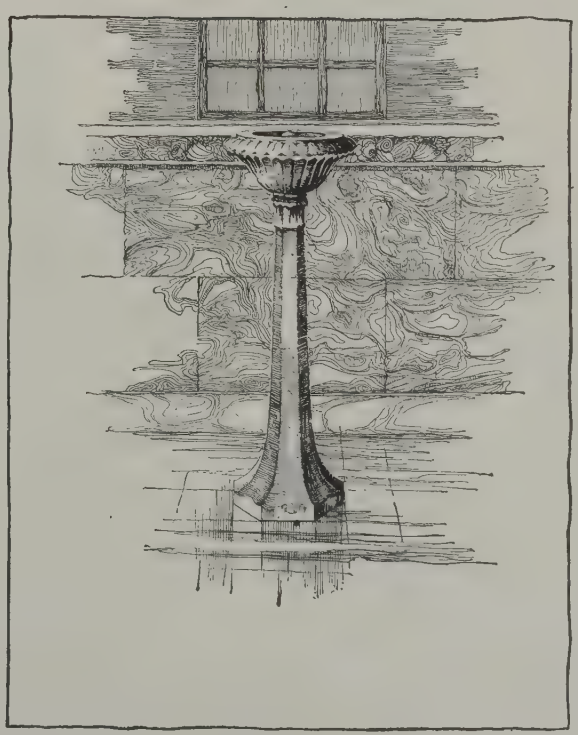
Series W
Design 125



Series W
Design 115



Series P
Design 170



Series P
Design 160

OSTERKAMP-MEAD CORPORATION

Artistic Sculptural Castings and Fine Wrought Metal Work
International Foundry Service

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Products

Sculptural and Architectural Castings, Wrought and Drawn Metal Work, including executions in bronze, all non-ferrous alloys and other metals.

Also Electrolytic Impressions (Galvanoplastic); Ecclesiastical Fixtures in original designs and authentic reproductions of European Craftsmanship.

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We have the largest collection, available in the United States, of sculptured models and bronze replicas, enabling us to supply from stock or to order—at the same minimum cost.

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Our Service Department will execute from your drawings through all stages to the finished product. Co-operation is given in working up designs, in part or in whole, also in supervising sculptural commissions and in experimental and research work.

Bronze and Silver Statuette—The Greek Dance
By C. Paul Jennewein

Memorial to the 7th Regiment, N. Y., 107th United States Infantry

PENN BRASS & BRONZE WORKS

HENRY J. LANDOLT'S SONS

Manufacturers of Architectural Brass and Bronze Work

105-117 Dobbin Street, BROOKLYN, N. Y.

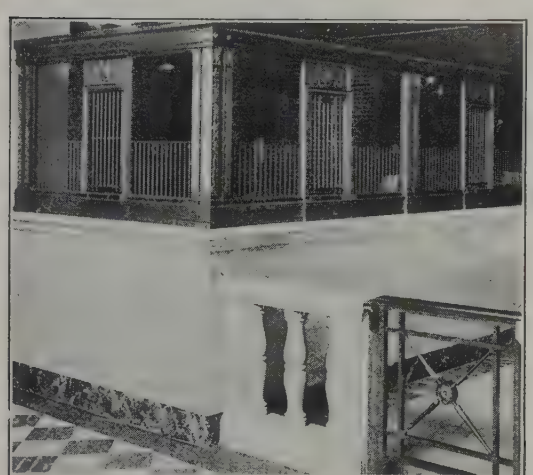
Products

ORNAMENTAL BRONZE and BRASS WORK of every description, for private and public buildings:

Doors, Entrances, Balustrades, Newels, Stair Rails, Interlocking Windows, Grilles, Theater Railings, etc.; Cast Bronze Letters, Numerals and Signs for buildings; Gates, Folding Gates, Marquises, Mausoleum Doors and Supplies, Bank Enclosures, Counter Screens, Check Desks, Elevator Enclosures, Fences, Balconies, Lamp Standards, Brackets, Tablets, Push Plates, Kick Plates, Brass and Bronze Saddles, Door and Window Guards, Special Hardware, Special Castings (all Alloys), etc.

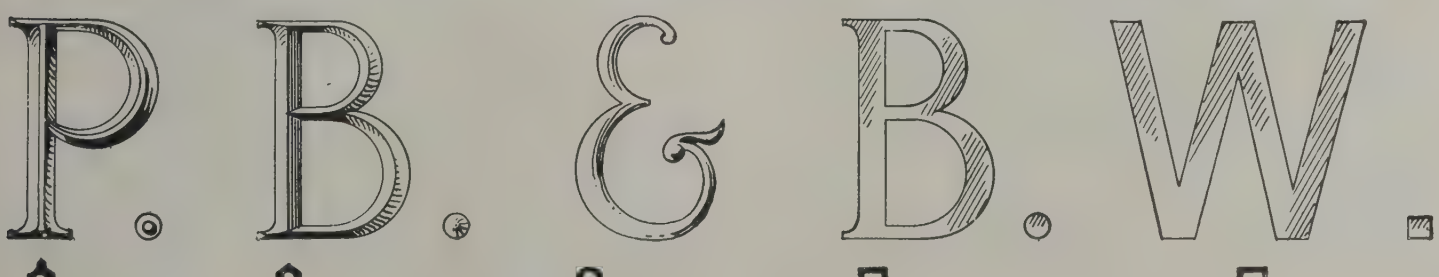
Entrance, Ridgewood Branch, Manufacturers Trust Company, Brooklyn, N. Y.
A. F. GILBERT, Architect

Bronze Front, Windows and Entrances
CARMICHAEL & MILLSPAUGH CO., Architects
E. ELFORD & SON, Builders



Cage, The Bank of United States, Fifth Avenue and 44th Street, New York, N. Y.
CHAS. L. CALHOUN, Architect

Tablet for City Hall Annex, Newark, N. J.
FRANK GRAD, Architect



Cast Bronze Letters

All sizes; made from architects' details and also from stock patterns. Cast bronze name plates, signs and tablets

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SINCE 1887

Manufacturers Ornamental Iron Work and Building Specialties

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Ornamental Cast Iron, Wrought Iron and Light Steel Work for building construction, manufactured to architect's designs; and Standard Iron Building Specialties.

Territory

Location in the heart of the industrial South, with raw materials at hand and excellent railroad facilities, enables us to give quick and competent service throughout the Southern States.

Subcontracts

Much of our work, such as that shown in illustrations, is furnished under contracts covering the furnishing and installing complete in buildings of all ornamental and miscellaneous iron work called for by architects' plans and specifications.

Facilities

Plant consists of modeling and pattern shops, foundry, machine and fitting shops and forge shop, all conveniently arranged and modernly equipped for the manufacture of building iron work and devoted exclusively to this product.

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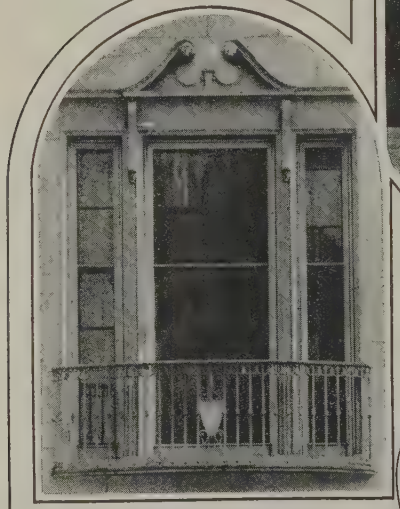

WINDOW TRIM

MARQUEE

SHOP FRONTS

ARCHITECTS
HOLABIRD & ROCHE
CHICAGO, ILL.

CONTRACTORS
GEO. A. FULLER COMPANY
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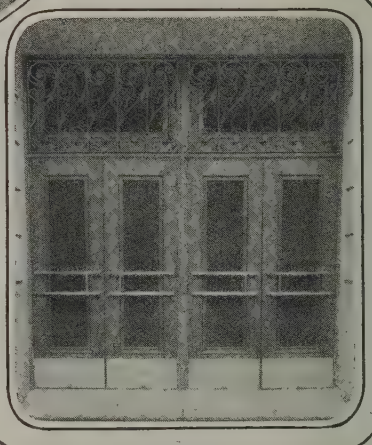

DOORWAY

Organization

From management to field erectors our organization is made up of men of long experience in this line of activity, and trained to faithful execution of design and intelligent co-operation with architects, contractors and other trades toward the correct completion of buildings.

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Are made up on subcontract work from architects' complete plans and specifications.

Incorporating stock patterns and standardized construction where economy of cost has to be considered are cheerfully furnished to architects, and consultation for this purpose is invited.

ESTABLISHED 1910

RELIANCE FIREPROOF DOOR CO.

Architectural Ornamental Bronze

73 to 103 Dobbin Street and 80 to 110 Banker Street
BROOKLYN, N. Y.

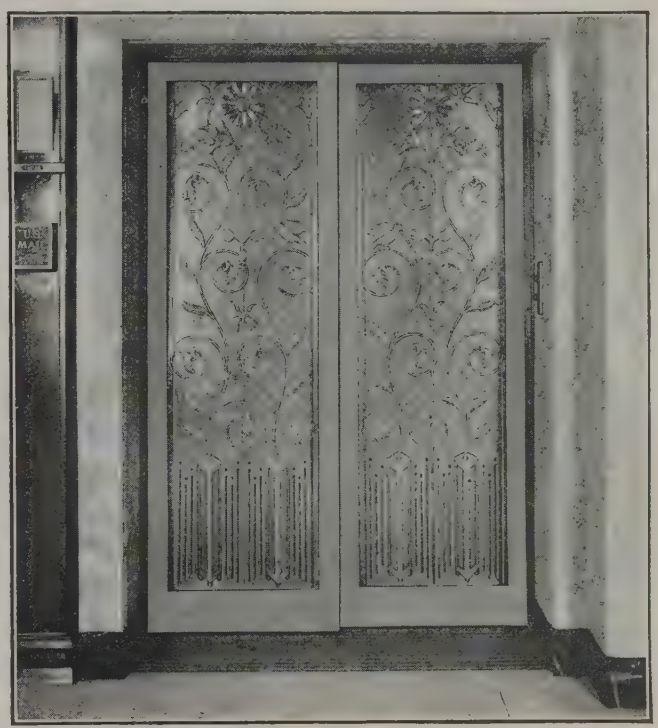
For Representatives, see page A980
For Metal Doors, etc., see pages A980-982

Architectural Bronze Products

We have ample facilities to produce all items of architectural and ornamental bronze work required in the building and allied industries. We have a sales and engineering force competent to handle work in this line of any scope, and our products are built by a force of skilled artisans. Our castings are produced in French sand from highly chased metal patterns or in the lost wax process, reproducing in minute detail ornament from models approved by architects; and we use drawn and extruded sections of heavy gauges only in the working of our architectural bronze products.

We have developed over a period of years types of windows, doors and store fronts, which we manufacture in heavy gauges of bronze and extruded metal and we specialize in the production of the following items:

"Reliance" Extruded Double Hung Windows
"Reliance" Extruded Casement Windows
"Reliance" Complete Elevator Enclosure Units
"Reliance" Extruded Doors and Frames
"Reliance" Extruded Store Fronts



Elevator Doors

Partial List of Installations

Building	Architect
Harriman Building, New York, N. Y.	Cross & Cross
1500 Walnut Street Building, Philadelphia, Pa.	Ritter & Shay
Fox Theatre Building, Brooklyn, N. Y.	C. Howard Crane
Fox Theatre Building, Detroit, Mich.	C. Howard Crane
Chanin Building, New York, N. Y.	Sloan & Robertson
Public Ledger Building, Philadelphia, Pa.	H. Trumbauer
Free Public Library, Philadelphia, Pa.	H. Trumbauer
J. B. Duke Residence, Newport News, R. I.	H. Trumbauer
Manufacturers Trust Co., 407 Broadway, New York, N. Y.	A. F. Gilbert
Manufacturers Trust Co., 774 Broadway, Brooklyn, N. Y.	E. A. Klein
Boardwalk National Bank, Atlantic City, N. J.	Lockwood, Greene & Co.
Park Royal Hotel, 73rd Street, New York, N. Y.	Geo. F. Pelham
Beekman Apartment, 561 Park Avenue, New York, N. Y.	Geo. F. Pelham
Overbrook Sunday School, Overbrook, Pa.	Simon & Simon

Entrance

Stair Rails and Balustrade

Reliance Ornamental Bronze Work, Harriman Building, 37 Broadway, New York, N. Y.

F. P. SMITH WIRE AND IRON WORKS

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Manufacturers of Ornamental Iron and Bronze Work

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GENERAL OFFICES, SHOPS, FOUNDRY AND WAREHOUSE: CLYBOURN, FULLERTON AND ASHLAND AVENUES, AND CHESTER STREET—TELEPHONE, LINCOLN 7000

Private Exchange all Departments

Products

Manufacturers of ORNAMENTAL IRON, BRONZE, BRASS and WIRE WORK of High Grade:

Area Gratings
Balustrades
Bars: Corner Post, Transom
Castings: Iron, Brass, Bronze
Cemetery Vault Doors, Tablets (Bronze)
Coalhole Covers
Doors: Entrance, Sidewalk
Elevator Enclosures, Cabs, Gates, Doors
Entrances: Iron and Bronze
Fences: Iron, Wire, Wire Netting
Fire Escapes
Flagpoles: Steel
Fronts: Store, Building
Gates: Iron, Wire and Folding
Grille Work
Guards: Iron and Wire—Window, Stall, Wheel, Machinery, Skylight
Hangers: Joist, Wall, I-beam
Hitching Posts
Jail Work
Lamp Brackets
Lamps: Iron
Lawn Furniture, Settees, Chairs, etc.
Lockers: Wire, Iron
Marquises
Metal Ladders
Partitions, Wire
Pipe Railing
Porte-cochères
Post Caps
Railings: Bank, Theater, Iron, Brass, Wire, Pipe
Roof Crestings
Shutters
Stable Fixtures: Hay Racks, Feed Boxes, Water Troughs, Stall Posts, Gutters, Cesspools, Harness Brackets, Box Stall Hinges and Latches, Floors and Pans, Oats Cleaners
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Stairs, Pre-Cast Concrete Tread and Riser, Licensed under Babcock-Davis Co.'s Patent
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Vases, Iron
Wall Ties
Weathervanes
Wickets
Wire: Lath, Signs, Netting
Wire Cloth: Steel, Galvanized Iron, Brass, Copper

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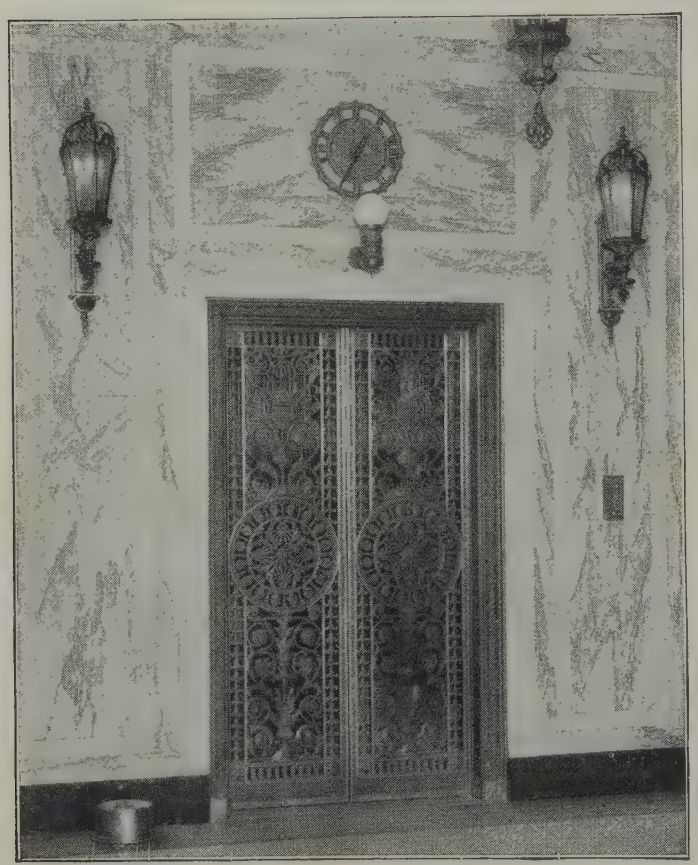
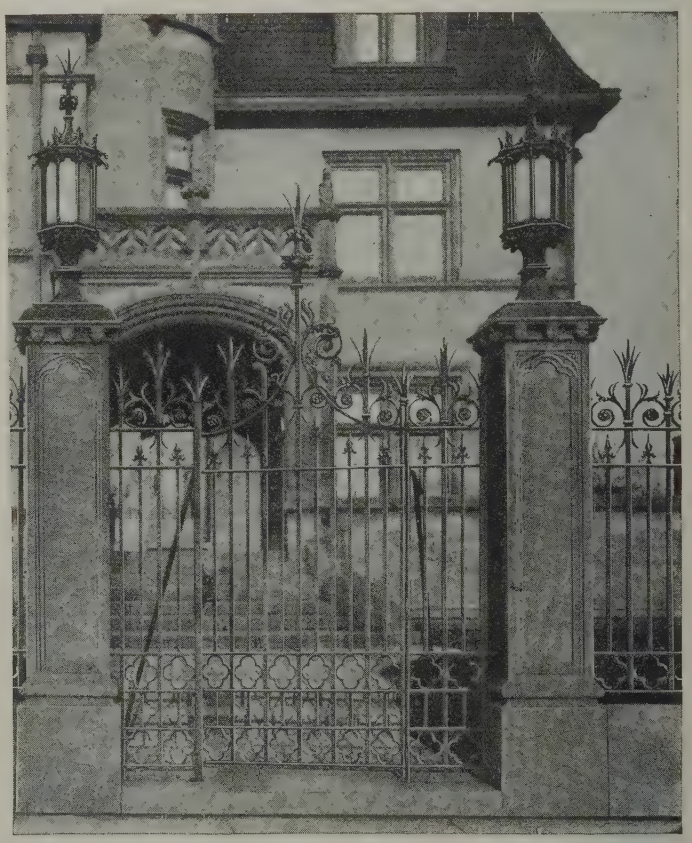


Typical First Floor Bronze Elevator Enclosure, Kahl Office and Theater Building, Davenport, Iowa
C. W. and GEO. L. RAPP, Architects



Fence, Gates and Lamps, John R. Thompson Residence, Chicago, Ill.
H. R. WILSON, Architect

Continued on next page

References

Following is a partial list of buildings in which representative installations of our work have been made:

BUILDING, LOCATION AND ARCHITECT

Monroe Building, Chicago, Ill., Holabird & Roche
"Chicago" Building, Chicago, Ill., Holabird & Roche
Advertising Building, Chicago, Ill., W. C. Zimmerman
Borland Building, Chicago, Ill., Charles S. Frost
Webster Building, Chicago, Ill., A. S. Alschuler
Farmers' Security Bank Building, South Bend, Ind., Perkins, Fellows & Hamilton
McKay Building, Chicago, Ill., Huehl, Schmidt & Holmes
Sharpe Building, Kansas City, Mo., H. R. Wilson
Overland Stores Building, Kansas City, Mo., Mills, Rhines, Bellman & Nordhoff
Stewart Building, Houston, Tex., Jonas & Rue
Cosden Building, Tulsa, Okla., Henry F. Hoit
Rand-McNally Co. Building, Chicago, Ill., Holabird & Roche
Harper Memorial Building, University of Chicago, Chicago, Ill., Shepley, Rutan & Coolidge
Sisters of Providence, College and Music Building, St. Mary's, Ind., D. A. Bohlen & Son
Seminary Building, Archdiocese of Chicago, Z. T. Davis
U. S. Post Office Buildings (over 45), James Knox Taylor
U. S. Naval Training Station (15 buildings), Lake Bluff, Ill., Jarvis Hunt
City of Chicago Police Stations, Fire Engine Houses, Chicago, Ill., Chas. W. Kallal
School Buildings—A large number for Board of Education, Chicago, Ill., D. H. Perkins, A. F. Hussander and John C. Christensen
Iowa State College, Central Building, Ames, Iowa, Proudfoot & Bird
Y. W. C. A. and Y. M. C. A., Nashville, Tenn., Shattuck & Hussey
Y. M. C. A. College Building, Chicago, Ill., Emery S. Hall
Henry Ford Hospital, Detroit, Mich., Albert Wood
Chicago Memorial Hospital, Chicago, Ill., Frank D. Chase Co.
Commonwealth-Edison Co. (6 buildings), Chicago, Ill. Shepley, Rutan & Coolidge and Holabird & Roche.
Montgomery Ward & Co., Chicago, Ill., Richard E. Schmidt, Garden & Martin
Popular Mechanics Company Building, Chicago, Ill., Marshall & Fox
Masonic Temple, Davenport, Iowa, Clausen & Kruse
Kahl Building, Davenport, Iowa, Rapp & Rapp
Chas. Lange Building, Chicago, Ill., Clarence Hatzfeld
Hotel Sherman, Chicago, Ill., Holabird & Roche
Severin Hotel, Indianapolis, Ind., Vonnegut & Bohne
Blackhawk Hotel, Davenport, Iowa, Temple & Burrows
Mayflower Hotel Building, Washington, D. C., Warren & Wetmore
Milwaukee Journal Building, Milwaukee, Wis., Frank D. Chase Co.
United Light & Power Building, Davenport, Iowa, Temple & Burrows
Chicago Produce Mart, Chicago, Ill., Fugard & Knapp
Crane Co. Building, Chicago, Ill., Graham, Anderson, Probst & White
Margarita Club, Evanston, Ill., Morrison & Wallace
Chicago Athletic Association, Chicago, Ill., Schmidt, Garden & Erickson
Blackstone Hotel and Theater, Chicago, Ill., Marshall & Fox
Illinois Theater, Chicago, Ill., Wilson & Marshall
Shubert Theater, St. Paul, Minn., Marshall & Fox
Hippodrome Building, Cleveland, Ohio, Knox & Elliott
Woods Theater and Office Building, Chicago, Ill., Marshall & Fox
State & Lake Theater, Chicago, Ill., C. W. & Geo. L. Rapp
Chicago National League Ball Park, Chicago, Ill., Davis & Davis
James Theater and Office Building, Columbus, Ohio, C. Howard Crane
Keith's Theater, Cleveland, Ohio, C. W. & Geo. L. Rapp
Selwyn-Harris Theater Buildings, Chicago, Ill., C. Howard Crane and Kenneth Franzheim
Schueneman's Recreation Building, Chicago, Ill., Michaelson & Rognstad
Shea's Theater, Buffalo, N. Y., C. W. and Geo. L. Rapp
Coronado Theatre, Rockford, Ill., Frederic J. Klein
National Theaters Corp., Paradise Theater, Chicago, Ill., John Eberson
Marks Bros., Granada and Marbro Theaters, Chicago, Ill., Levy & Klein
The Fair (Department Store), Chicago, Ill., Mundie & Jensen
American Insurance Union Building, Columbus, Ohio, C. Howard Crane

Canopies and Fire Escape for Gessler Building, Chicago, Ill.

Main Stairs, 3rd to 15th Floors, "Chicago" Building, Chicago, Ill.
HOLABIRD & ROCHE, Architects

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BOSTON, MASS.

WORKS: CHELSEA, MASS.

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Non-climable Chain Link Fences and Gates.
Iron and Wire Fences.
Garden Furniture.
Weather Vanes, Silhouette and Copper.

Also Bank Guards, Builders Iron Work, Catch-basins, Cemetery Gates, Cesspools, Cow Barn Fittings, Fire Escapes, Folding Gates, Garage and Stable Fittings, Garden Ornaments, Sundials, Grilles, Iron Stairs, Spiral Stairs, Manholes, Marquises, Ornamental Balconies, Pipe Railings, Porch and Stair Railings, Roadway Grates, Sidewalk Doors, Steel Doors, Tennis Court Enclosures, Window Guards.

Non-climable Chain Link Fences and Gates

We manufacture all types of non-climable fences and gates of the chain link type. Quotations and further information will be submitted on request.

Iron and Wire Fences

Our iron and wire fences and gates are made in all types and styles and are applicable for all uses, such as factory enclosures, residence purposes, lawns, courts, stairs, porches, cemeteries, fields, farms, etc.

Garden Furniture

Our garden furniture is designed along graceful lines which make our patterns distinctive and attractive. Although ornamental, it is substantially constructed to stand the outdoor weather of any climate. It is all very nicely finished in a soft green but any color requirements can be furnished at a nominal extra cost.

No. 540 S—Colonial arm chair, standard size.
No. 540½S—large size.
No. 541 S—Colonial side chair, standard size.
No. 541½S—large size.
No. 542 S—Colonial bench, length 48 in.
No. 542½S—length 56 in.
No. 543 S—Colonial bench, circular pattern, length 56 in.
No. 543½S—length 72 in.
No. 544 S—Colonial table, four legs, 30-in. diameter.
No. 545 S—three legs, 25-in. diameter.
No. 601 S—Colonial table, 20x36 in.

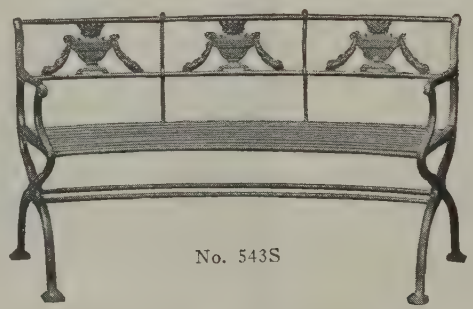
Numerous other patterns and styles, including side benches, fern tables, and glass top tables are available.

French Garden Furniture—We also carry a line of imported French garden furniture.

No. 581S—Lawn table, 36-in. diameter.
No. 605S—42-in. diameter.
No. 606S—48-in. diameter.
No. 577S—Side chair with spring seat.
No. 579S—Arm chair with spring seat.

Old Southern (1820) Garden Furniture—No. 558S as shown is 36-in. length. Single chair and table to match can be furnished.

No. 544S



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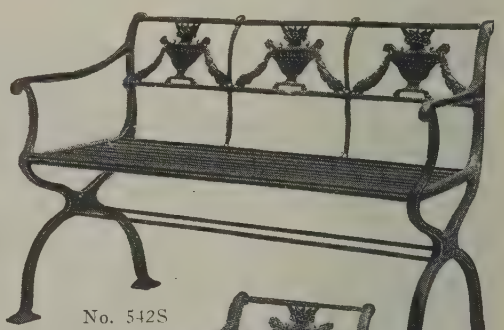

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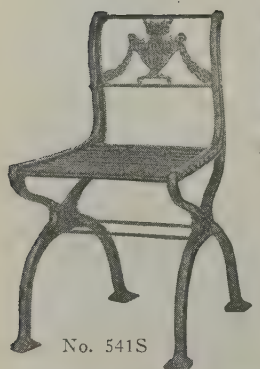

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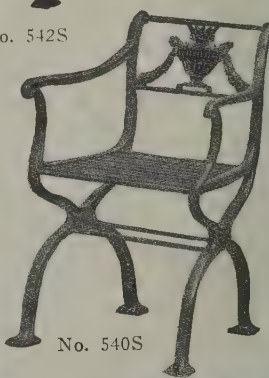
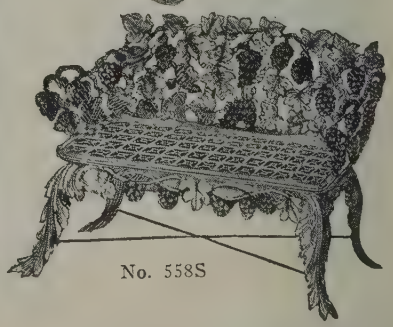


No. 540S

No. 601S

Imported French Garden Furniture



No. 558S

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SNOW WEATHER VANES
SILHOUETTE AND COPPER

Plate 200W

Plate 203W

Plate 206W

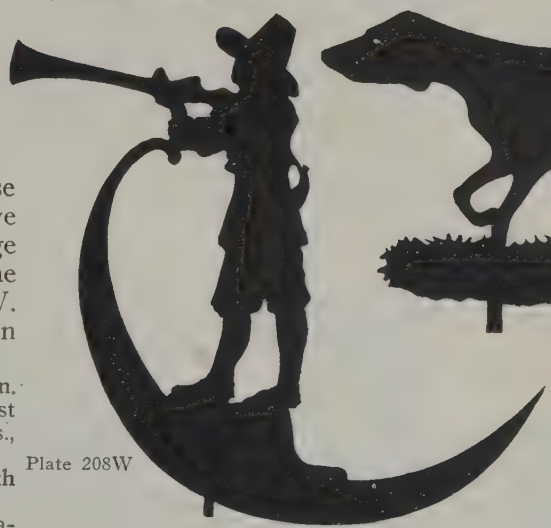


Plate 208W

Plate 209W

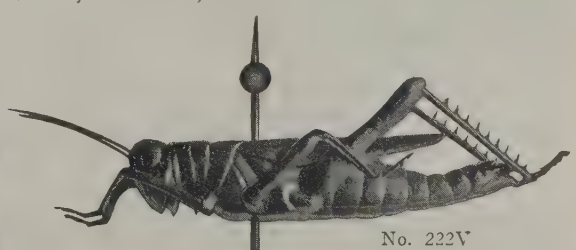
Silhouette Weather Vanes—These weather vanes are of unusual and attractive designs and are used for the garden, garage and stable. All vanes are furnished with the letters complete as shown in Plate 200W. Sails on the ship designs can be finished in white if desired.

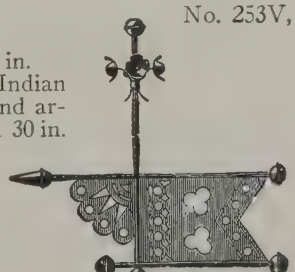
Plate 200W—"Full Rigged Ship," length 28 in.
Plate 203W—"Charles W. Morgan," the last whaler sailing out of New Bedford, Mass., length 32 in.
Plate 204W—"Mediterranean Galley," length 33 in.
Plate 206W—"Galleon," in the time of Elizabeth (1670), length 30 in.
Plate 207W—"Boy with Rabbit," length 29 in.
Plate 208W—"Colonial," height 30 in.
Plate 209W—"Setter," length 30 in.
Plate 210W—"Rooster," height 24 in.
Plate 211W—"Automobile," length 30 in.
Plate 212W—"English Rooster," height 24 in.

Copper Weather Vanes—These vanes are made of copper and gilded with pure golf leaf. All vanes are furnished with letters complete as shown in Plate 251V.

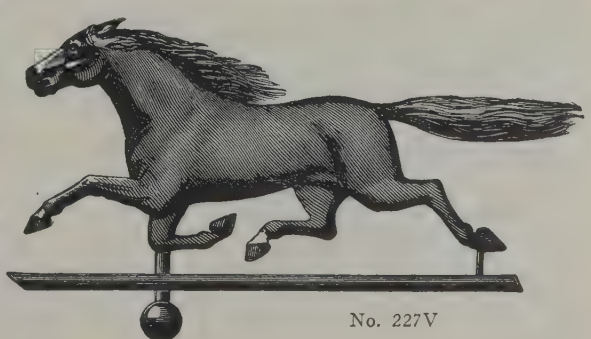
No. 220V—"Ship," length 34 in.
No. 221V—"Airplane," length 42 in.
No. 222V—"Grasshopper" (1565), length 42 in.
No. 223V—"Indian Chief" with bow and arrow (1720), length 30 in.
No. 224V—"Wyandotte," size 19x24 in.
No. 225V—"Deer" without bush, length 31 in.
No. 226V—"Deer" with bush, length 31 in.
No. 227V—"Smuggler" (horse), length 25 in.; No. 228V, 32 in.; No. 229V, 42 in.; No. 230V, 48 in.
No. 231V—"Dog," length 34 in.
No. 232V—"Codfish," length 31 in.; No. 233V, 36 in.; No. 234V, 48 in.
No. 235V—"Pickerel," length 36 in.; No. 236V, 48 in.
No. 237V—"Arrow," length 18 in.; No. 238V, 24 in.; No. 239V, 30 in.; No. 240V, 36 in.; No. 241V, 42 in.; No. 242V, 48 in.; No. 243V, 60 in.
No. 244V—"Eagle," spread 15 in.; No. 245V, 18 in.; No. 246V, 24 in.; No. 247V, 30 in.; No. 248V, 36 in.; No. 249V, 42 in.; No. 250V, 48 in.
No. 251V—"Banneret," length 30 in.; No. 252V, 36 in.; No. 253V, 42 in.; No. 254V, 48 in.

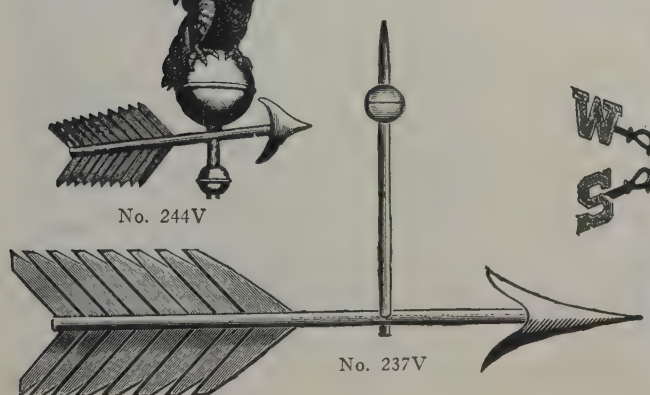
No. 244V


No. 222V



No. 251V


No. 227V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Ornamental and Architectural Iron Work

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PHILADELPHIA, PA., Sales Office and Studios, 1700 Walnut Street
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Products

Ornamental and Architectural Metal Work for buildings, including Stairs, Store Fronts, Entrances, Elevator Enclosures, Window Frames, Marquises, Railings, Fences and Grilles.

For Exterior Lighting Fixtures of Cast Iron and Bronze, see page C3539.

Facilities

Complete drafting and engineering departments. Designing studio.

Pattern shops.

Two foundries. Extensive machine and fitting shops.

Estimates promptly furnished from architects' plans, and drawings submitted for unusual needs.

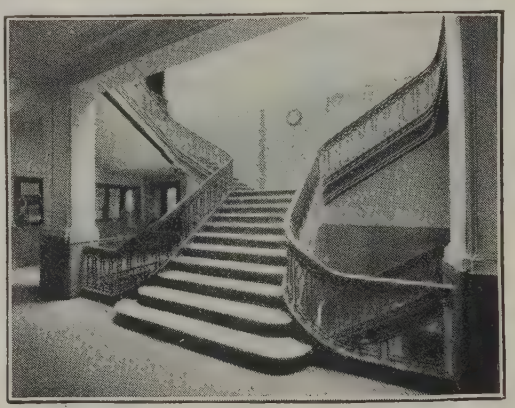
The Smyser-Royer Co. issues a "Booklet S" on Spiral Stairs which will be sent on request.

TRADE-MARK

References

A few of the many large buildings for which we have furnished the ornamental iron work:

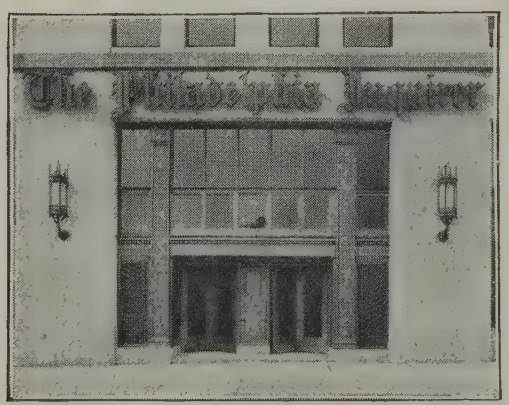
Building and Location	Architect
Delaware River Bridge, Philadelphia, Pa.	Paul P. Cret
Elverson Building, Philadelphia, Pa.	Rankin, Kellogg & Crane
John Hancock Building, Boston, Mass.	Parker, Thomas & Rice
Public Ledger Building, Philadelphia, Pa.	Frank C. Roberts
State Penitentiary, Rockview, Pa.	John T. Windrim
Integrity Trust Co., Philadelphia, Pa.	Paul P. Cret
Fidelity Mutual Life Insurance Building, Philadelphia, Pa.	Zantzinger, Borie & Medary
Second Church of Christ, Scientist, Germantown, Pa.	Day & Klauder
Provident Trust Company, Philadelphia, Pa.	Rankin & Kellogg



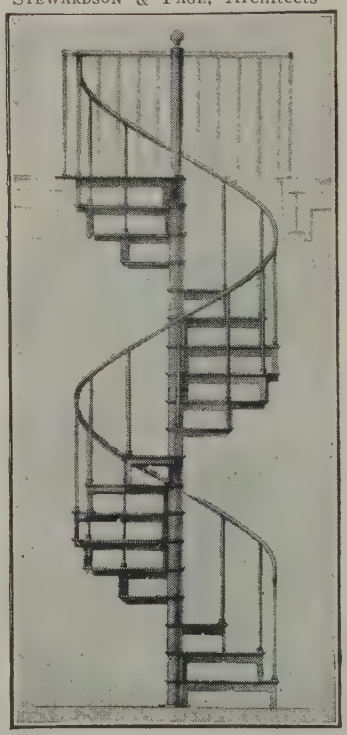
Cast Iron Main Stairs, Bennett Hall, University of Pennsylvania, Philadelphia
Stewardson & Page, Architects

Wrought Iron Organ Screen, Second Church of Christ, Scientist, Philadelphia, Pa.
Day & Klauder, Architects

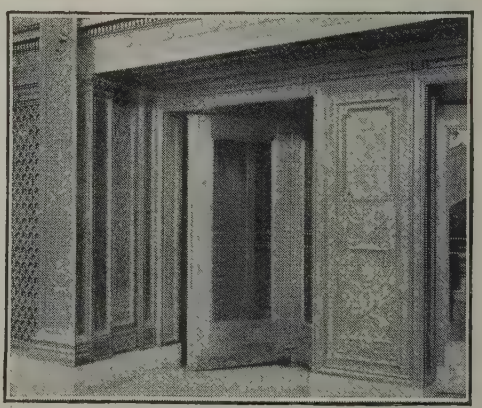
Cast Iron Main Entrance, Independence Indemnity Insurance Co., Philadelphia, Pa.
Ritter & Shay, Architects



Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
Rankin, Kellogg & Crane, Architects



Smyser-Royer No. 300 Stock Spiral Stairs



Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
Rankin, Kellogg & Crane, Architects

SUPERB BRONZE & IRON CO., INC.

Designers and Manufacturers of Artistic Metal Work

3064-3088 Atlantic Avenue, 2-26 Berriman Street, 239-261 Shepherd Avenue

BROOKLYN, N. Y.

BRANCH OFFICES

WASHINGTON, D. C.	SALT LAKE CITY, UTAH	DENVER, COLO.	CLEVELAND, OHIO	SAN FRANCISCO, CAL
HOUSTON, TEX.	PITTSBURGH, PA.	JAMESTOWN, N. Y.	COLUMBUS, OHIO	PHILADELPHIA, PA.
CHARLOTTE, N. C.	DALLAS, TEX.	BOSTON, MASS.	DETROIT, MICH.	NEW ORLEANS, LA.
ST. LOUIS, MO.	CHICAGO, ILL.	NEWARK, N. J.	BALTIMORE, MD.	

Products

ARCHITECTURAL BRONZE, BRASS, MONEL METAL, GERMAN SILVER and Allied Metals for Banks, Mausoleums, Theaters, Monumental and Memorial Buildings.

Service and Territory

We have a staff of experienced designers and sculptors who are ready at all times to co-operate either in carrying out your suggestions or in preparing original designs.

We are prepared to execute contracts in any section of the United States and elsewhere.

Facilities

We have a modern plant in every respect covering one and a quarter acres. It is fully equipped and organized for the manufacture of ornamental metal work, exclusively. Every known device that makes for mechanical perfection has been installed.

Two of our departments are worthy of special mention—the foundry and the finishing department. Our foundry is equipped to handle the most difficult castings in the false core and lost wax process. Our finishing department is manned with a staff of *specially* trained craftsmen who take particular pride in finishing work in a highly artistic manner and in strict accordance with specifications.

Bank Interior, Federal Trust Co., Newark, N. J.
DENNISON & HIRONS and GEO. E. JONES, Architects

Partial List of the Many Buildings for Which We Executed the Ornamental Bronze Work and Their Architects

Bank Buildings

Security Trust Company, Detroit, Mich.	Albert Kahn, Inc.
Aurora National Bank, Aurora, Ill.	Weary & Alford Co.
Mechanics & Metals National Bank, W. 57th Street, New York, N. Y.	
Columbus Branch, New York, N. Y.	Delano & Aldrich
National Bank of Commerce, 269 Madison Avenue, New York, N. Y.	York & Sawyer
National Tradesmen's Bank & Trust Co., New Haven, Conn.	Alfred Hopkins
Lehigh Valley National Bank, Bethlehem, Pa.	Ritter & Shay
U. S. Manufacturing & Trust Co., 47th Street and Lexington Avenue, New York, N. Y.	Morgan French & Co.
First National Bank, Palmerton, Pa.	E. F. Strassle
American State Bank & Trust Co., Pittsburgh, Pa.	H. Hornbostel and Eric Fisher Wood
Bank of New York & Trust Co., New York, N. Y.	Benj. W. Morris
Federal Reserve Bank, Baltimore, Md.	Parker, Thomas & Rice
Federal Reserve Bank, New Orleans, La.	Rathbone De Buys
Glen Cove Trust Co., Glen Cove, N. Y.	Shreve & Lamb
Manufacturers & Traders Peoples Trust Co., Buffalo, N. Y.	Halsey, McCormack & Helmer, Inc.
Jenkintown Bank & Trust Co., Jenkintown, Pa.	Horace Trumbauer

Bank Buildings (Continued)

Mercer Trust Co., Trenton, N. J.	Dietz, Pennell & Jordan
Commercial Trust Co., Jersey City, N. J. Bergen Avenue Branch, Jersey City, N. J.	Purdy & Davis
National City Bank, Long Island City, N. Y.	Walker & Gillette

Public and Private Buildings

Detroit Institute of Arts, Detroit, Mich.	Paul P. Cret and Zantzinger, Borie & Medary
Travelers Insurance Co., Hartford, Conn.	Donn Barber and McKenzie, Voorhees & Gmelin
Agricultural Insurance Building. Watertown, N. Y.	York & Sawyer
Douglas L. Elliman Building, New York, N. Y.	Cross & Cross
Masonic Temple, Detroit, Mich.	Geo. D. Mason & Co.
New Orleans Public Service Building, New Orleans, La.	Favrot & Livaudais, Ltd.
Book-Cadillac Hotel, Detroit, Mich.	Louis Kamper
Union Electric Building, St. Louis, Mo.	Albert B. Groves
Holy Redeemer Church, Detroit, Mich.	Donaldson & Meier
Bonwit-Teller Co., Philadelphia, Pa.	Clarence E. Wunder
Rockefeller Institute for Medical Research, New York, N. Y.	Coolidge, Shepley, Bulfinch & Abbott
Shedd Aquarium, Chicago, Ill.	Graham, Anderson, Probst & White

Store Fronts

Strawbridge & Clothier, Philadelphia, Pa.	Louis H. Friedland
W. B. Moses & Sons, Washington, D. C.	A. B. Mullet & Co.
Frank R. Jelleff, Washington, D. C.	A. P. Clark, Jr.
J. E. Limeburner Co., Philadelphia, Pa.	Heacock & Hokanson
Thresher Brothers, Philadelphia, Pa.	Simon & Simon
I. Miller & Son, 47 W. 34th Street, New York, N. Y.	Louis H. Friedland

Bronze Entrance Doors, Federal Reserve Bank, Baltimore, Md.
PARKER, THOMAS & RICE, Architects

THE TYLER COMPANY

Elevator Entrances and Cars

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 247 Park Avenue
CHICAGO, ILL., 310 South Michigan Avenue
DETROIT, MICH., 535 Griswold Street
BOSTON, MASS., 20 Providence Street
PHILADELPHIA, PA., 260 South Broad Street
ATLANTA, GA., 133 Luckie Street

Products

FIREPROOF ELEVATOR ENTRANCES and CARS.

Also Bronze Tablets; Bank, Office, Vault, Stair, Balcony, Altar, Veranda and Counter Railings; Stairs; Store Fronts; Marquises; Counter Screens; Lamp Standards and Brackets; Window Guards and Grilles; Porte-cocheres; Corridors; Fencing; Gates; Wickets; Signs; Electroliers; Self-closing Folding Gates; Bronze and Iron Entrance Doors; Mausoleum Doors.

TRADE-MARK

Elevator Entrances and Cars

Made of all-metal fireproof construction throughout.

Can be supplied to suit the hatchway conditions in new or old buildings.

Two-panel Front, Two-speed Doors Open, Showing Car

Furnished in a wide variety of finishes, including: electroplate, enamel bronzes, solid baked colors or grained to match any kind of wood.

Also made in solid bronze.

We build all parts entering into the construction of entrances and cars, including all hardware and mechanism, in our own factory.

This insures perfect operation and undivided responsibility.

Door Construction

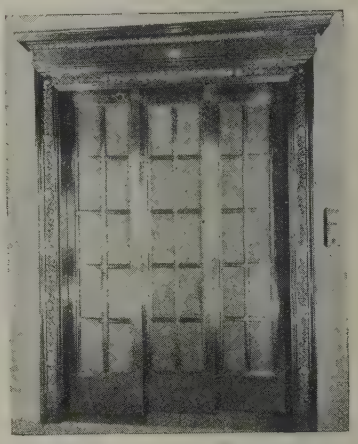
Made in single sliding, two-speed, center-opening and other types as required; capable of quiet, high speed operation.

Door panels are made of heavy gauge material, reinforced to withstand the peculiar strains and stresses to which they are subjected.

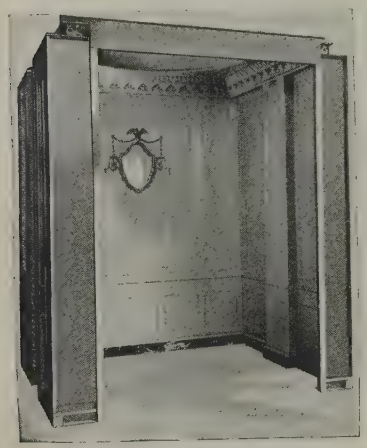
Engineering Service

The Company's engineers will gladly assist architects and owners in selecting the type of equipment best suited to any type of building. Designs and estimates will also be submitted when requested.

Two-panel Front, Center Opening Doors

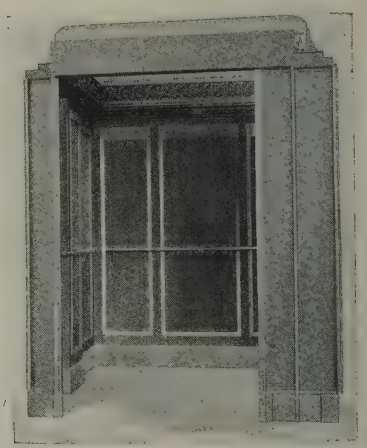


Three-panel Front, Two-speed Doors and Stationary Panel



Typical Tyler Car

Transom Treatment



Typical Tyler Car

ESTABLISHED 1890

VILSACK, MARTIN CO., INC.

INCORPORATED 1907

Manufacturers of Ornamental Iron, Bronze and Wire Work

3222-3228 Penn Avenue, PITTSBURGH, PA.

Products

ORNAMENTAL and MISCELLANEOUS IRON and WIRE WORK, consisting of Iron Stairs, Balcony and Porch Railings, Grilles, Wire and Iron Window Guards, Entrance Doors and Gates, Fire Escapes, Pipe Railings, Area Gratings, Steel Cellar Doors, Bridge Railings, Iron Fence and Gates, Tree Boxes, Flower Box Balconies, Iron Brackets and Builders' Iron Work.

Fine Craftsmanship

We also specialize in Hand Forged and Hammered Work in Genuine Wrought Iron for fine residences and other buildings, such as Interior Gates, Grilles, Railings, Door Pulls, Hinges, Metal Stands, Fireplaces, Andirons, Fire Tools, Candlesticks, Fire Screens, Stair Rails, Wall Brackets, Chandeliers, Alms Boxes, Tabernacles, Side Altar Safes, Baptistry Gates, Altar Rails, etc.

Partial List of Installations

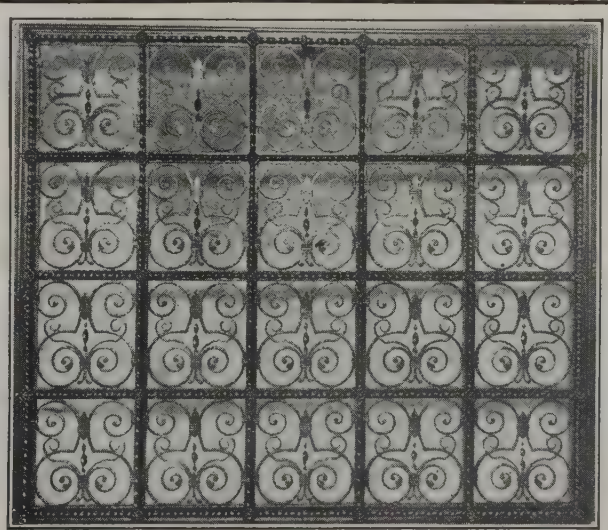
East End Savings & Trust Co.	Pittsburgh, Pa.
Logan Trust Co.	New Kensington, Pa.
Dollar Savings & Trust Co.	Pittsburgh, Pa.
Press Publishing Co.	Pittsburgh, Pa.
Pittsburgh Asylum for the Insane	Mayview, Pa.
Cambria Steel Co.	Johnstown, Pa.
Citizens General Hospital	New Kensington, Pa.
Etna High School	Etna, Pa.
Theatre for Spang Chalfant	Etna, Pa.
Stanley Theatre	Pittsburgh, Pa.
Sacred Heart Church	Pittsburgh, Pa.
W. W. Willock Residence	Sewickley, Pa.
Mother House, Sisters of Divine Providence	Pittsburgh, Pa.
Kingsley House Association	Pittsburgh, Pa.
Mother House, Benedictine Sisters	N. S. Pittsburgh, Pa.
Braddock Theatre	Braddock, Pa.
St. Paul's Presbytery Building	Pittsburgh, Pa.
Martin Building	N. S. Pittsburgh, Pa.
Swissvale High School	Swissvale, Pa.
St. Margaret's Hospital	Pittsburgh, Pa.
Enright Theatre	Pittsburgh, Pa.

Hand Wrought Letter Box

Office Display Room

Wrought Iron and Brass Tabernacle, Gold Plate Finish

Stairway with Ornamental Balustrade



Hand Wrought Ornamental Grille

JNO. WILLIAMS, INC.

Manufacturers of Ornamental Bronze and Iron Work for Buildings

TELEPHONE
CHICKERING 10300

542 West Twenty-seventh Street, NEW YORK, N. Y.

Products

ORNAMENTAL BRONZE, IRON and WIRE WORK, including:

Bronze and Iron Entrance Doors
Door and Window Grilles
Stair and Tube Railings
Lamp Standards
Bank Fittings, Screens and Enclosures
Wire Mesh Work
Elevator Enclosures
Mausoleum Doors and Fittings
Memorial Tablets
Honor Roll Tablets
Bronze Signs and Letters
Fine Bronze Castings
Statues, Figures and Portraits
Busts and Medallions
Monumental Bronze Work
Fountains and Sundials
Iron Driveway Gates
Fencing and Grille Work

No. 1

No. 2

No. 3

Illustrations

No. 1—New addition banking room, Union Dime Savings Bank, New York, N. Y., Alfred H. Taylor, Achitect.

No. 2—Bronze Tablet, erected on Stevenson Taylor Memorial Building, New York, N. Y., Renwick, Aspinwall & Guard, Architects.

No. 3—Bronze Lamp Standard Type "S." Made for United States Government.

No. 4—Sculptured Bronze Doors. Evelyn B. Longman (Mrs. Batchelder), Sculptor. Erected in Wellesley College, Wellesley, Mass.

No. 5—Wrought Iron Driveway Gates, "Christopher Mathewson Memorial," Bucknell University, Lewistown, Pa., Horace Trumbauer, Architect.

No. 6—Wrought Steel and Bronze Stair Railing. Interior of Residence, Fifth Avenue, New York, N. Y., Guy Lowell, Architect.

No. 4

No. 5

No. 6

Examples of Bronze and Iron Work Made by Jno. Williams, Inc., New York, N. Y.

ARCHITECTURAL METAL PRODUCTS, INC.

FORMERLY THE PROBERT SHEET METAL CO.

Manufacturers of "Leedor" and A.M.P. Metal Covered Doors

FACTORY AND MAIN OFFICE

COVINGTON, KY.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

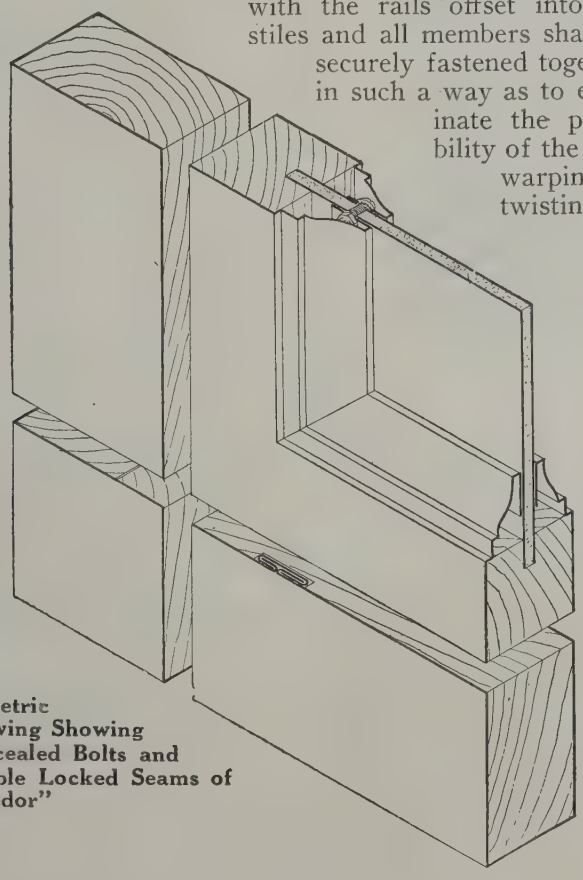
METAL COVERED DOORS, FRAMES and TRIM.
BRONZE and COPPER COVERED DOORS.
HOLLOW METAL FRAMES.
Also Elevator Doors, Metal Covered Partitions and Smoke Screens.
For Marquises, see page A854.

"Leedor" (U. S. Patent No. 1680221), an Improved Metal Covered Door

The "Leedor" is an innovation in metal covered door construction and has been pronounced one of the greatest improvements made since the inception of metal covered doors. Note illustration below showing stile covering and panel moulding formed from one piece of metal—the whole being so formed that when it is slipped over the wood core the moulding is forced tightly against the panel.

Specifications—The metal covered doors shall be "Leedors" as manufactured by the ARCHITECTURAL METAL PRODUCTS, INC., Covington, Ky.

Cores—The wood core shall be of the best grade white pine, thoroughly seasoned and free from loose knots, resin, shakes and dry rot. All core members to be run through a size moulder to insure absolute uniformity. The core members shall then be assembled with the rails offset into the stiles and all members shall be securely fastened together in such a way as to eliminate the possibility of the core warping or twisting.



Isometric Drawing Showing Concealed Bolts and Double Locked Seams of "Leedor"

Metal Coverings—The metal covering shall be of No. 26 gauge galvanized iron sheets. The stile and rail coverings shall be formed with the panel moulding as an integral part thereof. These coverings shall then be neatly fitted over the cores and the panel moulding shall be securely fastened to the panel by means of bolts concealed under the face of the moulding. No fastenings, such as nails, screws, etc., shall appear on the face of the panel moulding.

Gluing—After assembling the cores they shall be thoroughly covered with special glue before the metal covering is applied. After applying the metal covering the doors shall be put under heavy pressure, which is to be maintained for at least eight hours, so that all surfaces of the finished door will be absolutely free of buckles, blisters or waves. All finished doors to have perfectly flat and smooth surfaces and the metal covering must adhere securely and permanently to the cores.

Seams—Metal covering to be securely fastened together at the joints by flat locked seams, sweated with solder and scraped smooth to a flat even surface. In no case shall a seam in the metal occur over a joint in the core.

Painting—All finished doors to receive a shop coat of special gray primer sprayed on.

Underwriters' Label Service—The "Leedor" can be furnished either with or without the Underwriters' Label.

A.M.P. Doors

We also manufacture the A.M.P. Door which has the drawn kalamein moulding applied to the panels with nails or screws. These can be supplied when so specified, but we recommend the "Leedor" as it makes for better appearance.

Copper and Bronze Covered Doors

We are especially equipped to produce copper and bronze covered doors of the highest grade.

Intelligent and careful workmen are in charge of this department and they take pride in producing excellent products. These men are thoroughly experienced in the handling and fabricating of copper and bronze with the result that only the finest finished products are produced.

We have manufactured many entrance doors for some of the finest buildings to the complete satisfaction of the most particular architects.

Bronze doors are covered with No. 18 B.&S. gauge with extruded or hollow bronze mouldings, producing an effect similar to hollow bronze, at a much lower cost.

Hollow Metal Frames

We are producing formed steel frames and can supply them in connection with our doors when required. These can be furnished either with or without the Underwriters' labels.

ART METAL CONSTRUCTION COMPANY

Hollow Metal Doors and Trim

JAMESTOWN, N. Y.

For Branch Offices, see page C3784

TRADE-MARK

Products

HOLLOW METAL DOORS and BUILDING TRIM; ELEVATOR, STAIR and DUMBWAITER ENCLOSURES; CORRIDOR and OFFICE PARTITIONS and CABINET WORK in STEEL and BRONZE.

For Steel and Bronze Interior Equipment, see pages C3784-3787.

Facilities

Largest and most modernly equipped plants devoted to the manufacture of hollow metal products and building equipment.

Service

Main and branch offices maintain competent engineers, whose services are free to architects, engineers, and builders.

Materials

All materials used in Art Metal products are the best of their respective kinds, for their particular purposes. All steel and ingot iron are the best grades commercial furniture stock of U. S. standard gauge. All bronze is best grade commercial stock Brown and Sharpe gauge, of suitable hardness and uniform color.

Workmanship

Work is executed by craftsmen, employing the latest principles of construction and most modern methods of manufacture.

Standards

Our construction is in accordance with the "Simplified Practices" adopted by the industry and approved by the Federal Dept. of Commerce, effective August 1, 1928.

Art Metal Bronze Doors, Buckeye Savings & Loan Association, Columbus, Ohio

General Description of Steel Products

Doors and Sash—Stiles and rails are formed of No. 18 gauge stock with cold drawn panel mouldings securely keyed thereto. Stiles are provided with compressed cork inserts. Joints are fitted, reinforced, welded and dressed to produce invisible connections.

Metal panels consist of two plates of No. 20 gauge stock and ¼-inch heat retarding insulation.

Glass panels are retained by removable cold drawn moulding frames closely fitted and secured to panel mouldings by No. 6-32 countersunk oval head screws.

Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel mouldings.

Astragals are of cold drawn interlocking shapes welded to stiles.

Jambs—For openings in walls up to 7½ inches thick, jambs are formed of No. 18 gauge stock; over 7½ inches No. 16 gauge with ½-inch plain or moulded stops for regular units and ⅝-inch for Fire Underwriters' units. Jambs are secured to bucks by No. 8-32 screws.

Casings—Of No. 18 gauge cold drawn shapes, corners accurately mitered, welded and dressed to produce invisible joints. Casings are secured to jambs by concealed method.

Pressed Steel Bucks—Of No. 14 gauge stock provided with anchor retainers and plaster bonds, corners accurately fitted, reinforced and provided with interlocking screw connections. Temporary spreaders are of wood and permanent spreaders of No. 14 gauge channels 2x¾ in. with No. 12 gauge gussets secured to bottom. No. 18 gauge corrugated adjustable anchors are furnished for each 25 inches of opening height.

Bucks for walls of plaster block construction are furnished with struts when called for. Struts are of ¼x3-inch bars having No. 12 gauge flanged gusset ceiling connections.

Bucks for opening more than 3 feet 6 inches wide in tile or brick walls are furnished with arched masonry supports when called for where lintels are not provided. Supports are of 4-inch by No. 12 gauge stock welded to head at ends.

Frames—Combination buck and jamb frames are formed of No. 10, 12, 14 or 16 gauge stock. Corners accurately fitted, welded and dressed to produce invisible rigid joints. Trim members are pressed into frames or of drawn shapes applied by concealed method. Frames are provided with spreaders, anchors, struts and masonry supports as specified for bucks.

Trim Mouldings—Chair rail, staff or scribe, picture and wire mouldings are of No. 18 gauge cold drawn shapes, secured to walls by concealed method.

Bases—Constructed of No. 18 gauge stock with plain or moulded profiles, and secured to walls by concealed method. When called for, bases are fitted with bronze sanitary coves.

Window Trim—Jambs and mullions are of No. 18 gauge stock, plain or paneled, and provided with adjustable moulded stops secured by No. 6-32 countersunk oval head screws.

Stools—Of No. 16 gauge stock with returns accurately mitered, welded and dressed. Stools are secured by No. 8-32 countersunk oval head screws.

Continued on next page

Casing and Aprons—Of No. 18 gauge cold drawn shapes with corners and returns accurately mitered, welded and dressed, and secured by concealed method.

Partitions—Of sectional type with units of sizes allowing for flexibility of arrangement. Units proper are constructed of formed and drawn shapes reinforced and so assembled as to produce invisible connections.

Owing to the perfected construction, installation is simple and can be performed economically and expeditiously.

Hardware—Hollow metal work is prepared and reinforced for the proper reception of all hardware and appliances. Ordinarily the hardware is furnished under separate contract, but applied at our plant.

Bronze Work

The foregoing description covers our standard products in steel. Bronze work is executed similarly, except that materials are two gauges heavier, joints are made by riveting, screwing and brazing, and finish is produced in accordance with standard methods for durability and desired effects.

Finish

Material is thoroughly cleaned, primed and filled, followed by subsequent coats as required to produce a durable finish of color selected. Each coat is uniformly applied, baked, and sanded, with final coat rubbed to an eggshell gloss.

The following finishes are standard and grouped according to class:

STANDARD FINISHES OF ART METAL DOORS

Class	Finish	Class	Finish
No. 1	Olive "F"	No. 3 (cont.)	White Ivory Cream
No. 2	No. 29 Brewster green No. 30 Stone green No. 51 Medium green No. 52 Brown No. 53 Tan Maroon Black	No. 4	No. 36 Dark mahogany, crotch grain No. 61 Brown mahogany
No. 2½	No. 1 Dull bronze, light No. 2 Dull bronze, medium No. 3 Dull bronze, dark French gray	No. 5	No. 57 Plain oak, medium No. 58 Quartered oak, medium
No. 3	No. 36 Dark mahogany, straight grain No. 36B Light mahogany, straight grain No. 54 Gold bronze No. 55 Silver bronze	No. 6	No. 59 Light American walnut No. 60 Dark American walnut Circassian walnut
		No. 7	No. 56 Verdigris green, stippled No. R-228 Mottled green, stippled

Fire Underwriters' Requirements

The National Board of Fire Underwriters have tested and approved Art Metal products, authorizing their labels for the following situations:

Class "A," Units in Division Walls Between Separate Buildings or Sections of Buildings—Limitations: swinging type; single doors for openings not exceeding 4x7 feet, and doors in pairs not exceeding 5x7 feet, all steel with approved hardware.

"Class B," Units in Enclosures to Vertical Communications Through Buildings—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, all steel with approved hardware.

Class "C," Units in Corridor and Room Partitions—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, with or without panels of standard wire glass. Exposed area of individual lights not exceeding 1296 square inches.

Class "D," Units in Exterior Walls Subject to Severe Fire Exposure—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 6x10 feet, with or without panels of standard wire glass. Exposed area of individual lights not to exceed 720 square inches, lights not to exceed 54 inches in height.

The Work of Art Metal Today

The position of Art Metal in the field of hollow metal work is evidenced by the following list of installations:

Federal Reserve Bank, New York, N. Y., York & Sawyer, Architects; Marc Eidlitz & Sons, Inc., Contractors

Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks, Architects; John Gill & Son, Contractors

John Hancock Mutual Life Insurance Co., Boston, Mass., Parker, Thomas & Rice, Architects; L. P. Soule & Sons, Contractors

First National Bank of Boston, Boston, Mass., York & Sawyer, Architects; Stone & Webster, Contractors

Union Electric Light & Power Co., St. Louis, Mo., McClellan & Junkersfeld, Engineers & Contractors

Cunningham Piano Co., Philadelphia, Pa., Andrew J. Sauer & Co., Architects; Hughes-Foulkrod Co., Contractors

Federal Reserve Bank, Omaha, Neb., Graham, Anderson, Probst & White, Architects; Selden Breck Construction Co., Builders

New York County Courthouse, New York, N. Y., Guy Lowell, Architect; John T. Brady & Co., Contractors

Ford Hospital, Detroit, Mich., Albert Kahn, Architect; Otto Misch Co., Contractors

Selig Building, Indianapolis, Ind., Vonnegut, Bohn & Mueller, Architects; R. W. Bauman & Co., Contractors

Utica Gas & Electric Light Co., Utica, N. Y., Thos. Murray, Architect; H. R. Beebe, Inc., Contractors

Herman Kiefer Hospital, Detroit, Mich., Albert Kahn, Inc., Architect; Culvertson & Kelly, Contractors

Exchange National Bank, Pittsburgh, Pa., Weary & Alford, Architects and Contractors

Massachusetts Mutual Life Insurance Building, Springfield, Mass., Kirkham & Parlett, Architects; Turner Construction Co., Builders

Brooklyn Lodge B. P. O. E. Club House, Brooklyn, N. Y., McKim, Mead & White, Architects; Mark C. Tredennick Co., Builders

Columbia University, Students Hall, New York, N. Y., McKim, Mead & White, Architects; John Lowry, Inc., Builders

Philadelphia Public Library, Philadelphia, Pa., Horace Trumbauer, Architect; F. W. Mark Construction Co., Builders

Equitable Building, Philadelphia, Pa., A. F. Gilbert, Architect; Earl-Thompson Co., Builders

Barnett National Bank, Jacksonville, Fla., Mowbray & Uffinger, Architects; James Stewart & Co., Builders

Wilson Dam Buildings, Muscle Shoals, Ala., Hugh L. Cooper & Co., Consulting Engineers

New Madison Square Garden, New York, N. Y., Thomas W. Lamb, Architect; James Stewart & Co., Inc., Builders

Number Two Park Avenue Building, New York, N. Y., Buchman & Kahn, Architects

B. F. Keith Theater, Boston, Mass., Thomas W. Lamb, Architect

B. F. Keith Theater, Columbus, Ohio, Thomas W. Lamb, Architect

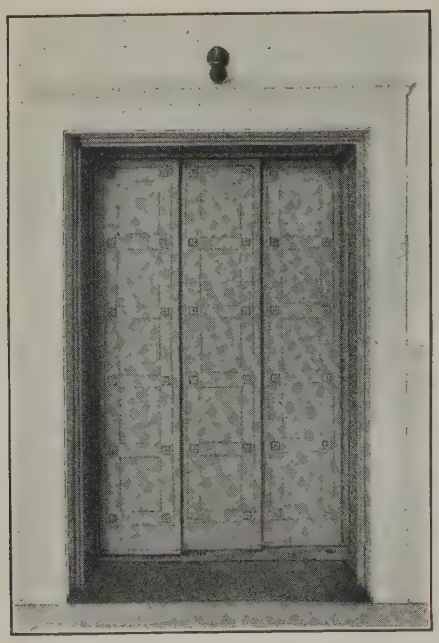
Fountain Theater, Cincinnati, Ohio, Thomas W. Lamb, Architect

Union Central Life Building, Cincinnati, Ohio, Garber & Woodward, Architects

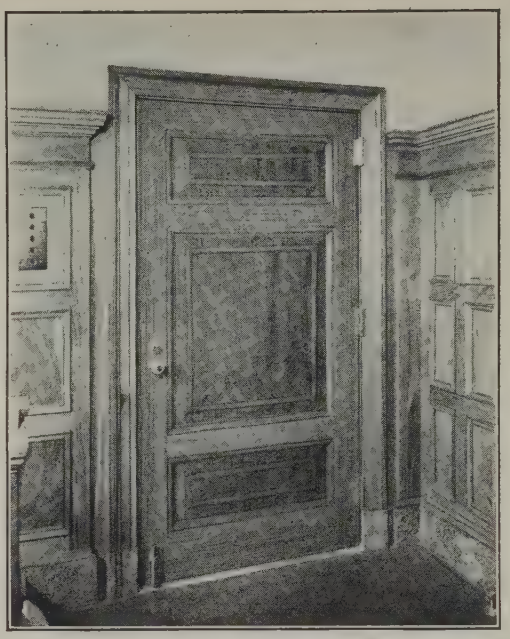
437 Fifth Avenue Building, New York, N. Y., F. H. Hutton, Architect

Ingraham Building, Miami, Fla., Schultz & Weaver, Architects

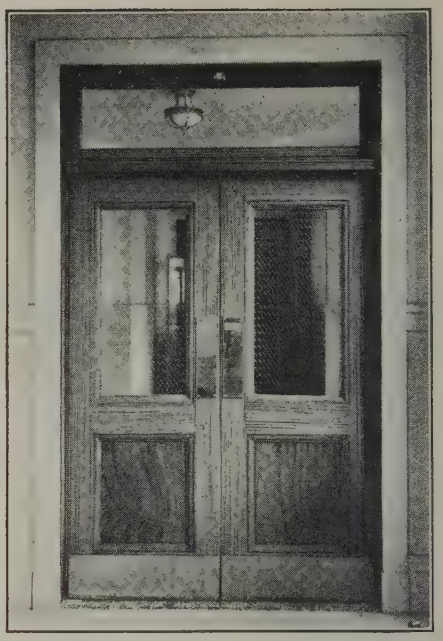
Municipal Building, Baltimore, Md., W. H. Emory, Architect



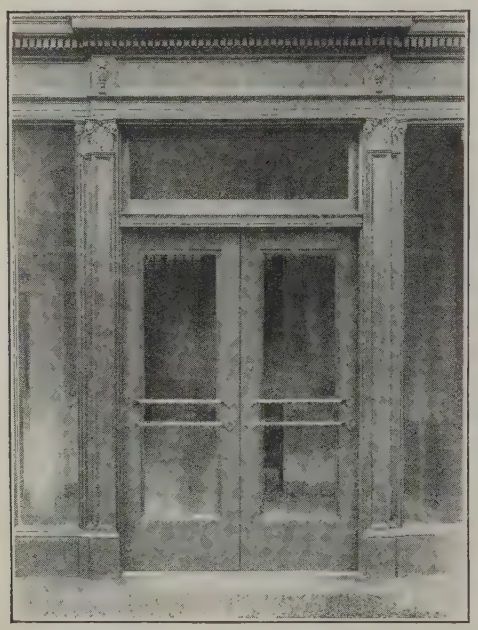
Close-up of One of the Many Art Metal Elevator Doors
New York County Courthouse



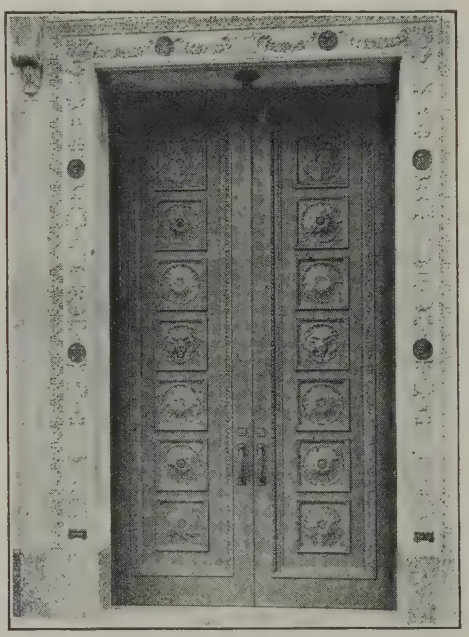
Art Metal Door
Referee's Room, Referee No. 4, Second Floor, New York County Courthouse



Art Metal Corridor Doors
New York County Courthouse



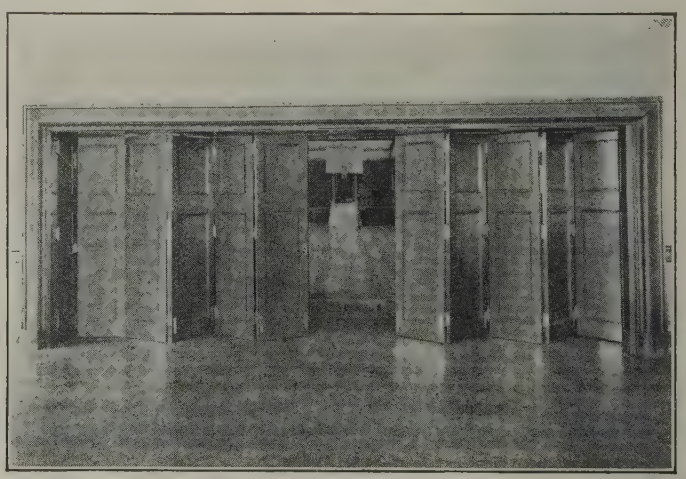
Art Metal Bronze Entrance Doors
State Bank of Orlando & Trust Co., Orlando, Fla.



Art Metal Bronze Entrance Doors
First National Bank, Fort Wayne, Ind.

Art Metal Bronze Elevator Enclosures
United Cigar Stores Building, Akron, Ohio

Art Metal Elevator Enclosures
Cunningham Piano Co., Philadelphia, Pa.



Art Metal Accordion Doors
Federal Reserve Bank, Cleveland, Ohio

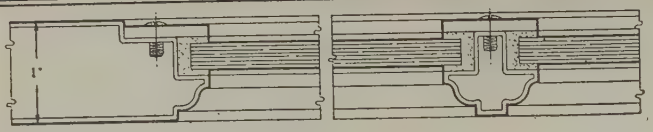
Typical Installations of Art Metal Entrance and Elevator Enclosures

Continued on next page

STYLES OF DOORS

Art Metal	STANDARD · DETAILS · ·ART · METAL · CONSTRUCTION · CO·	·DRAWING · NO 1 ·DATE · AUG: 25.

Continued on next page



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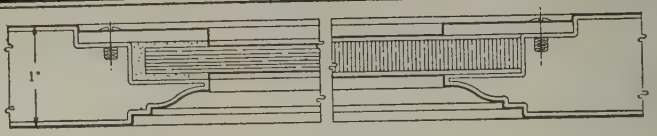

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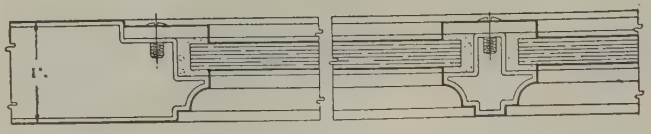

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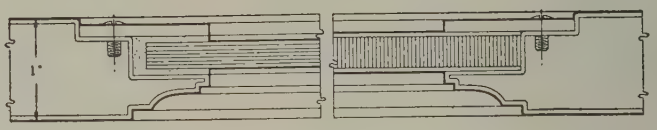

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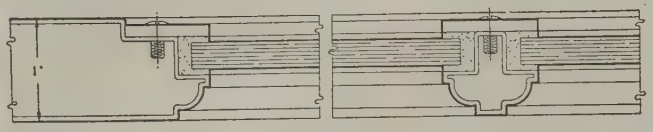

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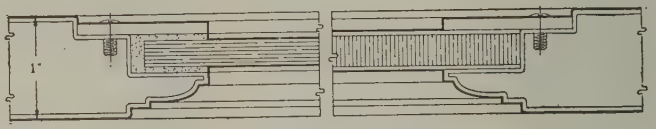

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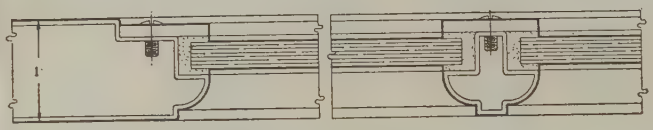

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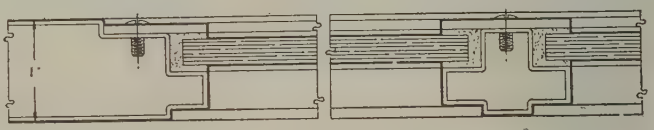

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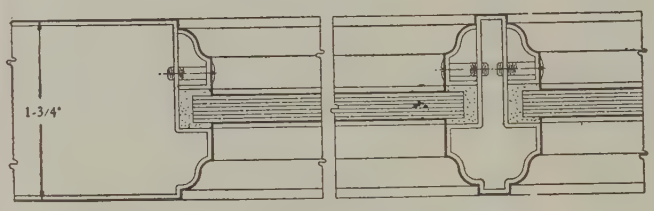

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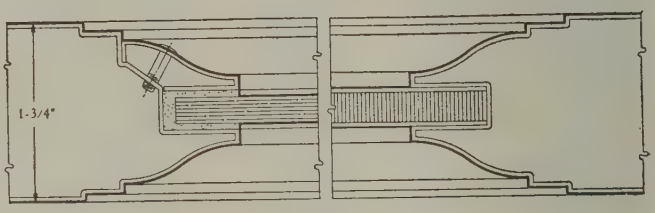

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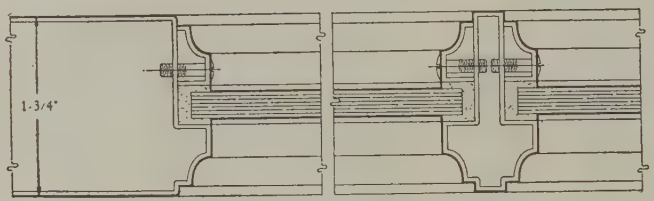

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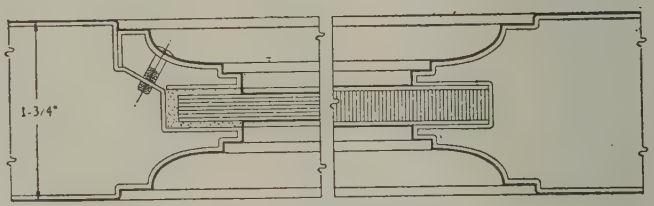

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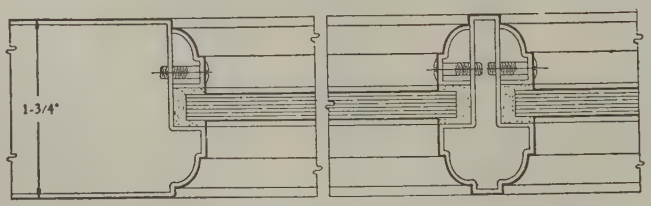

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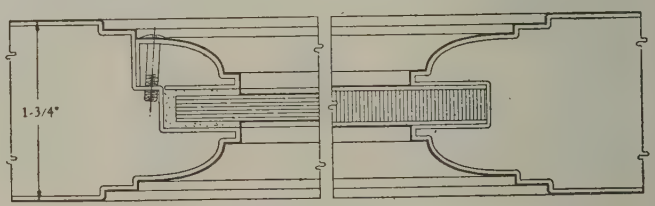

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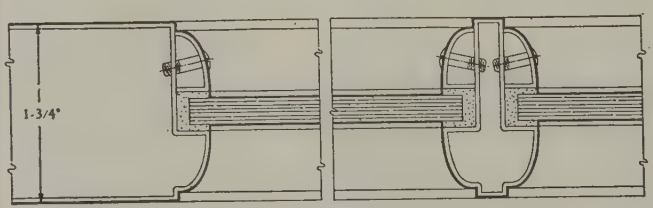

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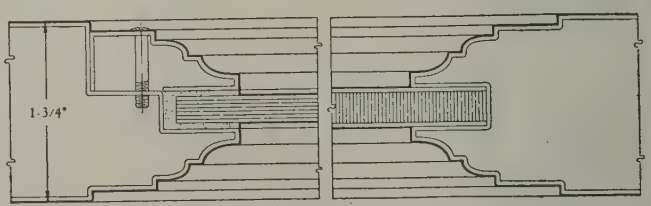
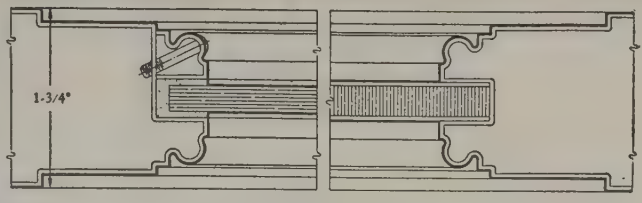


• TYPE • 90 •

TYPES OF DOORS

Art Metal	• STANDARD • DETAILS • ART • METAL • CONSTRUCTION • CO •	• DRAWING • NO • 2 • SCALE 0 1 2 • DATE • AUG. 25.

Continued on next page



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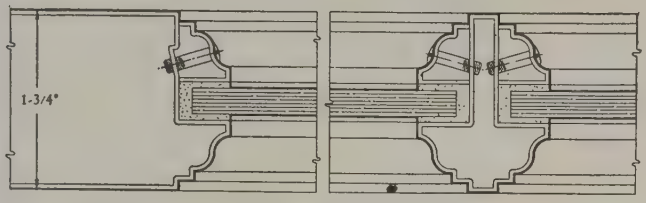

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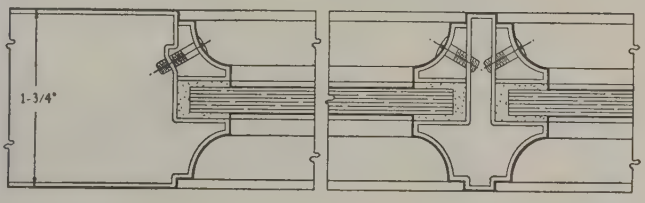

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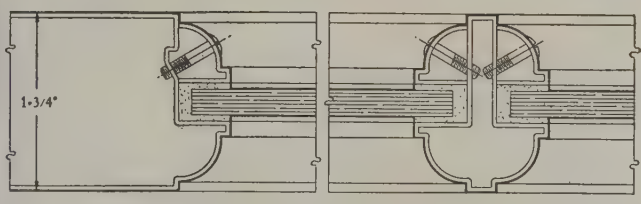

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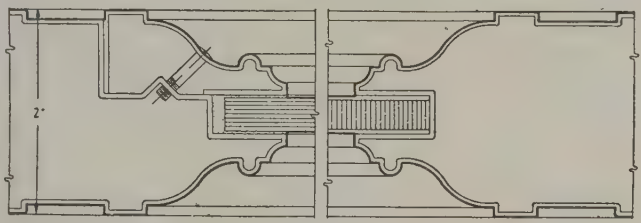

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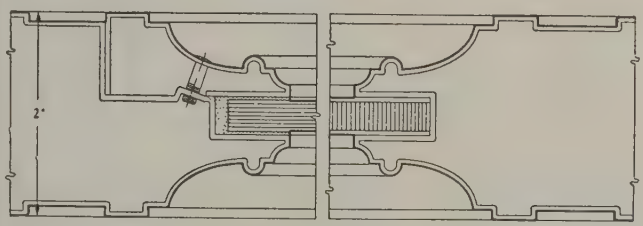

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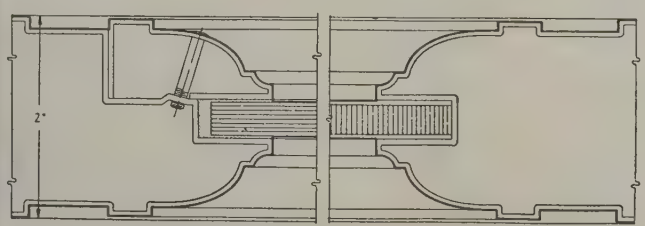

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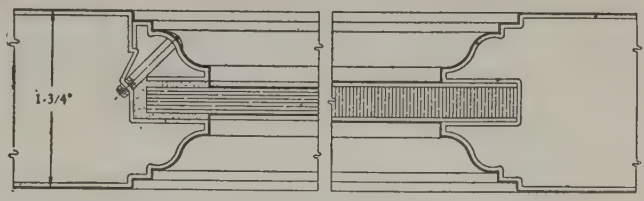

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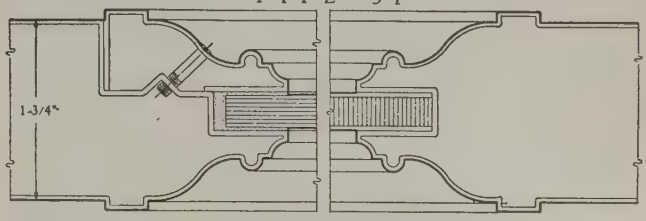

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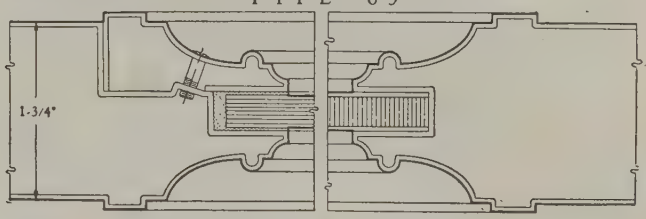

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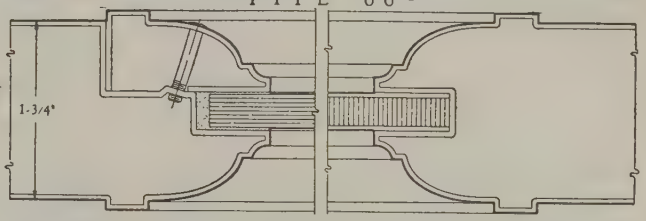

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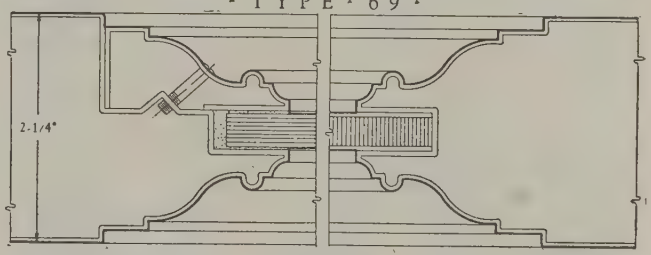

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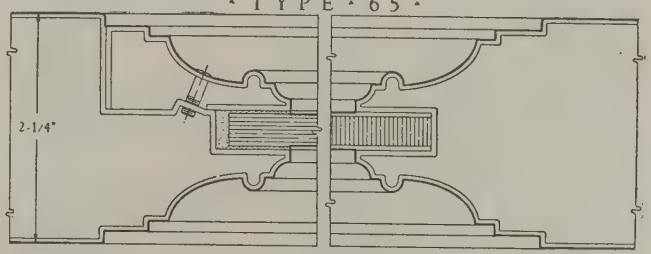

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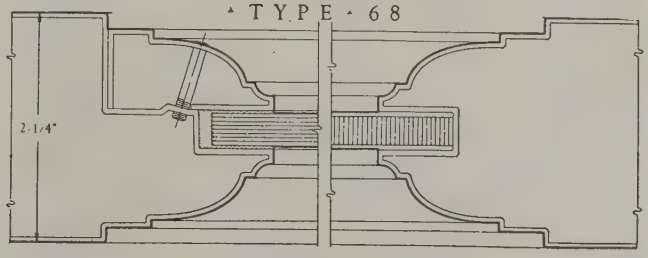
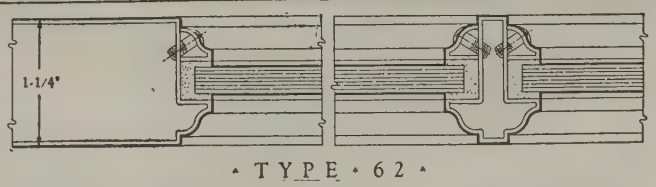


• TYPE • 71 •

TYPES OF DOORS

Art Metal	• STANDARD • DETAILS • • ART • METAL • CONSTRUCTION • CO •	• DRAWING • NO • 3 • SCALE • • DATE • AUG. 23.

Continued on next page



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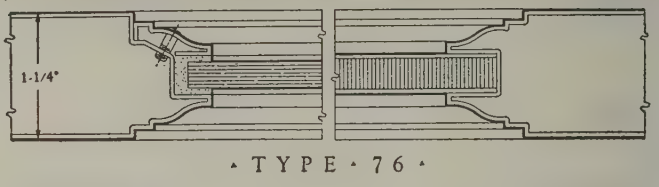

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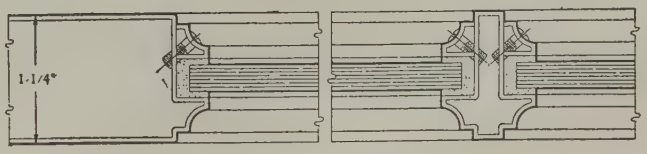

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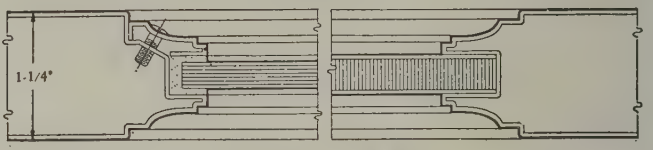

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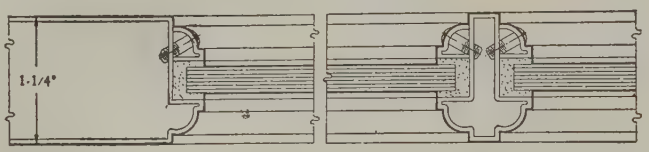

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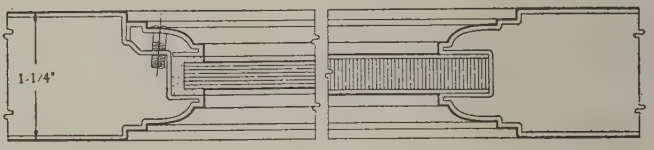

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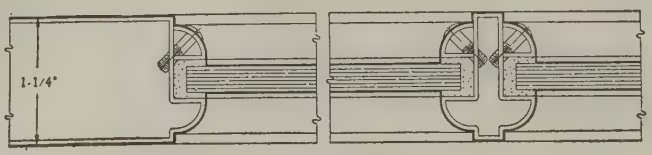

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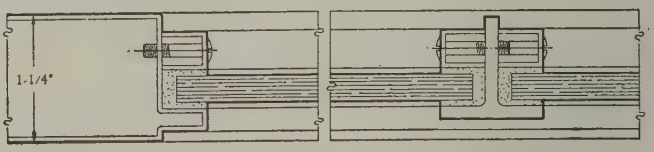
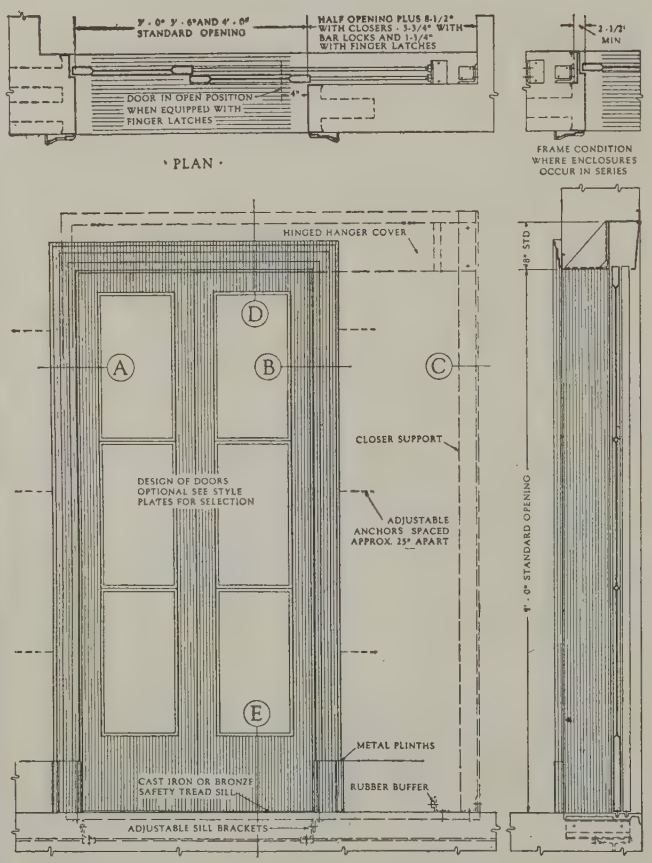
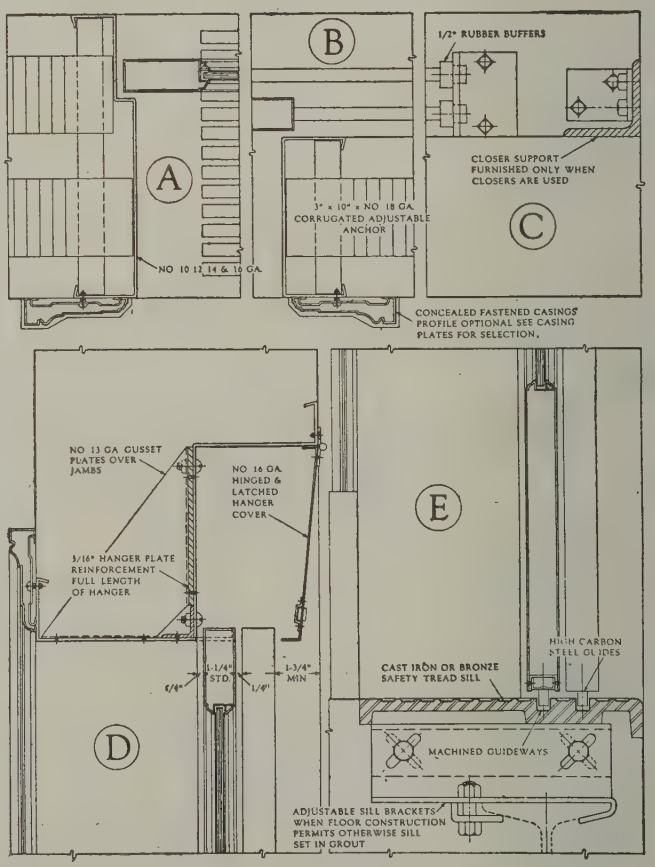


• TYPE • 102 •

TYPES OF DOORS





DETAILS FOR TWO SPEED ELEVATOR ENCLOSURE

Art Metal Construction Co. Bampton-on-the-New York U.S.A.	• STANDARD • DETAILS • • ART • METAL • CONSTRUCTION • CO •	• DRAWING • NO • 4 • SCALE 1/2" 1" 3" • DATE • AUG. 25.

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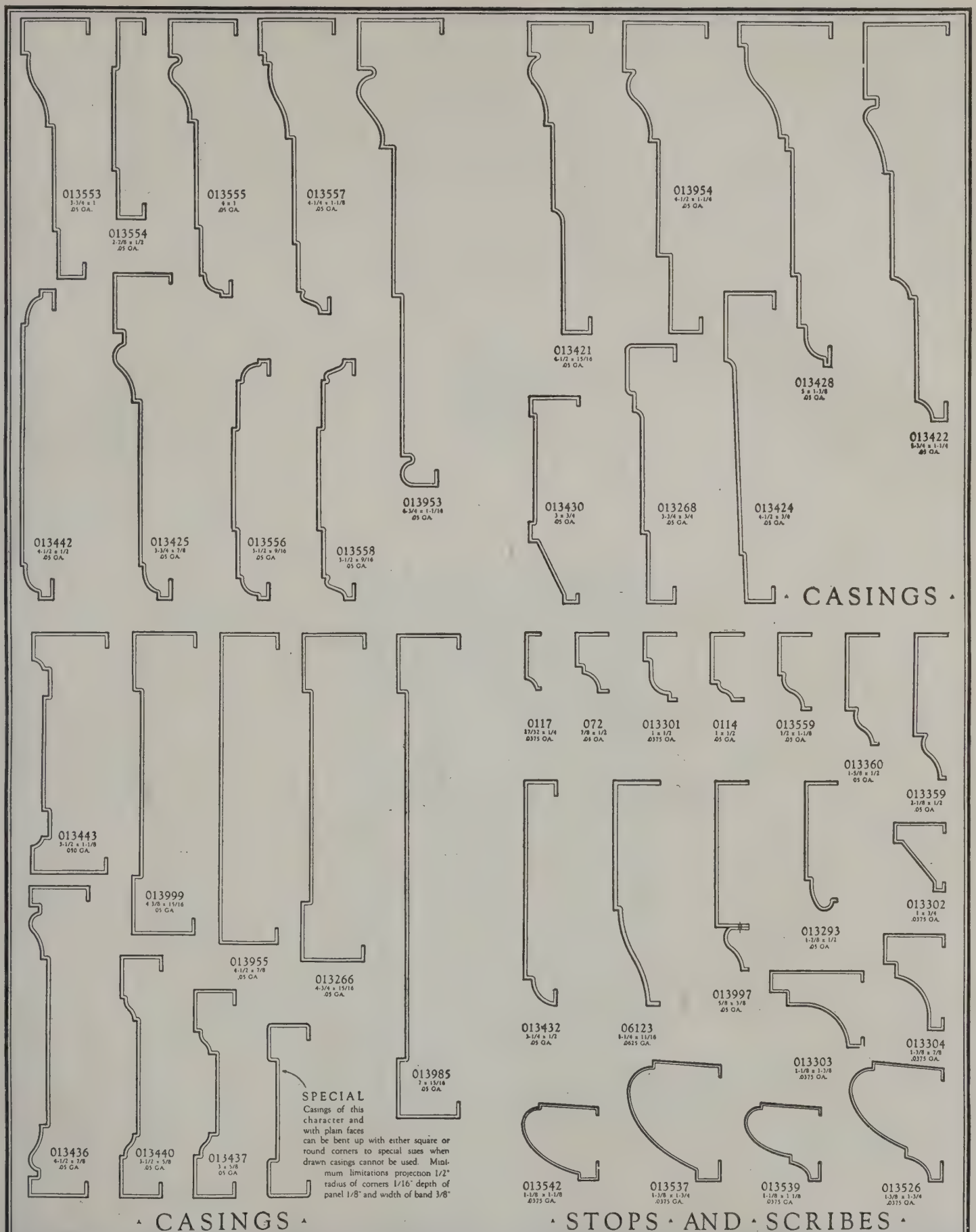

· STANDARD · DETAILS ·
· ART · METAL · CONSTRUCTION · CO ·

· DRAWING · NO · 5
· SCALE 0 1 2
· DATE · AUG. 25.

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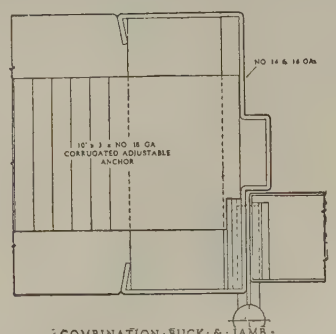
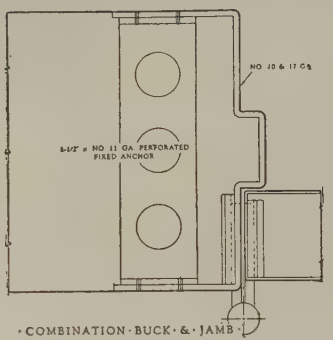
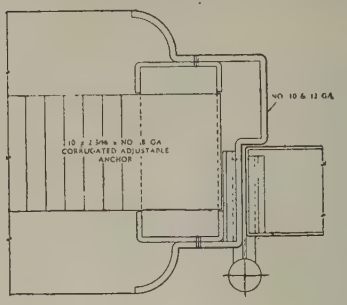


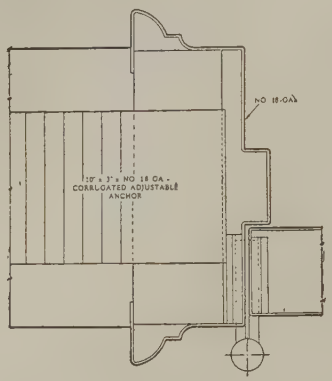
COMBINATION BUCK & JAMB
TYPE B2



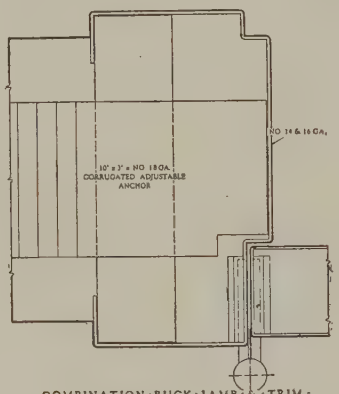
COMBINATION BUCK & JAMB
TYPE C2



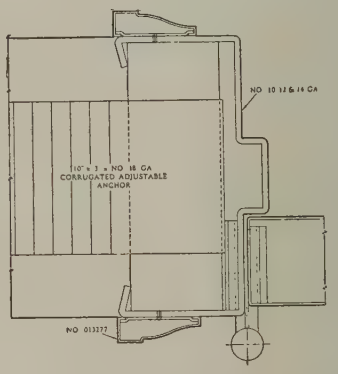
COMBINATION BUCK & JAMB
TYPE E2



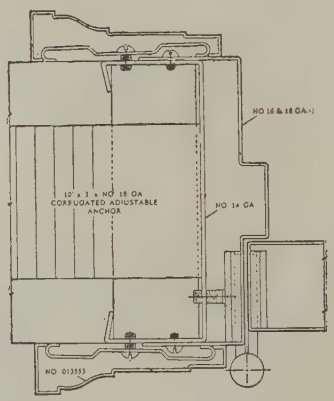
COMBINATION BUCK JAMB & TRIM
TYPE F2



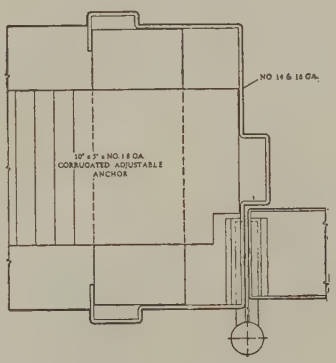
COMBINATION BUCK JAMB & TRIM
TYPE T2



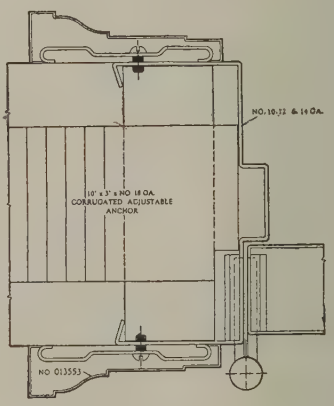
COMBINATION BUCK JAMB & TRIM
TYPE H2



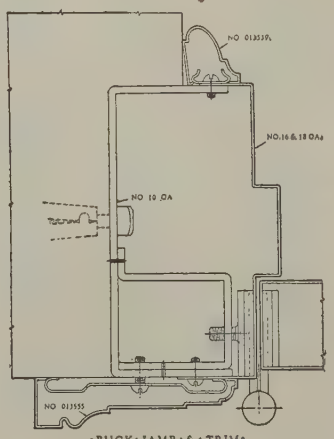
BUCK JAMB & TRIM
TYPE J2



COMBINATION BUCK JAMB & TRIM
TYPE S2



BUCK JAMB & TRIM
TYPE U2



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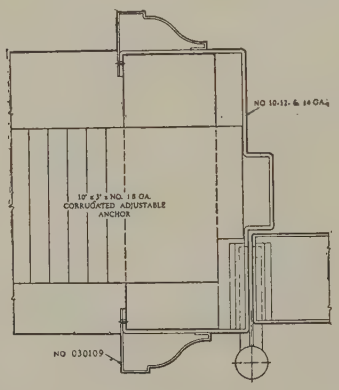

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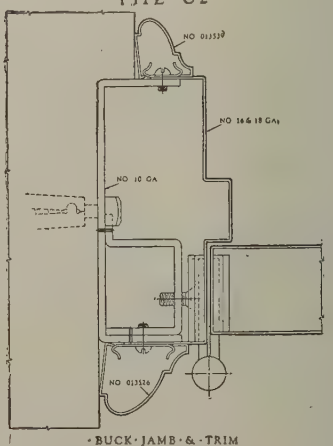
TYPE R2



BUCK JAMB & TRIM
TYPE N2

TYPES OF FRAMES

STANDARD DETAILS
ART METAL CONSTRUCTION CO

DRAWING NO 6
SCALE 3"=1FT.
DATE AUG. 26.

DAHLSTROM METALLIC DOOR COMPANY

EXECUTIVE OFFICES AND FACTORIES
JAMESTOWN, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 475 Fifth Avenue CHICAGO, ILL., 19 So. La Salle Street DETROIT, MICH., 1331 Dime Bank Building
PACIFIC COAST PLANT: 335 East Slawson Avenue, LOS ANGELES, CALIF.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

Manufacturers of METAL DOORS and TRIM; ELEVATOR ENTRANCES; ADJUSTABLE STEEL PARTITIONS.

Also General Trim for office buildings, hotels, apartments, hospitals, schools, banks, theaters; Hose Cabinets and Switch Box Panels.

TRADE-MARK

Quality—Dahlstrom products are internationally known. Only the *expert* workmanship and first class materials entering into their manufacture can sustain this reputation.

Classification of Finishes—In order to make it clearly understood that the kind of finish required will affect prices, a list of standard classifications is given below.

Class A—Plain colors finishes such as: No. 10 dark green; No. 11 olive green; No. 15 Maroon; No. 17 chocolate; No. 19 dull black; No. 30 sea green; No. 33 statuary brown; No. 47 bottle green; No. 48 slate; No. 49 navy gray; No. 50 dark gray; No. 51 quaker drab; No. 52 medium brown.

Class B—Plain color finishes such as: No. 13 white; No. 18 French gray; No. 34 pearl gray, cream, light blue and light gray.

Class C—Grained and stipple finishes such as: No. 26A verde antique stipple; No. 28 green stipple; No. 42 medium brown stipple.

Class D—Grained and stipple finishes such as: No. 1 light mahogany; No. 2 tuna mahogany; No. 3 dark mahogany; No. 8 birch; No. 36 bronze stipple, statuary; No. 38 bronze stipple, black; No. 46 mottled Egyptian green; No. 53 gumwood; No. 54 American walnut.

Class E—Grained and stipple finishes such as: No. 4 medium oak; No. 5 light oak; No. 6 dark oak; No. 7 circassian walnut, light; No. 9 ash; No. 31 dark circassian walnut; No. 35 natural bronze stipple; No. 37 bronze stipple, mottled; No. 40 bronze stipple, mottled verdigris; straight oak and pine.

Class G—Grained and special finishes such as: fumed oak; silver oak; special crotch mahogany; Australian mahogany; teakwood; burl walnut; also marble, inlay work and special bronzes.

Dahlstrom Metal Doors and Trim

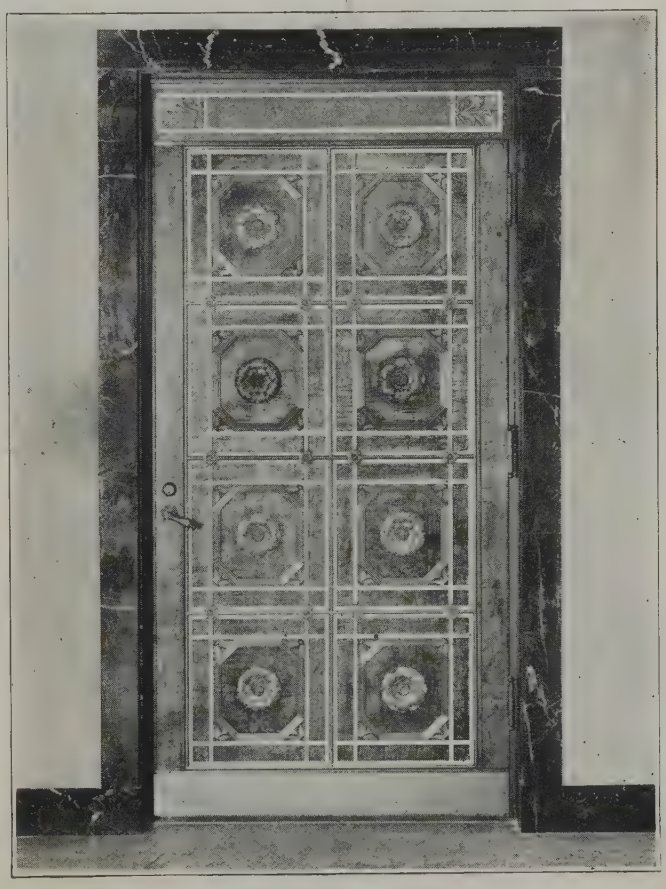
Design—Original and largest manufacturers of metal doors and trim in the world. Metal doors were originated by the founder of this Company. Twenty-five years of designing and manufacturing doors and trim to meet various conditions have given Dahlstrom products the well-earned title of "The Specified Standard."

Construction — Dahlstrom Metal Doors and Trim have during a quarter of a century proved their fire retarding value. No portion of the product can burn.

All joints are carefully welded. Reinforcements are also welded to the construction members. The design of Dahlstrom Metal Doors makes for rigidity, stability, fire protection and elegance.

Door frames are fabricated from Nos. 16 to 11 gauge metal according to the size of the opening and the service required.

Finish—All surfaces are thoroughly cleaned before finish is applied, all materials are carefully tested in our laboratory. Each coat of paint or enamel is carefully baked and properly treated to secure the superior finish for which Hahlstrom products are noted. The same care and attention is given all finishes whether plain colors, stipples or reproductions of wood graining. All material for finishing is carefully tested in our laboratory.



Corridor Door, The Times Union Building, Rochester, N. Y.

Specifications

Complete specifications have been prepared covering the entire field of hollow metal. Separate specifications covering elevator entrances are also available. We shall be glad to send these specifications to architects on request.

Continued on next page

New-Improved Dahlstrom Partition

Rapidly changing business conditions, expansions and mergers seem to be the order of the day. Departmental organizations are replacing the one-man office force. Single floors expand into whole buildings.

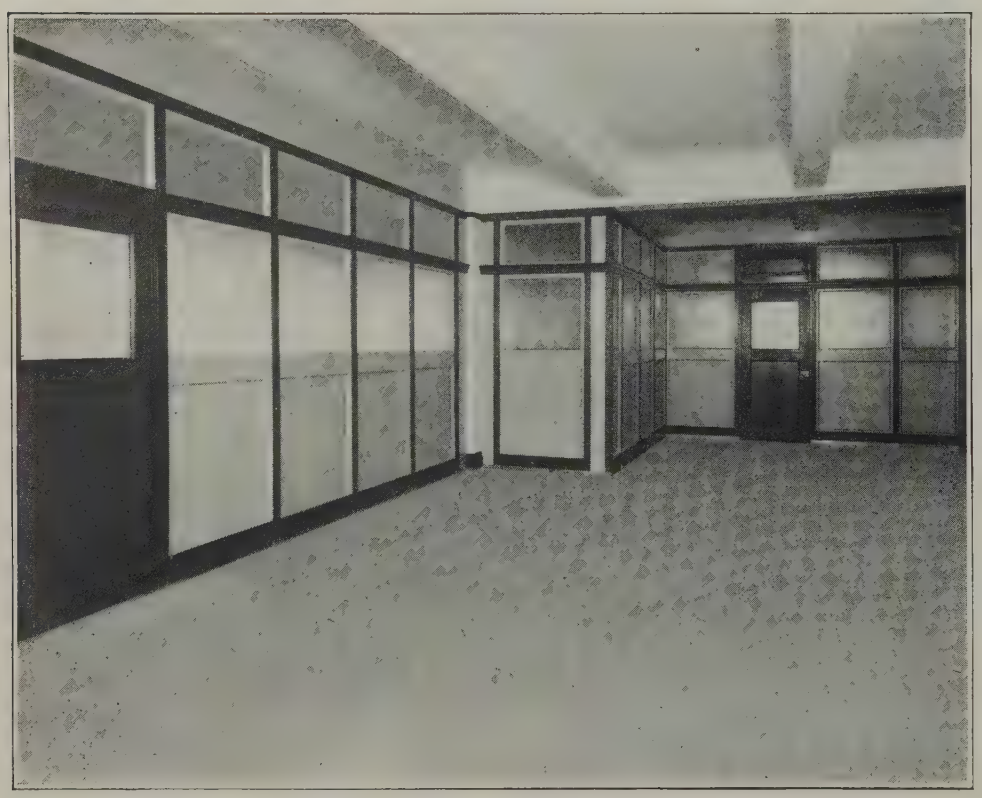
Partition walls are constantly being moved to meet tenant requirements. Old tenants must be satisfied and accommodating arrangements must be made for new ones. Tile and plaster partitions are not flexible enough to meet these rapidly changing conditions.

The "loft" type of building construction has done much to meet these rapidly changing conditions. They can be easily divided to meet tenant requirements.

To further facilitate meeting these requirements, the flexible partition has been developed.

For a number of years Dahlstrom has manufactured metal partition. Now comes the New-Improved Dahlstrom Partition, based on years of experience and experimentation. It meets every requisite necessary in subdividing floors and departments.

Type G-52 Dwarf Height Partition



Type G-52 Ceiling Height Partition

It is flexible and easily set up or taken down. Doors and panels may be interchanged. Cross rail heights can be readily changed. It has a telescoping wall filler which minimizes the cutting of fillers on the job.

It is rigid. It will not vibrate and chatter. The same principles used in building steel skeletons of modern buildings have been applied to the New-Improved Dahlstrom Partition.

This partition is designed to carry the wiring so necessary for convenient outlets. The cornice construction is such that wires can be carried concealed and fed down through pilasters to any receptacle outlets or switches. This is done by removing one side of the cornice. A simple fastening arrangement holds the cornice moulding.

The New-Improved Dahlstrom Partition is a fire retardant because there is nothing in its construction to burn.

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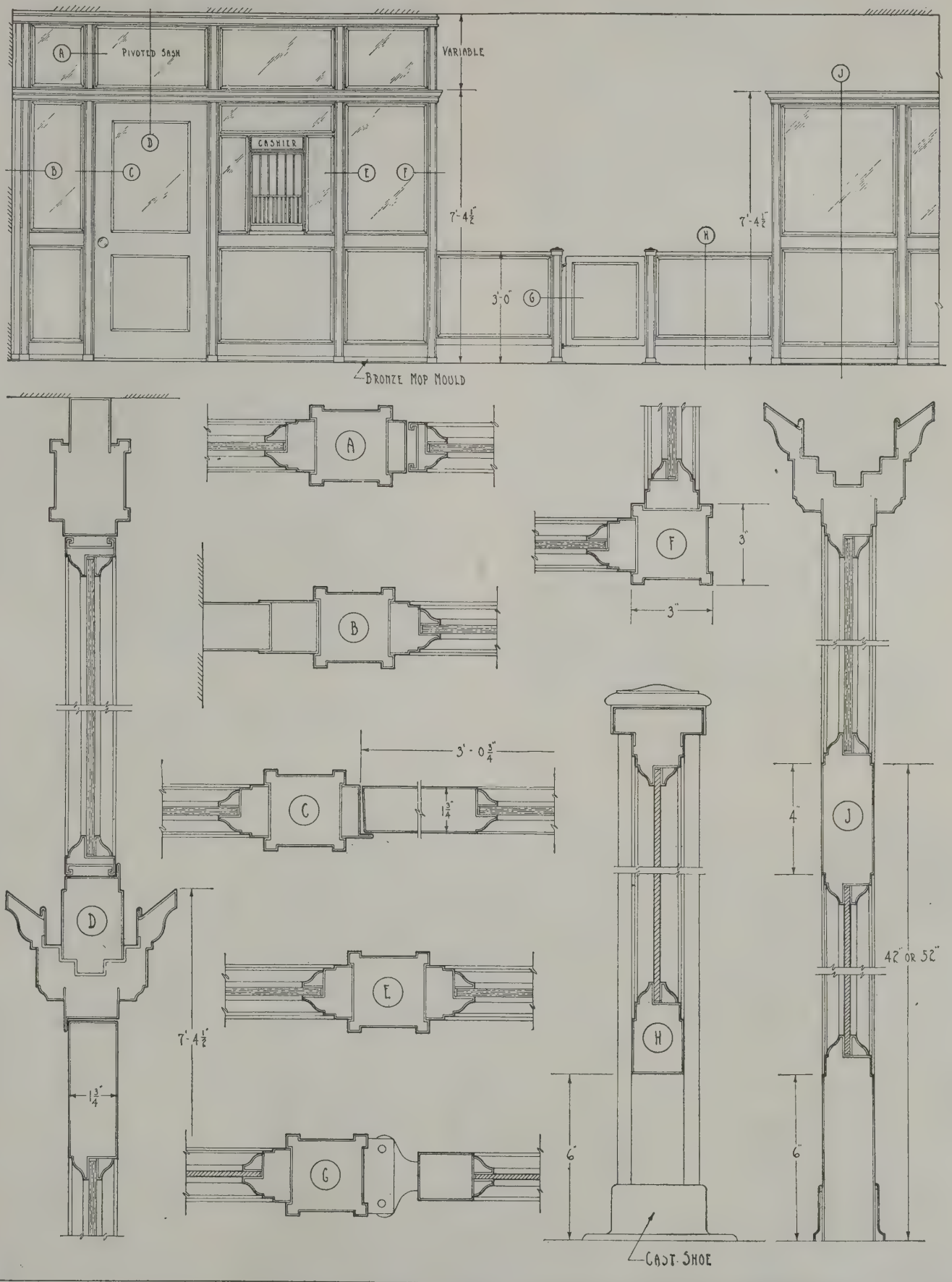


DAHLSTROM METALLIC DOOR CO. JAMESTOWN, N.Y.	UNIT PARTITIONS AND RAILING	PLATE 1

Continued on next page

Elevator Entrances

Just as the internal combustion engine made the automobile possible, so the development in elevator engineering made the skyscraper possible. At the same time came the fire menace and hazard in the skyscraper. The elevator shaft proved to be a veritable flue or chimney with a natural draft, thus making a favorite haunt for fire. Fire could quickly travel through the open shaft and rapidly spread from floor to floor.

The timely appearance of Dahlstrom Metal Doors and Trim provided a solution to this problem. Elevator shafts could be enclosed, thus preventing fire on floors below for using this means of travel through the building. It is a pleasure to check the efficient service still being rendered by early Dahlstrom installations, even those of more than twenty years ago. Ninety per cent of the early Dahlstrom installations were elevator entrances.

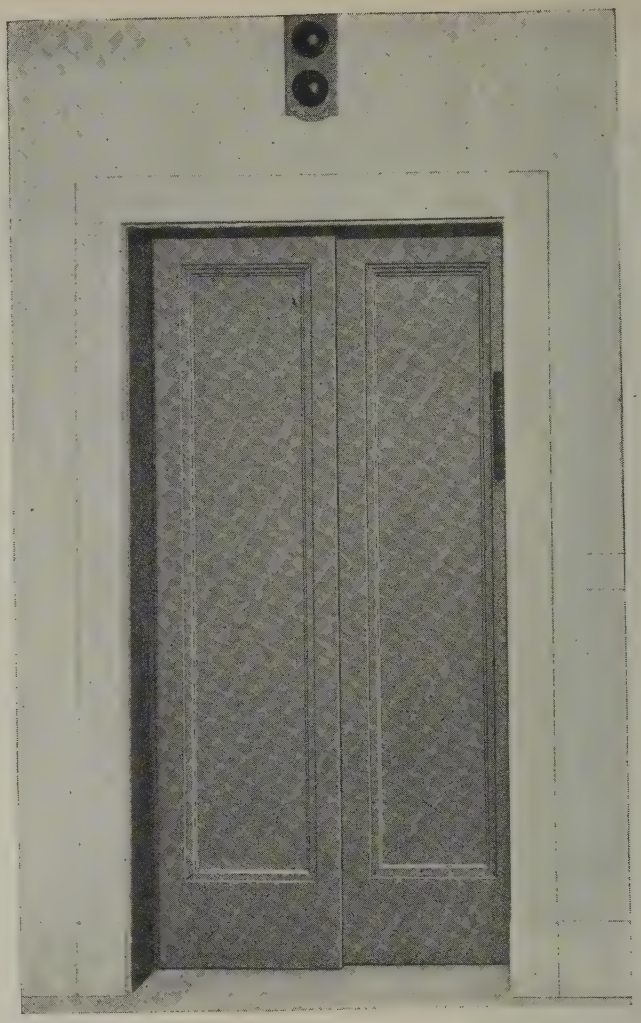
Dahlstrom Elevator Entrances receive the same high standard of careful workmanship and finish for which all the Dahlstrom products are noted. The first Dahlstrom installations are still in use.

The weight of the door permits easy operation, while the general design provides fire protection and beauty. A beauty in keeping with the high type of architecture brought about by the large modern building.

The development of the elevator and the shaft which incloses it has kept pace with other features of building construction. In this connection the modern elevator has played an important part.

Contrast the old open grille work around elevators with the modern installations of Dahlstrom Entrances and the vast strides made in recent years will at once become apparent. It is a distinct source of pride with us that it fell to our lot to pioneer this important achievement in modern building.

That we did pioneer this development becomes very evident when consideration is given to the fact that the major portion of our early installations were door units for stair wells and elevator shafts and those installations date back to the very inception of the metal door industry.



Typical Dahlstrom Elevator Entrance, Prudential Building, Newark, N. J.

Years of experience in designing, manufacturing and installing elevator entrances in buildings of many different types with their great variety of shaft conditions have given Dahlstrom valuable data as to the most suitable type of entrance necessary to secure the most efficient service.

The Dahlstrom Engineering Department will gladly work with you in designing entrances to meet your requirements.

Dalstrom Elevator Entrances with Cast Bronze Mouldings and Medallions, Breslin Building, Louisville, Ky.

Continued on next page

Decorative Elevator Entrances

The general trend in building decoration is toward color and decorative art. This has called for many drastic changes in elevator door design. Etched panels, colored glass, fused enamels on bronze, cast bronze ornamentation and even hand-painted designs and motifs. For some time Dahlstrom has been furnishing elevator fronts designed along these lines.

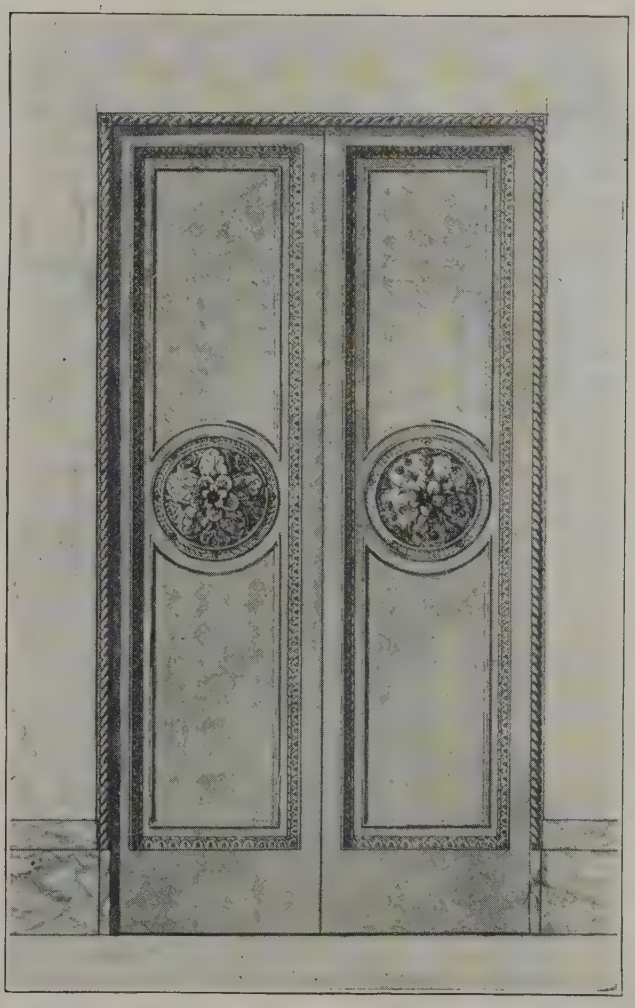
Etched panels with rich, luxurious backgrounds and for the more ornate, vitreous enamel medallions, mouldings and motifs on bronze have been worked out for ground floor elevator entrances.

These designs are pleasing to the eye and may be made to harmonize with the lobby decorative scheme.

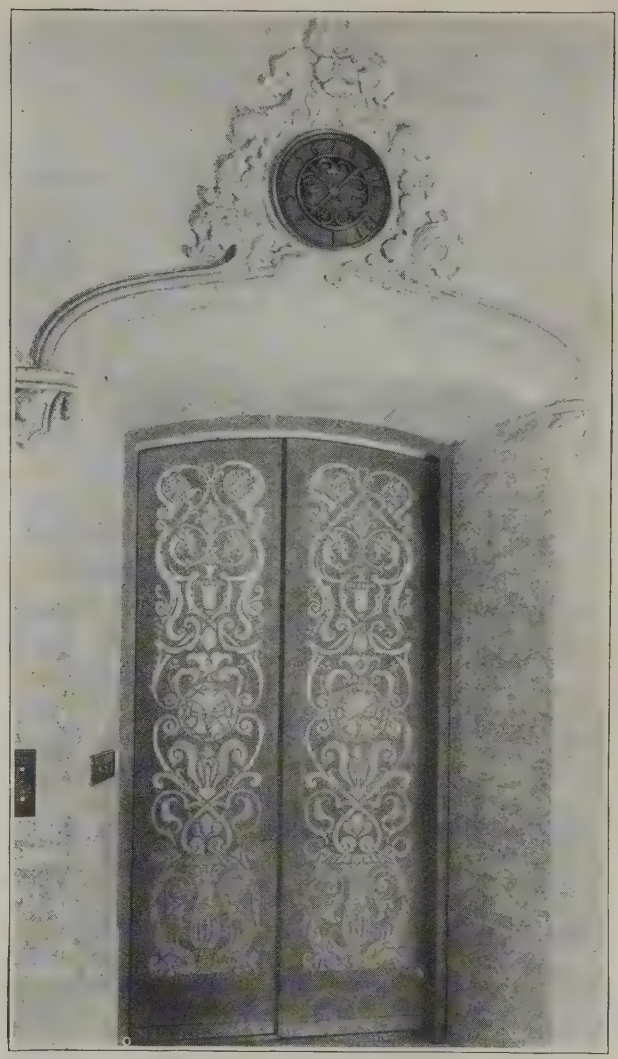
Dahlstrom artists and engineers will gladly co-operate with architects and designers in designing elevator entrances in plain or in decorative designs.

The process employed in the use of vitreous enamel is unique in that it utilizes a special bronze which permits the application of vitreous enamels, which are fused into the metal at 2000° F. Unlike the well-known, so-called polychrome treatment of metals, this treatment is as permanent as the bronze itself. It provides for a wider range of color and detail and makes possible an economical combination of Dahlstrom doors with decorative panels.

The Favrille glass designs are used in connection with appropriately designed saw-pierced etched metal inlaid with the glass. The panels can be designed to conform to any decorative scheme involving style as well as color.



Dahlstrom Elevator Entrance Doors with Vitreous Enamel Mouldings and Medallions, First National Bank Building, Detroit, Mich.



Dahlstrom Elevator Entrance Doors with Etched Panels, United Artists Theater Building, Los Angeles, Calif.

A Few of the Dahlstrom Decorative Elevator Entrance Installations

Lennox Hotel, St. Louis, Mo.
Bank of Commerce, St. Louis, Mo.
Hawthorne Apartments, St. Louis, Mo.
Smith-Young Building, San Antonio, Tex.
Northern Life Tower Building, Seattle, Wash.
National Bank of Commerce, Houston, Tex.
Pythian Building, St. Louis, Mo.
Baker Hotel, Mineral Wells, Tex.
Hutchenson Arms Apartment, St. Louis, Mo.
Bay & Richmond Building, Toronto, Can.
Berger Building, Buffalo, N. Y.
Haskins Apartments, Highland Park, Mich.
Wheeler Building, Syracuse, N. Y.
Felter Apartments, St. Louis, Mo.
Levine Apartments, Detroit, Mich.
Mark Twain Hotel, St. Louis, Mo.
Waterboard Building, Detroit, Mich.
1st National Bank Building, Ann Arbor, Mich.
Ernst Polless Apartments, Detroit, Mich.
National City Bank, St. Louis, Mo.
Kopman Apartments, St. Louis, Mo.
Union Trust Building, Detroit, Mich.
Michigan Bell Telephone Building, Detroit, Mich.
De Luxe Apartments, Washington, D. C.
Bralove Apartments, Washington, D. C.
American Druggist Insurance Building, Cincinnati, Ohio
Cloister Apartments, St. Louis, Mo.
Buffalo City Court, Buffalo, N. Y.
Municipal Building, San Antonio, Tex.
Milam Building, Dallas, Tex.
United Artists Theatre Building, Los Angeles, Calif.
Vendome Hotel, Evansville, Ind.
Baker-Trubee-Putnam Building, Buffalo, N. Y.
First National Bank, Detroit, Mich.

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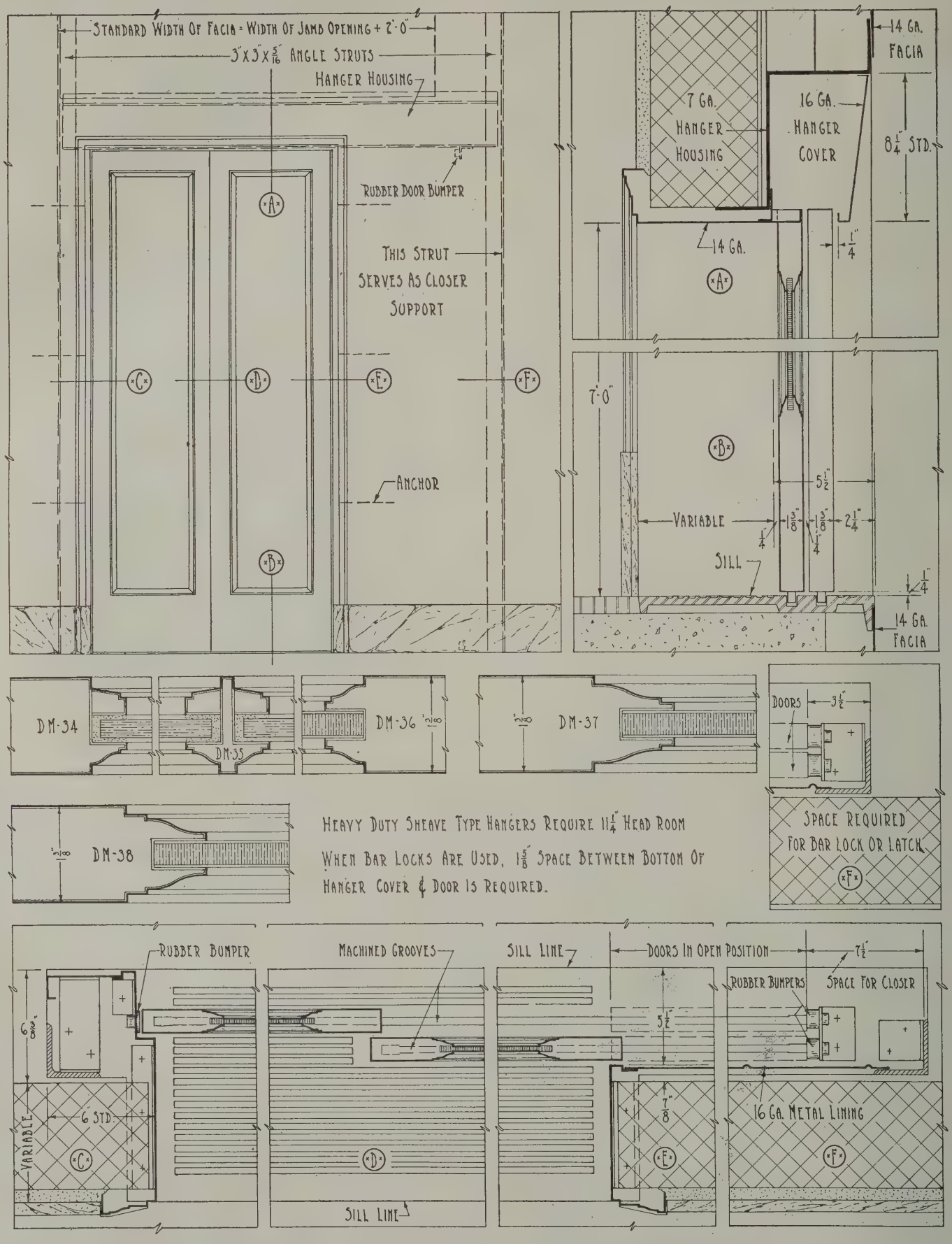

DAHLSTROM METALLIC DOOR CO. JAMESTOWN, N.Y.	TWO-SPEED ELEVATOR ENTRANCE UNIT	PLATE 2

Continued on next page

DAHLSTROM METALLIC DOOR CO. JAMESTOWN, N.Y.

SWING DOOR DESIGNS

PLATE 3

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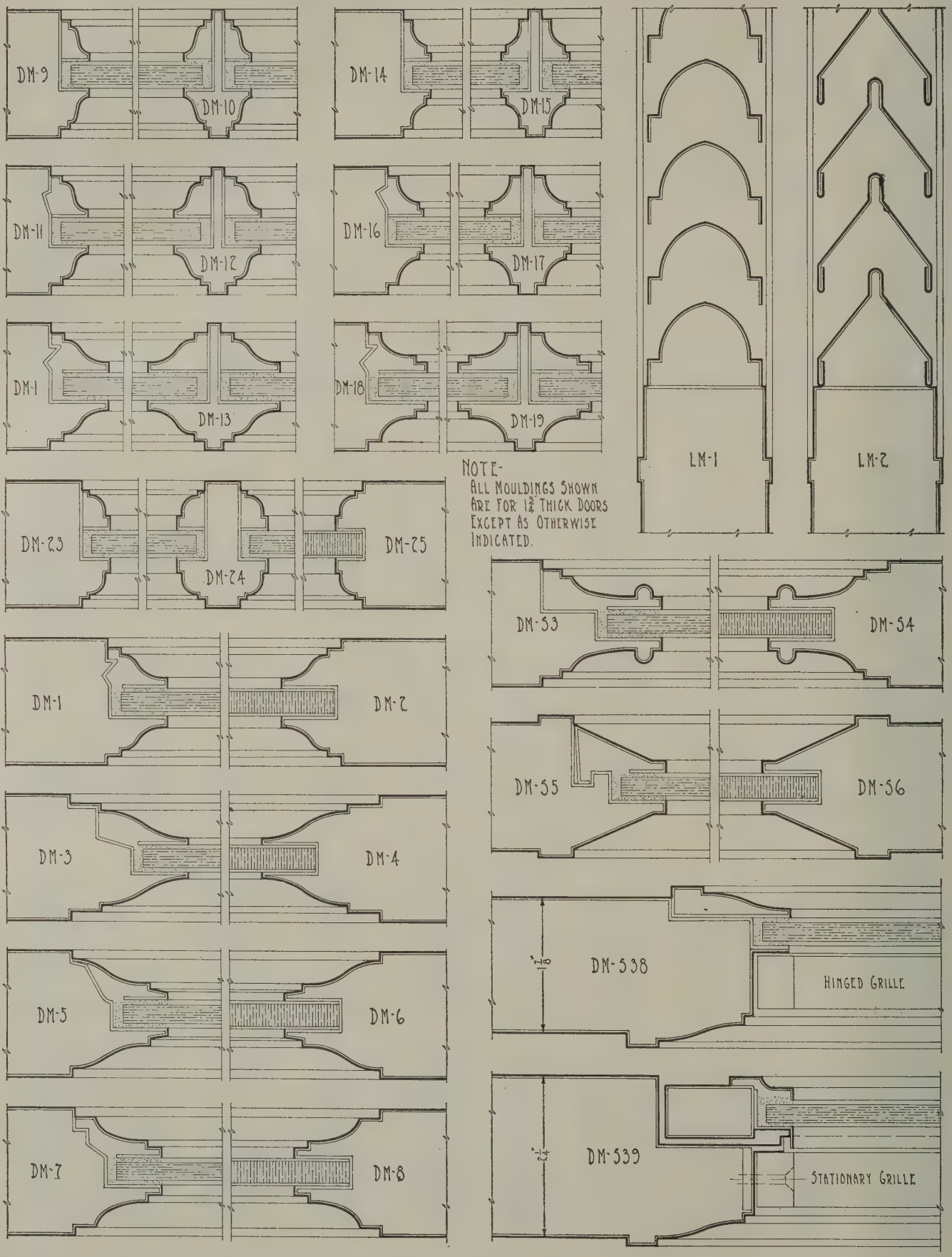

DAHLSTROM METALLIC DOOR CO. JAMESTOWN, N.Y.

SWING DOOR AND SASH TYPES

PLATE 4

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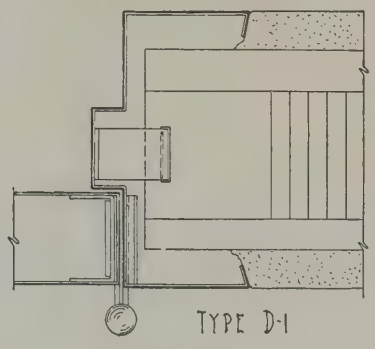
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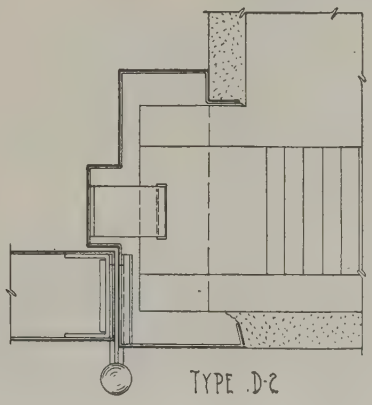
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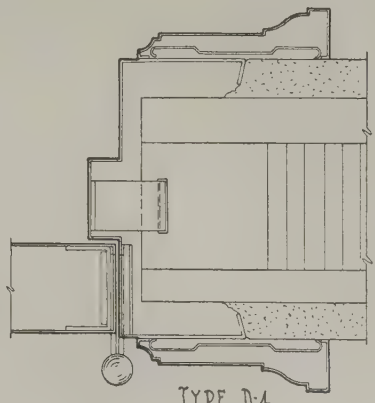
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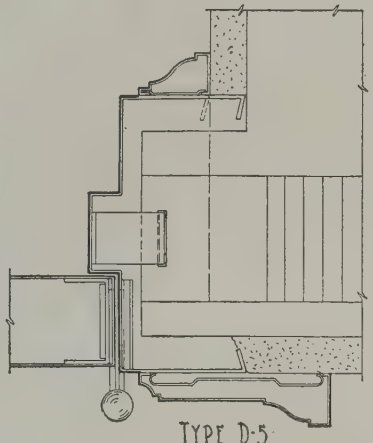
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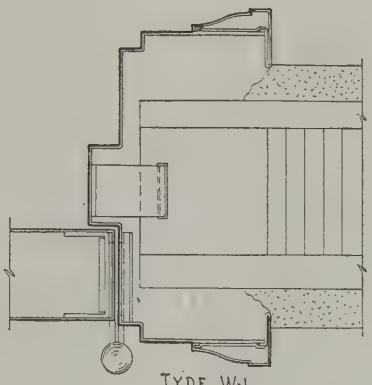
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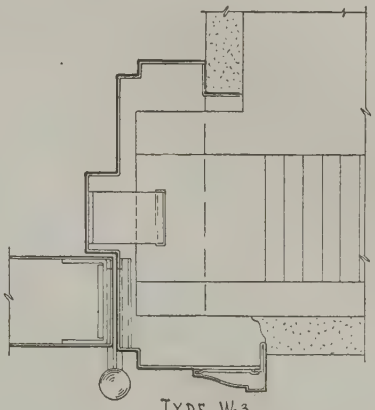
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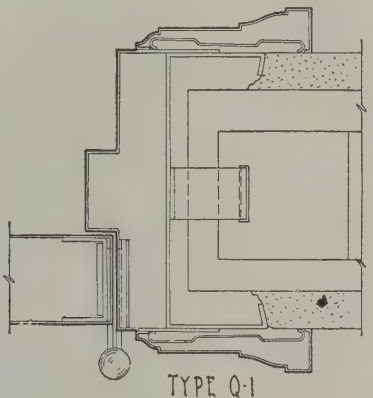
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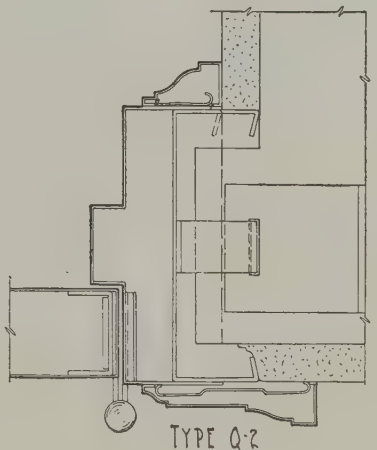
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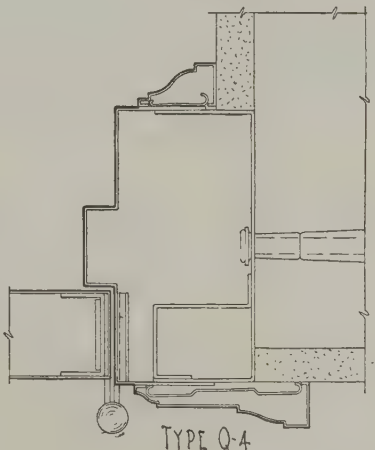
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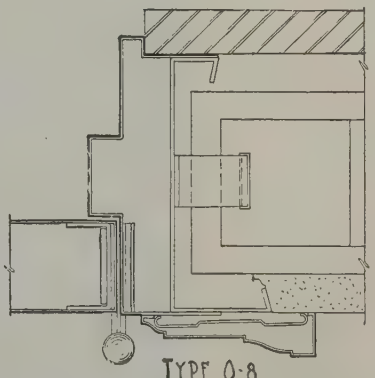
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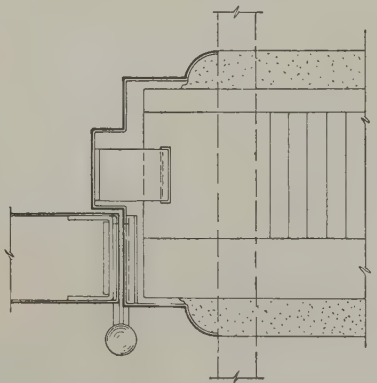
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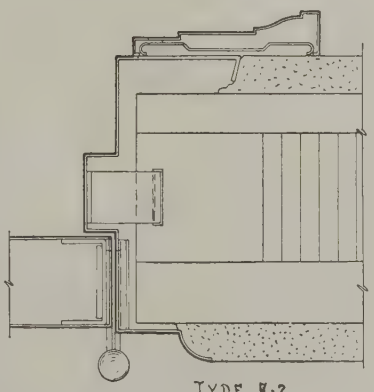

TYPE K-2

DAHLSTROM METALLIC DOOR CO. JAMESTOWN, N.Y.	SWING DOOR FRAME TYPES	PLATE 5

BETZ BROS., INC.

Manufacturers of Hollow Steel Doors and Trim

FACTORY AND OFFICE
Pleasant Avenue and Ann Street
CLIFTON, N. J.
NEW YORK OFFICE: 20 Vesey Street
REPRESENTED IN ALL PRINCIPAL CITIES

Products

HOLLOW METAL DOORS.
ROLLED COMBINATION BUCKS, JAMBS and TRIM.
CABINET JAMBS and TRIM.
MOULDINGS.
STORE FRONT SHAPES.
COMPLETE ELEVATOR ENCLOSURES.

BETZ Steelbilt TRADE MARK PRODUCTS

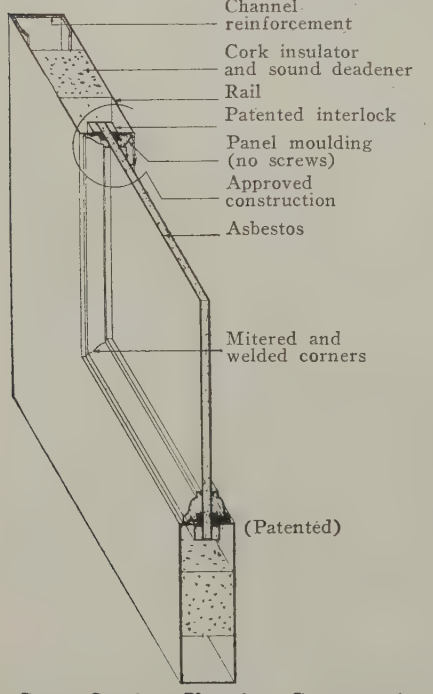
Improved Facilities

We have recently moved into our new factory at Clifton, N. J. With the additional facilities which this new plant affords, we are exceptionally well equipped to handle large jobs.

Our New Factory at Clifton, N. J.

Betz Bros. Hollow Metal Doors

Our doors are built with continuous interlocking and reinforcing channels of special design which clip the panel mouldings and lock the panels to the stiles and rails without the use of screws. This key-lock construction is a patented feature which provides great structural strength and makes these doors unusually efficient fire retardants.



Cross Section Showing Construction

These doors are manufactured from No. 16 and No. 18 U.S. Standard gauge all open hearth process, full cold rolled, full pickled, patent leveled, re-squared, re-annealed and oiled furniture steel.

Properly designed reinforcing plates and bars are electrically spot-welded in place to take care of the attachment of hardware.

Stiles and rails are carefully welded together, using both acetylene gas and electric processes.

Panels and panel mouldings are keyed to the stiles and rails by means of the patented construction described above. Mouldings are No. 18 gauge cold rolled steel; all panel mouldings are mitered at corners and gas-welded. For glazed panels, the loose stops may be either snapped in place with concealed fasteners or attached by means of oval head machine screws.

Stiles, rails and panels are insulated with sound deadening cork, fibre or asbestos.

Doors are finished to our standard sample colors and finishes, the baking being accomplished at temperatures from 280° up, as the particular jobs may require.

Approval of Underwriters' Laboratories, Inc.—These doors have been tested and listed by the Underwriters' Laboratories, Inc. Labels will be furnished when specified.

Rolled Combination Bucks, Jambs and Trim

Our rolled combination bucks, jambs and trim are made in 16 and 18 U.S. Standard gauge, bright cold rolled, full finish strip steel. The workmanship on these combination bucks is of the highest grade and in keeping with the best grade of hollow steel materials. They are furnished finished, and protected, and are especially recommended for tenant changes.

Cabinet Jambs and Trim

Our cabinet jambs are made of No. 18 U.S. Standard gauge all open hearth process, full cold rolled, full pickled, patent leveled, re-squared, re-annealed and oiled furniture steel; with plain or moulded stops and reinforced for hardware as required. Trim may be secured to frames by either concealed spring clips or exposed oval head machine screws.

Hollow Metal Door with Pressed Steel Buck

Mouldings

We are equipped to manufacture all kinds of metal mouldings.

Store Front Shapes

We manufacture a variety of standardized store front shapes. Details and quotations on request.

Complete Elevator Enclosures

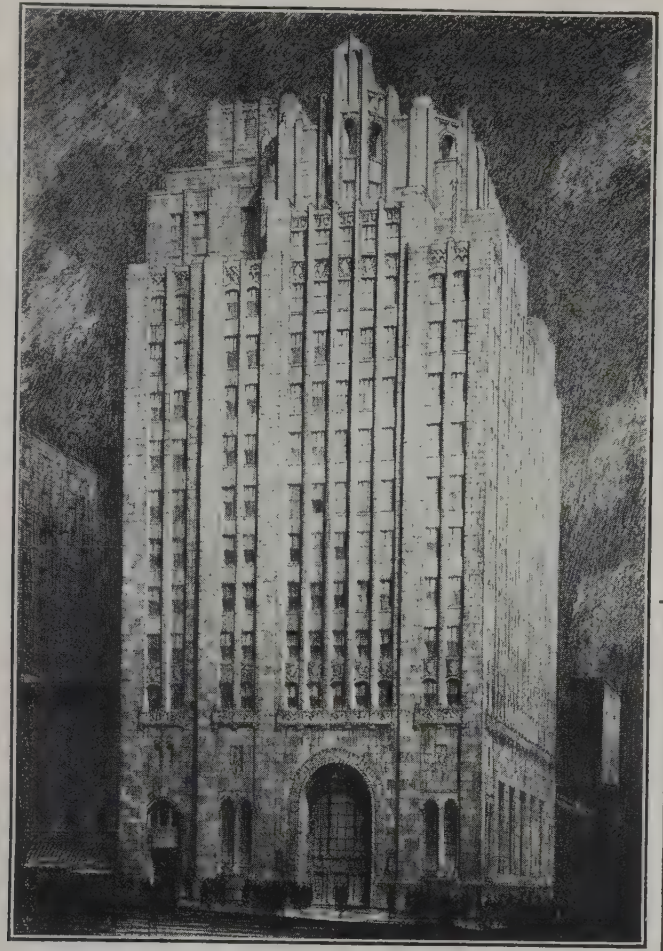
We have developed fifteen types of treatments for elevator openings. These complete treatments include combination buck, jamb and trim units, closure mouldings, toe guards for shaft sides of doors, cast iron or bronze sills, brass or bronze knobs and lock sets, Rixson or ball bearing hinges; complete doors, including glass and glazing, etc.

Continued on next page

We will be glad to co-operate with architects, contractors and owners in the design and execution of work of this character.

Partial List of Installations

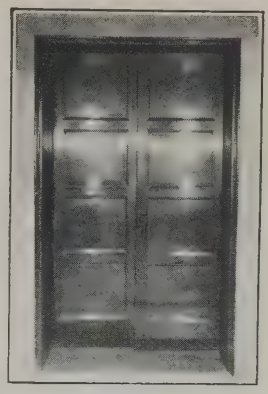
Seamen's Bank for Savings, New York, N. Y.
American Radiator Co. Building, New York, N. Y.
Ward Baking Plant, Baltimore, Md.
Roosevelt Public School, Birdsboro, Pa.
Prudential Life Insurance Building, Newark, N. J.
New Jersey State Home for Girls, Trenton, N. J.
Laemmle Theatre, Brooklyn, N. Y.
Women's Infirmary, Denver, Colo.
Connecticut Mutual Life Insurance Co., Hartford, Conn.
Sears, Roebuck Building, Cambridge, Mass.
Pennsylvania R. R. Building, Philadelphia, Pa.
Providence College, Providence, R. I.
Petroleum Building, Houston, Tex.



Seamen's Bank for Savings, New York, N. Y.

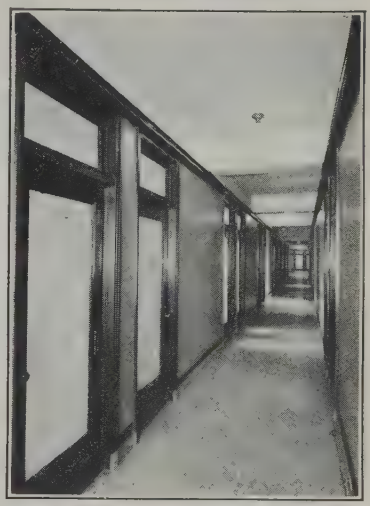
Steelbilt Heavy Elevator Doors

These doors are made of 12 and 14 gauge seamless tubing, with the necessary hardware reinforcements, ⅜-in. panels made of two sheets of 18 gauge steel, with ¼-in. asbestos filling between. The door moulding is held in place by concealed fasteners, and glass moulding held in place with screws as required. All joints solid electrically welded, and ground smooth. The entire door is hermetically sealed. Doors can be furnished in a variety of designs.

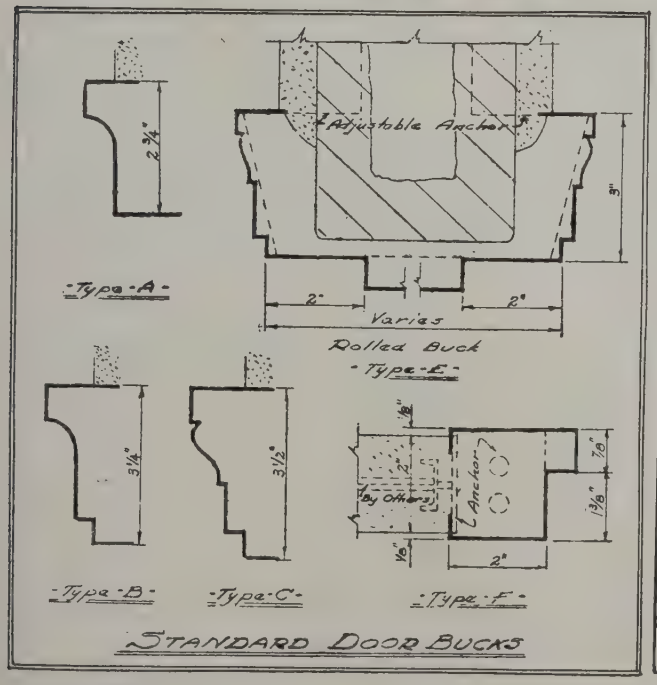


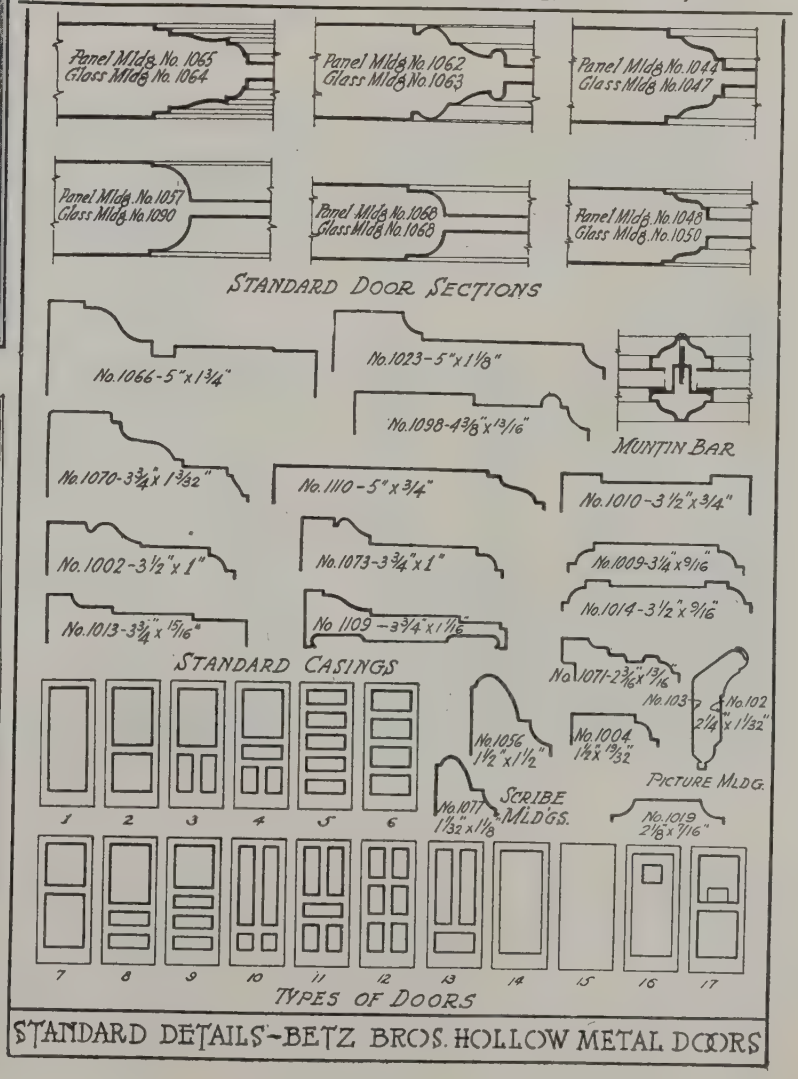
Right:
Steelbilt Heavy Elevator Doors

American Radiator Building, New York, N. Y.



Installation in Bryant Park Building, New York, N. Y.





THE CINCINNATI MFG. CO.

Kalamein and Hollow Metal Doors

CINCINNATI, OHIO

Products

HOLLOW METAL and KALAMEIN DOORS and TRIM, all types and designs.

HOLLOW METAL DOORS, bearing Underwriters' Laboratories, Inc., label of approval.

ELEVATOR ENCLOSURES, DOORS and CARS.

For Ornamental Iron and Bronze Work, see pages A860-861.

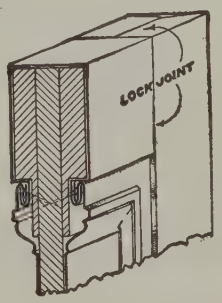
Kalamein Doors

These doors are constructed with a wood core over which sheet metal is applied. This kalamein will not warp or bulge, as expansion and contraction are allowed for in a special lock seam.

They can be furnished in a variety of stock designs.

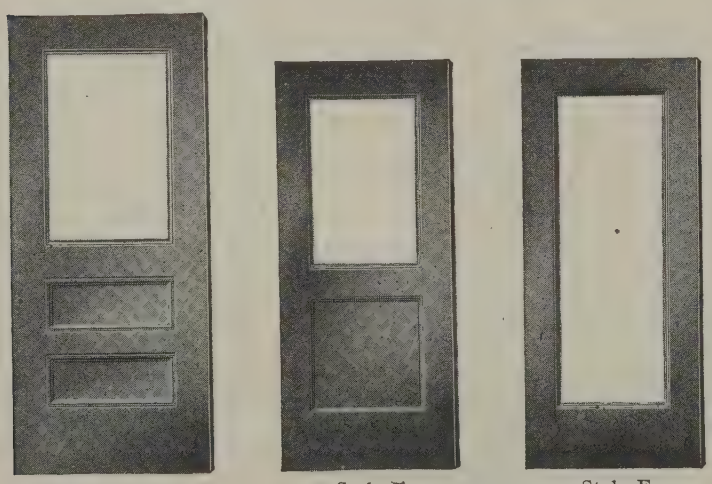
Catalogue No. 53 sent on application.

In addition to doors, kalamein trim, mouldings, muntin bars, astragals, and stop strips are manufactured by this company in either stock or special designs.



Detail of Construction for Kalamein Door

Specification Data—Core of thoroughly kiln dried lumber, tongue and groove joined, and clinch nailed. Stamp panels and rails in separate pieces, of metal specified. All joints are blind nailed and lock seamed securing covering to core in a manner which allows for expansion and contraction of metal. Doors exposed to weather covered with galvanized steel or sheet copper. Interior doors covered with Armco steel, bronze or copper. Steel doors finished with one coat gray priming paint, or baked enamel in imitation of wood, to be specified.



Style B Style E Style F

Kalamein Doors, with Glass Panels

Hollow Metal Doors

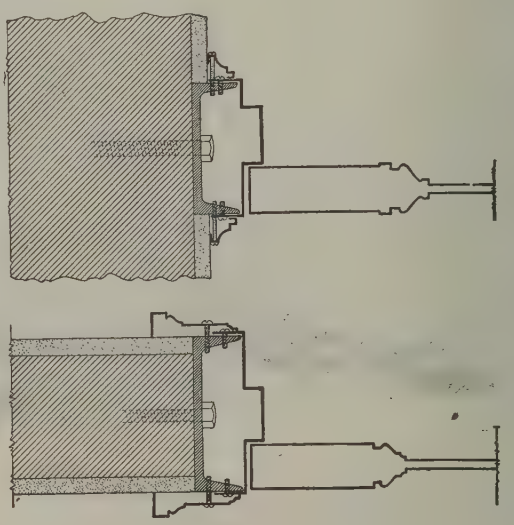
Made to architect's designs in special finishes permitting a wide range of individual expressions, or in stock patterns and standard finishes. Thoroughly insulated throughout to insure an efficient fire retardant and to prevent metallic sound. The construction obviates necessity of installing jamb during erection of walls, and permits hanging and adjusting of doors independently of frames. The Underwriters' Laboratories, Inc., have tested and approved these doors and their label is affixed to them, for all classes of openings.

Complete information should be given when asking for estimates, as they are based on the requirements of each particular installation.

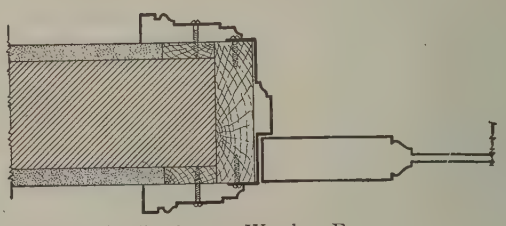
Catalogue No. 53 sent on request.

Corner Section Hollow Metal Door

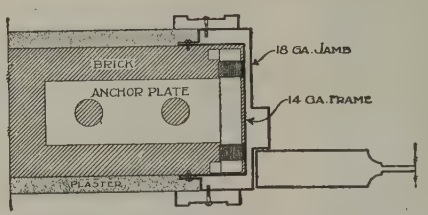
Specification Data—Doors of highest grade No. 18 gauge Armco open hearth steel specially treated. All surfaces true, level, and free from all imperfections. Parts interlocked and welded with invisible seams and joints. Insulate stiles, rails, and panels throughout with asbestos. Apply baked enamel finish in imitation of wood specified. Frames of No. 14 gauge steel, welded at joints to form one piece. Attach to walls by means of adjustable anchor plates. Jambs, furnished in separate pieces, fit over frames.



Applications to Channel Iron Frames



Application to Wooden Frames



Application to Cinmanco Approved Frame with Adjustable Anchor Plates

Section Through Door Jambs Showing Approved Buck Jamb and Casing Constructions for Hollow Metal Doors

Continued on next page

Elevator Enclosures, Doors and Cars

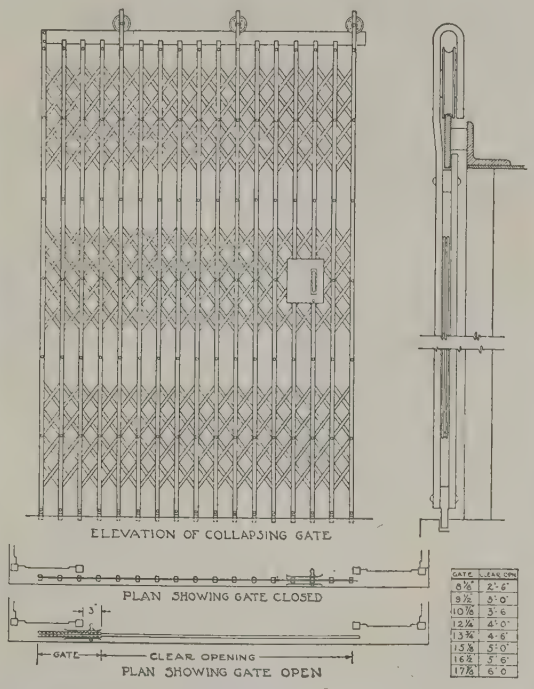
Many years' experience and a completely equipped plant enable us to produce any type of elevator enclosure in bronze, or steel. Several of our stock designs are shown here. Our engineering department is ready at all times to assist and co-operate with you in designing enclosures for special conditions.

We make enclosures of steel diamond mesh, steel square mesh, kalamein and hollow steel construction with polished wire, glass or steel bar panels, made in any wood finish desired.

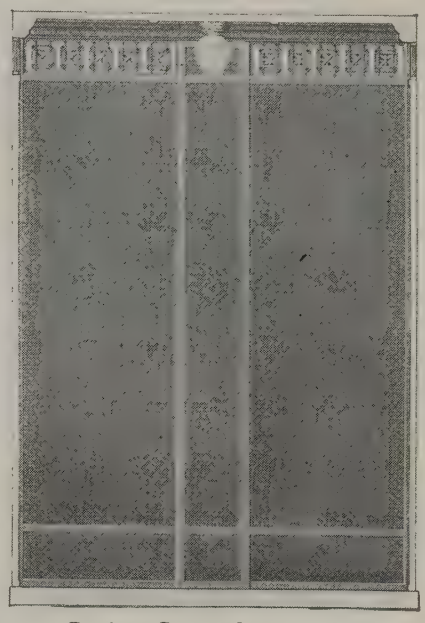
Standard doors are made in the following types: single sliding, two-speed sliding, two-thirds opening sliding, and combination sliding and swinging. Doors furnished complete with hardware.

Catalogue No. 55 on request.

Design C-26 Elevator Car



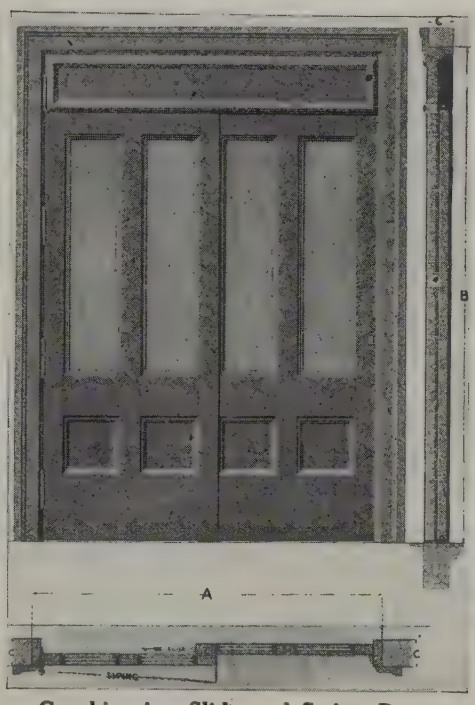
No. 602 Collapsing Gate



Design C-27 Elevator Car

Two-thirds Opening Sliding Door

Estimates furnished on receipt of dimensions A, B, C and D



Combination Slide and Swing Door

Desirable where elevator is used for both passenger and freight service. Estimates furnished on receipt of dimensions A, B and C

Design F-101 Elevator Front

COBURN TROLLEY TRACK MFG. CO.

Metal Covered Doors, Windows and Finish, Steel Bucks and Trim

HOLYOKE, MASS.

BRANCHES IN ALL PRINCIPAL CITIES

Products

Metal Covered Doors with photographic graining to match wood doors; Metal Covered Double Hung Windows both with and without integral weatherstripping; Bronze and Copper Entrances; Metal Covered Dumbwaiter Units of all types; Elevator Enclosures, including sills and hardware complete; Tin Clad Fire Doors and Shutters with hardware.

For Sliding Door Hardware of all types, see pages B2323-2327.

Facilities and Shipping

This company is prepared to handle orders of any size for all parts of the country. A large modern plant, with direct rail connection, insures the fabrication and delivery of all work promptly and in a satisfactory manner.

Metal Covered Doors and Trim

Coburn metal covered doors are furnished both labeled and unlabeled for use in office buildings, hospitals, public buildings, hotels, theaters, stores, residences, etc. These include stair, elevator, fire escape, tower, corridor and partition doors for general interior work, and entrance doors in copper, bronze, and brass.

Coburn standard doors are made with kiln dried white pine cores; rails are tenoned into stiles; panels are grooved into stiles and rails. Cores are covered with kalamein or galvanized iron, bronze, copper or brass.

For standard details and application of labeled and unlabeled doors showing mouldings and panels, see drawing No. K1.

Underwriters' Labeled Kalamein Doors

Coburn underwriters' labeled kalamein doors when installed as specified below for the purposes indicated, will give maximum protection and procure minimum rates for the insuring of the building and its contents.

Standard Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 96 in. wide. Panels to be solid. Hung on angle iron frames for brick walls and channel frames for tile walls or for metal lath and plaster partitions, with strap hinges and latches or butts and lock sets. Doors to stairs should be made self-closing. Doors can not be hung on metal covered jambs.

Fire Escape and Tower Doors—Labeled for single doors up to 4 ft. wide, 10 ft. high and for pairs up to 8 ft. wide, 10 ft. high; can include glass panels not exceeding 720 sq. in. in area. Must be hung in the same manner as stair and elevator doors.

Corridor and Partition Doors—Labeled to receive 9 sq. ft. of wire glass. Labeled up to 4 ft. wide, 10 ft. high for single doors and 8 ft. wide, 10 ft. high for pairs.

Specifications for Kalamein and Metal Covered Work

The following specifications are applied to the manufacture of all Coburn metal covered work and comply strictly with the most approved methods of construction for labeled and unlabeled doors and trim.

Cores—All woodword used in the manufacture of doors and window frames, jambs, doors, sash and trim to be seasoned, clear, kiln dried white pine. Stiles more than 6 in. wide to be built up of strips glued together. All door and sash members to be mortised and tenoned together.

Trim—Trim for doors to be shipped knocked down and fitted in the field so that any irregularities may be taken up at the job.

Metal—All metal covering of galvanized iron, furniture steel or kalamein to be of gauges ranging from 18 to 26; copper to be from 16-oz. to 32-oz.; bronze from 16-gauge to 24-gauge. Metal to be drawn on to wood cores through steel dies. Furniture steel or kalamein can be painted in color or grained to match any type of wood door; copper and bronze to be finished antique, statuary bronze to be finished antique, statuary bronze or any suitable design as required.

Covering of Cores—*Unlabeled Doors*—The metal is to be applied directly over the cores. All metal must fit closely to the wood cores. All surfaces and edges are to be straight and true; mouldings to be as per details. Bench marks are to be avoided as much as possible and cut ends at miters are to be covered with the same metal as used on mouldings. Thickness of door is 1¾ in.

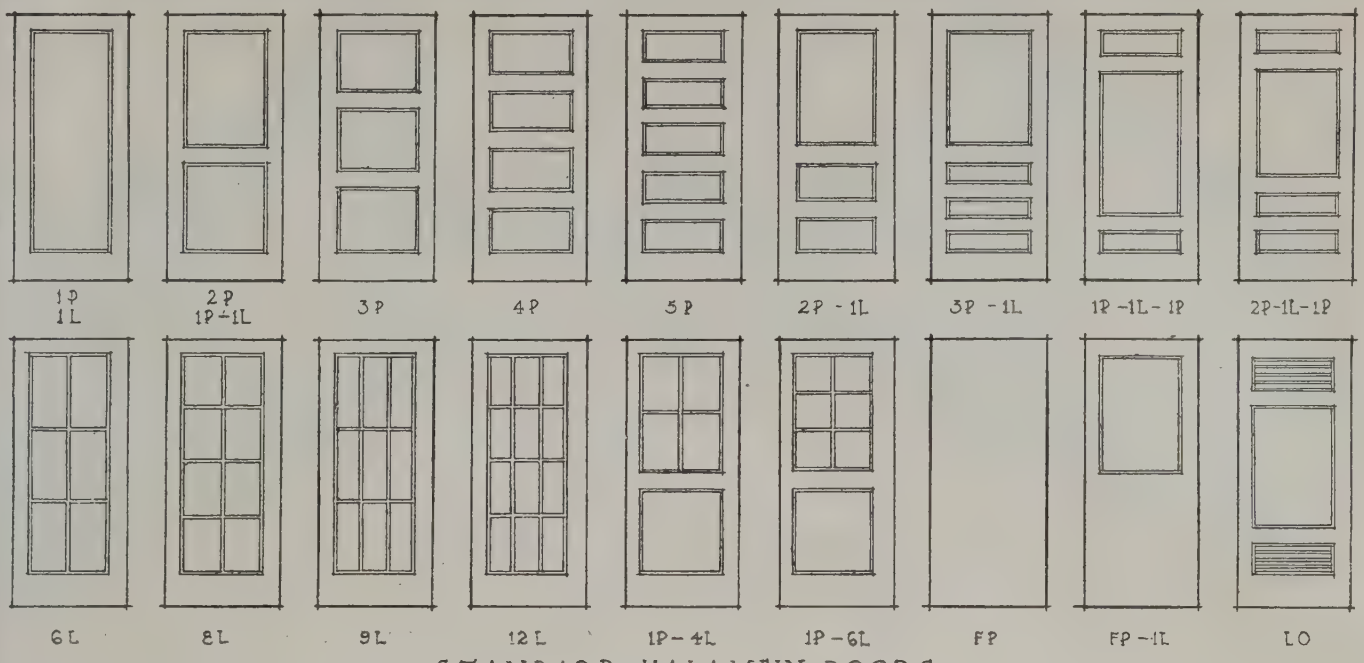
Labeled Doors—Are to be covered in the same manner as the unlabeled doors except as shown on detail on following page. Thickness of door is 1⅞ in.

All joints of metal to be locked and soldered so that no moisture can gain entrance to the cores.

Steel Bucks and Trim

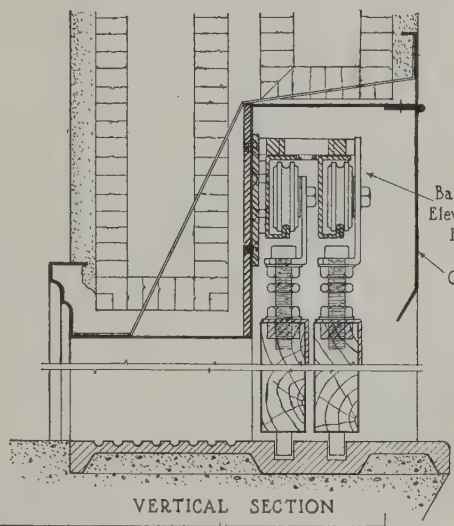
Our steel bucks can be furnished with integral trim, in 16 or 14 gauge. All other gauges as required can be furnished in flat hospital type bucks to suit specifications.

Continued on next page

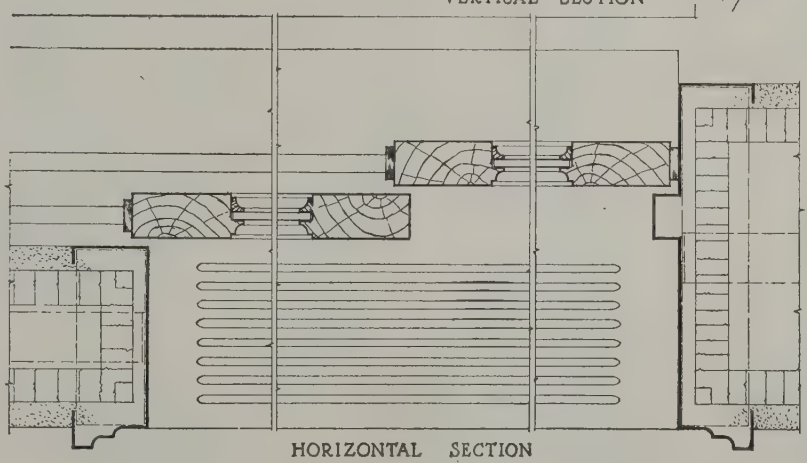


STANDARD KALAMEIN DOORS

Coburn makes, furnishes and installs the complete opening, including, Doors, Steel Jambs, Track and hangers, Sills and Track Covers.
Details show standard material

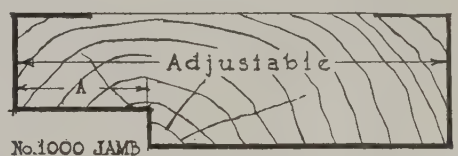


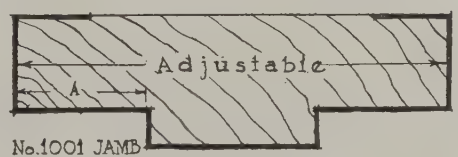
VERTICAL SECTION

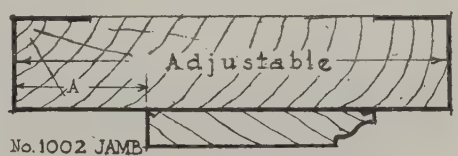


HORIZONTAL SECTION

DETAILS OF TWO SPEED GEARED KALAMEIN ELEVATOR DOORS WITH STEEL BUCKS AND TRIM

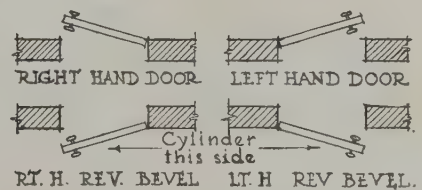






"A" is 2" for St'd Labeled Doors, & is 1⅞" for St'd Unlabeled Doors. This dimension can be varied for special heavy doors.

ONE-HALF FULL SIZE DETAILS OF STANDARD JAMBS



DESIGNATIONS OF DOOR-SWINGS.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF TYPICAL COBURN METAL COVERED DOORS AND SASH.	SCALE 1½"&6" EQUALS 1'-0" DATE JUL. 26 DRWG K-1

THE COMPOUND AND PYRONO DOOR CO.

Manufacturers of Fireproof Veneered Doors and Trim

ST. JOSEPH, MICH.

For Branch Offices, see page B1440

Products

PYRONO FIREPROOF DOORS and TRIM.

For compound Key-Veneered Doors, see pages B1440-1441; for Trimount Soundproof Doors, see page B1437.

Py-ro-no TRADE MARK REGISTERED

Asbestos Interlined FIRE PROOF DOORS

Process of Construction

The PYRONO process is a mechanical method of fireproofing wood cores in the manufacture of doors and trim.

In PYRONO construction, cores of non-resinous wood are used and these when assembled are covered with pure, long fiber asbestos sheathing mechanically bonded to their surfaces, excluding oxygen, thus preventing ignition and assuring against spread of flame from the place of origin to other parts of a building—the one essential province of a fire door.

Appropriate Use

PYRONO doors are used for stairways, elevators, corridors and partitions, in office buildings, hotels, hospitals, apartments, schools, dormitories and similar types of fireproof buildings.

Fully Tested

PYRONO, first introduced in 1910, has fully demonstrated in official tests and actual fires its perfect efficiency as a fire retardant.

Designs

Flush doors with or without inlay. Panel doors, any arrangement of panels. Sash doors with glass lights not exceeding 720 square inches. PYRONO doors and trim furnished in all cabinet woods used in interior finish.

Specifications

Pyrono Panel Doors—Fireproof paneled veneered doors to be constructed as follows: Stile and rail cores to consist of narrow softwood strips, thoroughly kiln-dried, not more than ⅞-in. thick and glued together under pressure. This wood core to be covered on face and edges with pure long fibre asbestos sheathing thoroughly glued and indented with not less than twenty-five indentations to the square inch. Each indent to be perforated at its base to perfect the glue bond between core and veneer. Hardwood veneer as specified to be applied to face of such stiles and rails, and edge strips to match veneer to be applied to all edges.

Panels shall be laminated seven-ply with grain crossed on alternate wood plies. The ply next to the core on each side shall be pure long fibre asbestos sheathing thoroughly glued and indented to the core as indicated for stile and rail construction. Face veneer to be as specified by architect. All panels to be not less than ¾-inch thick.

All stile and rail joints to be of mortise and tenon construction.

All doors shall be hand or belt smoothed and entirely free from cross grain sander scratches.

All doors to receive one coat of stain and shellac (including filler if necessary), or lead and oil priming before shipment.

Pyrono Flush Doors—Fireproof flush veneered doors to be constructed as follows:

Cores to consist of narrow softwood strips, thoroughly kiln-dried, not more than ⅞-inch thick, glued together to form stiles, cross rails and flush panels, and framed together with mortise and tenon joints. This wood core to be covered on face and edges with pure long fibre asbestos sheathing thoroughly glued and indented to the core, with not less than twenty-five indents to the square inch. Each indent to be perforated at its base to perfect the glue bond between core and cross band.

Hardwood edge-strips of same wood as face veneer to be applied on all edges and door to be completed by application of ⅛-inch cross-band and face veneer not more than ⅛-inch thick.

All doors to be hand or belt smoothed and absolutely free from machine or sander marks that will appear on application of stain or varnish. All doors to receive one coat of stain and shellac (including filler if necessary), or lead and oil priming before shipment.

A Few of the Scores of Pyrono Installations and Their Architects

Beth Israel Hospital, New York, N. Y., Louis Allen Abramson
Columbia-Presbyterian Medical Center, New York, N. Y., James Gamble Rogers
Equitable Trust Bldg., New York, N. Y., Trowbridge & Livingston
Old Colony Life Ins. Bldg., Chicago, Ill., C. A. Eckstrom
Ohio Bell Telephone Bldg., Cleveland, Ohio, Hubbell & Benes
Straus Bldg., Chicago, Ill., Graham, Anderson, Probst & White
Drake Hotel, Chicago, Ill., Marshall & Fox
Sherman Hotel, Chicago, Ill., Holabird & Roche
Hotel Cleveland, Cleveland, Ohio, Graham, Anderson, Probst & White
Masonic Temple, Columbus, Ohio, Stribling & Lum
Y.M.C.A., Worcester, Mass., Louis E. Jallade
Union Station, Chicago, Ill., Graham, Anderson, Probst & White
Clements Library, Ann Arbor, Mich., Albert Kahn, Inc.
St. Catherine's High School, Racine, Wis., Barry, Byrne & Ryan
Grand Rapids Savings Bank, Grand Rapids, Mich., Osgood & Osgood
American Radiator Co. Bldg., New York, N. Y., Raymond Hood
Ambassador Hotel, Chicago, Ill., Schmidt, Garden & Martin
Hanna Bldg., Cleveland, Ohio, Chas. Platt
Cunard Bldg., New York, N. Y., Benjamin W. Morris
Butler Brothers Bldg., Chicago, Ill., Graham, Anderson, Probst & White
Federal Reserve Bank, Chicago, Ill., Graham, Anderson, Probst & White
Federal Reserve Bank, Kansas City, Mo., Graham, Anderson, Probst & White
Ohio State University Library, Columbus, O., Allen & Collens
Ohio State University Administration Bldg., Columbus, Ohio, J. N. Bradford
Chicago Theatre, Chicago, Ill., C. W. & Geo. L. Rapp
Metropolitan Life Insurance Co., New York, N. Y., D. Everett Waid
Dayton Savings & Trust Co. Bldg., Dayton, Ohio, Schenck & Williams
Michigan Hospital School, Detroit, Mich., Albert Kahn, Inc.
Hotel Statler, St. Louis, Mo., George B. Post & Sons
Hotel Washington, Washington, D. C., Carrere & Hastings
Y.M.C.A. Apartments, Indianapolis, Ind., Rubush & Hunter
First National Bank, Wichita, Kan., Richards, McCarty & Bulford
Divinity Hall (Union College), Columbus, Ohio, Perkins, Fellows & Hamilton
St. Nicholas Hotel, Springfield, Ohio, H. L. Stevens Co.
Eaton Tower, Detroit, Mich., Louis Kamper
Roosevelt School, Detroit, Mich., Malcomson & Higginbotham
United Artists Bldg., Detroit, Mich., C. Howard Crane
Cooley High School, Detroit, Mich., Donaldson & Meier
Edsel Ford Residence, Detroit, Mich., Albert Kahn, Inc.
Century Club, Detroit, Mich., George D. Mason
Wenonah Hotel, Bay City, Mich., H. L. Stevens Co.
St. Regis Hotel, New York, N. Y., Sloan & Robertson
Chicago Temple, Chicago, Ill., Holabird & Roche
Olympia Fields Country Club, Chicago, Ill., Geo. C. Nimmons & Co.
McCormick Residence, Chicago, Ill., John A. Armstrong
Geo. B. Reynolds Residence, Chicago, Ill., Marshall & Fox
Steuben Club, Chicago, Ill., K. M. Vitzthum & Co.
Fisher Bldg., Detroit, Mich., Albert Kahn, Inc.
Medinah Athletic Club, Chicago, Ill., Walter Ahlschlager
Chase Co. Offices, Waterbury, Conn., Cass Gilbert

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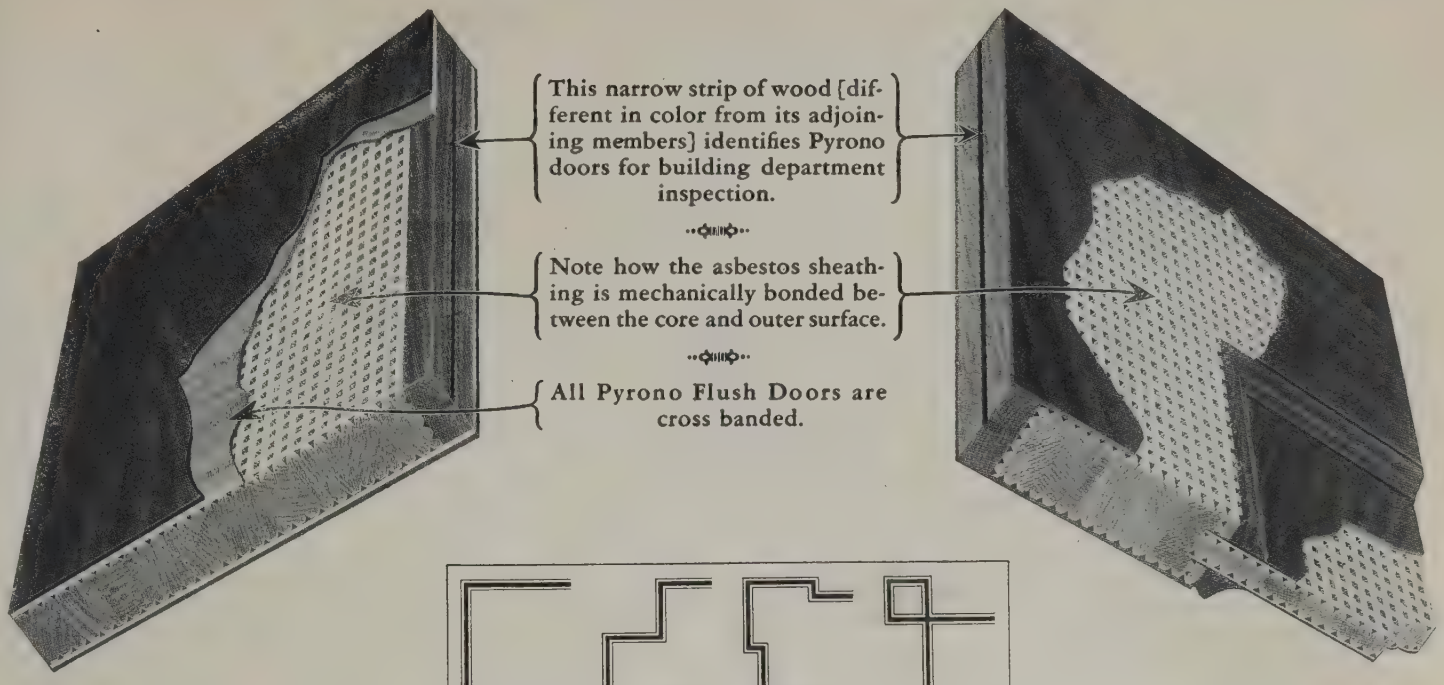
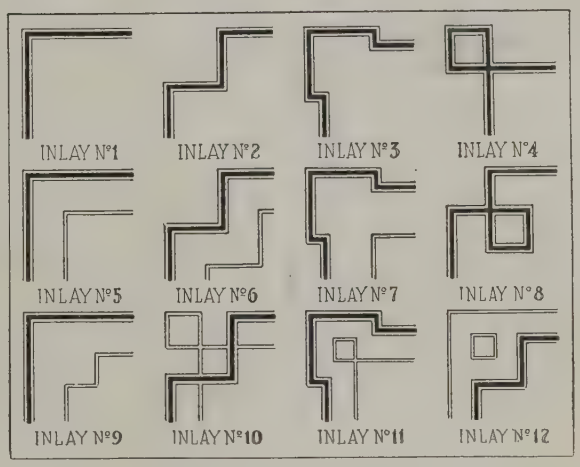


Construction of the Pyrono Flush Doors

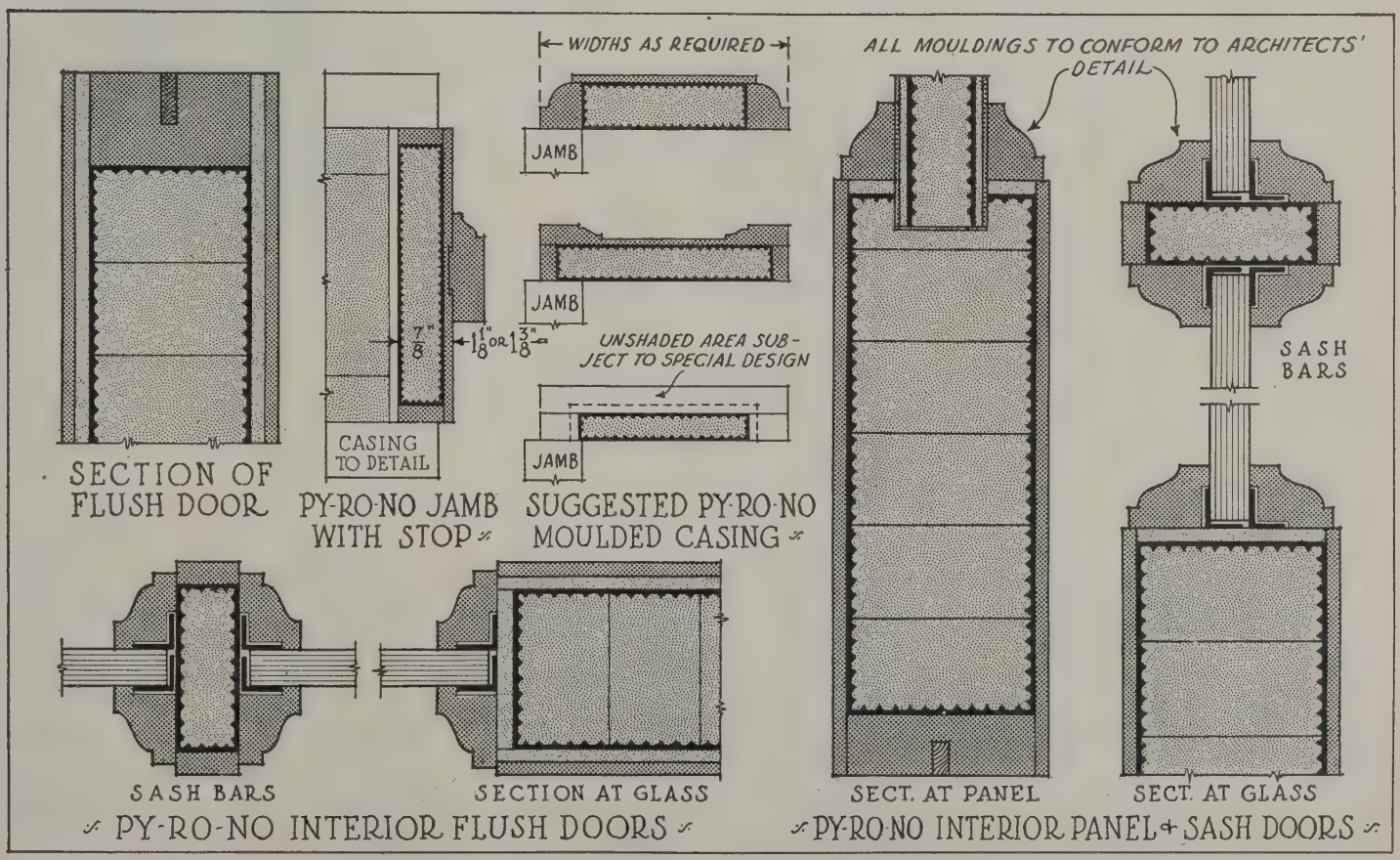
Pyrono Flush Doors are custom made in any size to meet architects specifications. They are furnished inlaid or plain



Standard Inlay Designs

Construction of the Pyrono Panel Doors

Pyrono Panel Doors are made in any design, size or style to meet architects requirements



Pyrono (Fireproof) Doors and Trim are Built to Architect's Designs Regardless of Period or Type

EMPIRE FIREPROOF DOOR CO.

EMPIRE KALAMEIN CO., INC., SUBSIDIARY

Metal Covered Doors, Windows and Trim; Architectural Bronze

Southern Boulevard at 145th Street

NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 3727 Northwestern Avenue

CLEVELAND, OHIO, 308 Euclid Building

Write to Home Office for Address of Nearest Representative

Products

METAL COVERED KALAMEIN DOORS (Underwriters' Labeled), WINDOWS, DOOR FRAMES and TRIM, ELEVATOR FRONTS, SMOKE SCREENS; BRONZE ENTRANCES.

We specialize in Bronze Work.

KALAMEIN PRODUCTS

TRADE-MARK (Registered)

"Empire Commercial" Metal Covered Doors

Through years of specialization in the manufacture of metal covered work, we have evolved a product in which we take just pride—the "Empire Commercial" metal covered door, suitable for any class of fireproof work.

Details—***Cores***—Sound kiln dried white pine milled in one piece, sanded and finished accurately, for cores of stiles and rails.

Covering—Long terne or galvanized or furniture steel of No. 24 gauge. Drawn on through steel dies; sharp angles and arrises; tight and free from waves and buckles.

Panels—To be three-ply laminated pine meeting requirements of all city and state building departments.

Assembly—Doors are mortised and tenoned, wedged and glued or doweled. Seams soldered and scraped by our own process, producing a perfect and smooth surface. Under ordinary use seams are guaranteed not to split.

Finish—All material receives one coat of special metallic primer.

Underwriters' Labeled Doors

Paneled metal clad swinging doors may be used for openings in vertical shafts, corridor or room partitions, exterior walls, and fire escape exits when provided with special hardware. Size when mounted singly, not exceeding 4x8 ft. In pairs, not exceeding 7x8 ft. Doors must be hung to angle iron, channel iron or hollow metal jambs.

Empire Metal Covered Windows

Double hung or casement type windows are made in our standard design, or they will be manufactured to meet special conditions. The construction follows, in general, the strictest standard requirements. Great care is taken to secure tight seams and joints to counteract the natural effects of exposure.

Empire Integro Window—Details are the same as described for the standard window, with the addition of special interlocking features which combine to produce all the effect of a weatherstripped window.

Empire Bronze Doors

Bronze doors are now built in a more substantial and more attractive manner by using extruded bronze panel mouldings and edge pieces.

Specifications—Stiles and rails are to be kiln dried white pine, free from loose knots and blue sap. The panels are to be 3-ply laminated wood cores covered with No. 20 gauge bronze, glued on under pressure of 350 lb. per sq. in. Covering of stiles and rails to be No. 18 gauge bronze. Extruded bronze edge pieces ⅛ in. thick to be used around both sides and top and bottom of all doors. Extruded bronze moulding ⅛ in. thick to be used for all panels both solid and glass. Edge pieces and moulding to lap doors on both faces.

All mouldings to be secured with concealed brass screws in all places except the moulding on removable side. ⅛-in. brass plates to be countersunk over all seams and joints on the cores and to be secured by countersunk brass screws. Bronze covering is to be brazed to this plate. The seams between stiles and rails to be invisible.

Empire Copper Doors

It is wise to use an "Empire Copper Kalamein Door" for exterior openings as the chemical composition of copper is such that will enable it to withstand the elements far better than iron or steel.

Empire Metal Covered Smoke Screens

For enclosing stair halls, and corridors, we manufacture in any design to meet any condition.

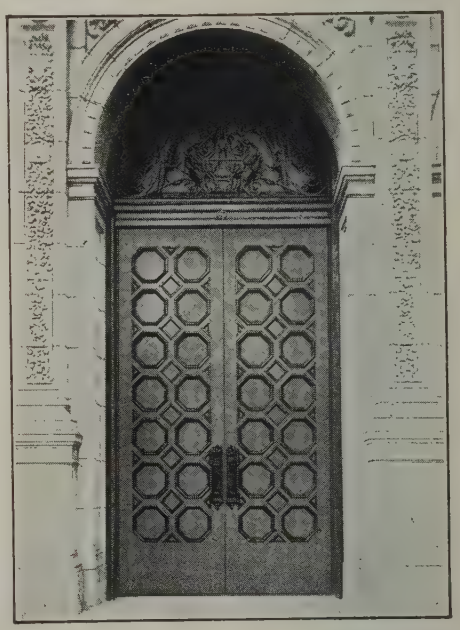
Empire Metal Covered Elevator Fronts

Kalamein elevator fronts are being used more extensively now than ever before, because the solid core feature makes it practically the only fireproof elevator door which can be operated quietly.

The tinny metallic rattling sound so common in metal sliding doors is absent in kalamein as the wood core acts as a sound deadener.

Empire Architectural Bronze

We manufacture and will erect in any part of the United States, cast and wrought bronze doors, windows, grilles, bank and counter screens, etc. We have specialized in bronze work for years and have many notable installations to which we can refer anyone interested.



Doors in Our Lady of Victory Church, Chicago, Ill.

SHUETZ CONSTRUCTION CO., Chicago, Ill., Contractors

E. BRIELMAIER & SONS, Milwaukee, Wis., Architect

Empire Service

"We can duplicate in kalamein any door that can be designed in wood."

This company is always ready to cooperate with the architectural profession.

We are ready at all times to suggest details or to furnish technical information in relation to our products.

Catalogues sent on request.

References

Theaters

Loew's Syracuse, Syracuse, N. Y.
Shubert's Forrest, Philadelphia, Pa.
Loew's Richmond, Richmond, Va.
Keith's, Chester, N. Y.
Mark Strand, Utica, N. Y.

Banks

Northport Trust Company, Northport, L. I., N. Y.
Flushing National Bank, Flushing, L. I., N. Y.
Malverne Bank, Malverne, L. I., N. Y.
Little Neck National Bank, Little Neck, L. I., N. Y.
First National Bank, Wytheville, Va.
First National Bank, Niagara Falls, N. Y.
Peoples Bank of Potsdam, Potsdam, N. Y.
First National Bank, Atlanta, Ga.
Bethlehem Savings & Trust Co., Bethlehem, Pa.
Washington National Bank, Washington, Ind.

Schools

Julia Richman High School, New York, N. Y.
Girls' Commercial High School, Brooklyn, N. Y.
Adams School, Youngstown, Ohio
University of Wyoming, Casper, Wyo.
Jerome High School, Phoenix, Ariz.
McNeil High School, Kansas City, Mo.
Junior High School, Camden, N. J.

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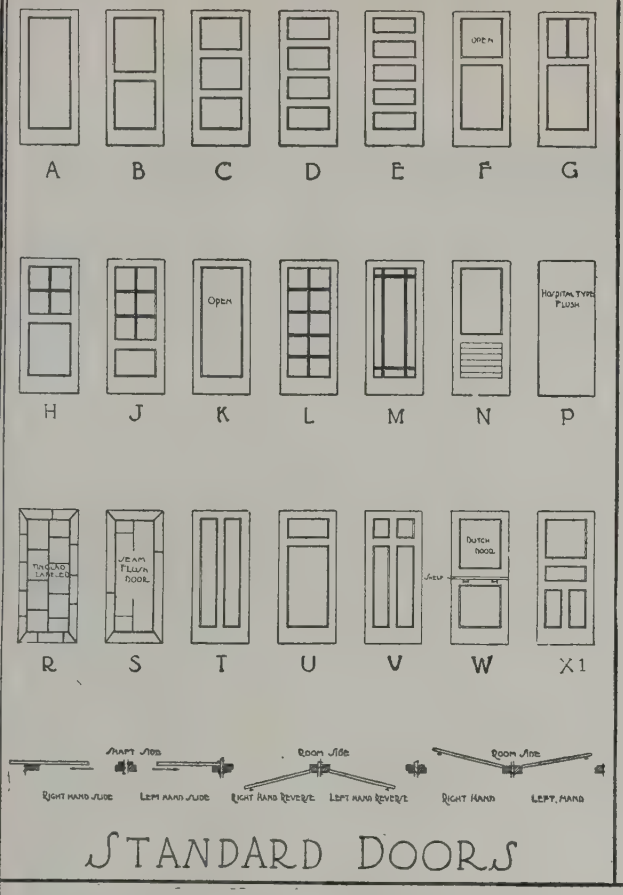
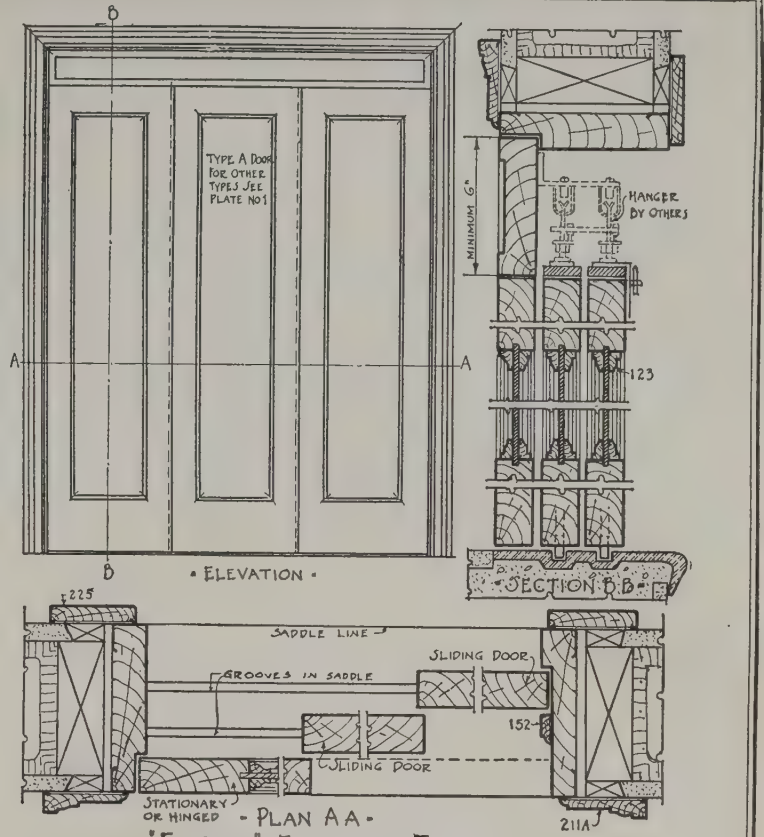
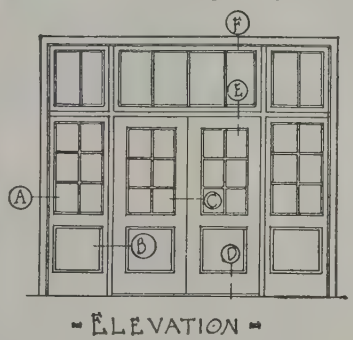


STANDARD DOORS

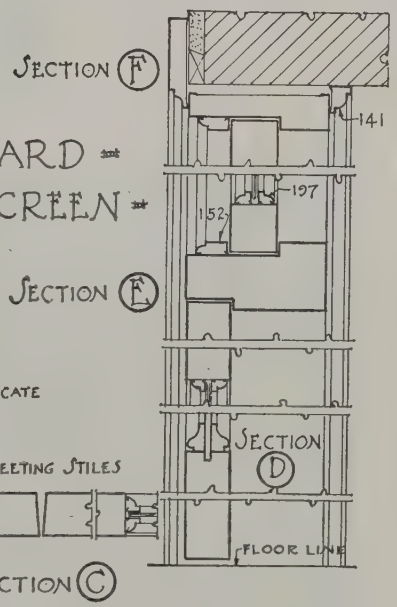


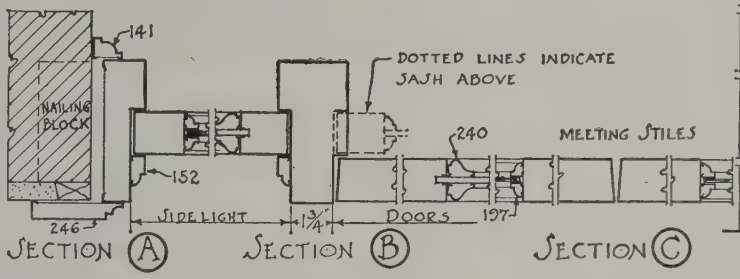
"EMPIRE" ELEVATOR FRONTS
STANDARD 2 SPEED DOORS WITH ARM

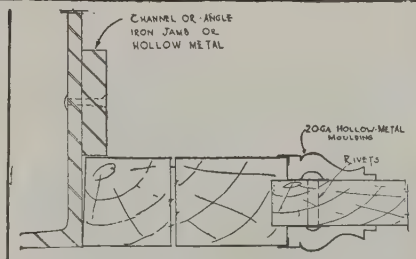


ELEVATION

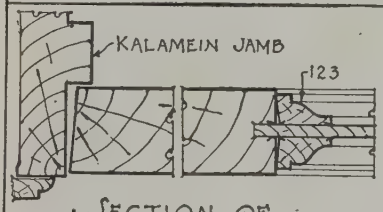
STANDARD SMOKE SCREEN



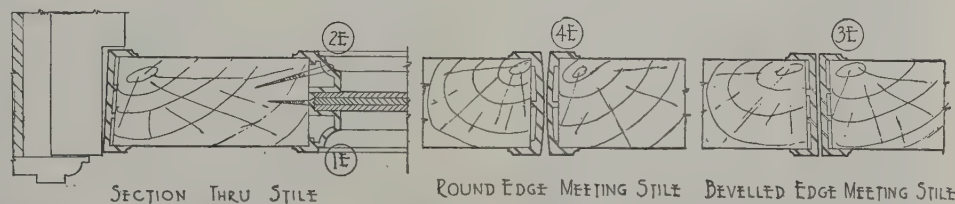




SECTION OF UNDERWRITERS KALAMEIN DOOR



SECTION OF STANDARD KALAMEIN DOOR



SECTION THRU STILE — ROUND EDGE MEETING STILE — BEVELLED EDGE MEETING STILE

18 GAUGE BRONZE DOOR WITH EXTRUDED BRONZE MOULDINGS

DRAWN BY EMPIRE FIREPROOF DOOR CO., INC.	STANDARD DETAILS EMPIRE FIREPROOF DOOR CO., INC.	SCALE 1½" & 3" EQUALS 1 FT. DATE JUNE '25	DR'WG. 1

FIRECRAFT CORPORATION

TELEPHONES
SEELEY 6490, 10082

Manufacturers of Fireproof Doors

2229-2233 South Ogden Avenue, CHICAGO, ILL.

Products

We manufacture a complete line of FIREPROOF DOORS of every description.

All doors are approved by the National Board of Fire Underwriters' and Factory Mutuals. All doors are labeled by the Underwriters' Laboratories, Inc.

"Firecraft" Type Numbers

Hollow metal doors, Nos. 100 to 199.
Kalamein doors, Nos. 200 to 299.
Steel fire doors, Nos. 300 to 500.
Freight elevator doors, Nos. FB1 to FB50.
Dumbwaiter doors, Nos. FDW1 to FDW10.
Passenger elevator doors, No. PE1 to PE99.
Tin clad doors, Nos. 550 to 599.
Steel plate doors, Nos. 600 to 650.
Storeroom doors, No. 900.

Various Types of "Firecraft" Hollow Metal Doors

Type No. 100, single panel door with "C" finish.

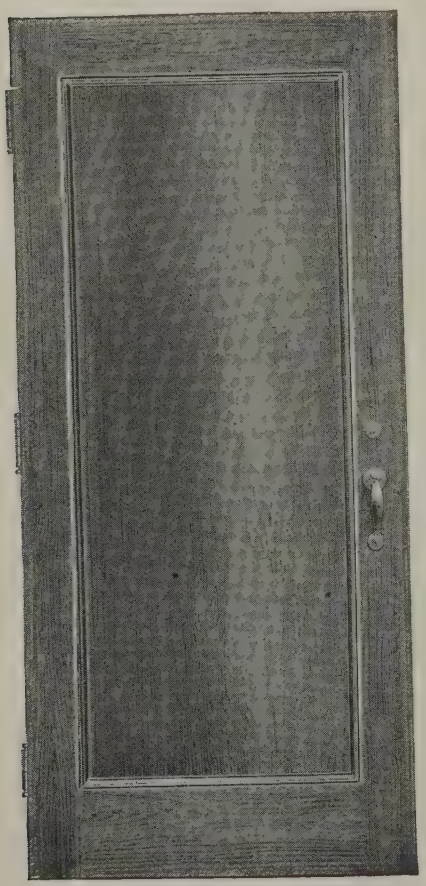
Type No. 195, two raised center octagon panels with corner and side depressed panels. Finish "D" weathered English oak, ornamented with flowers in depressed side panels.

Type No. 136, hollow metal entrance doors to school; has raised panels and recessed mouldings.

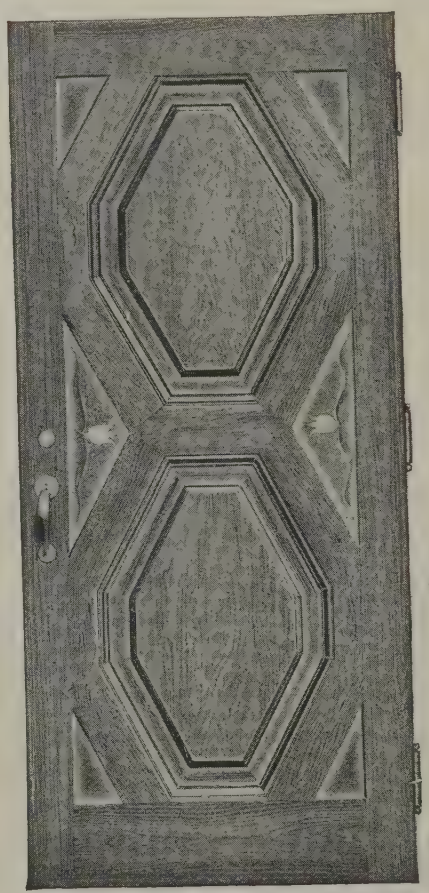
Type No. 110, hollow metal exit door for theatre, having ten panels finished in oak; equipped with panic latch.

We make these doors in all types and designs.

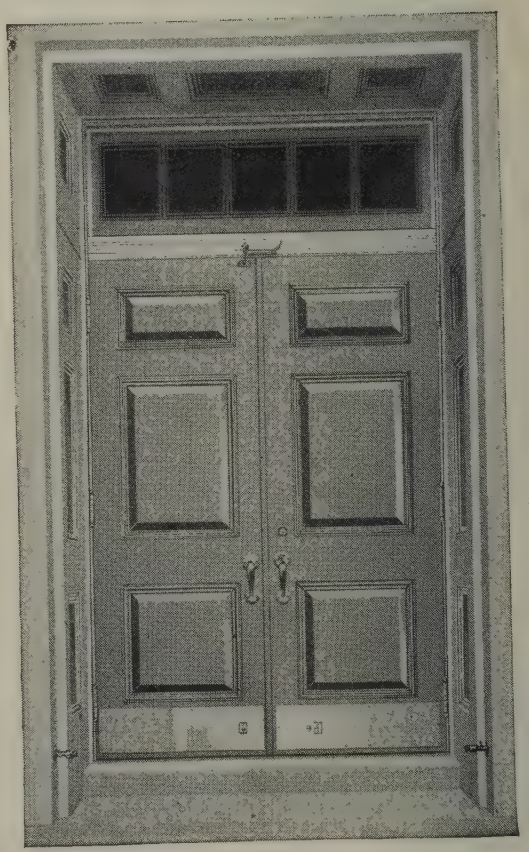
Type No. 110 "Firecraft" Door



Type No. 100 "Firecraft" Door



Type No. 195 "Firecraft" Door



Type No. 136 "Firecraft" Door

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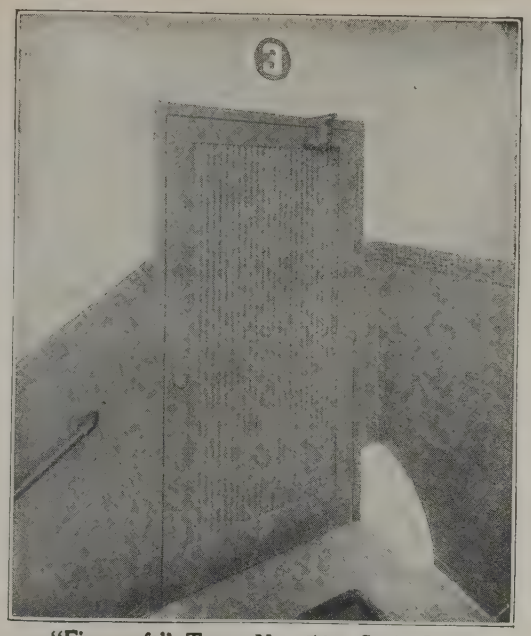
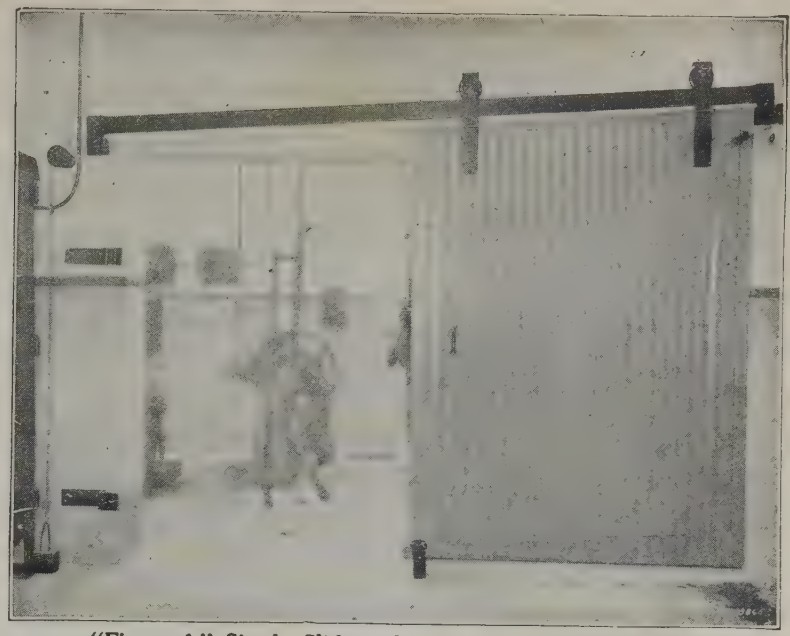
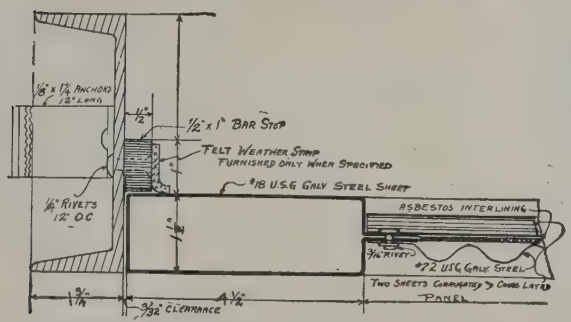


"Firecraft" Type No. 500 Stair Door
Made of galvanized steel with mortised hardware



"Firecraft" Single Sliding Gravity Type Door No. 400
Overlapping wall 4 in. at sides and top. Automatic hardware



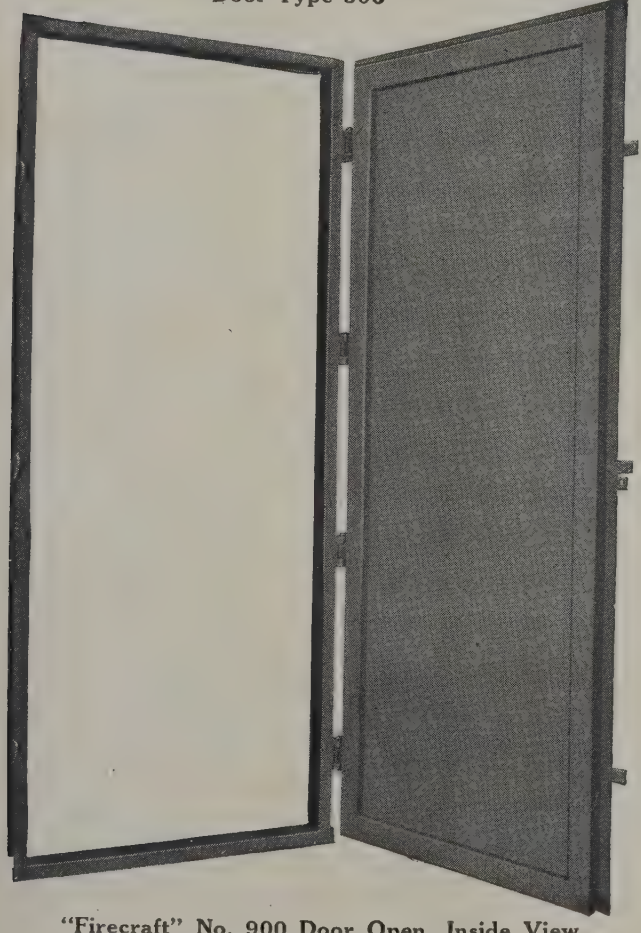
Section Through Door and Jamb, "Firecraft" Door Type 500

"Firecraft" Type Nos. 300 to 500 Doors (Patented)

Construction—Doors are constructed of two layers of cross-layed steel sheets, galvanized and corrugated, interlined with asbestos. The edges are riveted to heavy galvanized steel stiles and rails. Made in all types—swinging, sliding, slide-up and turn-over, etc.

Advantages—"Firecraft" 300 to 500 doors are fireproof, strong, rigid, and comparatively light in weight, and as easily operated as ordinary wood doors.

Not subject to dry rot, as in case of tin clad doors.



"Firecraft" No. 900 Door Open, Inside View
Note clear, smooth, easily cleaned surfaces

"Firecraft" Type No. 900 Doors Underwriters' Labeled

"Firecraft" Type No. 900 doors are designed particularly for storerooms of storage warehouse, but may be used for penthouse and exterior openings. They are a distinct departure from the customary storeroom doors as they are rigid and yet not unwieldy. The outside is ruggedly protected with heavy strap hinges, butts, latches, etc., while the inside surface is clear and easily cleaned with no projecting cross bars to catch dust.

Features—
(1) Rigid construction.
(2) Tight fitting door.
(3) Sanitary construction.
(4) Ruggedly built.
(5) Underwriters' labeled.
(6) Easily cleaned.
(7) Shipped and erected as a unit.
(8) All steel throughout.
(9) Locking device provided.
(10) Material carried in stock for immediate shipment.

"Firecraft" No. 900 Door Closed Outside View
Note strong hinges, etc.

E. H. FRIEDRICH COMPANY

Manufacturers of Metal Covered Doors, Windows, Partitions and Trim

HOLYOKE, MASS.

REPRESENTATIVES

BOSTON, MASS., Rubin-Burke Co., 333 Washington Street
NEW HAVEN, CONN., A. R. Kirschner Co., 30 Whitney Avenue
NEW YORK, Haefner & Harding, 562 Broadway, Albany, N. Y.
BALTIMORE, MD., Consolidated Supply Co., 10 West Chase Street
PHILADELPHIA, PA., Consolidated Supply Co., 1830 Arch Street
WASHINGTON, D. C., Consolidated Supply Co., Bond Building
SCRANTON, PA., LeBar Evans & Allen, Scranton Electric Building
ROCHESTER, N. Y., American Clay & Cement Co., 1175 East Main Street
UTICA, N. Y., American Hardwall Plaster Co.

Products

High grade Kalamein (Metal Covered) Woodwork for fireproof and sanitary purposes, including Doors and Trim, Windows, Partitions, etc., in Kalamein, Copper, Bronze and Steel; Fireproof Hollow Metal Windows with Underwriters' label.

Also manufacturers of a general line of Building Sheet Metal Work.

TRADE-MARK

Facilities and Workmanship

Our factory is especially well equipped to produce any design in high grade metal covered woodwork or hollow metal windows, suitable for buildings such as banks, public office and school buildings.

This work can be executed promptly and efficiently.

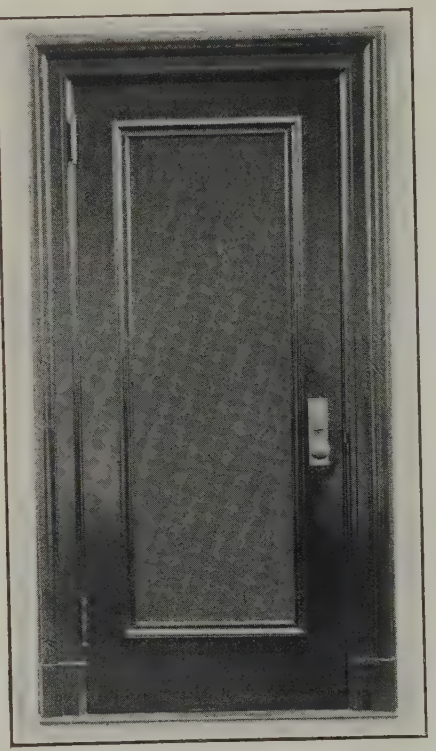
High Grade Metal Covered Entrance Doors

The manufacturing of highest grade metal covered entrance doors is our specialty.

They are made in copper or commercial bronze.

Finish

All bronze and copper work is properly cleaned, oxydized and oiled before it leaves the factory to prevent corrosion.



A Friedrich Metal Covered Door
Hardware applied at factory

Kalamein products are cleaned and painted with one coat of special metal primer.

Metal Covered Mouldings

In order to economize in designing metal covered work, a number of standard stock mouldings for panels, trim, etc., have been shown at the scale of 3 in. to the foot.

By using these mouldings the cost of special dies is saved.

Kalamein Elevator Doors

We make a specialty of metal covered elevator doors in kalamein, copper or bronze.

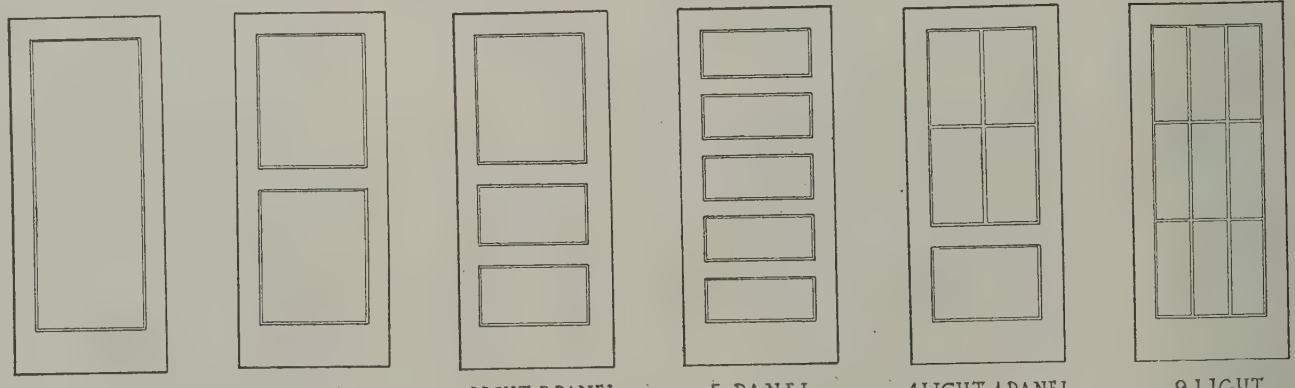
These are furnished in three types: swing, slide, or combination slide and swing, and in any design. Mouldings to be standard to fit our dies.

Doors can be furnished complete with hardware.

Specifications for Kalamein Doors and Smoke Screens

Where indicated on plans, doors, jambs, trim, side lights, transoms, etc., shall be kalamein.

All metal used for covering shall be "Keystone" copper steel. No. 26 gauge to be used for stiles, rails, jambs and panels, and for all sash and trim, and No. 28 for all moulding.



DETAILS SHOWING STOCK KALAMEIN DOOR DESIGNS

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All cores shall be made up from clear kiln dried white pine, free from loose knots, sap and shakes.

All cores shall be milled true to form. All stiles over 6 in. wide shall be built up of small strips glued together. All door stiles and rails shall be mortised, tenoned, and glued together.

All door stiles, sash, jambs, mouldings, muntins and trim shall be drawn through steel dies. All mouldings and edges shall be clean, sharp and true to detail with metal fitting closely to wood cores.

Special care must be used in assembling to avoid bench marks as much as possible.

All joints between metal shall be filled with solder and scraped flush.

After work is assembled all metal surfaces shall be thoroughly cleaned, with oxide of iron, of grease and all foreign substances, and given one coat of special metallic primer sprayed on even and smooth.

Hollow Metal Windows

A complete line of hollow metal windows, underwriters' label, of all types is manufactured by this company.

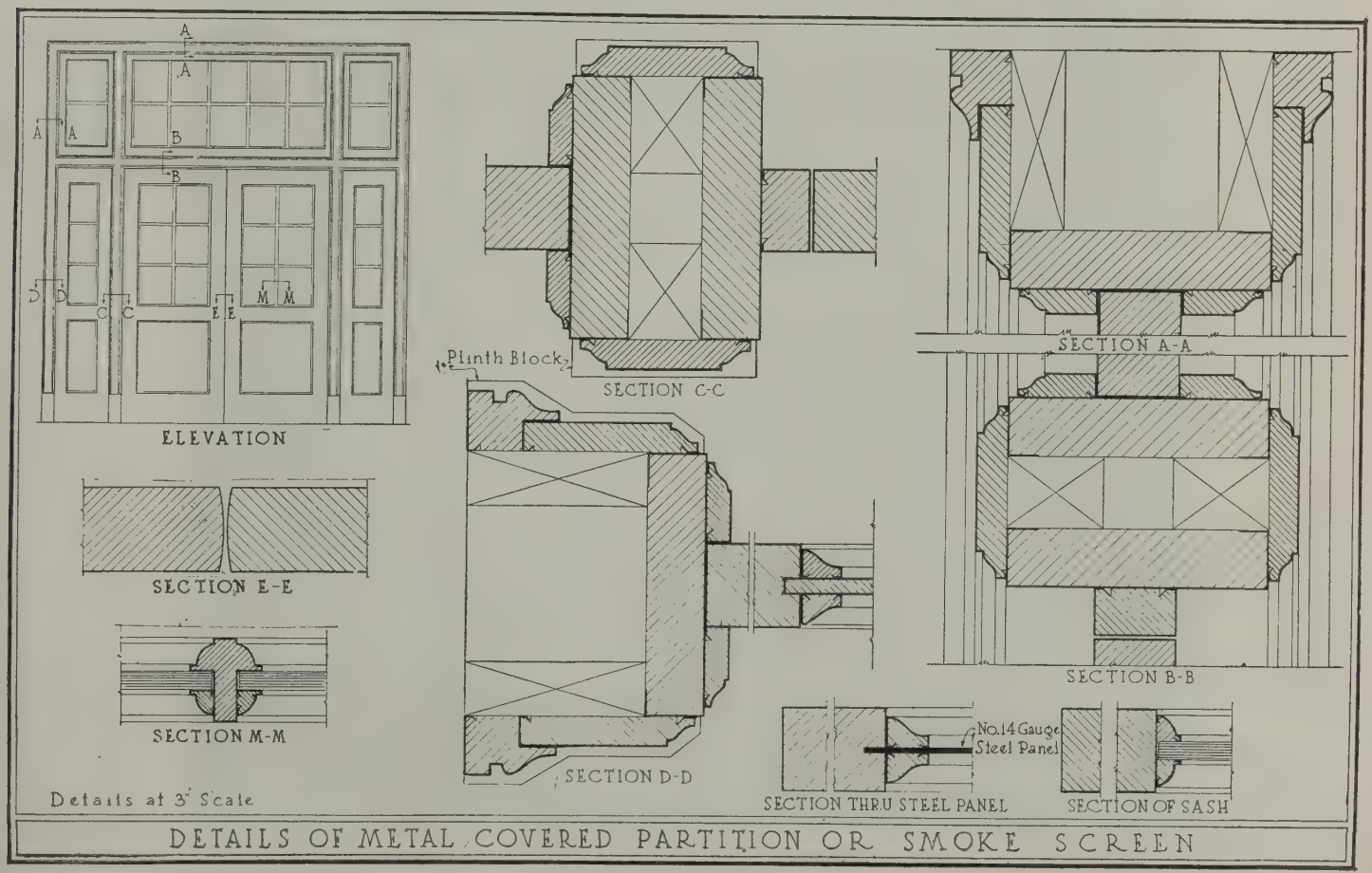
This includes double hung stationary, pivoted, and combinations of these types.

All windows are made with cutting and forming dies which insure the fitting of every member when assembled and a perfect operating window. Made in standard No. 24 gauge, also Heavy Type No. 20 gauge.

Specifications and details sent on request.

Recent Contracts

School No. 33, Scranton, Pa.
St. Lawrence State Hospital, Ogdensburg, N. Y.
First National Bank, Amherst, Mass.
Somerville High School, Somerville, Mass.
Park City Hospital, Bridgeport, Conn.
Crocker Burbank Mfg. Co., Fitchburg, Mass.
Boston Elevated Substation, Boston, Mass.
Central Maine Power Company, Lewiston, Me.
Ann Lee Home, Albany, N. Y.
Kingston City Hall, Kingston, N. Y.
Masonic Temple, New Britain, Conn.
Waterbury Hospital, Waterbury, Conn.
Odd Fellows Temple, Springfield, Mass.
Baltimorean Apartments, Baltimore, Md.
Trinity Grace Church, Springfield, Mass.
General Industrial Bank, New Haven, Conn.
Elks Home, New Haven, Conn.
Borough Hall, Merchantville, N. J.
High School, Middletown, N. Y.
Wynnfield Theatre, Philadelphia, Pa.
Germantown Trust Co., Philadelphia, Pa.
Baltimore City College, Baltimore, Md.
John A. Nichols School, Syracuse, N. Y.
Sixth Precinct Building, Albany, N. Y.
Fourth Presbyterian Church, Washington, D. C.
First National Bank, Exeter, Pa.
Kingston Hospital, Kingston, N. Y.
Prospect Street Apartments, Stamford, Conn.
Baltimore Club, Baltimore, Md.
St. Francis College, Staten Island, N. Y.
Mercy Hospital, Springfield, Mass.
Firestone Tire & Rubber Co., Washington, D. C.
Bowdoin College, Brunswick, Me.
Walter Reed Hospital, Washington, D. C.
First National Bank, Greensboro, N. C.
Y. M. C. A., Winston-Salem, N. C.
Pollard Building, Lowell, Mass.
Masonic Temple, North Adams, Mass.
American National Bank, Camden, N. J.
Chamber of Commerce Building, Springfield, Mass.



DETAILS OF METAL COVERED PARTITION OR SMOKE SCREEN

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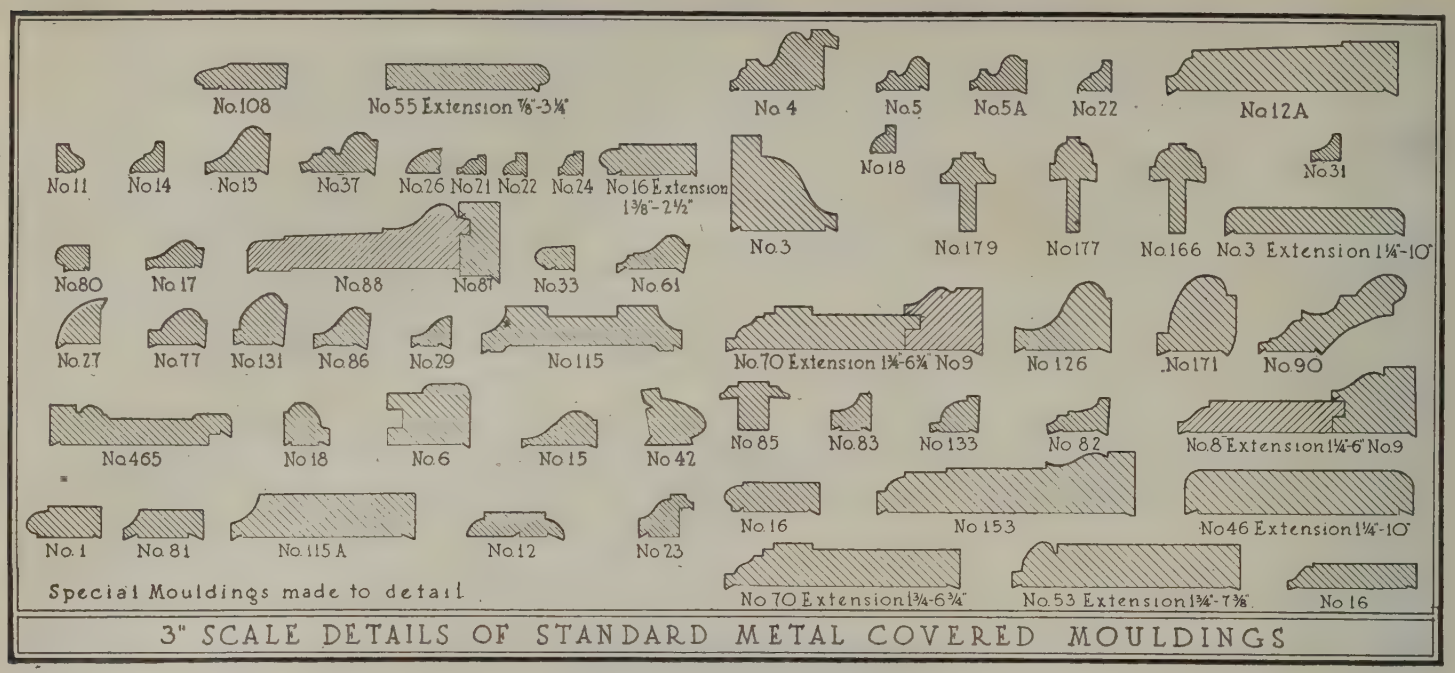
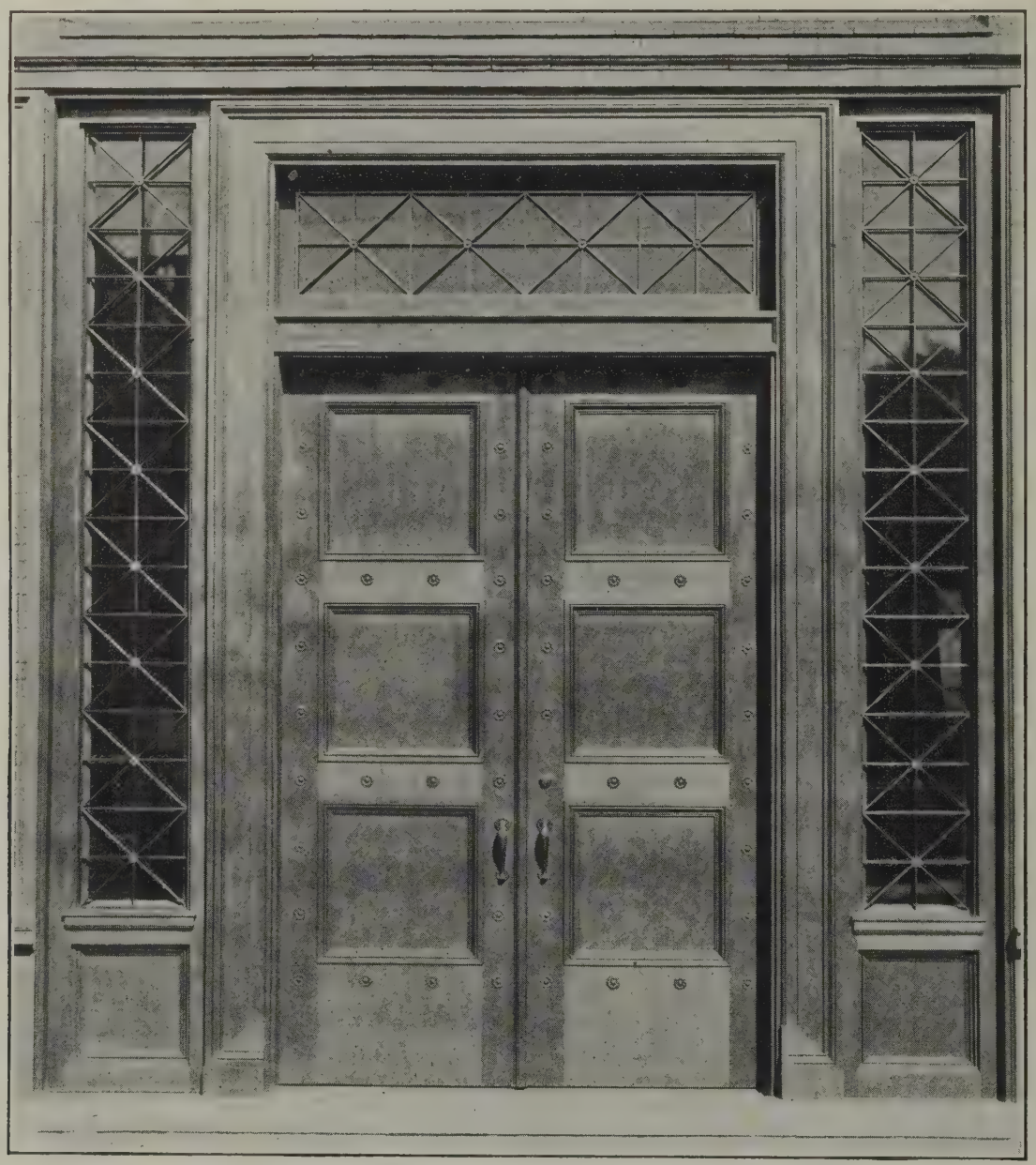


3" SCALE DETAILS OF STANDARD METAL COVERED MOULDINGS



Connecticut Power Company Office Entrance, New London, Conn.

GROSS METAL PRODUCTS COMPANY

Manufacturers of Architectural Hollow Metal Doors, Frames and Trim

2575 Como Avenue
ST. PAUL, MINN.

3325 Como Avenue
MINNEAPOLIS, MINN.

REPRESENTATION IN ALL PRINCIPAL CITIES

Products

GROSS STEEL SLAB DOORS, HOLLOW STEEL and BRONZE DOORS, FRAMES and TRIM, ELEVATOR ENCLOSURES and CABS.

Also special Sash and Frames; Steel Partitions.

Service

Competent engineers at all times are at the disposal of architects and contractors for special information or assistance.

Gross Hollow Metal Doors

The panel doors are built according to the best practice, and quality is at all times the first consideration.

Labels—Underwriters' labels can be furnished when required.

Material—Doors are constructed of No. 1 furniture steel, full pickled, full cold rolled and stretcher leveled.

Frames are constructed of pickled cold rolled steel.

General Description—All doors and frames have gas or electric welded joints, all perfectly ground after welding.

Rails and stiles are constructed of No. 18 gauge steel properly reinforced for hardware, with compressed cork inserted to deaden metallic sound. Panels are two thicknesses of No. 20 gauge steel, with $\frac{5}{16}$-in. asbestos between. Mouldings are of one piece and firmly locked to stiles and rails, or separate mould on each side, no screws being used except for loose glass mould.

Frames are constructed of No. 16 gauge pickled cold rolled steel, true to profile with clean sharp lines; mortised and reinforced for all hardware, then joints properly welded. Six anchors are regularly furnished with each frame without transom, and eight for frame with transom.

Finish—All surfaces of metal are first thoroughly cleaned to be free from all grease and other foreign material, then each coat as applied is baked and sanded. Any finish can be applied whether primed, enameled solid color, or grained to match woodwork adjacent to metal doors or trim.

The personnel of our finishing department is composed of highly skilled metal finishers, and all work is given expert attention.

In asking for quotations, the color and nature of finish should be carefully described.

Installations of Hollow Metal Doors, Frames and Trim

Following is a partial list of installations executed by us:

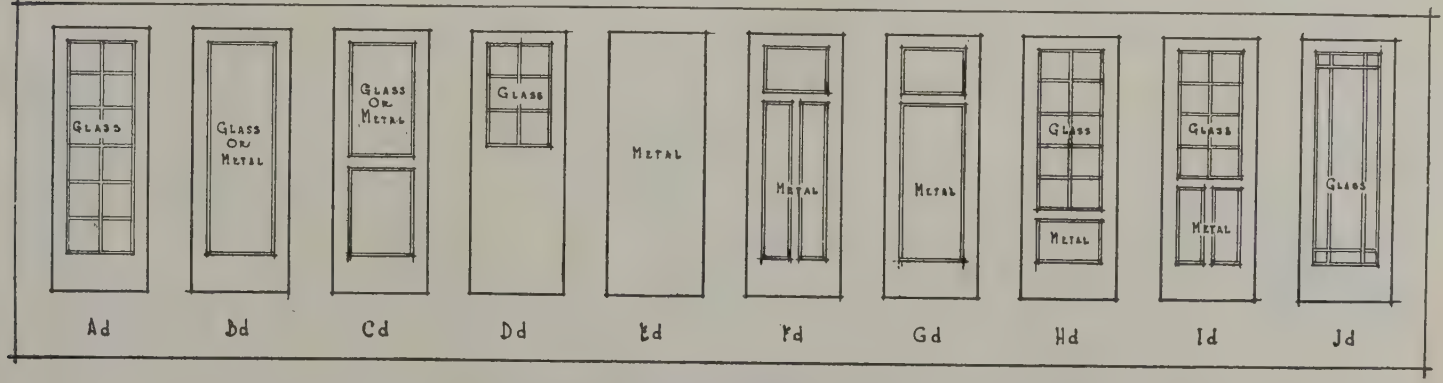
30 W. Washington Street, Chicago, Ill., Schmidt, Garden & Erikson, Architects.

St. Theresa's College, Winona, Minn., 1150 slab doors and frames, C. H. Johnston, Architect.

Mayo Clinic, Rochester, Minn., Ellerbe & Co.

Duquesne Light Company, Pittsburgh, Pa.

Marine Hospital, Cleveland, Ohio.



Various Types of Gross Hollow Metal Doors

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Gross Hollow Metal Slab Doors

Gross Hollow Metal Slab Doors being spot-welded on both sides every 2½ in. both vertically and horizontally, become so rigid that they cannot be twisted or warped by any reasonable pressure.

In making a careful examination of Gross Hollow Metal Slab Doors, architects and engineers are astounded at the complete absence of any metallic ring.

The surface of the door is perfectly flat and smooth and can never become unsightly, as in the case of wood doors, by gradual peeling of veneer; or buckling of steel covering applied on kalamein doors.

They can be finished in either solid color enamels, or beautiful wood grain effects baked on in carefully tempered ovens. Unless otherwise specified, however, all doors leave the factory with a prime coat of paint.

All hardware is fitted to the doors at our factory from templates and, after delivery to the building, are ready for erection as soon as hardware is attached.

A careful survey of erection costs proves that a complete unit of Gross frame and door can be installed at a cost very little above a complete wood unit. When estimating the cost of installation, the fact should not be overlooked that there is no future annoyance caused by swelling or warping, or expense of refitting due to climatic conditions, as is the case with wood doors.

Specifications—

All flush slab doors, where shown on plans or schedule, shall be Gross Hollow Metal Slab Doors constructed with a single No. 20 gauge steel sheet for each side; each side spot-welded to a web-formed reinforcing extending full width and length; approximately 2½ in. on centers. Butts shall be recessed into door and lock properly mortised.

After doors are finished they shall be coated with paint; dipped so that the inside, as well as the outside, is thoroughly coated and left perfectly flat.

Hardware—All doors shall be equipped with the following hardware furnished by the Hollow Metal Door contractor, lock and trim, except knobs, applied at the factory.

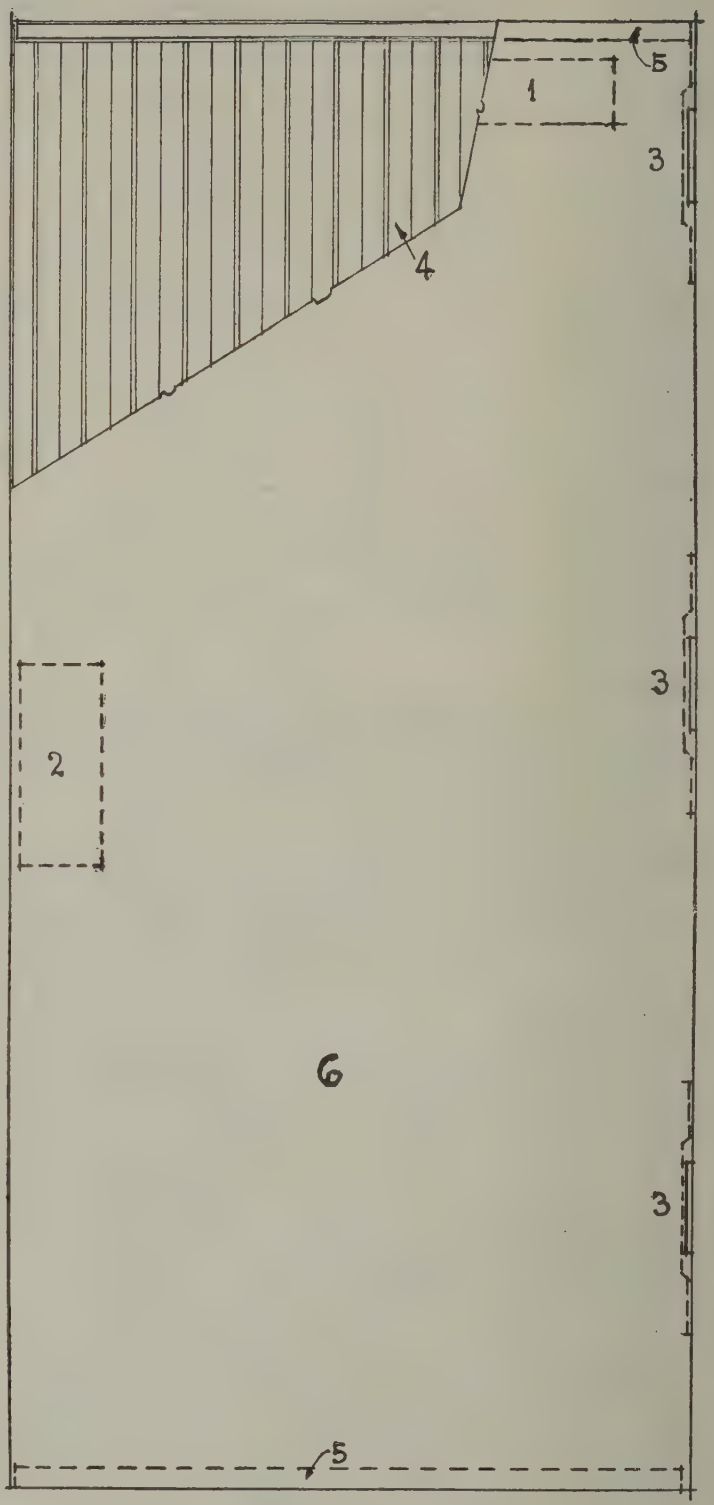
Doors where so scheduled shall be fitted with Yale & Towne cylinder lock No. 77901, knob No. DT35, escutcheon No. DT86. When cylinder knobs are not required use Yale & Towne lock series No. 1500 with knob No. DT35 and escutcheon No. DT86.

Underwriters' Labeled Doors—Where required, our Slab doors can be furnished with Underwriters' labels except for fire walls.

Guarantee

Gross Metal Products are guaranteed to be of the highest quality both in materials and workmanship.

They are absolutely fireproof.

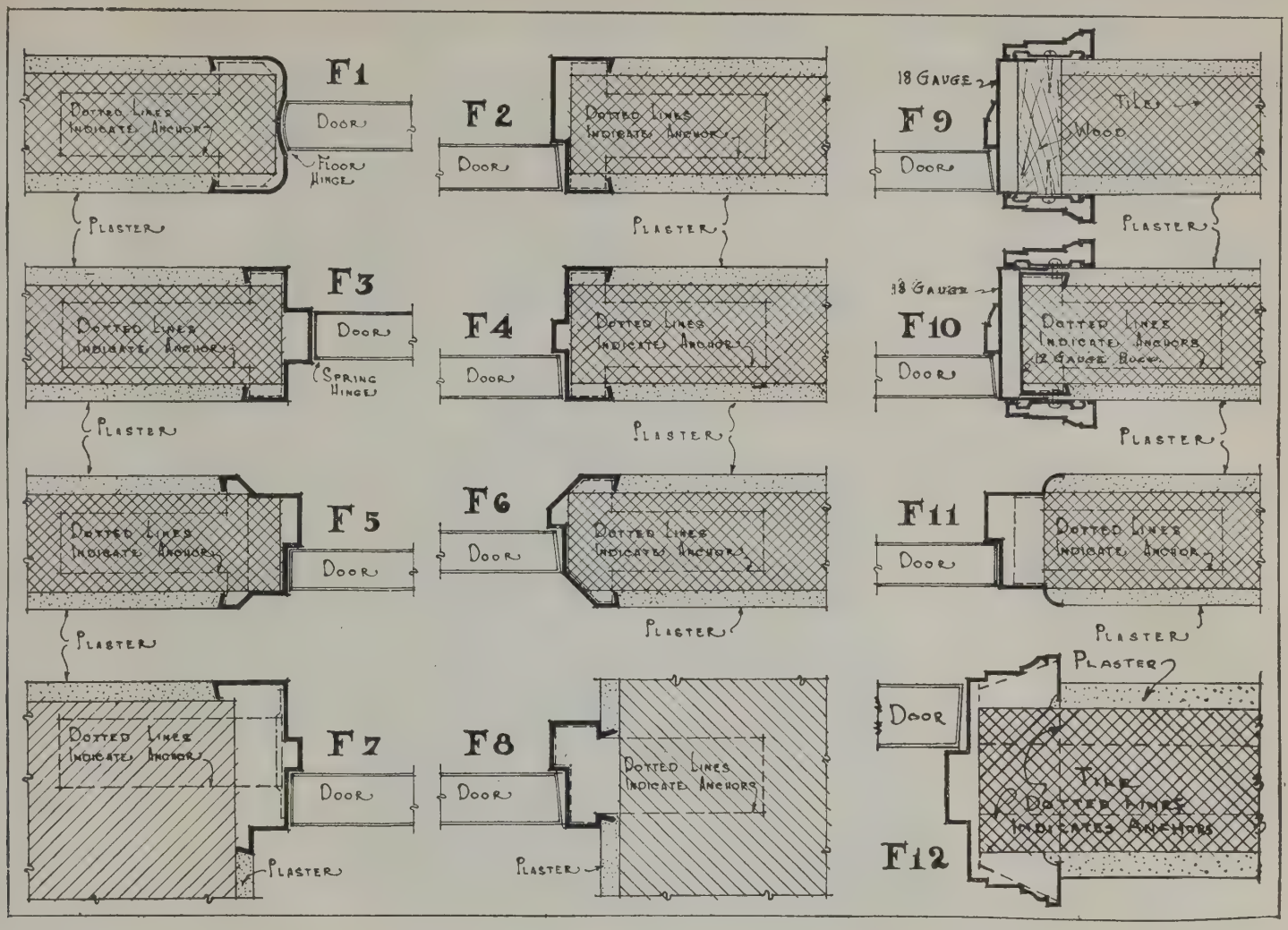


Elevation of Gross Slab Door

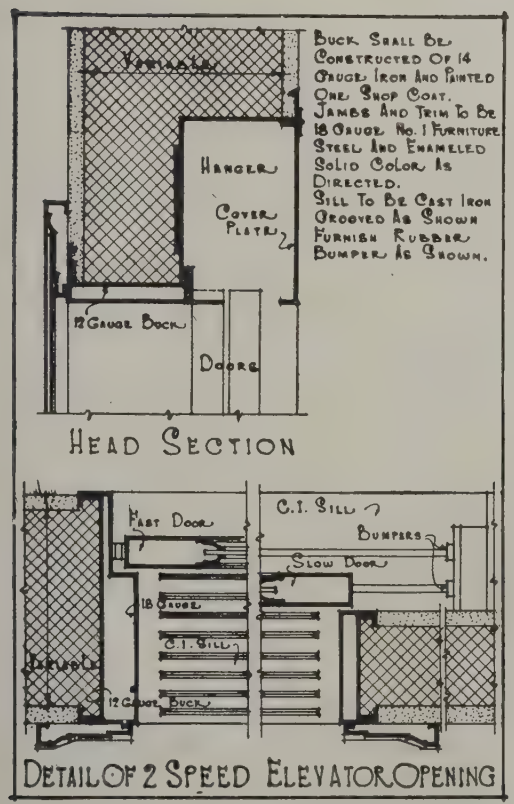
(1) Reinforcement for door check, placed in all doors.
(2) Reinforcement for lock and trim. Lock fitted and all holes drilled and tapped for screws by templates.
(3) Reinforcement for hinges or butts. Doors recessed and all screw-holes drilled and tapped by templates to receive butts.
(4) Formed web stiffener full length and width of door. Spot-welded to both cover sheets approximately 2½ in. on centers, vertically and horizontally.
(5) Closing channel ½ in. deep and spot-welded to cover sheets top and bottom of door.
(6) Cover sheets of No. 20 gauge highly finished stock blanked for hardware, and formed to size.

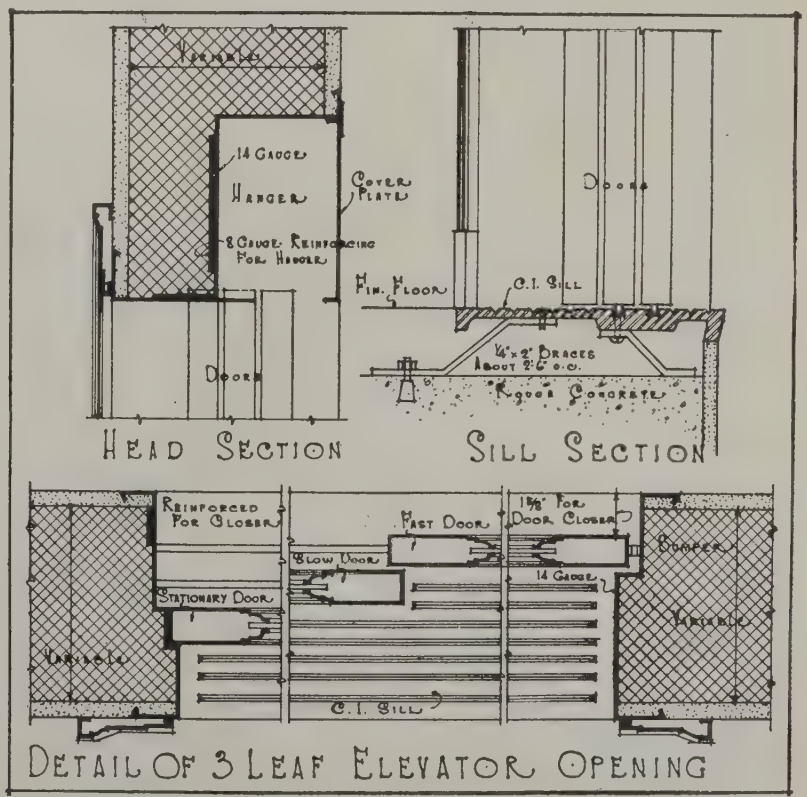
Section Through Gross Slab Door

Continued on next page



Typical Details of Frames





JAMESTOWN METAL DESK COMPANY, INC.

Hollow Metal Doors and Trim

JAMESTOWN, N. Y.

REPRESENTATIVE SALES OFFICES

NEW YORK, N. Y., 15 East 40th Street
BOSTON, MASS., Chamber of Commerce Building
BUFFALO, N. Y., Morgan Building
PHILADELPHIA, PA., Pennsylvania Building
DETROIT, MICH., Buhl Building
ST. LOUIS, MO., 1956 Railway Exchange Building

REPRESENTATIVES IN PRINCIPAL CITIES

Products

HOLLOW METAL DOORS and TRIM.

ELEVATOR ENCLOSURES.

Also Furniture and Metal Desks.

For Sectional Office Partitions, see pages B2662-2663.

General Description

The stiles and rails are formed from a single sheet of No. 18 gauge steel. All joints and miters are made a continuous weld with acetylene gas process. Panel mouldings electric welded to the stiles and rails, insuring perfect alignment and rigidity. Cork insulation strips are inserted in the stiles and rails to deaden the metallic ring of hollow metal. Panels are insulated with ¼-in. thick asbestos.

Reinforcing plates are placed inside, backing up all hardware. Drilling and tapping for hardware is done at factory. Combination bucks and jambs are made of No. 18, 16, 14 or 12 gauge steel as required. Corners are mitered and gas welded and provided with anchors. Trim is made of No. 18 gauge cold rolled steel. Mitered corners are gas welded. Trim is secured with concealed fasteners or with special oval head screws.

All finished products are thoroughly cleaned, primed and filled, followed by required coats to produce durable finish of color desired. Each coat uniformly applied, baked, and sanded, with final coat rubbed as required.

U. G. I. Building, Philadelphia, Pa.

PERRY, SHAW & HEPBURN, Architects, Boston, Mass.
MURPHY-QUIGLEY & Co., and U. G. I. CONTRACTING Co., Contractors, Philadelphia, Pa.

Sectional office partitions, elevator enclosure doors, hollow metal swing doors, counter work and equipment, manufactured and installed by JAMESTOWN METAL DESK COMPANY, INC.

Installations

A partial list of installations executed by this company:

Mellon National Bank, Pittsburgh, Pa., Trowbridge & Livingston, Architects; Mellon Stuart Co., Contractors

Federal Reserve Bank, Minneapolis, Minn., Cass Gilbert, Architect; C. F. Haglin & Sons, Contractors

Barclay-Vesey Telephone Bldg., New York, N. Y., McKenzie, Voorhees & Gmelin, Architects; Marc Eidlitz & Son, Inc., Contractors

Bank of New York & Trust Co., New York, N. Y., Benjamin Morris, Architect; Marc Eidlitz & Son, Contractors

New Jersey Bell Telephone Co. of Newark, N. J., Voorhees, Gmelin and Walker, Architects; Turner Construction Co., Contractors

Liberty Bank of Buffalo, Buffalo, N. Y., Alfred C. Bossom, Architect; John Gill & Sons, Contractors

Keith Theatre and Office Bldg., Cleveland, O., C. W. & Geo. L. Rapp, Architects; Lundoff-Bicknell Co., Contractors

Life Insurance Co. of Virginia, Richmond, Va., Clinton & Russell, Architects; John R. Wilson & Co., Contractors

Federal Trust Co., Newark, N. J., Dennison & Hirons, Architects; George E. Jones, Associate; Public Service Production Co., Contractor

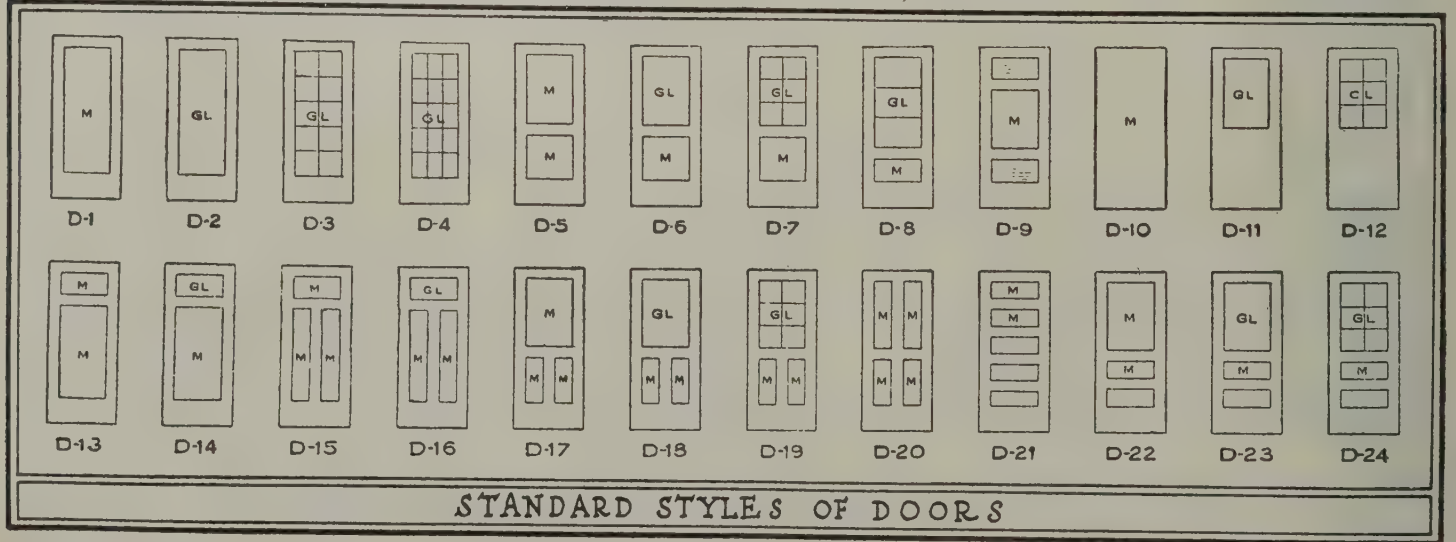
One State Street Office Bldg., Boston, Mass., Mowll & Rand, Architects; Olympia Construction Co., Contractors

Beth Israel Hospital, Boston, Mass., Densmore, LeClear & Robbins, Architects; Holt Fairchild Co., Contractors

Cincinnati Enquirer Building, Cincinnati, Ohio, Lockwood Greene & Co., Architects; George A Fuller Co., Contractors

City Hall Annex, Philadelphia, Pa., Phillip H. Johnson, Architect; F. W. Mark Construction Co., Contractors

Keifer Hospital, Detroit, Mich., Albert Kahn, Architect; W. E. Wood Co., Contractors

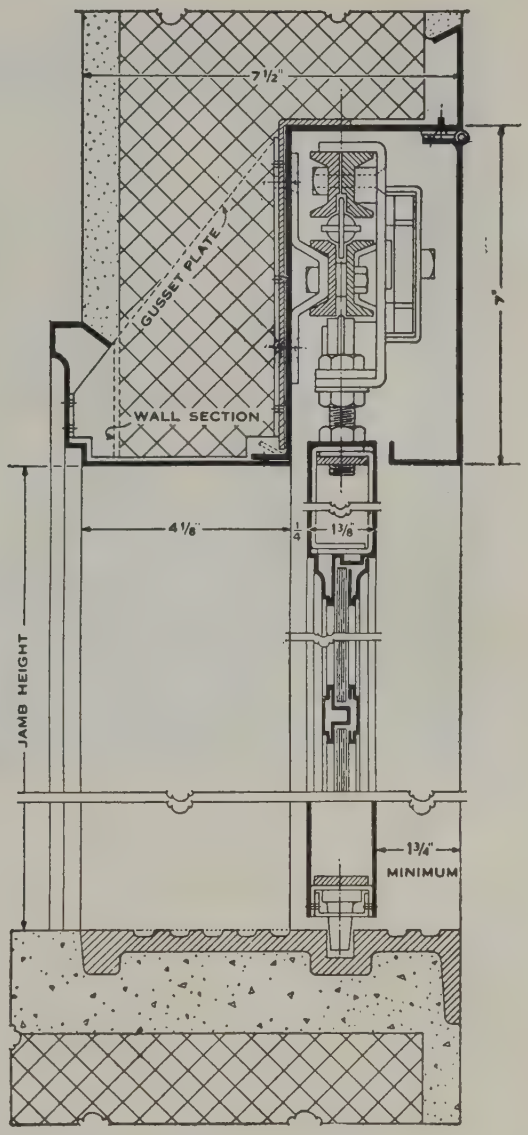


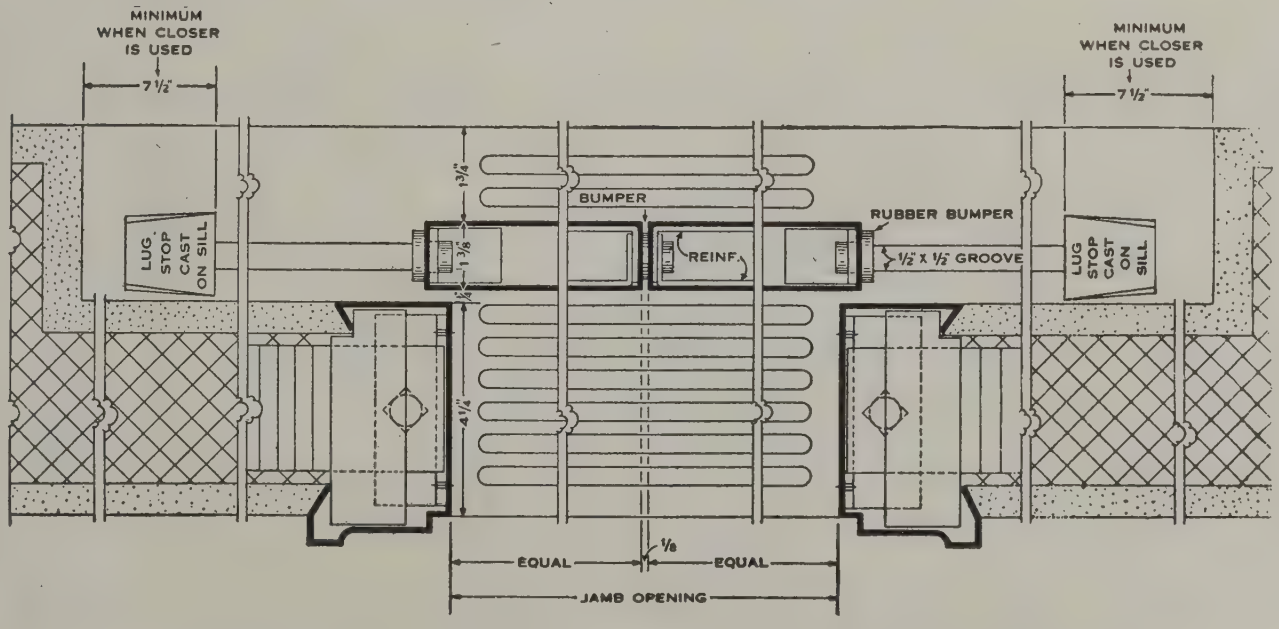
STANDARD STYLES OF DOORS

Continued on next page

Design D-7 Bi-parting Elevator Door Unit with Combination Buck, Jamb and Trim Frame

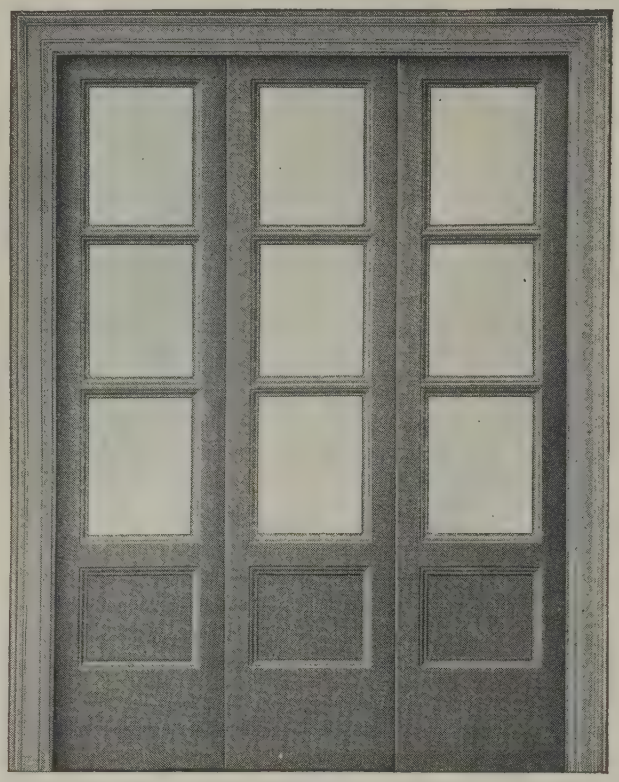
Any of our stock moulding can be used in the various door types, and door units finished in plain enamel or grained to match finished samples approved by architects.



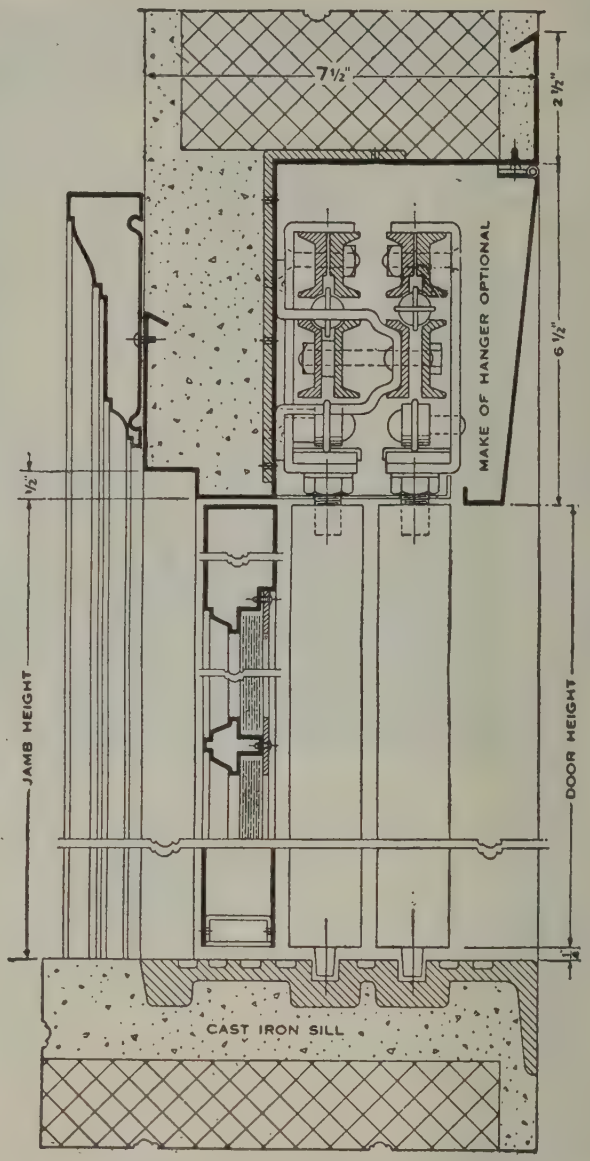


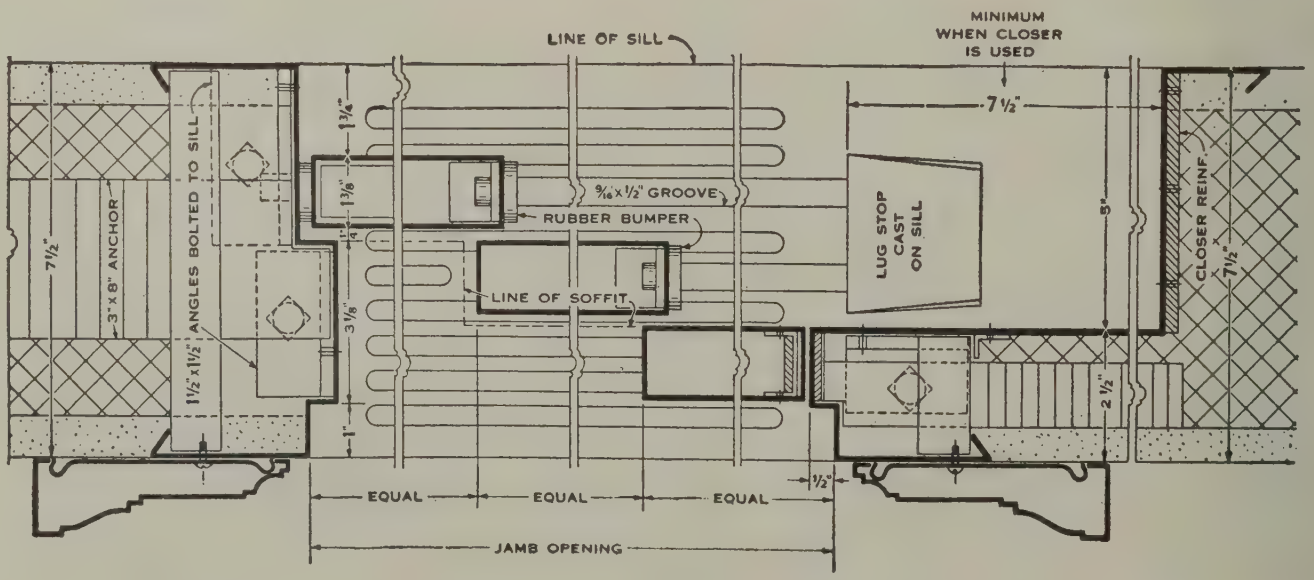
JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS & TRIM	Jone Steel DRAWING- 1

Continued on next page



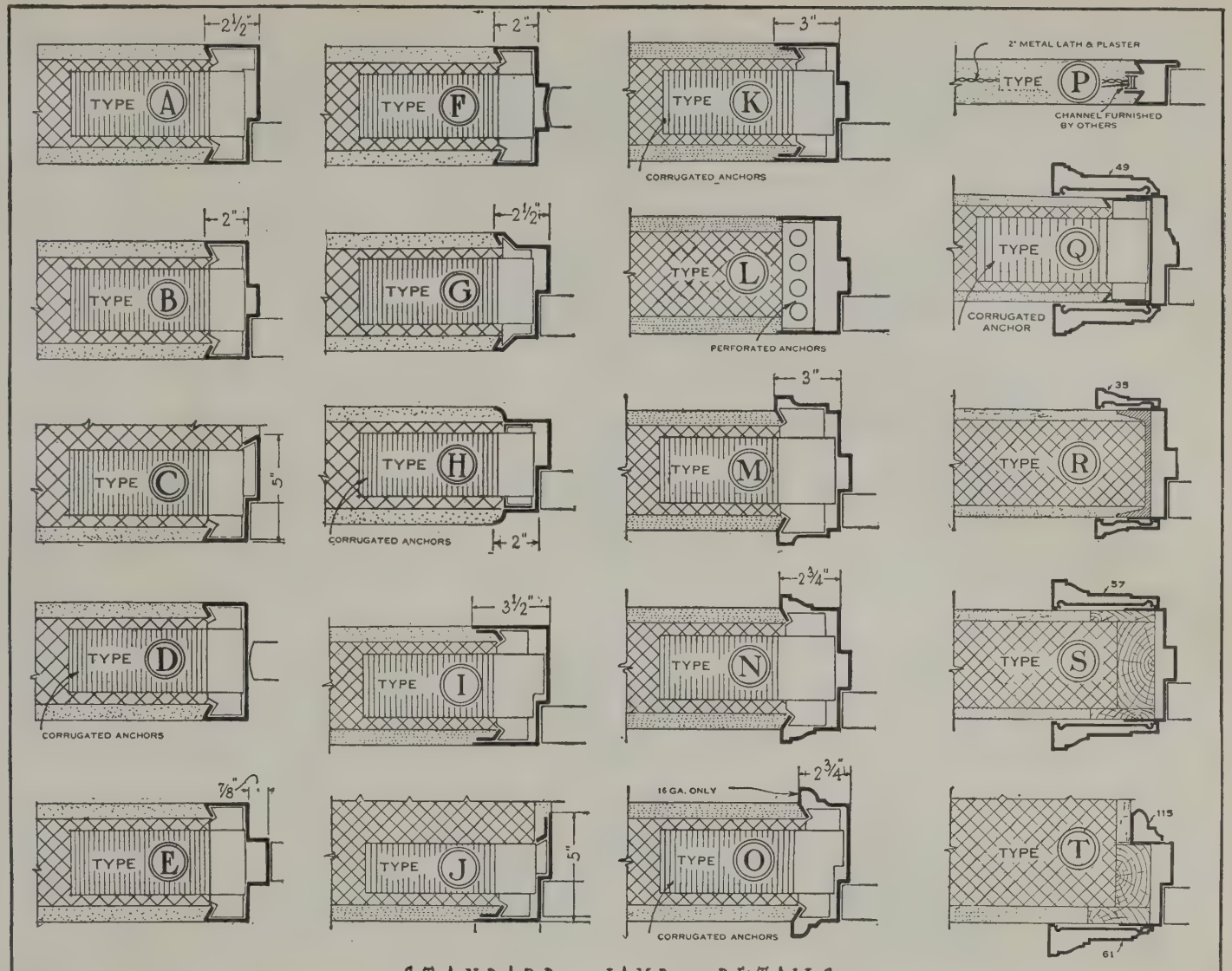
Design D-8, Two-speed Elevator Doors and Hinged Panel with Combination Buck, Jamb and Separate Trim



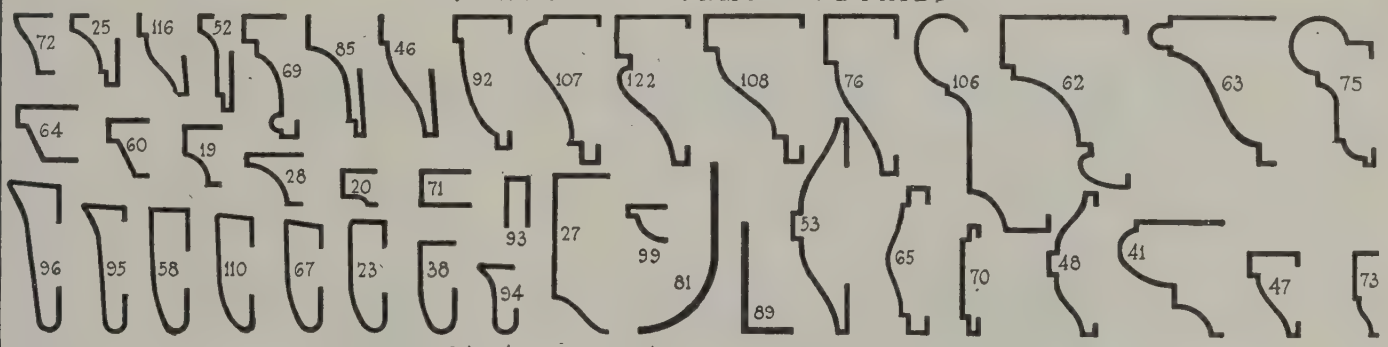


JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS & TRIM	Jones Steel DRAWING- 2

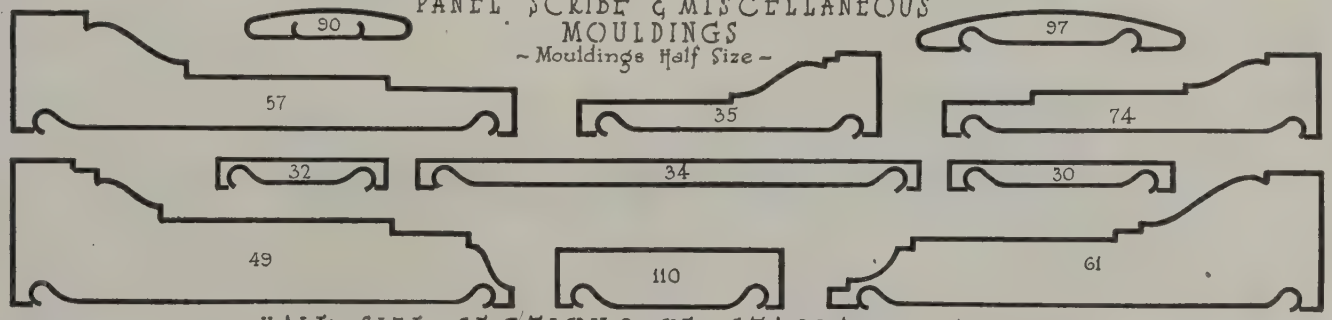
Continued on next page



• STANDARD JAMB DETAILS •



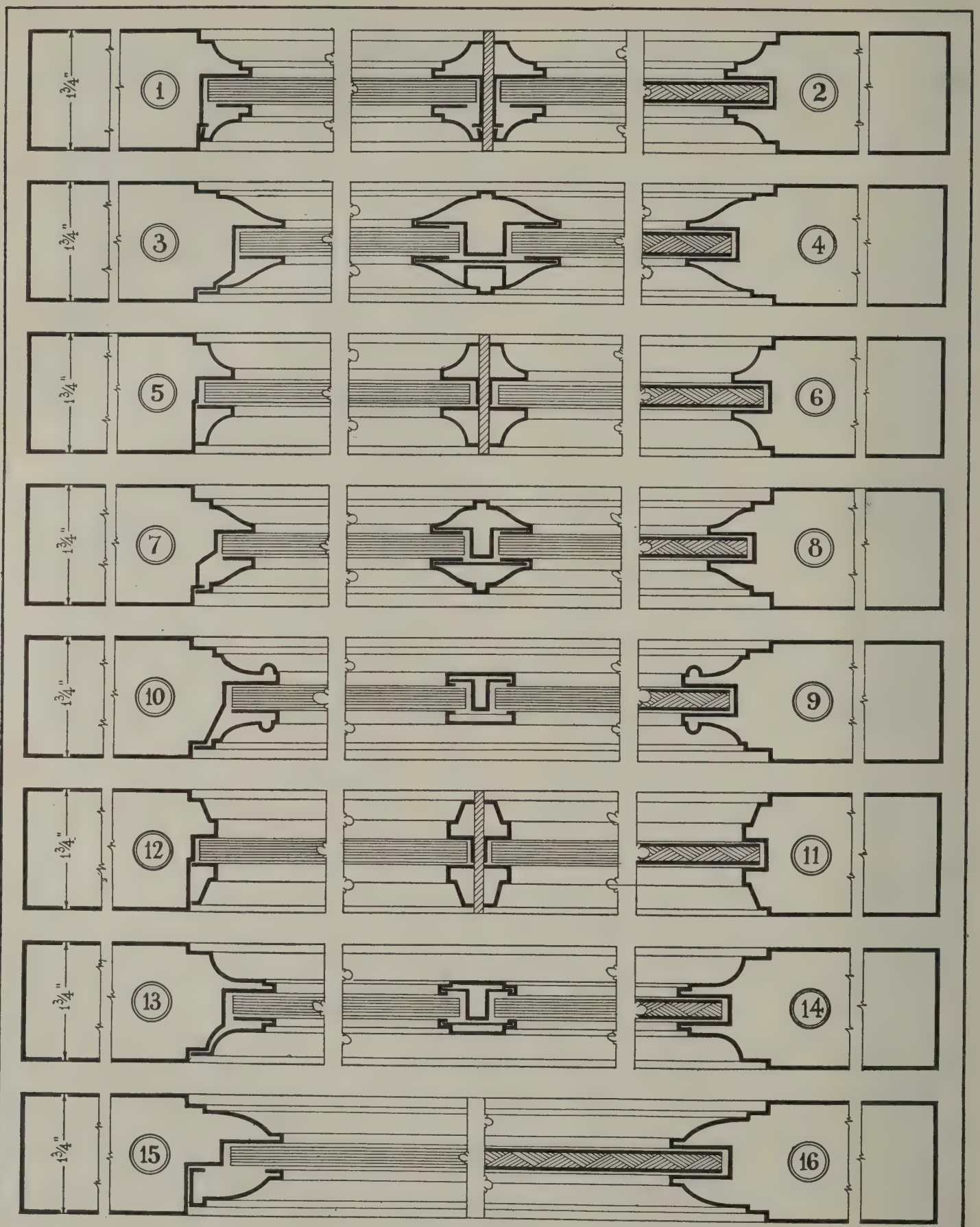
PANEL SCRIBE & MISCELLANEOUS MOULDINGS
~ Mouldings Half Size ~



• HALF SIZE SECTIONS OF STANDARD CASINGS •

JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS & TRIM	Jone Steel DRAWING- 3

Continued on next page



• STANDARD DOOR SECTIONS ~ HALF FULL SIZE •

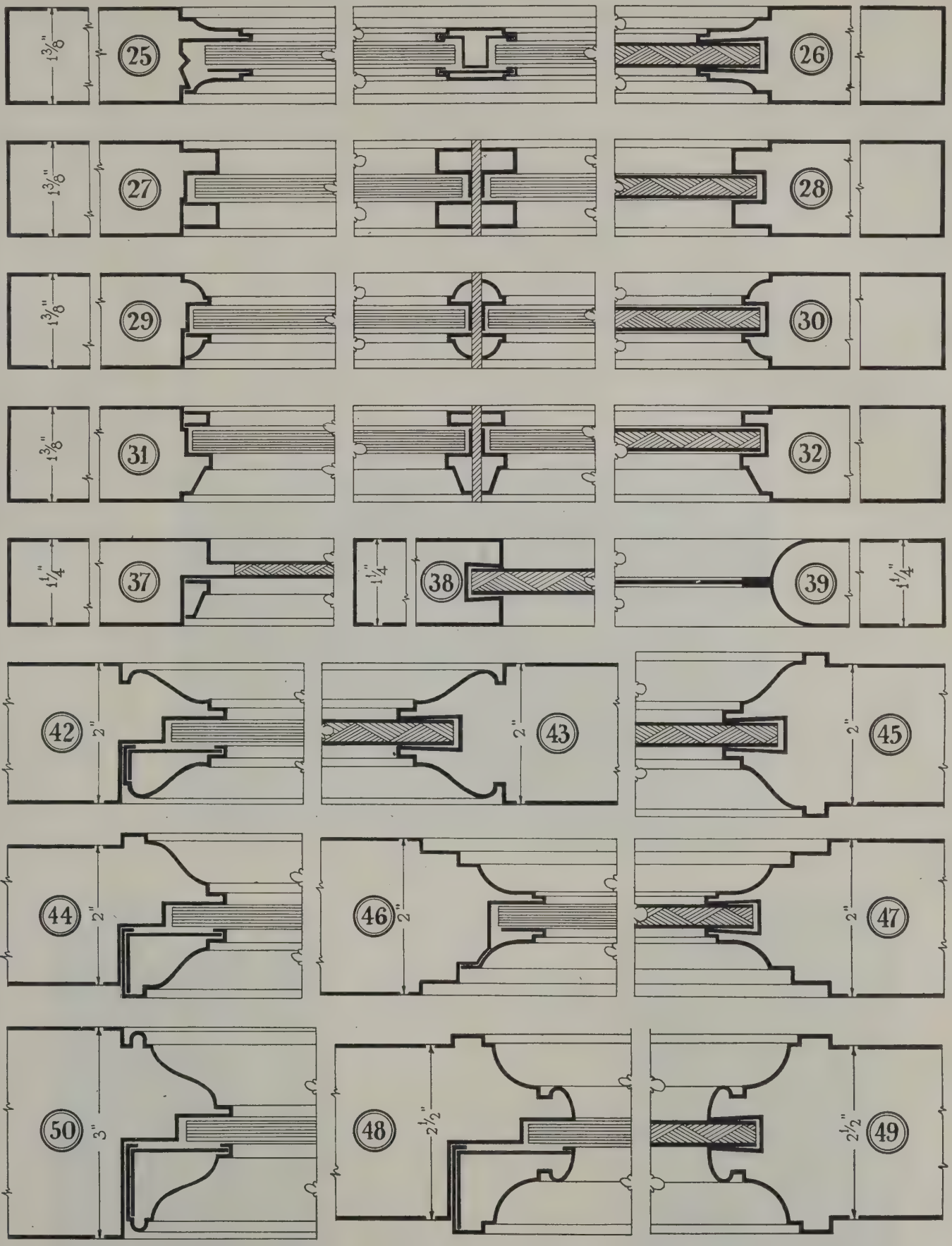
JAMESTOWN METAL DESK COMPANY

DETAILS OF HOLLOW METAL DOORS

Jone Steel JAMESTOWN METAL DESK CO.

DRAWING- 4

Continued on next page



ELEVATOR DOOR & SPECIAL DOOR SECTIONS ~ HALF FULL SIZE

JAMESTOWN METAL DESK COMPANY

DETAILS OF HOLLOW METAL DOORS

Jone Steel JAMESTOWN METAL DESK CO.

DRAWING- 5

THE KAWNEER COMPANY

Solid Nickel-Silver and Bronze Doors

NILES, MICH.

BRANCH OFFICES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
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MILWAUKEE, WIS.
NEW ORLEANS, LA.
NEW YORK, N. Y.
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Consult Telephone Directory for Local Branch Office Address—or Write Home Office

KAWNEER MANUFACTURING COMPANY OF CALIFORNIA
(SUBSIDIARY)
BERKELEY, CAL.

BRANCH OFFICE, 1135 Loew's State Building, LOS ANGELES, CAL.

Over 100 Distributors are located in the Principal Cities in the United States and Canada

Products

Doors of Solid Nickel-Silver and Bronze.

For Windows of Solid Nickel-Silver or Bronze, see page A1189.

For Store Front Construction in solid bronze or copper, see pages B2219-2225.

For Shower Bath Doors of solid nickel-silver and bronze, see page C2988.

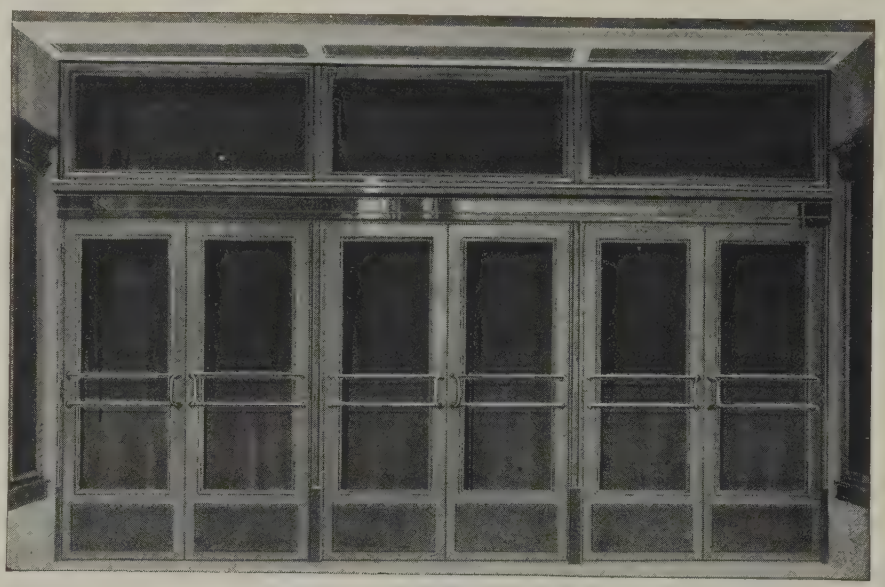
Construction

These doors are characterized by beauty and durability—two very desirable features. The stiles and rails consist of heavy nickel-silver or bronze closed seam tubes strongly welded at all corners.

Two bronze shapes comprise the glazing mouldings, one of which is securely locked to the frame. This arrangement simplifies glazing, and the two metals effect a combination of color that is very agreeable.

Kawneer Doors do not require painting or finishing. They can be made in many combinations and styles. (See illustrations below and elevations on following page.)

All hardware will be applied by Kawneer. Doors will be equipped with thresholds, strongly reinforced with steel, if specially ordered.



Typical Installation of Kawneer Solid Nickel-Silver and Bronze Doors

Special Construction

Kawneer Doors are not carried in stock but are custom made to meet the architect's specifications.

Kawneer
BRONZE
DOORS

At Left

A Beautiful Bank Entrance Built Entirely of Nickel-Silver and Bronze

The complete assembly was fabricated by Kawneer

At Right

Another Entrance Including Side Lights and Transom

The bronze pilasters, ornamental caps and rosettes were furnished and installed by Kawneer

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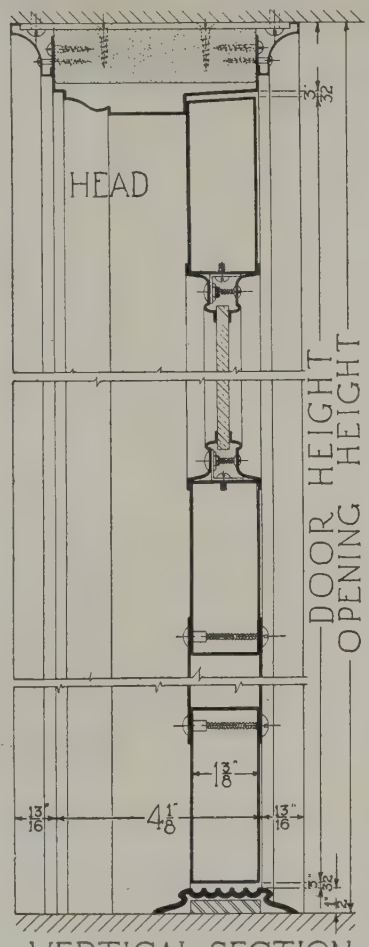
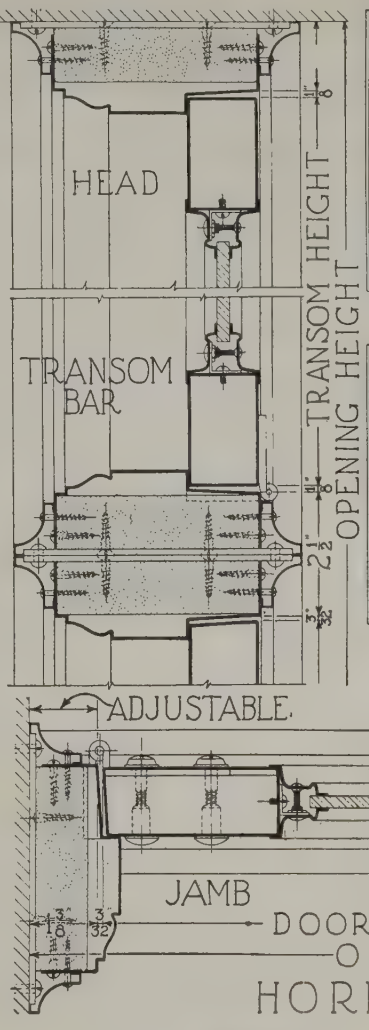
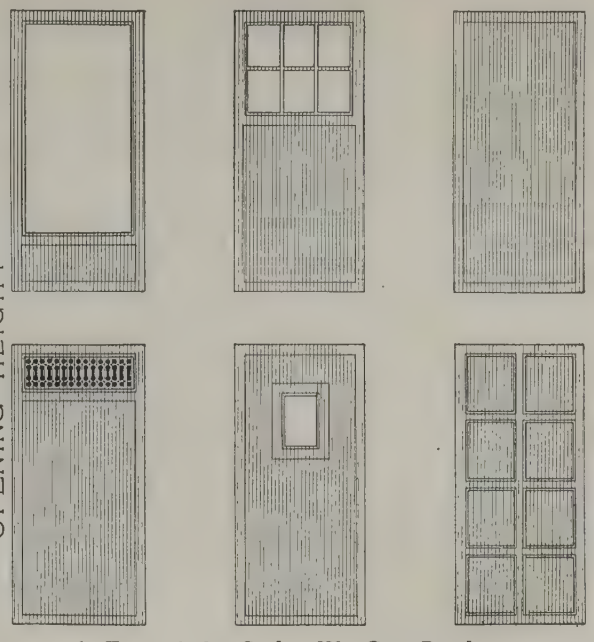
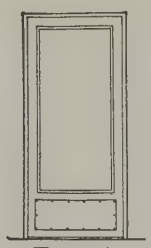


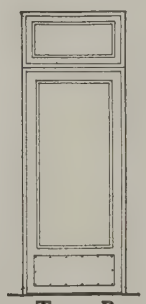




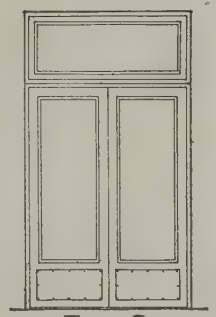
A Few of the Styles We Can Produce



Type A



Type B



Type C

KAWNEER SOLID NICKEL-SILVER AND BRONZE DOOR SIZES

Type A

Door size		Opening sizes	
Width	Height	Width	Height
2 ft. 6 in.	7 ft. 0 in.	2 ft. $8\frac{15}{16}$ in.	7 ft. $2\frac{1}{16}$ in.
3 ft. 0 in.	7 ft. 0 in.	3 ft. $2\frac{15}{16}$ in.	7 ft. $2\frac{1}{16}$ in.
3 ft. 6 in.	7 ft. 0 in.	3 ft. $8\frac{15}{16}$ in.	7 ft. $2\frac{1}{16}$ in.
3 ft. 0 in.	7 ft. 6 in.	3 ft. $2\frac{15}{16}$ in.	7 ft. $8\frac{1}{16}$ in.
3 ft. 6 in.	7 ft. 6 in.	3 ft. $8\frac{15}{16}$ in.	7 ft. $8\frac{1}{16}$ in.

Type B

Sizes below include transom 1 ft. $3\frac{3}{4}$ in., 1 ft. $9\frac{3}{4}$ in.

Door size		Opening sizes	
Width	Height	Width	Height
2 ft. 6 in.	7 ft. 0 in.	2 ft. $8\frac{15}{16}$ in.	8 ft. $8\frac{9}{16}$ in., 9 ft. $2\frac{9}{16}$ in.
3 ft. 0 in.	7 ft. 0 in.	3 ft. $2\frac{15}{16}$ in.	8 ft. $8\frac{9}{16}$ in., 9 ft. $2\frac{9}{16}$ in.
3 ft. 6 in.	7 ft. 0 in.	3 ft. $8\frac{15}{16}$ in.	8 ft. $8\frac{9}{16}$ in., 9 ft. $2\frac{9}{16}$ in.
3 ft. 0 in.	7 ft. 6 in.	3 ft. $2\frac{15}{16}$ in.	9 ft. $2\frac{9}{16}$ in., 9 ft. $8\frac{9}{16}$ in.
3 ft. 6 in.	7 ft. 6 in.	3 ft. $8\frac{15}{16}$ in.	9 ft. $2\frac{9}{16}$ in., 9 ft. $8\frac{9}{16}$ in.

Type C

Sizes below include transom 1 ft. $3\frac{3}{4}$ in., 1 ft. $9\frac{3}{4}$ in.

Door size		Opening sizes	
Width	Height	Width	Height
2 ft. 6 in.	7 ft. 0 in.	5 ft. $3\frac{1}{32}$ in.	8 ft. $8\frac{9}{16}$ in., 9 ft. $2\frac{9}{16}$ in.
3 ft. 0 in.	7 ft. 0 in.	6 ft. $3\frac{1}{32}$ in.	8 ft. $8\frac{9}{16}$ in., 9 ft. $2\frac{9}{16}$ in.
2 ft. 6 in.	7 ft. 6 in.	5 ft. $3\frac{1}{32}$ in.	9 ft. $2\frac{9}{16}$ in., 9 ft. $8\frac{9}{16}$ in.
3 ft. 0 in.	7 ft. 6 in.	6 ft. $3\frac{1}{32}$ in.	9 ft. $2\frac{9}{16}$ in., 9 ft. $8\frac{9}{16}$ in.

Note: Special doors with or without jambs can be made up to and including 4x8 ft. in size. All doors are single acting unless otherwise specified.

KAWNEER SOLID NICKEL-SILVER AND BRONZE DOORS

HOWELL, FIELD & GODDARD, INC.

Hollow Steel and Metal Covered Doors and Windows, Steel Bucks and Interior Trim, Steel Unit Partitions

GENERAL OFFICES
420 Lexington Avenue
NEW YORK, N. Y.

TELEPHONE
LEXINGTON 0360

FACTORIES IN LONG ISLAND CITY, N. Y. and PHILADELPHIA, PA.

Products

HOLLOW STEEL DOORS.
STANDWELL METAL COVERED DOORS.
HOLLOW STEEL COMBINATION BUCKS, JAMBS and TRIM, plain or moulded.
ELEVATOR FRONTS, hollow steel and metal covered.
HOLLOW STEEL and METAL COVERED JAMBS and TRIM.
PICTURE and WIRE MOULDING.
CRAFTBUILT STEEL UNIT PARTITIONS.
Also manufacturers of Metal Covered and Steel Base Moulding; Tubular Steel Elevator Doors; Metal Covered Doors of bronze and copper.

Standwell Metal Covered Doors (Patented)

In the Standwell construction, the metal covering is of Nos. 22 and 24 gauge selected steel, made in tubular form entirely covering the wood cores. The metal is joined together and to the panels by welding, making the basic construction of the door one piece, which insures effective fire retardation.

The joints between stiles and rails are locked by a patented process (section AA below). This method makes the strongest joint possible to produce, also insuring that the metal surfaces of stiles and rails are flush and smooth without the use of a plastic filler. The joints, being filled with solder in the process, are polished over and are practically invisible.

The white pine cores used in the Standwell door serve a double purpose: making an absolute sound deadener (there being no metallic rattle to a Standwell door), also preventing any warping if door is subjected to fire. It also makes the application of hardware a simple matter, as templates are not required in advance as on all-steel doors.

Standwell doors are particularly suited for vertical shaft protection such as stairs and elevators where Underwriters' labels are required.

Doors of types 1, 3 and 4, will be carried in stock for immediate delivery in sizes as shown by schedule.

When ordering by schedule, note that jamb opening size is between jambs and from head jamb to finished floor. Allowance on finished door size is made for joint and for saddle.

Architects can, by using Standwell doors of sizes and designs shown, make a distinct saving for their clients, and owing to the H. F. G. standardized methods of manufacture be assured always of a uniform high quality and quick delivery.

STANDWELL DOOR SIZES FOR SWING DOORS

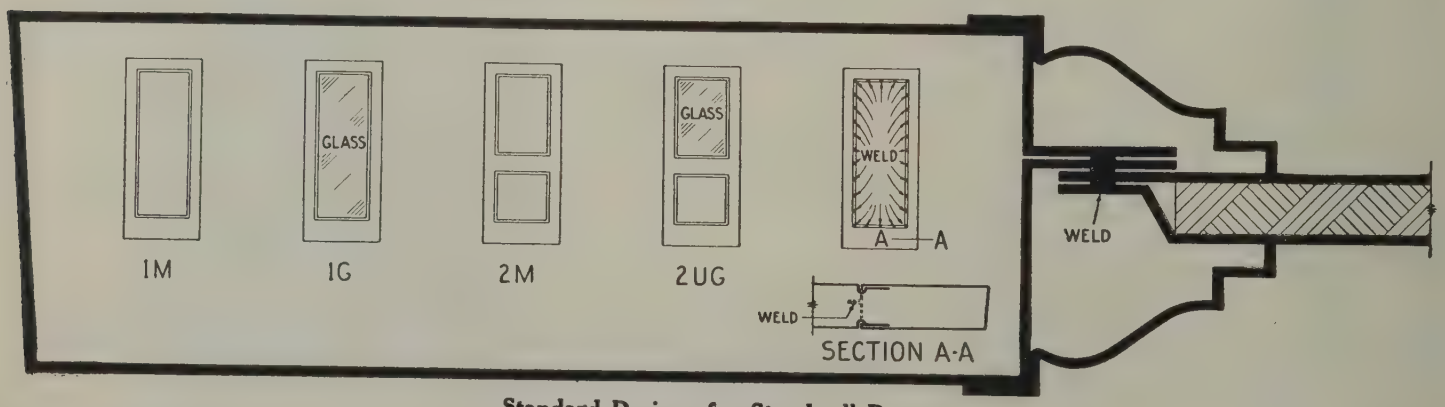
Widths

Single Doors				Pairs of Doors			
Jamb opening, ft.	in.	Finished door, ft.	in.	Jamb opening, ft.	in.	Each finished door, ft.	in.
*2	6	2	5 13/16	*5	0	2	5 13/16
2	7	2	6 13/16	5	2	2	6 13/16
*2	8	2	7 13/16	*5	4	2	7 13/16
2	9	2	8 13/16	5	6	2	8 13/16
*2	10	2	9 13/16	*5	8	2	9 13/16
2	11	2	10 13/16	5	10	2	10 13/16
*3	0	2	11 13/16	*6	0	2	11 13/16
3	1	3	0 13/16	6	2	3	0 13/16
*3	2	3	1 13/16	*6	4	3	1 13/16
3	3	3	2 13/16	6	6	3	2 13/16
*3	4	3	3 13/16	*6	8	3	3 13/16
3	5	3	4 13/16	6	10	3	4 13/16
*3	6	3	5 13/16	*7	0	3	5 13/16
3	7	3	6 13/16	7	2	3	6 13/16
3	8	3	7 13/16	7	4	3	7 13/16

Heights

Jamb opening, ft.	in.	Finished door, ft.	in.	Jamb opening, ft.	in.	Finished door, ft.	in.
6	8	6	7 5/16	7	2	7	1 5/16
6	9	6	8 5/16	7	3	7	2 5/16
*6	10	6	9 5/16	7	4	7	3 5/16
6	11	6	10 5/16	7	5	7	4 5/16
*7	0	6	11 5/16	7	6	7	5 5/16
7	1	7	0 5/16				

*Carried in stock.



Standard Designs for Standwell Doors

Continued on next page

All-steel Combined Bucks, Jambs and Trim

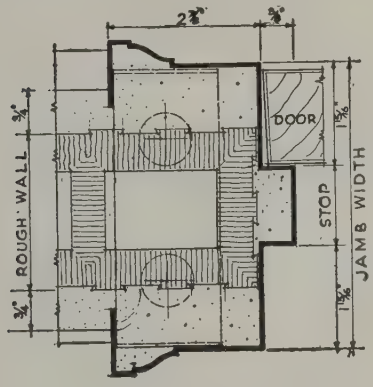
Bucks of Design 26, 27DT, 27DF, 28 and 29, made from No. 16 gauge steel, are suitable for all interior openings in the best types of buildings. Being of steel they are fireproof, and when used for fireproof openings, in conjunction with Standwell Steel Covered Doors, procure the lowest insurance rate.

They are suitable for non-fireproof openings where wood doors are used, being more economical than wood jambs and trim. The steel buck being erected as a unit, eliminates the extra cost of erecting separate bucks, jamb and trim.

All trim miters are welded, which eliminates the shrinkage and opening of miters found in wood trim.

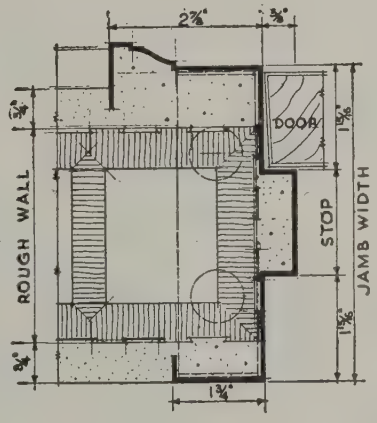
All trimmed members are formed with sharp, clean corners, that for architectural beauty can not be excelled.

Note: In order to produce the best results in all-steel bucks, architects should specify that when partition blocks are laid, all open spaces between the end and sides of partition blocks and the steel buck should be slushed with mortar. If this is done there will never be any cracking of plaster around the buck.



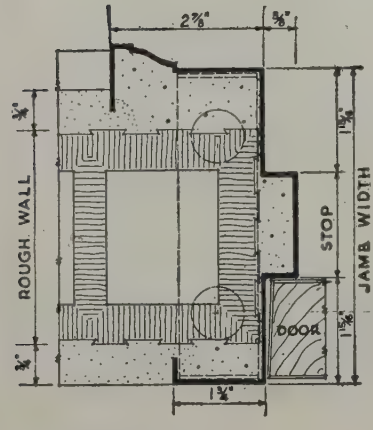
DESIGN 26

Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2605⅜	3	5⅜	1½
2606⅜	4	6⅜	2½
2608⅜	6	8⅜	4½



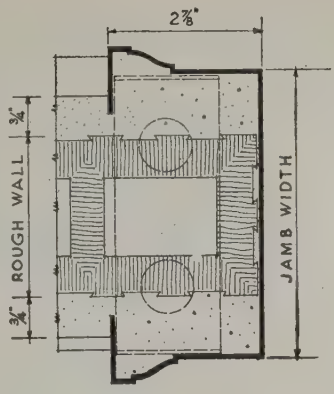
DESIGN 27DT

Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2704⅞	3	4⅞	1
2705⅞	4	5⅞	2
2707⅞	6	7⅞	4



DESIGN 27DF

Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2704⅞	3	4⅞	1
2705⅞	4	5⅞	2
2707⅞	6	7⅞	4

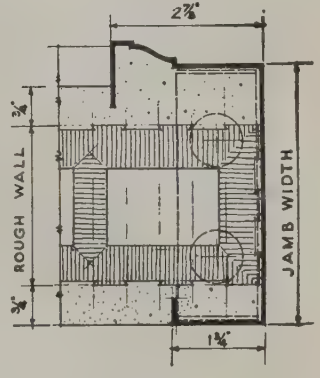


DESIGN 28

Type No.	Rough wall, in.	Jamb width, in.
2805⅜	3	5⅜
2806⅜	4	6⅜
2808⅜	6	8⅜

DESIGN 29

Type No.	Rough wall, in.	Jamb width, in.
2904⅞	3	4⅞
2905⅞	4	5⅞
2907⅞	6	7⅞



Buck Sizes

All-steel bucks, also metal covered jambs, are made to jamb opening sizes as shown on Standwell door schedule.

Complete Elevator Fronts

All-steel combination elevator bucks and complete elevator fronts, including saddles, bucks and doors and hardware, furnished and erected.

We will send on request complete information and specifications showing standard types of installation, covering wall and shaft conditions, for both metal covered and all-steel elevator door openings.

Noteworthy H. F. G. Door and Buck Installations—1926–1927

35-story Park Central Hotel, 7th Avenue, 55th-56th Streets, New York, N. Y., Gronenberg & Leuchtag, Architects
Jewish Hospital, Prospect Place near Classon Avenue, Brooklyn, N. Y., Crow, Lewis & Wick, Architects
Fidelity Mutual Life Insurance Company Building, Parkway and Fairmount Avenue, Philadelphia, Pa., Zantzinger & Borie & Medary, Architects
40-story Graybar Building, 44th Street and Lexington Avenue, New York, N. Y., Sloan & Robertson, Architects
Hotel St. Regis, 55th Street near Fifth Avenue, New York, N. Y., Sloan & Robertson, Architects
Mount Sinai Nurses Home, 5-17 East 98th Street, New York, N. Y., Kahn & Butler, Architects
35-story Office Building, Court and Montague Streets, Brooklyn, N. Y., H. Craig Severance, Architect
N. Y. Central Lines Passenger Terminal, Buffalo, N. Y., Fellheimer & Wagner, Architects
Harvard Medical School, Boston, Mass., Coolidge, Shepley, Bullfinch & Abbott, Architects
34-story Warwick Hotel, 54th Street and 6th Avenue, New York, N. Y., George B. Post & Emery Roth, Architects
45-story Ritz Towers, Park Avenue and 57th Street, New York, N. Y., Emery Roth, Architect
Office Building and Hotel, Montauk Point, Long Island, N. Y., Schultz & Weaver, Architects
Apartment Building, 88th Street at Park Avenue, New York, N. Y., Schwartz & Gross, Architects
Scottish Rite Temple, Philadelphia, Pa., Horace W. Castor, Architect
One Hundred and Fifty-two (152), one and two-family houses, City Housing Corporation, Sunnyside, Long Island, N. Y.
Tudor City, 41st Street to 43rd Street, First Avenue, New York, N. Y., Fred F. French Co., Architects

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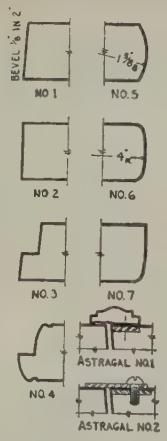
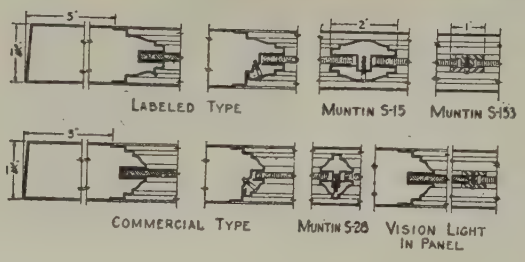
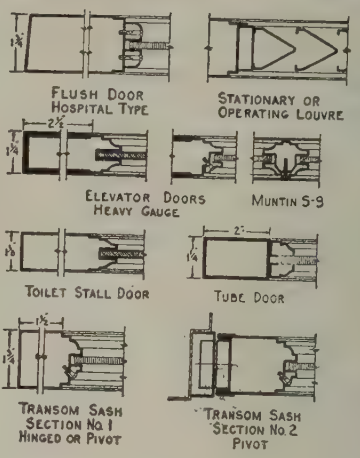


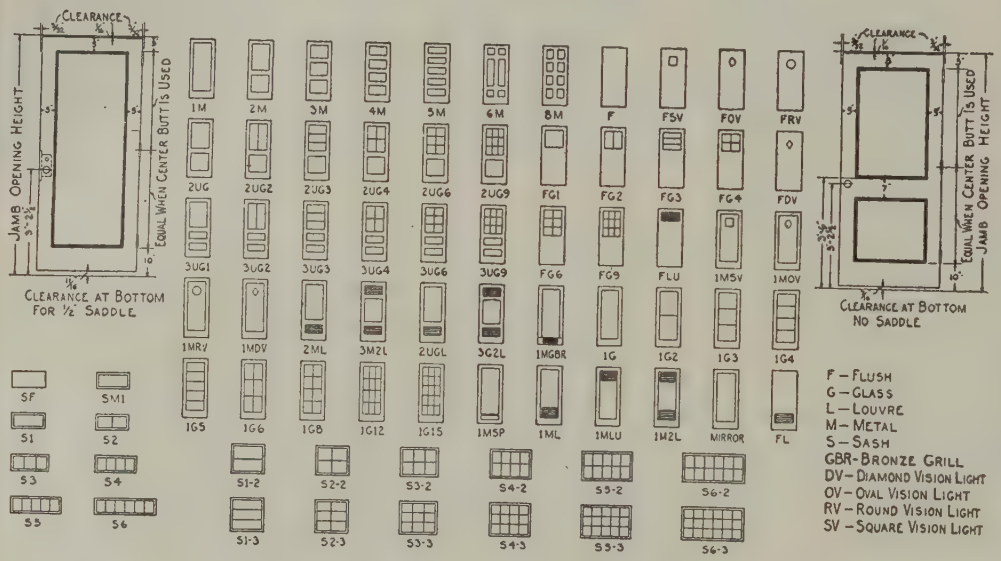




GLASS AREAS - LABELED DOORS

A & B LABEL - FOR FIRE WALL & VERTICAL SHAFT - NO GLASS
C LABEL - CORRIDOR & PARTITIONS 129% SQ. INS. GLASS
D LABEL - EXTERIOR - NOT FIRE ESCAPE - NO GLASS
E & F - LABEL - EXTERIOR FIRE ESCAPES 720 SQ. INS. GLASS

HOLLOW STEEL DOOR SECTIONS



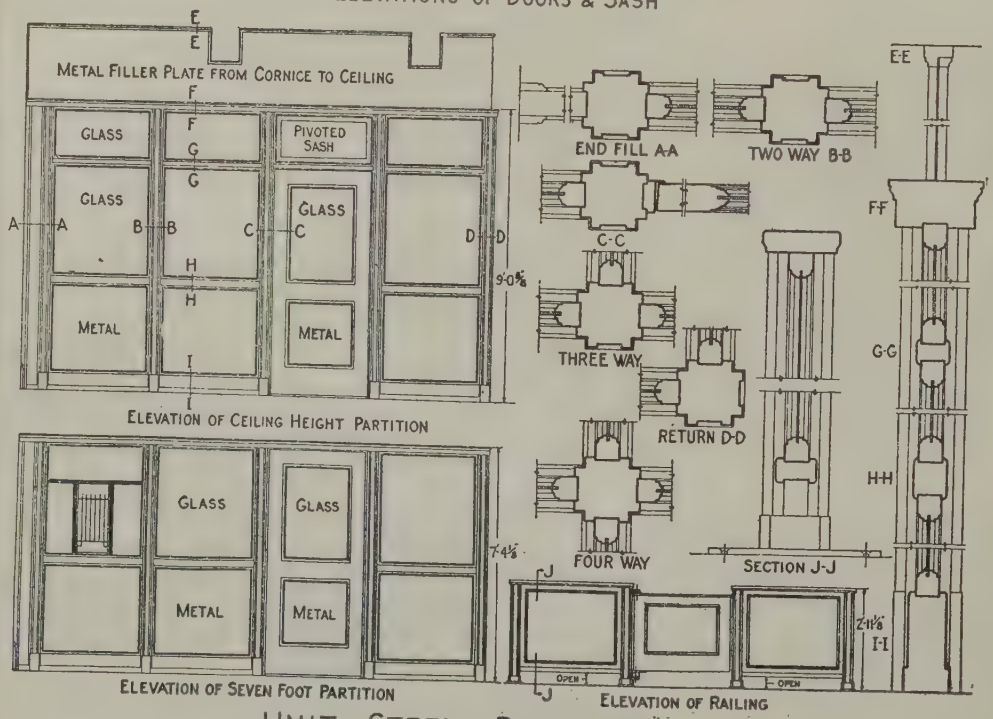
F - FLUSH
G - GLASS
L - LOUVRE
M - METAL
S - SASH
GBR - BRONZE GRILL
DV - DIAMOND VISION LIGHT
OV - OVAL VISION LIGHT
RV - ROUND VISION LIGHT
SV - SQUARE VISION LIGHT

DOOR ELEVATIONS SUITED TO DOOR CONSTRUCTION

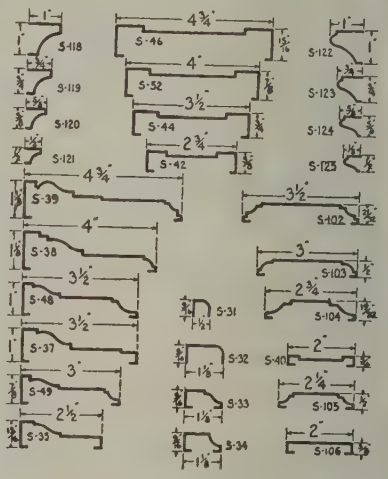
LABELED TYPE - 1M-2M-2UG4-2UG6
COMMERCIAL TYPE - 1M-2M-1ML-2ML 1MLU-F-FG1-1G-2UG

ELEVATOR DOORS - 1M-2M-1G3-1G4 1G6-1G8-1M5P-1M5V-1MOV-1MRV-1MDV
TOILET STALL DOORS - 1M-F

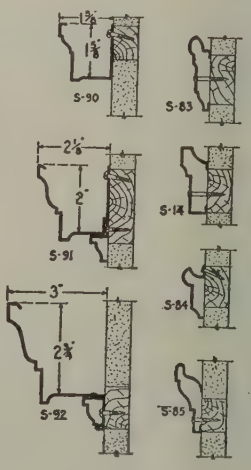
ELEVATIONS OF DOORS & SASH



UNIT STEEL PARTITIONS



TRIM, MOULDINGS & CHAIR RAIL



WIRE MOULDS PICTURE MOULDS

DETAILS OF HOLLOW METAL PARTITIONS, DOORS & MOULDINGS

LYON-CARR FIRE DOOR COMPANY

Manufacturers of Underwriters' Labeled Tin-clad Fire Doors

TELEPHONE
WEST 2703

1737-1743 Walnut Street
CHICAGO, ILL.

Products

LION STANDARD TIN-CLAD FIRE DOORS and SHUTTERS bearing Underwriters' Label.

LION STANDARD FIRE DOOR HARDWARE bearing Underwriters' Label.

Also Lion Kalamein Doors and Frames; Lion Standard Meeker Elevator Doors.

Fire Door Types

Designed to conform to various wall conditions, they are of many kinds—swinging (both single and double), and sliding (either gravity, level, horizontal or vertical). Doors are made both 2-ply and 3-ply.

Standard wood core tin-clad fire door construction is extensively used for the protection of large and small openings in fire walls of either old or new buildings.

Official Approval

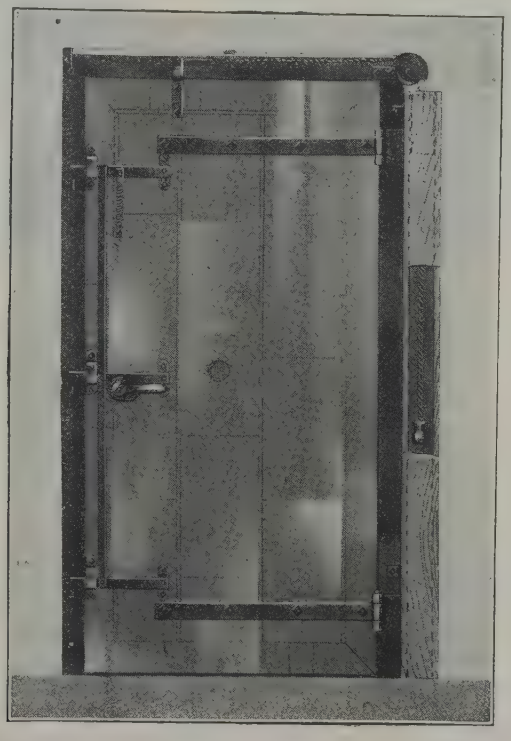
Lion standard tin-clad fire doors and fixtures are approved by the National Board of Fire Underwriters, the New England Mutuals and the Associated Factory Mutuals. The doors are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc., and fully approved by local and state inspection bureaus.

Swinging Fire Doors and Shutters

In design, this type can be either single or double swing and hung either to overlap the wall opening or fit in angle frame.

Complete fire door hardware can be furnished with or without the fusible link automatic closing device.

Window shutters are constructed so as to close flush with the face of wall or overlapping wall 4 in. each side and top.



No. 307. Lion Standard Tin-clad Swing Fire Door

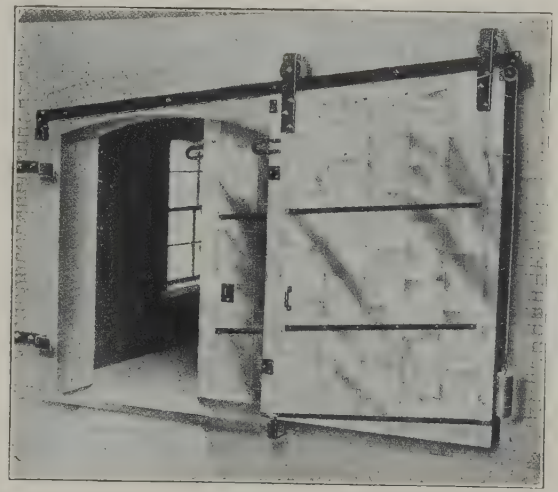
Sliding Fire Doors

Gravity fire doors are particularly adapted to fire wall openings on account of their easy operation. They are hung on inclined tracks which are pitched ¾ in. to the foot. The doors are held open by a counterbalance weight which is released by the melting of the fusible link when exposed to fire or excessive heat. When counterweight is released the door closes rapidly by force of gravity. It slides flush with the wall and does not take up floor space in its operation.

Split-gravity fire doors are designed to meet conditions such as insufficient wall space on either side of opening, and permit doors to slide clear of jamb, or where overhead carrier track passes through opening. Double sets of fire door hardware are required. Doors can be made split-slide for level track as well.

Level sliding fire doors are used where headroom is insufficient to place the track on an incline as required for gravity door. To meet varying conditions of headroom special designs of level track and hangers are provided.

Vertical slide-up fire doors are used where it is impossible to install either horizontal sliding or swinging fire doors. They are counterbalanced so as to balance the weight of the door, and are so arranged that in case of fire the fusible link releasing the weight, allows the door to descend slowly from force of gravity.



No. 301. Lion Standard Tin-clad Gravity Fire Door

Facilities and Workmanship

We make a speciality of fire door work including the manufacture of standard (non-labeled) Meeker freight elevator doors and non-labeled kalamein doors.

Special fire door hardware designed and manufactured to meet unusual conditions.

Lion fire doors and fixtures are built of the best in material and workmanship combining sturdy construction, rugged strength and promise of long service.

They bear the labels of the Underwriters' Laboratories, Inc.

Catalogue

Our latest catalogue contains complete description and illustrations of Lion fire doors and fire door hardware.

ESTABLISHED 1909

LAWTON-STEPHENS CO., INC.

Hollow Metal Doors, Drawn Metal Mouldings

427 Marcy Avenue, BROOKLYN, N. Y.

REPRESENTATIVES

SAN FRANCISCO, CAL., Badt, Falk & Co., 346 Call Building
LOS ANGELES, CAL., Harold L. Lewis, 1118 Commercial Exchange Building
CINCINNATI, OHIO, Central Building Products Co., 318 First National Bank Building
PITTSBURGH, PA., W. F. Overly & Sons, 336 Fourth Avenue
BOSTON, MASS., A. J. Macurdy, 80 Boylston Street
WASHINGTON, D. C., Consolidated Supply Co., Bond Building
CLEVELAND, OHIO, George Kimble, 308 Euclid Avenue Building
HOUSTON, TEX., Walcott & Maisey, 330 West Building
BALTIMORE, MD., Consolidated Supply Co., 10 W. Chase Street
SHANGHAI, CHINA, J. E. Hayes Engineering Corporation
YORK, PA., C. H. Strayer, 50 W. Philadelphia Street
DENVER, COLO., George P. Heinz & Co., Tietjen and No. 3rd Streets
PHILADELPHIA, PA., R. C. Kratz, 419 Perry Building
ATLANTA, GA., Builders Supply Co., Bona Allen Building
COLUMBUS, OHIO, Building Products Co., 975 W. Goodale Street
SCRANTON, PA., G. F. Becker, 517 Lackawanna Ave.
CHARLOTTE, N. C., Geo. B. Simpson, 516 Commercial National Bank Building
ROCHESTER, N. Y., Swalbach Building Products Co., 164 Inglewood Drive
ST. LOUIS, MO., Sydnor Hall & Co., 211 No. 7th Street
ENGLAND: Railway Supplies Co., Ltd., 68 Victoria Street, Westminster, LONDON, S. W. 1
MONTREAL, CANADA, C. G. Porter & Co., 305 New Birks Building

Products

Hollow Metal Doors and Trim.
Combination Buck, Jamb and Trim.
Complete Elevator Enclosures.
Drawn Metal Mouldings.

Service

The Lawton-Stephens Co., Inc. cordially invites architects and engineers to use its Sales Department Services. Without obligation of any kind, it will be glad to submit tentative designs and specifications, and co-operate in any way regarding methods of construction or problems where products of this nature are contemplated.

Doors

The Lawton-Stephens Co., Inc., hollow metal doors are made in any variety of styles and sizes as demanded by architects and builders—embracing solid panel, glass panel, raised panel, louver, or flush doors.

Lawton-Stephens hollow metal doors are constructed with care, and represent years of study in this field. They are adapted to meet all conditions where the best and most durable type of fireproof construction is required, such as in hotels, hospitals, apartment houses, office buildings, residences, etc.

Specifications for Standard Hollow Metal Doors—All doors to be of size and design as shown on door schedule and drawings, of Lawton-Stephens Co., Inc. manufacture, or equal, constructed throughout of open hearth, cold rolled, patent leveled, furniture steel. They shall be 1¾ in. thick, 5-in. stiles and rails, except bottom rail which shall be 10 in. in height, and be welded at all points of intersection. Stiles and rails to be of No. 18 gauge steel, with suitable asbestos or cork filler; panels to comprise two sheets of No. 18 gauge steel with suitable asbestos or other filler, or to be a single sheet of No. 12 gauge patent leveled furniture steel, and mouldings to be cold drawn of No. 20 gauge steel. Mouldings to be interlocked with and into these stiles and rails and, where doors are glazed, to be provided with loose steel stops arranged to receive the glass.

Note: If Underwriters' doors are required, they should be so specified—in which event, stiles and rails are lined with asbestos with Z-bar or other suitable spreader.

Special Hospital Type Door Construction

The doors shown were developed specially for use in hospitals where the sanitary feature is of utmost importance.

These doors are semiflush, carrying all of the characteristics and sanitary features of the flush door, eliminating the usual flat, monotonous appearance. This type of door costs very little more than a flush wood door and the finish is a high class baked or grained enamel, the life of which is about 25 years. Statistics show that wood doors must be refinished every three years at a cost of four to six dollars each. The wood doors are also subject to expanding and contracting due to weather conditions which in no way affects a hollow metal door.

Lawton-Stephens Hospital Type Door

Elevator Enclosures

The Lawton-Stephens Co., Inc., is a pioneer in this field of endeavor and has completed extensive installations where the full responsibility for the elevator enclosure has been entrusted to the door manufacturer. The entire opening, including doors, bucks, jamb, sill, glass, glazing and hardware is installed as one contract,

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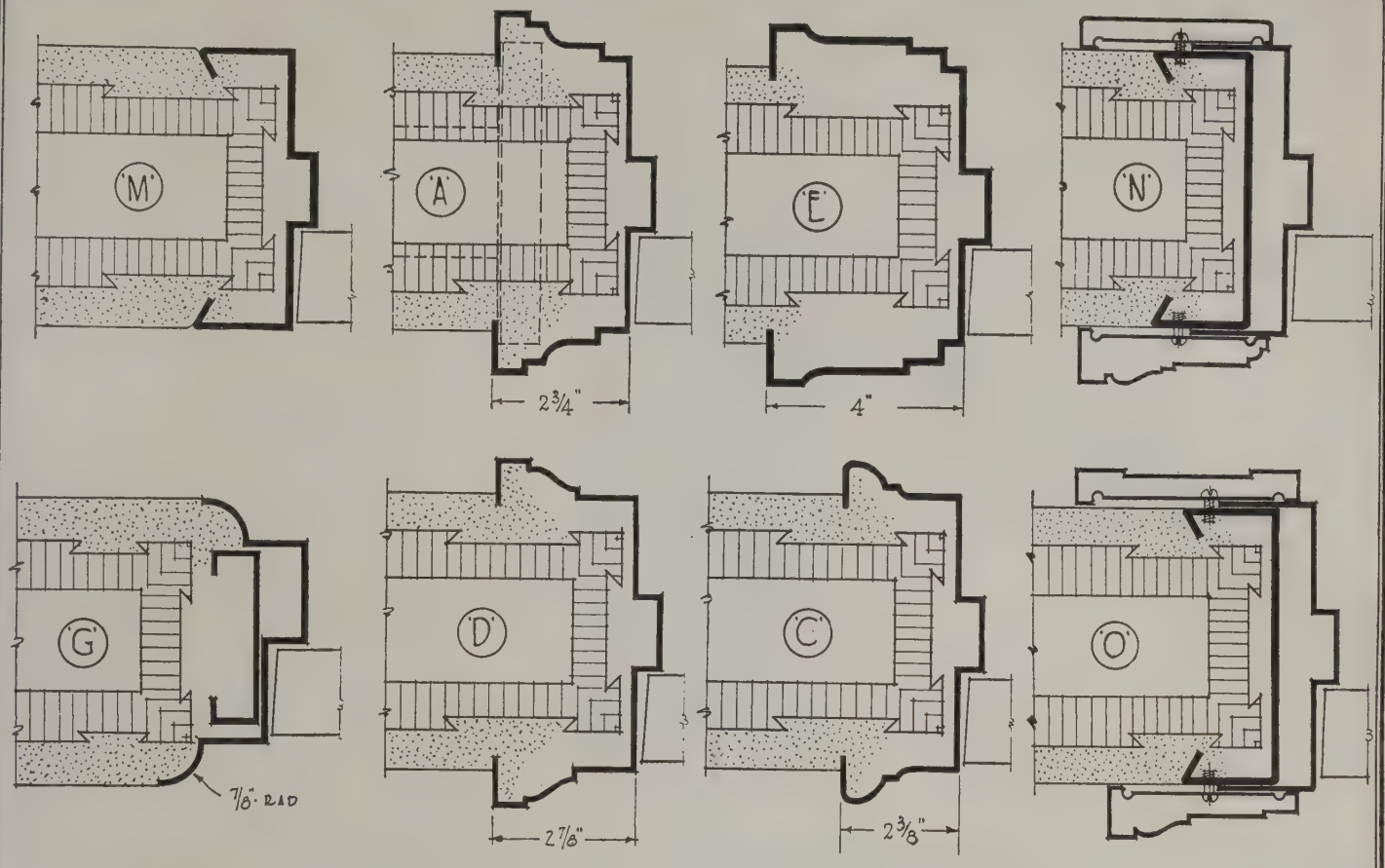
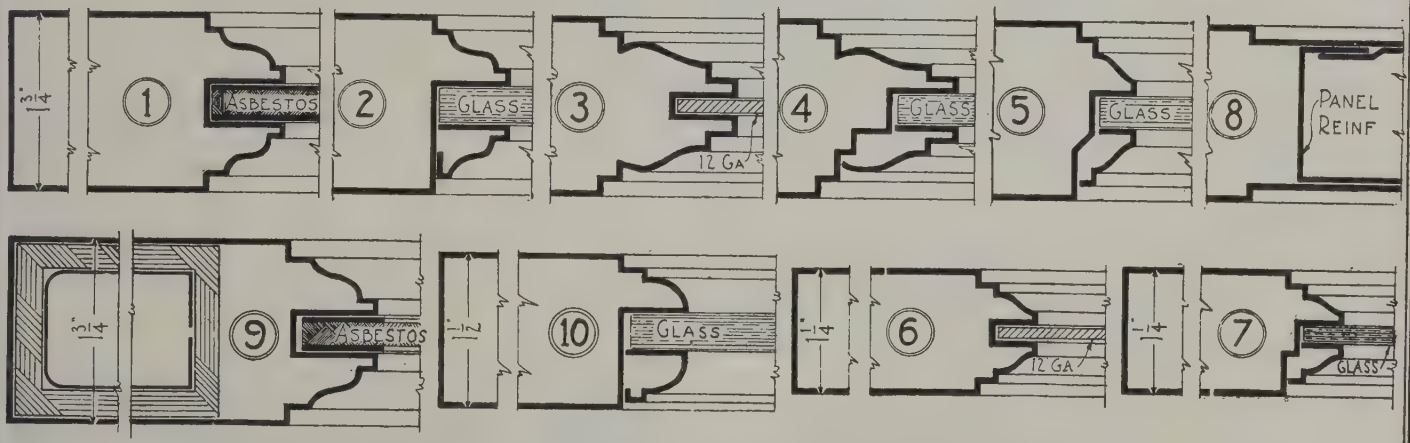
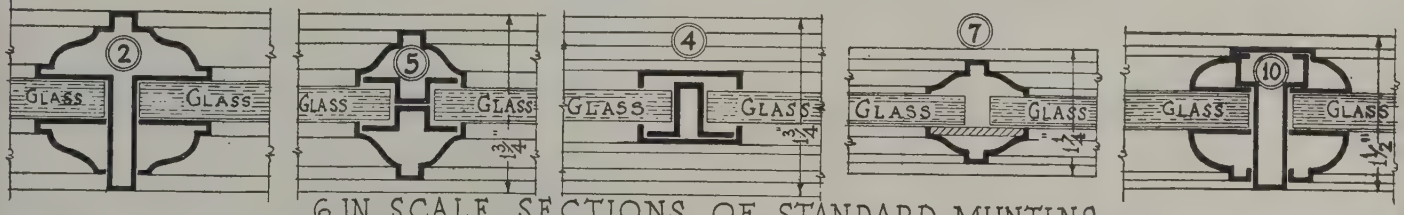


3 IN. SCALE DETAILS OF STANDARD DOOR FRAMES



6 IN SCALE SECTIONS OF STANDARD DOORS



6 IN. SCALE SECTIONS OF STANDARD MUNTINS

NOTE~ Doors No. 1, 2, 3, 4 & 5 are Standard 1¾" doors. Doors No. 6 & 7 are Standard 1¼" thick doors. Door No. 8 - 1¼", 1½" or 1¾" thick and Door No. 10 - 1½" thick are Standard Hospital Doors. Door No. 9 is Standard Fire Underw. Door 1¾" thick with 20 ga. steel shell and asbestos lining in stiles, rails and panels. Door No. 1 has asbestos lined panels. Doors No. 3 and 6 have No. 12 ga. solid steel panels. Doors No. 2, 4, 5, 7 and 10 are arranged for glazing. Door No. 4 is also made to receive asbestos lined panel. Door No. 8 has 1/8" sinkage metal panels. All doors except No. 9 have cork fillers in stiles and rails. Full Size Details mailed on request.

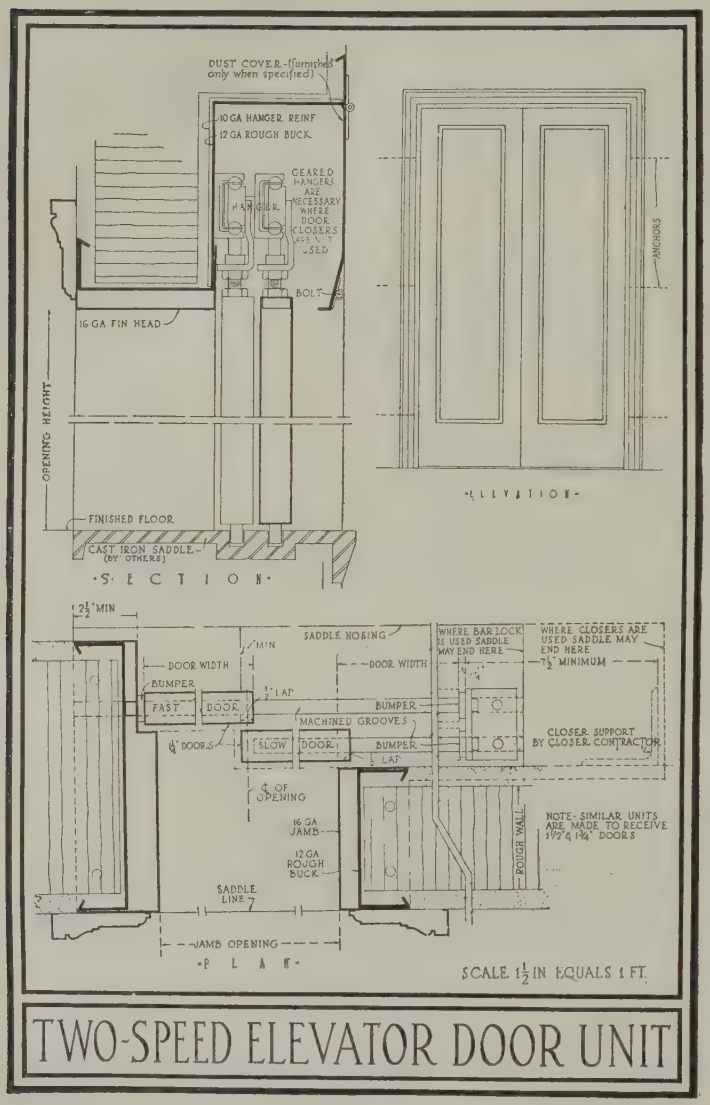
LAWTON-STEPHENS CO., INC.	DETAILS OF HOLLOW METAL DOORS AND TRIM	DRAWING NO. 1 SCALE 3" & 6" EQUALS 1'-0"

Continued on next page

thereby doing away with divided responsibility and faulty operation.

Particular attention has been given to push button installations for apartment houses and this company has developed a special standard installation for this type of enclosure.

Lawton-Stephens Co., Inc., will be pleased to forward to architects and builders complete data, including specification, photographs and sketches, on request.



TWO-SPEED ELEVATOR DOOR UNIT

Jambs

Jambs may be No. 12, 14, or 16 gauge integral combination buck, jamb and trim, or No. 18 gauge cabinet jambs installed with rough steel bucks. With cabinet jamb installation, trim is separate, either clipped on or screwed on, and both jamb and trim can be finished to match the door.

Finish

All surfaces are thoroughly cleaned of all grease and foreign matter before finish is applied. Each coat is then applied and baked.

This Company has an enviable reputation for the quality and durability of its finish and is prepared to furnish a large variety of enamels in plain colors, grained to match wood, or metallic finishes of various shades such as bronze, copper, verde antique or any other finish desired.

Where a prime coat finish is specified, the final coat is applied at the building by the painting contractor.

Mouldings

This Company specializes in drawn metal mouldings, made from either stock dies, or to special detail.

Our service includes a complete machineshop, to make either new dies or to keep old dies in first class condition. A large number of dies are in stock, including such shapes as panel mouldings, trim, automobile mouldings, channels, angles, and special shapes of many kinds. These may be specified in either hot or cold rolled strip steel, galvanized steel, bronze, copper, monel metal or various other metals, as desired.

Other Products

This company manufactures various types of pressed or stamped metal shapes for a large number of different purposes.

List of Representative Installations

Office Buildings

Architects Building, 101 Park Avenue, New York, N. Y., Ewing & Allen, Architects; Post & McCord, Builders
Westinghouse Building, 150 Broadway, New York, N. Y., Starrett & Van Vleck, Architects; Fred T. Ley & Co., Builders
Washington Central Trust Building, Washington, D. C., Coolidge, Shepley, Bulfinch & Abbott, Architects; James Stewart & Co., Builders
U. G. I. Fidelity Building, Philadelphia, Pa., U. G. I. Contracting Company, Builders

Hospital Buildings

Columbia-Presbyterian Medical Center, New York, N. Y., James Gamble Rogers, Architect; Marc Eidlitz & Son, Builders
Somerset Hospital, Somerville, N. J., Crow, Lewis & Wick, Architects; John Lowry, Inc., Builders
Boston City Hospital, Boston, Mass., Ritchie, Parsons & Taylor, Architects; J. A. Singarella, Builder
Germantown Hospital, Germantown, Pa., Arthur H. Brockie, Architect; Irwin & Leighton, Builders

Municipal Buildings

Brooklyn Municipal Building, Brooklyn, N. Y., McKenzie, Voorhees & Gmelin, Architects; Cauldwell-Wingate Co., Builders
White Plains Municipal Building, White Plains, N. Y., J. Friedlander, Architect; John O'Rourke & Sons, Builders
Court House, Canton, N. Y., S. W. Williams, Architect; Munn & Shea, Builders

Telephone Buildings

Newark Telephone Building, Newark, N. J., Voorhees, Gmelin & Walker, Architects; Turner Construction Co., Builders
Chesapeake & Potomac Telephone Exchange, Parkersburg, W. Va., McKenzie, Voorhees & Gmelin, Architects; Engstrom & Co., Builders
Southern New England Telephone Building, Stamford, Conn., R. W. Foote, Architect; H. Wales Lines Company, Builders

Factory Buildings

Ward Baking Company, Pittsburgh, Pa., C. B. Comstock, Architect; W. F. Trimble & Sons, Builders
Otis Elevator Company Building, Yonkers, N. Y., W. O. Moyer, Architect; Turner Construction Company, Builders

Educational Institutions

Richmond Hill High School, Richmond Hill, N. Y., Wm. H. Gomper, Architect; Thos. G. Sperling Company, Builders
Brooklyn Law School, Brooklyn, N. Y., Goodhue Associates, Architects; Thos. O'Reilly & Son, Builders

Residences

Dodge Residence, New York, N. Y., Clinton & Russell, Architects; L. M. Neckerman & Company, Builders
Chauncey M. Depew Residence, New York, N. Y., James Stewart & Company, Builders

Columbia-Presbyterian Hospital, New York, N. Y.
James Gamble Rogers, Architect
Marc Eidlitz & Son, Inc., Contractors
Over 3000 Lawton-Stephens Hospital Doors in this building

THE R. C. MAHON COMPANY

Manufacturers of Kalamein Doors

8650 Mt. Elliott Avenue
DETROIT, MICH.

Product

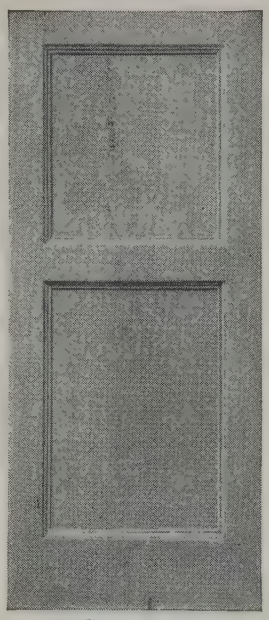
KALAMEIN DOORS.

For Mahon Steel Roof Deck, see pages A201-212; for Mahon Roof Sumps, see page C2789.

Underwriters' Labeled Doors

Mahon Underwriters' Labeled Doors are manufactured from the finest selected kiln-dried white pine, covered with No. 24 gauge sheet steel. All joints are welded, making a sturdy, fire-safe fine appearing door.

Each Mahon Underwriters' Labeled Door must pass the rigid inspection conducted by a representative of the Underwriters' Laboratories, Inc., in addition to the regular shop inspection. This double O. K. insures permanence and absolute fire safety.



Mahon Type 1 Kalamein Door

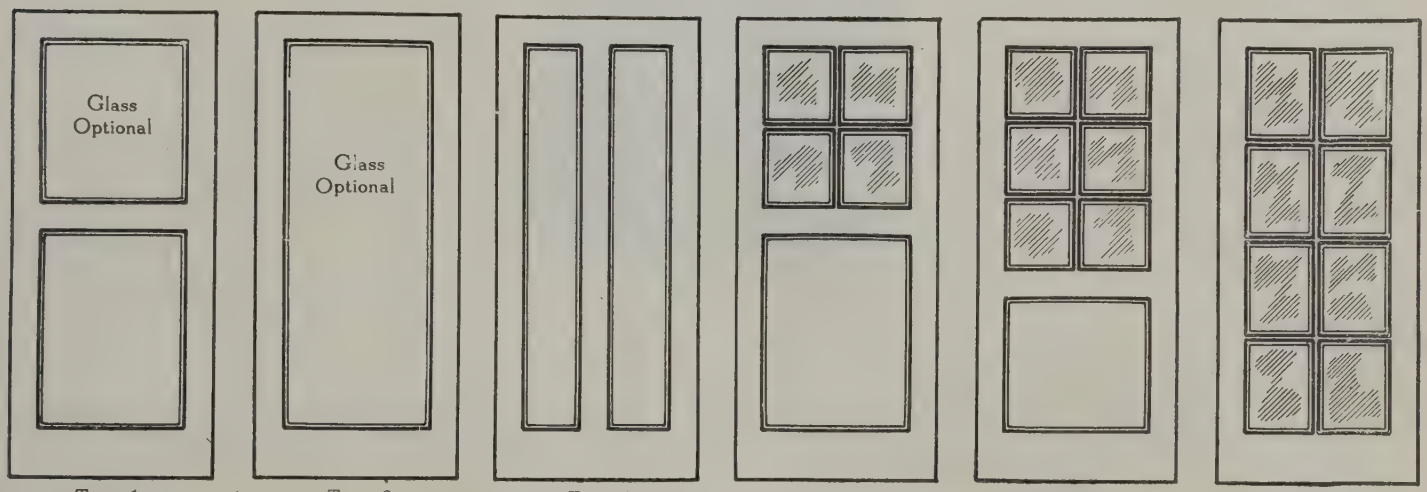
Standard Fireproof Doors

Mahon Standard Fireproof Doors are of the same general design and high quality as Mahon Underwriters' labeled doors. The standard door is a satisfactory fire door but should not be used where labeled doors are specified.

Standardization of sizes and facilities for quantity production in the Mahon plant make it possible to quote unusually low prices on this type of door.

Service

Mahon designers are available at all times to co-operate on special conditions where standard doors can not be used. They will gladly give the benefit of their specialized experience.



Type 1 Type 2 Type 3 Type 4 Type 5 Type 6

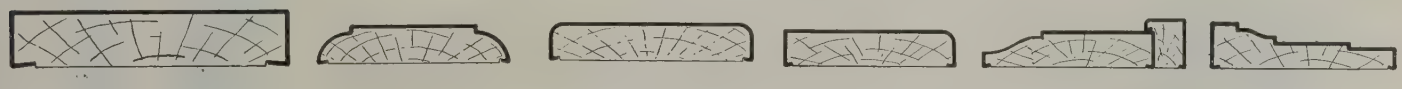
Standard Mahon Kalamein Doors

*Stock sizes		Semi-stock sizes, single doors		Semi-stock sizes, resultant pairs	
2′ 6″ x 7′ 2′ 9″ x 7′	3′ 0″ x 7′ 3′ 6″ x 7′	2′ 0″ x 7′ 2′ 3″ x 7′ 3′ 3″ x 7′	3′ 9″ x 7′ 4′ 0″ x 7′	4′ 0″ x 7′ 4′ 6″ x 7′ 6′ 6″ x 7′	7′ 6″ x 7′ 8′ 0″ x 7′

*Stock sizes ready for immediate delivery in Type 1 only.

Fireproofed Jambs, Trim and Moulding

Several standard jambs, trim and moulding sections in attractive designs, manufactured from the same high grade white pine, and fireproofed in the same manner as Mahon Kalamein Doors, are carried in stock ready for immediate delivery.



No. 101 — **Standard 5½-in. Jamb**

No. 200 No. 201 No. 203 Nos. 204 and 206 No. 205 — **Standard Trim Sections**

No. 100 No. 101 No. 102 No. 300 No. 305 — **Standard Stop Sections**

No. 307 Nos. 309 and 308 No. 310 No. 311 — **Standard Moulding Sections**

ESTABLISHED 1912 INCORPORATED 1920

THE McCOY BRONZE COMPANY, INC.

Manufacturers of Pyramid Bronze Doors

FACTORY AND GENERAL OFFICES
Forsythe and Holden Streets
DETROIT, MICH.

Products

PYRAMID EXTRUDED BRONZE DOORS.

For Pyramid Extruded Bronze Casements, see page A1255.

Facilities

A complete modern plant manned with experienced and capable workmen.

Service

Estimates will be furnished from architects' plans and specifications. Suggestions and designs or models will be furnished when desired. We solicit your inquiries.

Pyramid Bronze Doors

Suitable for all types of buildings.

The Pyramid Bronze Door is superior in appearance and many times as strong as the ordinary type of bronze door generally built of No. 14 gauge sheet bronze with rivets, screws, or solder to hold members together.

Pyramid Doors have no screws or rivets to loosen up, no welds, brazes nor solder to break. The thickness of material is ⅛ in. which eliminates wavy effects and is heavy enough so that reinforcing is not necessary. Pyramid Doors are made of special extruded bronze members dovetailed and locked together, making a door one hundred per cent more rigid than heretofore obtainable in any other type of construction. Our Pyramid Doors are made in many types and sizes due to this novel construction.

Before placing Pyramid Doors on the market we have carefully tested, and have had many prominent architects and engineers pass upon our construction, and we have yet to find anything but words of praise for Pyramid construction.

Pyramid Bronze Doors through their novel construction may be purchased at a price that will astound the most skeptical buyer.

They are standard in many thicknesses and widths of rail. On the following pages are shown a few of the standard types, made in many sizes.

Pyramid Doors are no heavier than the ordinary type of hollow bronze doors.

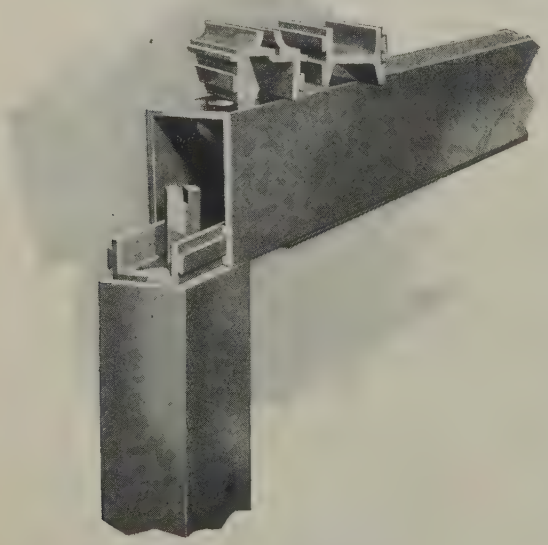
United Artists Theatre Building, Detroit
C. HOWARD CRANE, Architect

Hardware

Our prices include the application of all hardware as selected and furnished by the owner. Our factory is equipped with templates of standardized hardware, which will facilitate delivery and avoid undue delay.

Finish

All work is hand rubbed, removing all scratches and discolor marks. Many beautiful finishes may be obtained on Pyramid Doors.



Section of Construction

Door Bucks

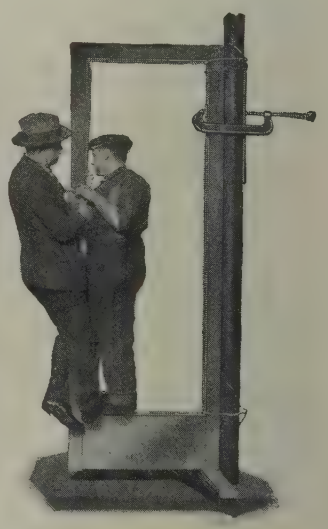
Bucks are made of extruded bronze, structural steel or heavy bent plates and are ordinarily erected before the walls.

Bucks are anchored into the walls with either the legs outstanding or turned into walls.

The frames are securely anchored to these bucks.

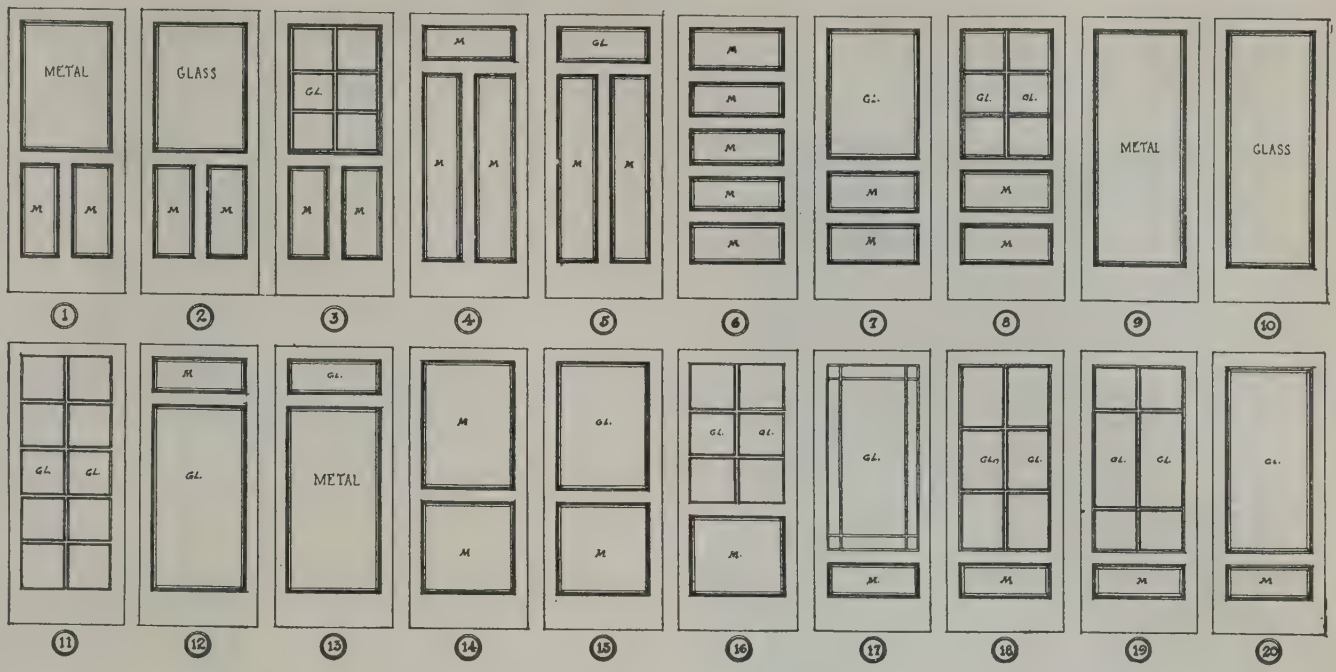
Specifications

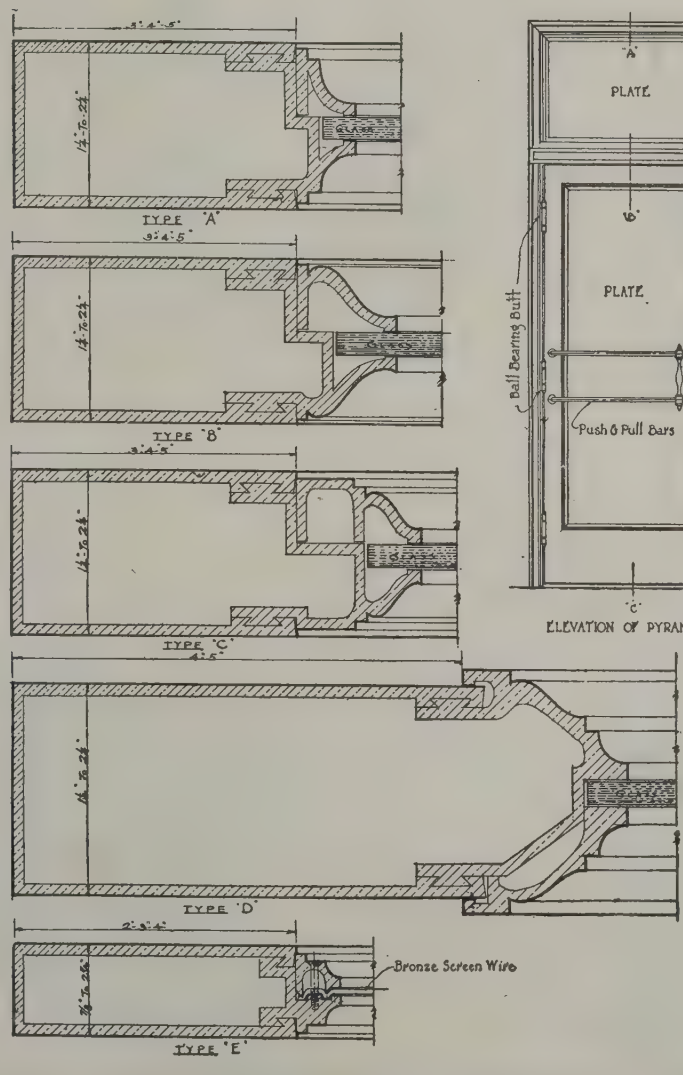
The door shall be made of extruded metal not less than ⅛ in. thick with dovetailed joints free from all screws, rivets and welds, brazing or solder and held together internally. All edges to be sharp and true to contour, stiles and face of doors to be free from wavy effects. The doors are to be Patented "Pyramid" as manufactured by the McCOY BRONZE CO. of Detroit, Michigan.

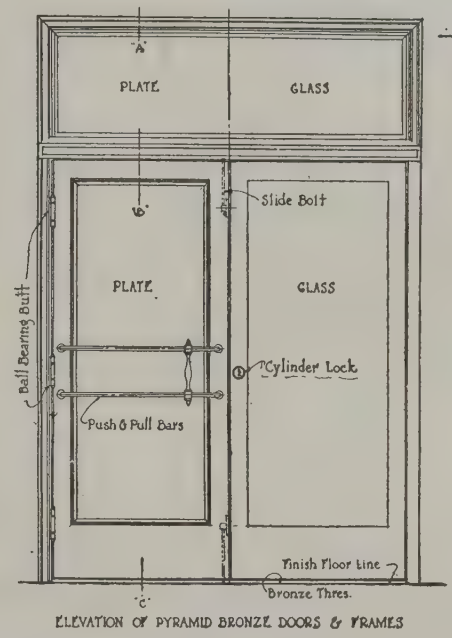


Test of Door

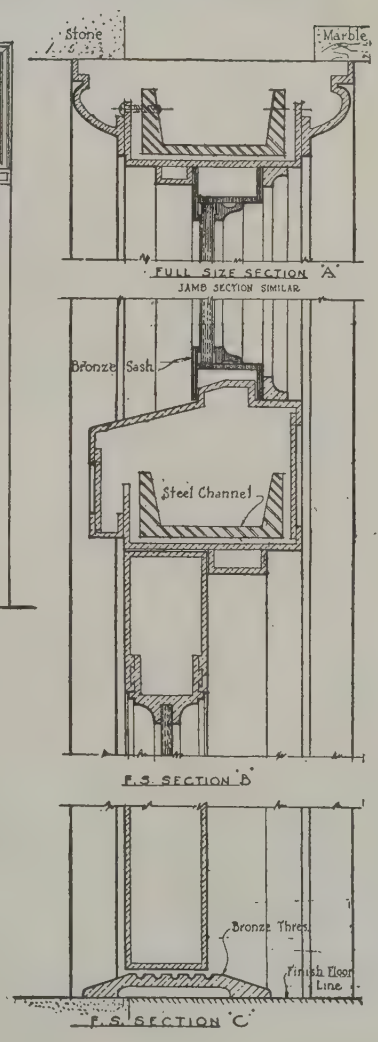
Continued on next page







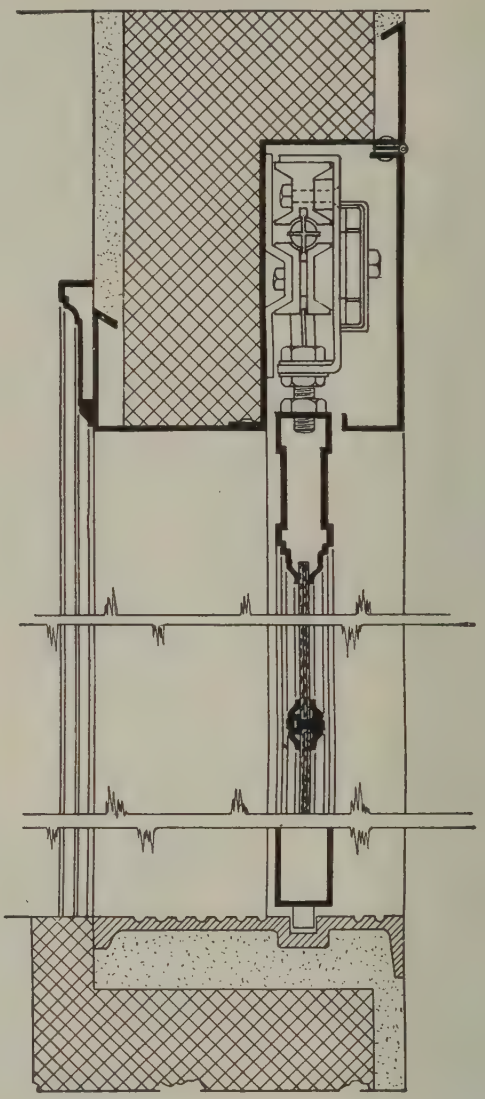
ELEVATION OF PYRAMID BRONZE DOORS & FRAMES



THE McCOY BRONZE CO.	Standard Types and Details of Frames of PYRAMID BRONZE DOORS	VARIOUS SCALES

Continued on next page

Elevator Opening in the United Artists Theatre Building, Detroit, Mich.
C. Howard Crane, Architect

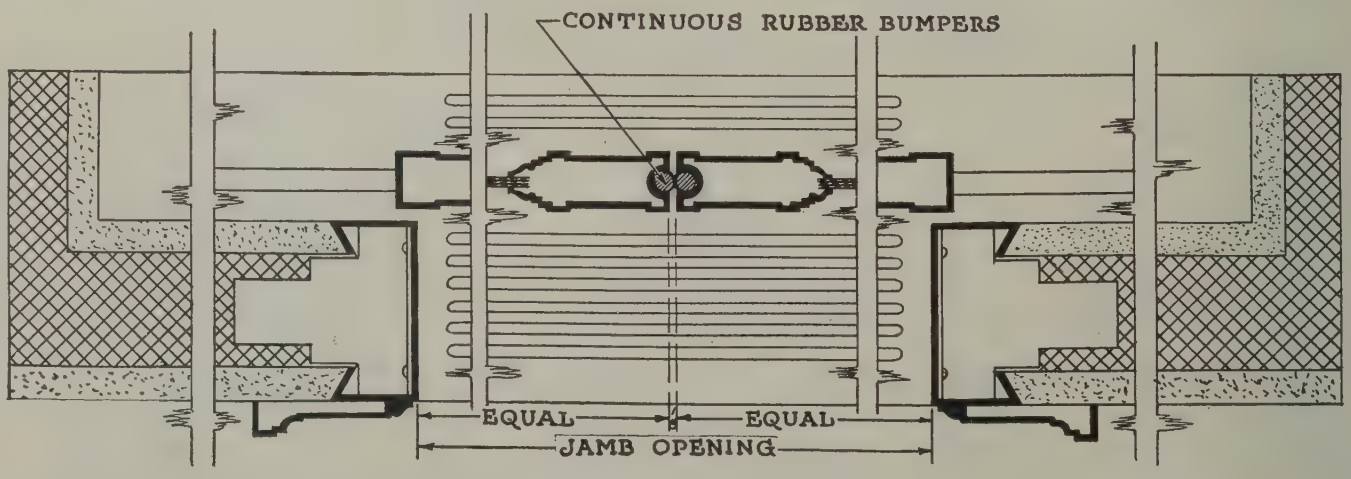


Many beautiful and pleasing effects may be had by using etched panels as above. Our Pyramid Standard Elevator Doors are so built that the addition of etched or cast panels adds very little to the cost.

Construction—Pyramid Elevator Doors are built of extruded bronze held together with dovetails. They are equipped with continuous removable rubber bumpers.

Cost—Pyramid Elevator Doors, due to their construction are inexpensive, comparing very favorably with the better grade of steel doors.

Prices and literature on request.



THE McCOY BRONZE CO.	DETAIL OF ELEVATOR DOORS AND TRIM	PLATE E-201

ESTABLISHED 1866

MERCHANT & EVANS CO.

Manufacturers of Fire Doors and Shutters

PRINCIPAL OFFICES

PHILADELPHIA, PA.

Also Sold by: GLOBE AUTOMATIC SPRINKLER COMPANY (General Agents)

OFFICES IN PRINCIPAL CITIES

"ALMETL" TRADE MARK REG. U.S. PAT. OFF.

FIRE DOORS AND SHUTTERS

Products

M & E "ALMETL" Labeled FIRE DOORS and SHUTTERS.

M & E "ALMETL" Unlabeled Doors, for factory and warehouse service.

For "Star" Roof Ventilators, see page A637.

M & E "Almetl" Labeled Fire Doors

Labeled "Almetl" Fire Doors and Shutters for all building openings under jurisdiction and control of insurance interests.

M & E "Almetl" Fire Doors are made in two thicknesses: 2¾ and 1⅞ in. The 2¾-in. door is labeled by Underwriters' Laboratories, Inc. for fire walls (Class A), vertical shafts (Class B), corridor and room partitions (Class C), and exterior openings (Classes D and E) when type and pattern are within the prescribed opening size limits.

The 1⅞-in. door is labeled by Underwriters' Laboratories, Inc. for Class B, C, D, and E situations when type and pattern are within the prescribed opening size limits.

Approvals—Inspected and labeled by the Underwriters' Laboratories, Inc., Chicago, Ill. and Factory Mutual Laboratories, Boston, Mass.; also approved and used by United States Government. Endorsed and recommended by over 250 National, State and Municipal fire and safety control authorities.

Types—Single sliding, pairs sliding, single swinging, pairs swinging, vertical sliding and horizontal lifting.

We also furnish "Almetl" Doors with convex heads, with panels for wire glass, with wicket gates, or recessed for overhead monorail systems.

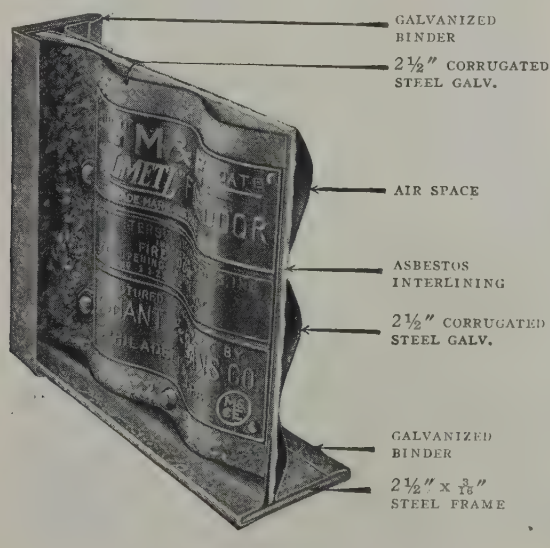
Sliding doors made sectional for assembly at destination when occasion requires; and doors to meet special requirements.

Advantages—Aside from the maximum reduction in insurance rates for installation of M & E "Almetl" Doors, the buyer is assured of 100% value, permanence and service due to the lasting and indestructible materials used in their construction. "Almetl" Doors are all steel and asbestos.

Twenty-year guaranteed—no better value in a "labeled" fire stop obtainable.

They are lighter, and the cost of maintenance is negligible.

Hardware—Fully approved and labeled hardware furnished with detailed erection prints.



Construction of "Almetl" Fire Door
Weight, 4¾ lb. per sq. ft.

Special hardware to meet unusual conditions when required. Lighter unlabeled hardware for unlabeled doors and panels.

Specification for Labeled Fire Doors

Fire doors where indicated on the plans or door schedule throughout the building shall be M & E "Almetl," as manufactured by MERCHANT & EVANS Co. (principal office, 2035 Washington Avenue, Philadelphia, Pa.).

Doors shall be made of two thicknesses of No. 24 gauge—2½-in. corrugated galvanized steel transversely laid, interlined with asbestos roll board in a continuous rigid frame of 2½x3/16-in. bar steel bound in a heavy gauge galvanized steel covering tightly riveted to the frame. Proper provision to be made for expansion and contraction without distortion.

Each door, whether sliding or swinging shall bear the label of the Underwriters' Laboratories, Inc., and also that of the manufacturer.

All hardware and automatic closing devices shall be in strict accordance with requirements of Fire Underwriters having jurisdiction.

M & E "Almetl" Unlabeled Service Doors

Unlabeled "Almetl" Service Doors for all commercial purposes—to enclose openings to street, yard, loading platforms; for sheds, exterior and interior openings of all kinds not subject to insurance control.

These doors are of the same sturdy construction as the labeled product, excepting slight reduction in insulation features.

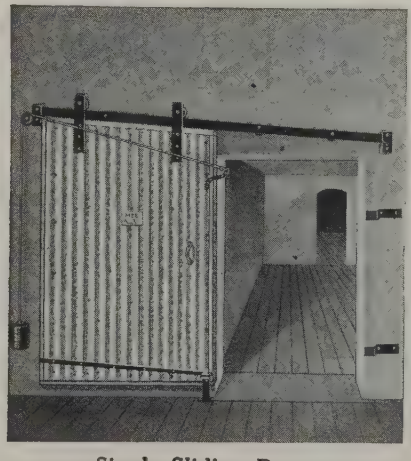
The special merits and advantages of these doors are light weight, neat appearance, low cost, durability in service. They can be designed for every use and any building mechanic can install them, using standard warehouse door hardware.

Service

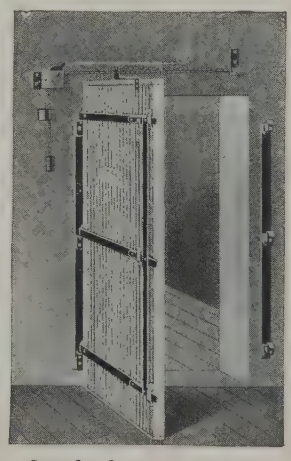
We or our 300 responsible and experienced "contracting and erecting licensees" will quote on "Almetl" Doors and Shutters separately, with or without "approved" hardware and installation—for any contract anywhere.

Our centrally located plant is equipped with up-to-date machinery and skilled workmen.

Our sales and engineering department is thoroughly informed and organized to advise on any unusual or complex installation problem.



Single Sliding Door



Single Swinging Door

METAL CLAD DOORS, INC.

685 Concord Avenue, CAMBRIDGE, MASS.

Products

METCLA METAL COVERED DOORS, FRAMES, TRIM, ENTRANCES and WINDOWS; TIN CLAD FIRE DOORS and SHUTTERS.

Kalamein and Tinclad Doors are furnished either with or without Underwriters' label.

Metcla Metal Covered Doors, Frames and Trim

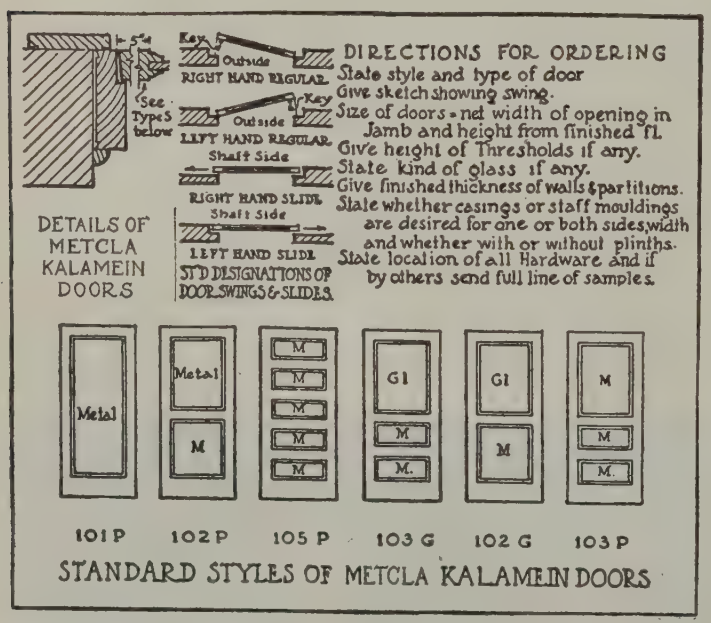
Made by drawing sheet metal through steel dies over a wood core of white pine. This process practically welds the metal covering to its core, eliminates buckles and brings out all moulding members in clear relief.

Made in kalamein iron, galvanized steel, copper or low brass; in sections, tongued, grooved and pinned together, and finished with a priming coat of paint. Glass is not furnished by us.

Standard styles in kalamein iron are illustrated below. Special styles and sizes will be furnished on short notice.

No. 102G
Metcla Metal Covered Door

Metcla metal covered doors, frames and trim are approved by leading architects and engineers, and have been used under the most severe conditions. In specifying Metcla doors, frames and trim the architect is assured of the utmost in quality, workmanship and durability, upheld by continuous service and a high reputation for materials and workmanship.



Metcla Metal Covered Windows

The outstanding qualities of Metcla windows are their simple construction, ease of operation, fire retarding qualities, and the unusually high standard maintained in regard to the materials used in their construction.

They combine safety, economy, durability and weatherproofness.

Made for all classes of buildings in all required types and sizes, either from our own or architects' details and to conform with special requirements.

Furnished glazed or unglazed, with or without hardware, as required.

Metcla Metal Covered Entrances of Copper, Bronze or Kalamein

Metcla entrances are made in accordance with the architect's details to meet every requirement. They are a striking feature of many prominent public and private buildings and have all the advantages and the appearance of cast metal doors, without their extreme weight or cost.

Mill Entrance
Metcla Copper Kalamein

Metcla Kalamein Elevator Fronts

Metcla kalamein elevator fronts are specified for durability, ease of operation and appearance, where sheet steel doors are not desired, or where hollow metal doors would be too expensive.

Tin Clad Doors and Shutters

These are made in any style and size, and are furnished with or without hardware f.o.b. Boston or installed with or without Underwriters' labels.

Storage Warehouse Equipment
Tin Clad Doors, Iron Frames, Special Hardware

PEERLESS FIREPROOF DOOR CO., INC.

Manufacturers of Kalamein Doors

TELEPHONE
South 8192, 8193

235 Sixth Street
BROOKLYN, N. Y.

Products

Metal Covered Doors, Windows, Frames and Trim.
Bronze and Copper Covered Doors.
Tin Clad Underwriters' Labeled Doors.
Metal Covered Smoke Screens.
Elevator Enclosures.

Peerless Metal Covered Doors, Windows, Frames and Trim

Cores—Sound, kiln-dried white pine, free from loose or large knots, dry rot, sap or shakes, machined to proper dimensions.

Metal Covering—Metal is free from all waves, blisters and any imperfections. Metal covering is drawn over wood through steel dies. Edges are sharp and true.

Metal for stiles and rails is No. 26 or 24 gauge long terne or galvanized or No. 24 or 22 gauge furniture steel.

Panels—All panels are 3/8 in. thick of three-ply laminated white pine wood cores with metal glued under pressure on both sides with waterproof glue.

Bronze Covered Doors

We specialize in the manufacture of bronze covered doors used for entrances and lobbies of banks, theaters and commercial buildings. The covering is either No. 18 or 20 gauge bronze. All seams between stiles and rails are of hairline width. Panel and glass mouldings are of extruded bronze.

Copper Covered Doors

The well-known weathering qualities of copper combined with our weatherproof construction of all joints make our copper covered door stand up under the severest climatic conditions.

Underwriters' Labeled Doors

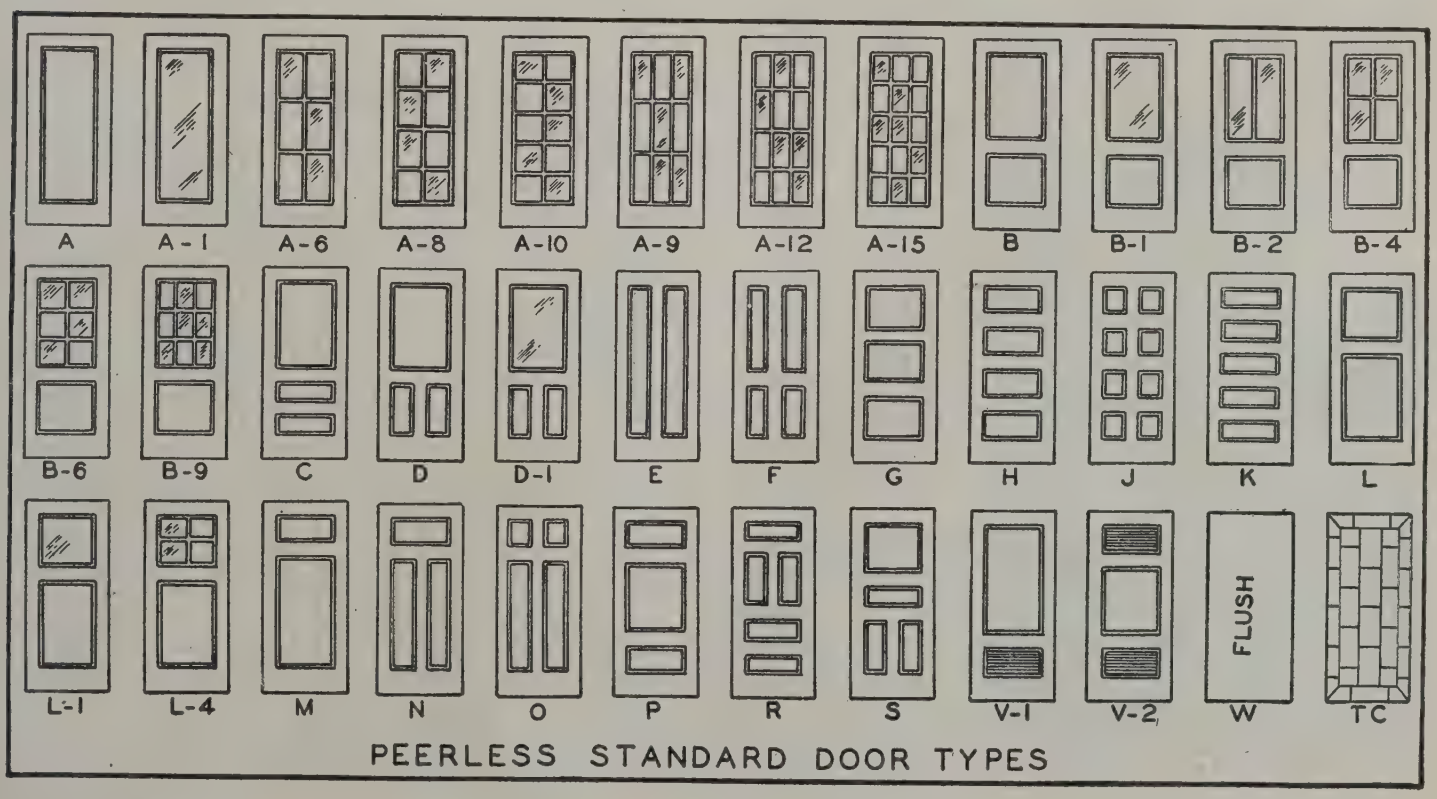
We manufacutre every type of labeled tin clad fire door to meet all conditions imposed by the insurance, building and fire departments. The doors are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc.

Metal Covered Smoke Screens

These smoke screens are made in accordance with architects' details to suit conditions in corridors and stair halls.

Elevator Enclosures

Our elevator enclosures are made for every type of opening in elevator shafts. They are practically noiseless in operation and of solid, long lasting construction.



PEERLESS STANDARD DOOR TYPES

NEW YORK KALAMEIN CO.

Manufacturers of Metal Covered Wood Work

800 Humboldt Street, BROOKLYN, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

DRAWN METAL COVERED WOOD DOORS, WINDOWS, ELEVATOR FRONTS, PARTITIONS and TRIM in Steel, Copper and Bronze.

NEW YORK KALAMEIN COMPANY

TRADE-MARK

Sound Construction

In the manufacture of our products we follow old established methods, which have been found through long use to be the most satisfactory. Doors are of mortise and tenon construction. No dowels or corrugated fasteners are used. No parts are covered by hand, the doors are strictly a machine made product.

All parts of doors, windows and trim are separately kalameined before assembly. This not only produces the highest class of work, but places us in a position to render a very wide service to users of all classes of metal covered woodwork.

Specification Data for Standard Metal Covered Doors

Cores, Stiles and Rails—Wood used in cores, stiles and rails is sound, kiln dried white pine, milled solid, and free from large and loose knots and sap.

Covering—All parts are covered with No. 24 gauge furniture steel, No. 24 gauge terne plate or No. 26 gauge galvanized iron by die process before assembly.

If doors are to be covered with copper, 16 oz. is recommended; if bronze is used, 20 gauge is recommended.

Panels—Panels are built up as in veneer process, under pressure of 2 sheets of metal, cemented on to approved board.

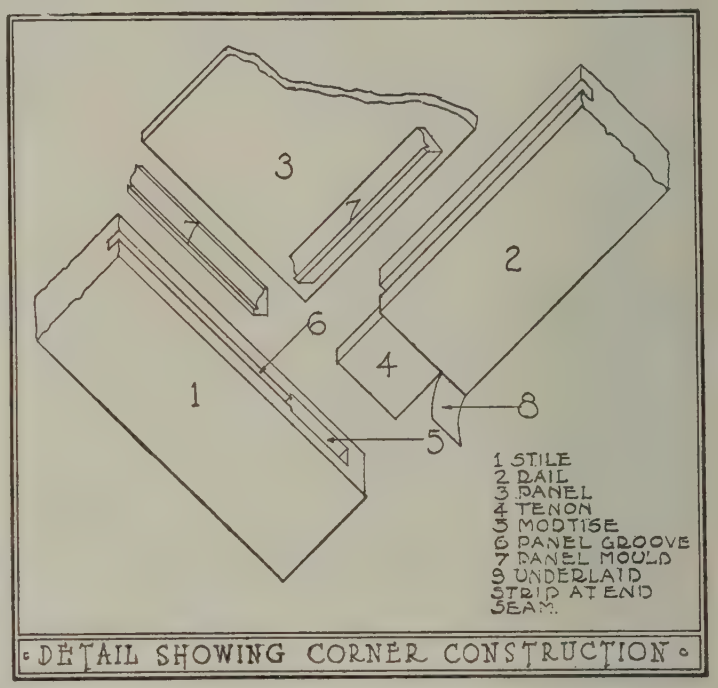
New York Central Building
WARREN & WETMORE, Architects
JAMES STEWART & CO., INC., Contractors
N. Y. Kalamein Doors used throughout

Assembly—Stiles are mortised and rails blind tenoned. Panel is inset into stiles and rails. Surface seams are soldered and scraped smooth. The top and bottom edge seams have underlaid strips of metal making the joints practically waterproof.

Painting—All material is given a priming coat of paint before leaving the factory.

Metal Covered Windows

Metal covered windows of double hung or casement type can be furnished in our own standard designs, or we will build them to specifications. Other types of windows will be manufactured to meet special conditions. All windows are of sturdy construction. Special care is taken to have the joints and seams tight to withstand the action of the weather.



DETAIL SHOWING CORNER CONSTRUCTION

Service

We are prepared to design special metal covered woodwork to fit openings with unusual contours. Upon receipt of drawings or sketches we shall be glad to submit for approval designs for filling any shape or size window opening.

Some Recent Installations

New York Central Office Building, New York, N. Y.; James Stewart & Co., Inc., Contractors; Warren & Wetmore, Architects

Vincent Astor Residence, New York, N. Y., Saxton-Gerard Co., Inc., Contractors; Mott B. Schmidt, Architect

Apartment House, 79 E. 79th Street, New York, N. Y., James Stewart & Co., Inc., Contractors; Electus Litchfield, Architect

Edison Substation, West 72nd Street, New York, N. Y., Saxton-Gerard Co., Inc., Contractors; W. Whitehill, Architect

Edison Substation West 124th Street, New York, N. Y., Ken-Well Contracting Co., Contractors; W. Whitehill, Architect

Hillsboro High School, Tampa, Fla., J. L. Crouse, Contractor; Francis J. Kennard & Son, Architect

Westbury Theater, Westbury, L. I., N. Y., A. B. Whitney Co., Contractors; D. P. Hall, Architect

Brooklyn Preparatory School, Brooklyn, N. Y., John Kennedy & Co., Contractors; McKenna & Irving, Architects

Coal Loading Towers, New York Edison & New York Steam Cos., New York, N. Y., Maine Electric Co., Contractors

U. S. Veterans' Hospital, Bedford, Mass., Murch Bros. Construction Co., Contractors

Clark Office Building, Philadelphia, Pa., Day & Zimmerman, Contractors; Zantzinger, Borie & Medary, Architects

Greenpoint Avenue Bridge, Brooklyn, N. Y., P. T. Cox Contracting Co., Contractors

Hartford National Bank, Hartford, Conn., Stone & Webster, Contractors; Dennison & Hirons, Architects

Radio Corporation of America Building, Riverhead, L. I., N. Y., Skinner & Cook, Contractors; Clinton McKenzie, Architect

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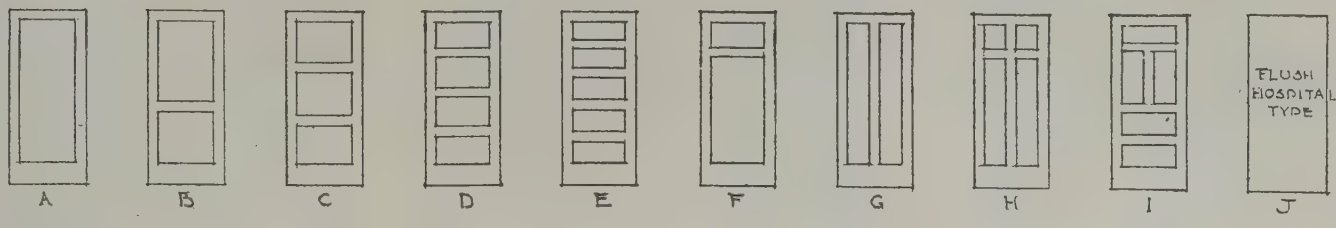
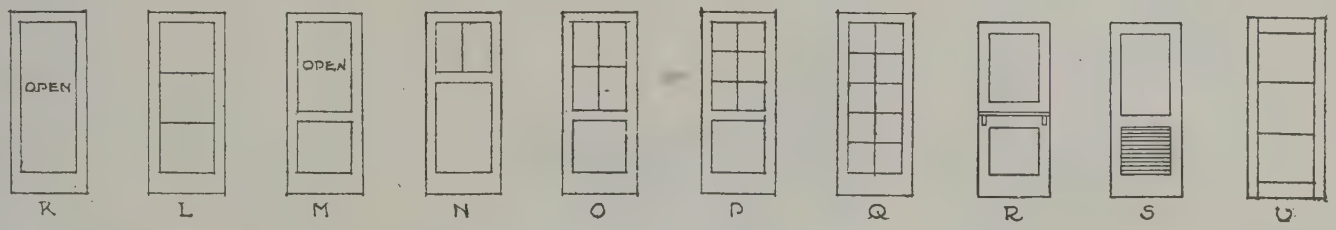
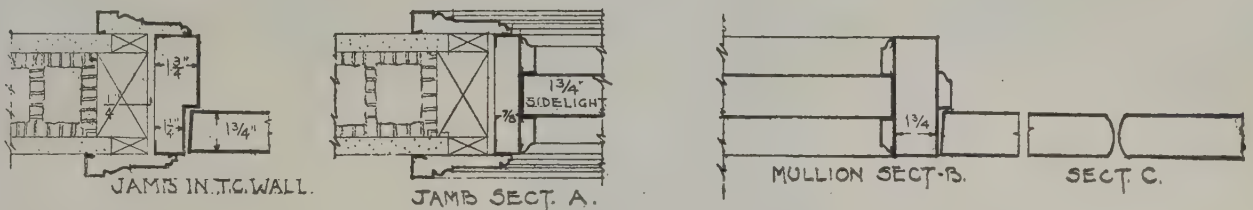
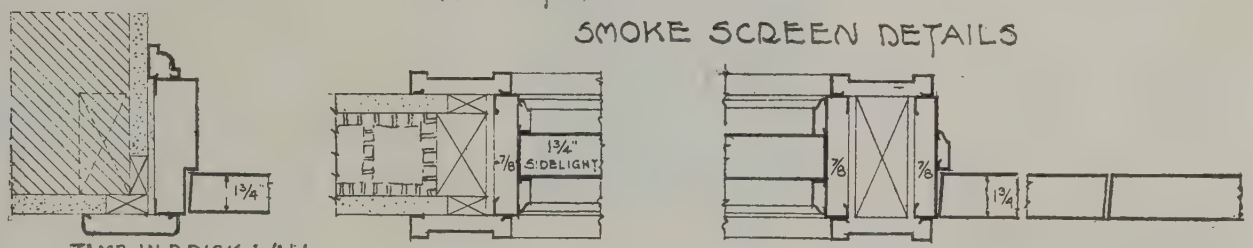




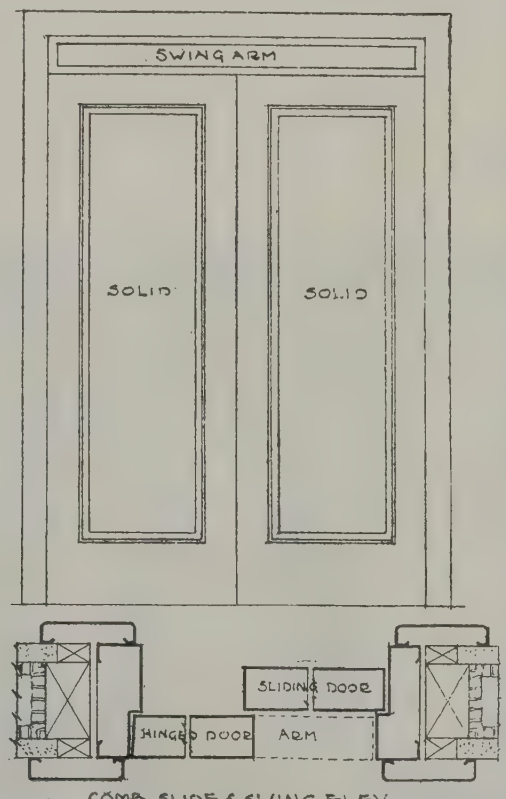


SMOKE SCREEN DETAILS



ALTERNATE CONST.

ELEVATION STANDARD SMOKE SCREEN



COMB. SLIDE & SWING ELEV.

N.Y. KALAMEIN	STANDARD TYPES- SMOKE SCREEN- ELEVATOR OPNG	SEPT-1-26

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Doors, Frames, Trim and Elevator Enclosures in Bronze and Steel

CINCINNATI, OHIO

BRANCHES

CHICAGO, ILL. NEW YORK, N. Y. ST. LOUIS, MO.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

Solid Cast Bronze Doors and Frames.

Extruded Bronze Doors and Entrances.

Kalamein Bronze and Steel Doors, Trim, Partitions and Elevator Enclosures.

Hollow Bronze and Steel Doors, Trim, Partitions and Elevator Enclosures.

For Bronze Store Fronts and Awning Bars, see pages B2227a-2227f.

For Bronze Windows, both Double Hung and casement types, see pages A1282-1283.

For Ornamental Brass, Bronze, Steel and Iron Work, see pages A894-895.

A Pair of Newman Bronze Doors

Construction

All bronze is genuine United States Standard. All ornamental cast work is moulded in the finest of French sand and hand tooled and chased wherever the details require it. All joints are mitered and connections are invisible. The corners of the doors are thoroughly reinforced with cast knees welded together. Types A and B Doors, as shown in details on opposite page, are made of no less than No. 12 Brown & Sharpe gauge, and our Types C and D are made of Extruded Bronze metal of no less than 1/8-in. thickness.

Finish

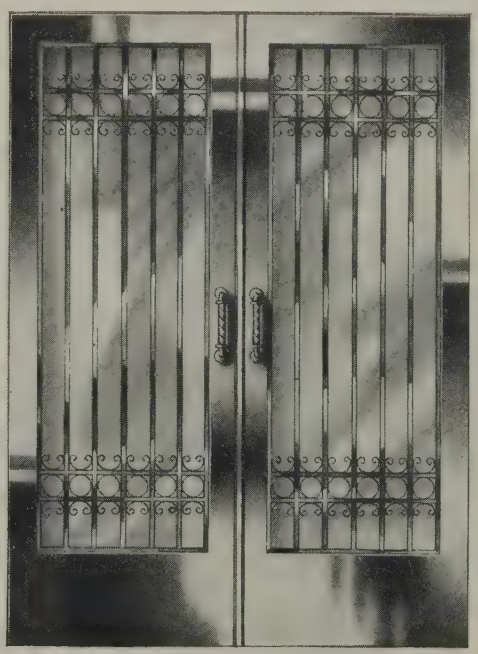
Finish can be light, medium or dark statuary bronze as selected by the architect. Steel and kalamein doors are finished with either one coat of gray priming or completely finished in baked enamel in any color, either plain or stippled, or in grained wood effects.

Service

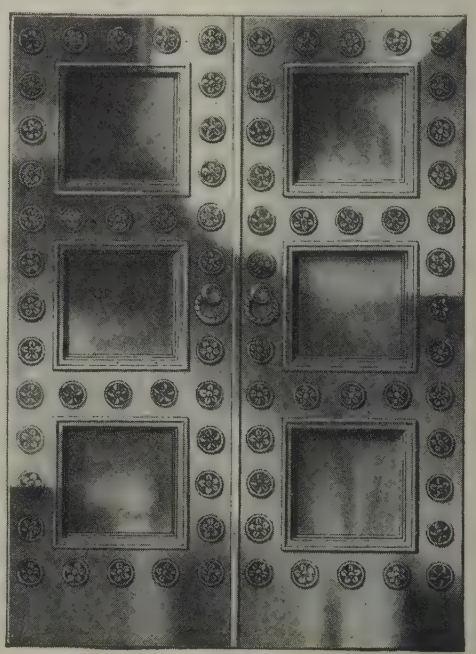
Full size details of all work are submitted to the architect for approval and after the drawings are approved, models or photographs of models are submitted to the architect.

Our Engineering Service Department is glad to cooperate and submit designs for any style door desired.

D-17



D-25



D-24

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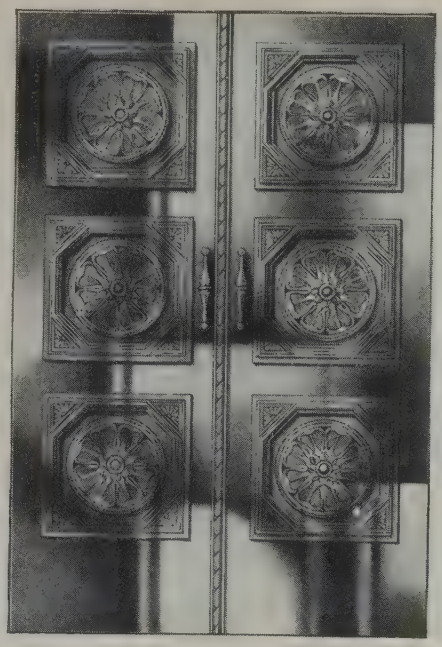
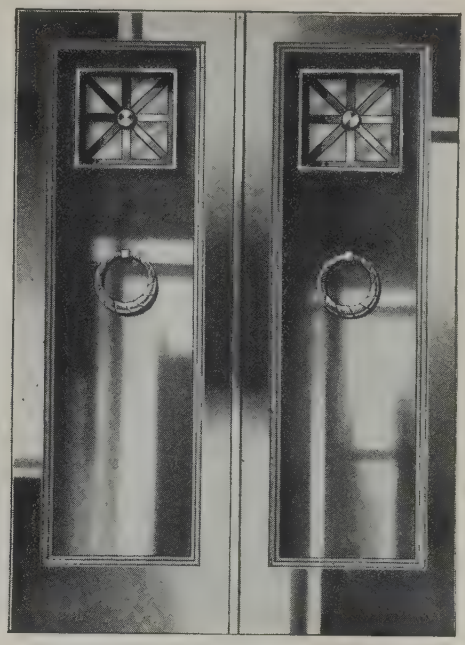


D-20

D-4

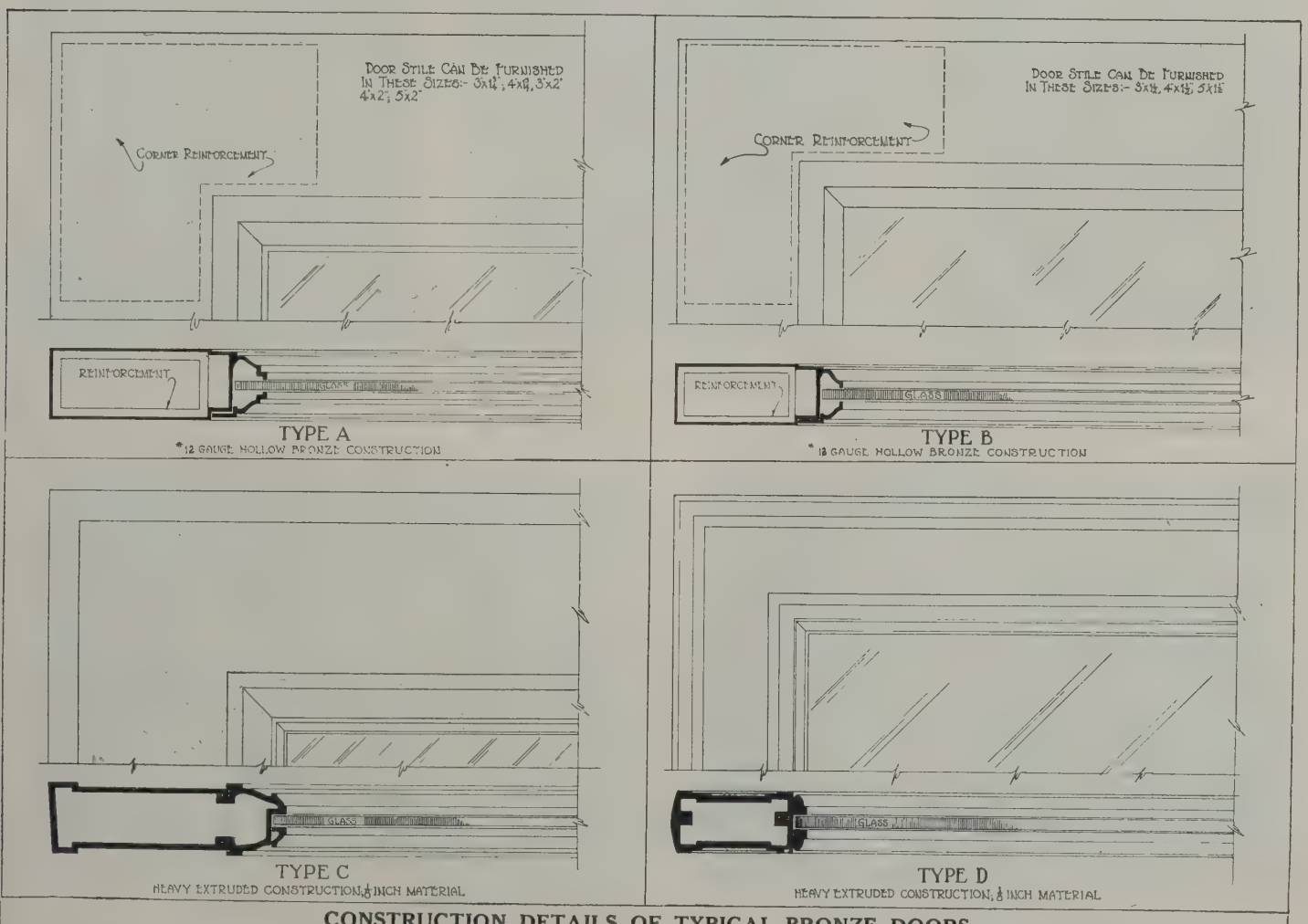


D-15

Facilities

The Newman Manufacturing Co., since taking over its new plant, has facilities second to none.

Our Engineering Department is ready to submit any type of design to any architect or contractor requiring special data, stock details, or estimates of cost. They will also furnish special designs to meet any requirements. Our workmen are of the highest type and can materialize a blue print into a beautiful work of art. It is their constant aim to so thoroughly appreciate the spirit of the architect's conception that in carrying out his instructions they will do so sympathetically rather than mechanically. To the skill of the craftsmen we add the greatest care in checking the accuracy of dimensions and a reassuring habit of delivering our work in time.



CONSTRUCTION DETAILS OF TYPICAL BRONZE DOORS

Continued on next page

Metropolitan Trust Co., Philadelphia, Pa.

Heavy Bronze Night Doors for Bank Entrances

Sussex & Merchants National Bank, Newton, N. J.
Crow, Lewis & Wicks, Architects

Guarantee Building & Loan Association, Newark, N. J.

Municipal Office Building, Baltimore, Md.
William H. Emory, Jr., Architect

Community Mausoleum, Tiffin, Ohio
Allen County Mausoleum Co.

Jane Arcade Building, St. Louis, Mo.
Thos. P. Barnett & Co., Architect

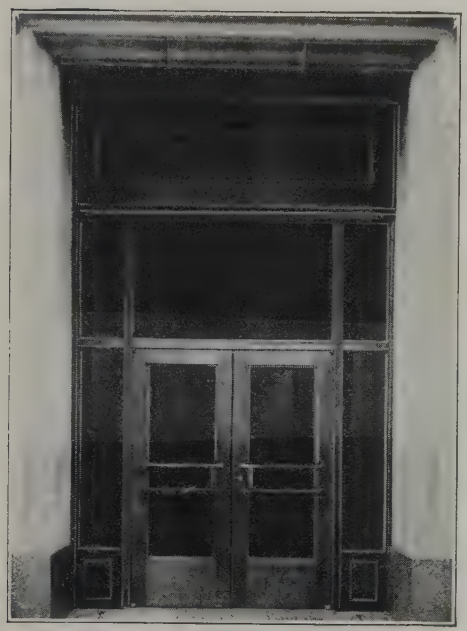
Eagle Savings & Loan Association
J. F. Sheblessy, Cincinnati, Ohio

Continued on next page

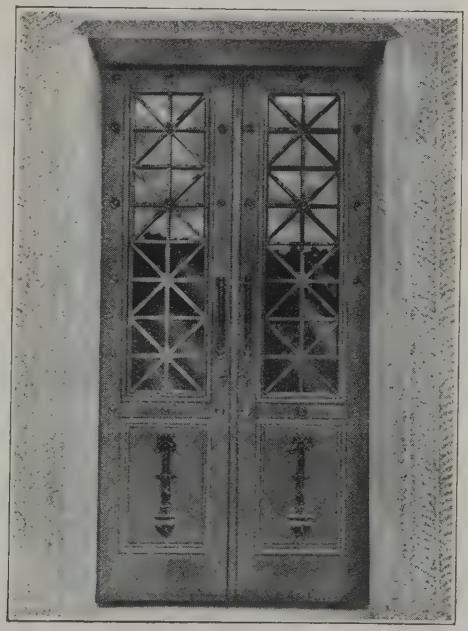
Cornelia Apartments, Chicago, Ill.
Robt. S. De Golyer Co., Architects

Commonwealth Bank, Baltimore, Md.

A simple, yet beautiful entrance of bronze



Peoples Trust & Savings Bank, Galesburg, Ill.



Kalamein Bronze Mausoleum Doors, Design N 667

Commonwealth Trust & Savings Bank, Chicago, Ill.
K. M. Vitzthum & Co., Architects

Union National Bank Building, Wichita, Kan.
K. M. Vitzthum & Co., Architects

E. F. Albee Theatre, Cincinnati, Ohio
Thos. W. Lamb, Architect

ESTABLISHED 1888

W. F. OVERLY & SONS

Metal Covered Doors

GREENSBURG, PA.

Products

LABELED and NON-LABELED METAL COVERED DOORS.

For Goodwin Automatic Stage Ventilator, see page A591.

Also manufacturers of Special Architectural Sheet Metal Products, including Marquees, Cornices, Skylights, Roof Ventilators, Gutters and Conductors.

Overly Service

Our Engineering Service is at your disposal to help in solving any problems involving metal covered materials. Write, telling us about the problem, and we will promptly co-operate with you.

Overly Metal Covered Doors

Overly Metal Covered Doors are manufactured to meet requirements more exacting than the actual conditions usually encountered. Carefully selected materials combined with the skill acquired by long experience produce a finished product that is not only excellent from the standpoint of utility in long service, but also most attractive in appearance.

Overly Metal Covered Doors are furnished with furniture steel, 16 oz. copper or 18 gauge bronze covering, to conform to any detail submitted by the architect.

Labeling Service

The following schedule pertains to Nos. 22 and 24 U. S. Standard gauge furniture steel covering. Also for 16 oz. copper covering.

LABELING SERVICE SCHEDULE

Label applied to doors for	Maximum size, ft.		Asbestos panel thickness, in.	Max. glass area, sq. in.	Door thickness, in.
	Single	Pairs			
Vertical shaft	4x8	8x8	¼	None	1¾
Corridor and partition	4x8	8x8	¼	1296	1¾
Fire escapes	4x8	8x8	¼	720	1¾

Overly Bronze Doors, Stearns Department Store, Williamsport, Pa.

Continued on next page

Specifications—Overly Metal Covered Doors with Underwriters' Labels

All fireproof doors indicated on drawings shall be Overly Metal Covered Doors, bearing Underwriters' labels, as manufactured by W. F. Overly & Sons, Greensburg, Pa., of dimensions indicated on drawings [listed in schedule herewith] including the following construction features:

Cores—Shall be straight grained white pine, either solid or built up with narrow strips, kiln dried (or stock which after a thirty (30) day air drying period, shall be acceptable to the architect), free from sap, dry rot or large or unsound knots.

Finished Core Sizes—Stiles, top rails and middle rails shall be not less than 5 in. wide; bottom rails shall be 10 in. wide; all core stock shall be 1¾ in. thick.

Panels—Shall be asbestos, ¼ in. in thickness.

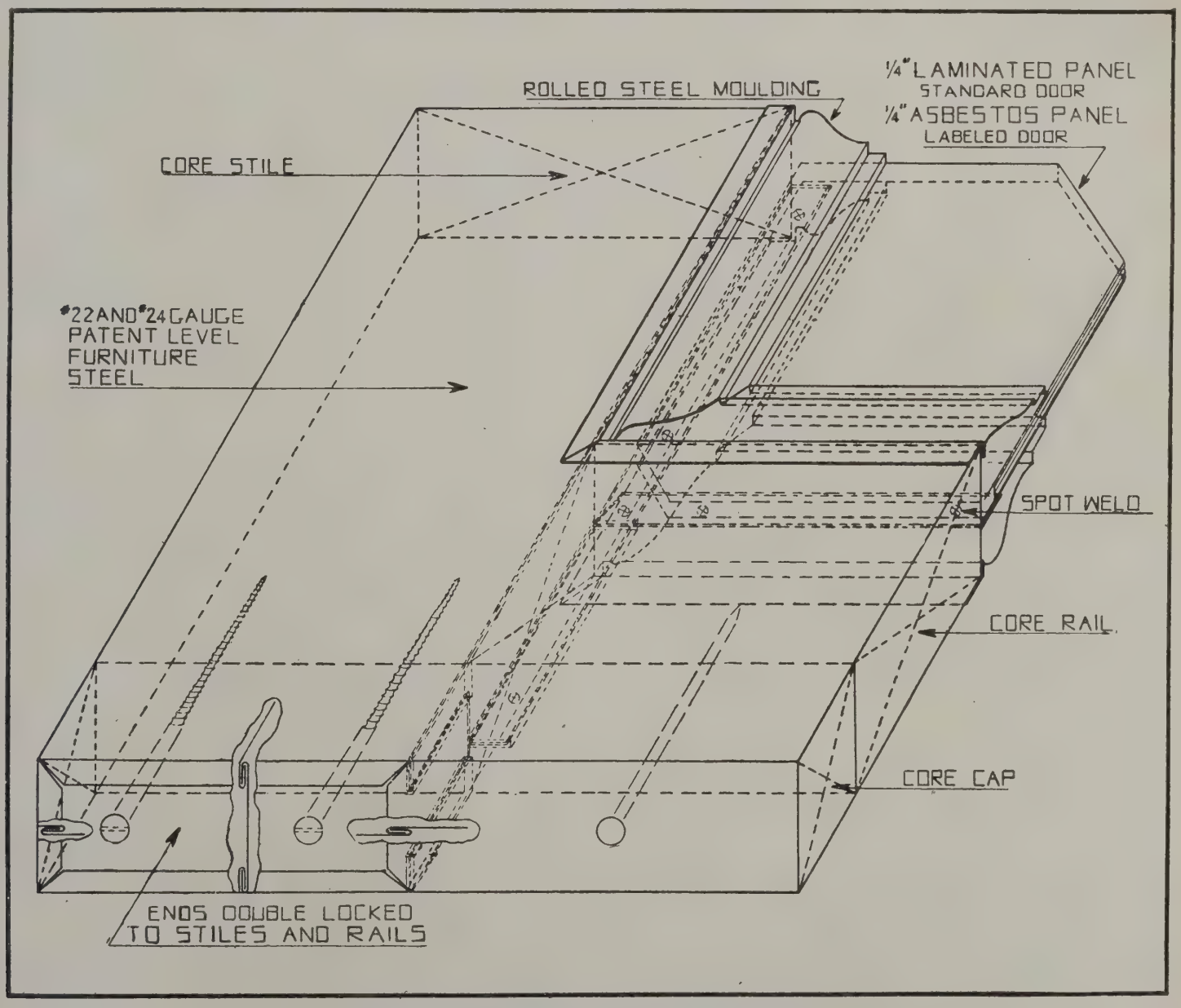
Metal—Shall be 22 [24] U. S. Standard gauge, patent leveled furniture steel [16 oz. copper], free from waves, buckles, mars or other imperfections.

Mouldings and Muntin Bars—Shall be of standard "rolled" steel type. Panel mouldings shall be mitered and acetylene welded and fastened to the stiles and rails by means of No. 6 oval head screws through countersunk holes equally spaced. Muntin bars shall be carefully squared, located and fitted, and thoroughly welded. They shall be prepared to receive glass panels.

Astragals—Doors hung in pairs shall have beveled meeting stiles with a $\frac{3}{16}$x3-in. steel astragal bolted through the meeting stile of one door. Through bolts (¼x2¼ flat head stove bolts) shall be located 2 in. from top and bottom of astragal and at intermediate points spaced not to exceed 12 in. center to center.

Primer—All metal surfaces shall be primed with one shop coat of Berry Bros. special metallic primer or equal, evenly applied, air dried.

Assembly—The metal shall be assembled over stiles and rails, adhering closely to the wood cores. These parts shall be assembled into a unit and squared, welding together both metal coverings on stiles, rails and metal projecting flanges and panels. Seams and double locks shall be made in accordance with the manufacturer's standard detail showing this construction, and shall be soldered and scraped flush to make a perfectly smooth joint.



Typical Overly Metal Covered Door Construction

THE PHILIPP MANUFACTURING COMPANY

Manufacturers of Kalamein Doors, Sliding Door Hardware and Hardware Specialties

EAST HAMPTON, MASS.

Member of the National Fireproof Door Manufacturers' Association

Products

METAL COVERED KALAMEIN DOORS, WINDOWS, DOOR FRAMES, TRIM, UNDERWRITERS' LABELED KALAMEIN DOORS; SMOKE SCREENS; ELEVATOR FRONTS; DUMBWAITER DOORS; BRONZE and COPPER KALAMEIN DOORS.

Metal Covered Doors

Wood cores are made of No. 1 sound, kiln dried white pine, free from loose or large knots, dry rot, sap or shake. Machine sized to accurate dimensions.

Stiles and rails mortised and tenoned, are glued with waterproof glue, doweled and wedged, grooved to receive panels.

Metal covering for stiles, rails and panels is 26 gauge galvanized or kalamein 16 to 32 oz. copper, 20 gauge bronze. Floor mouldings and trim, 26 gauge kalamein, 14 oz. copper or 24 gauge bronze.

Panels are composition board with metal glued to surfaces with waterproof glue, under pressure.

Special care is taken in assembling to avoid bench marks as much as possible.

All joints between metal filled with solder and scraped smooth. All material has shop coat of special metal primer.

Underwriters' Labeled Kalamein Door

Our Underwriters' labeled kalamein doors are built to requirements of National Board of Fire Underwriters and bear their labels. Single doors not to exceed 4x8 ft., pairs not to exceed 8x8 ft. These must be hung in channel, angle or hollow metal frames. We recommend consulting your local requirements to obtain minimum rates on building and contents.

Hardware

We are in position to fit for all mortised hardware on receipt of hardware schedule and samples.

Metal Covered Windows

Double hung or casement type windows are made in our standard design. All metal drawn on core to give neat and serviceable window.

Kalamein Elevator Fronts

Combined slide and swing, two-speed and three-speed, and standard swing elevator doors are serviceable and noiseless and are extensively used.

Kalamein Smoke Screens

We manufacture kalamein covered smoke screens of all types and for all conditions. Note one of our standard construction on next page.

Bronze and Copper Kalamein Doors

We also manufacture a high grade line of bronze and copper kalamein doors, etc., for entrances in banks, theaters, public buildings, etc.

Service

Estimates will be furnished from the architect's plans and specifications. Suggestions and shop drawings will be furnished whenever desired. We solicit your inquiries.

Blue Prints of Mouldings and Casings—We have a series of blue prints of our various stock designs of panel mouldings, stop mouldings, and casings which we will be glad to mail upon request.

References

Gardner High School, Gardner, Mass.
Maple Street School, Easthampton, Mass.
Sacred Heart School, Springfield, Mass.
Annunciation School, Florence, Mass.
Leonard Memorial Hospital, Natick, Mass.
Ward 4 School, Revere, Mass.
Female Infirmary, Northampton, Mass.
Granite Street School, Worcester, Mass.
Nelson Place School, Worcester, Mass.
Mary Hunt Home, Nashua, N. H.
Nurses' Home, Bristol, Conn.
Jefferson School, Meriden, Conn.
Trumbull Grade School, Meriden, Conn.
River Street School, Red Bank, N. J.
Cosmopolitan Club, Atlantic City, N. J.
Bala Cynwyd Theater, Bala, Pa.
First Presbyterian Church, Pottsville, Pa.
Theater, Bryn Mawr, Pa.
Clevenden Apartments, Philadelphia, Pa.
Newark Hospital, Rochester, N. Y.
St. Ann's Home for Aged, Rochester, N. Y.
Public School No. 15, Rochester, N. Y.
Empire Theater, Birmingham, Ala.
Ritz Theater, Birmingham, Ala.
School No. 20, Scranton, Pa.
West Side Theater, Scranton, Pa.
Harris Theater, Tarentum, Pa.
McFarland Junior High School, Washington, D. C.
St. Joseph's Home, Washington, D. C.
Washington City Orphan Asylum, Washington, D. C.
Semmes Garage, Washington, D. C.
Hillside School, Hillside, N. J.
East High School, Youngstown, Ohio
Washington School, Niles, Ohio
Cedar Lee Theater, Cleveland, Ohio
Stark School, Canton, Ohio
St. Andrews Church, Cleveland, Ohio
Telephone Building, Ashtabula, Ohio

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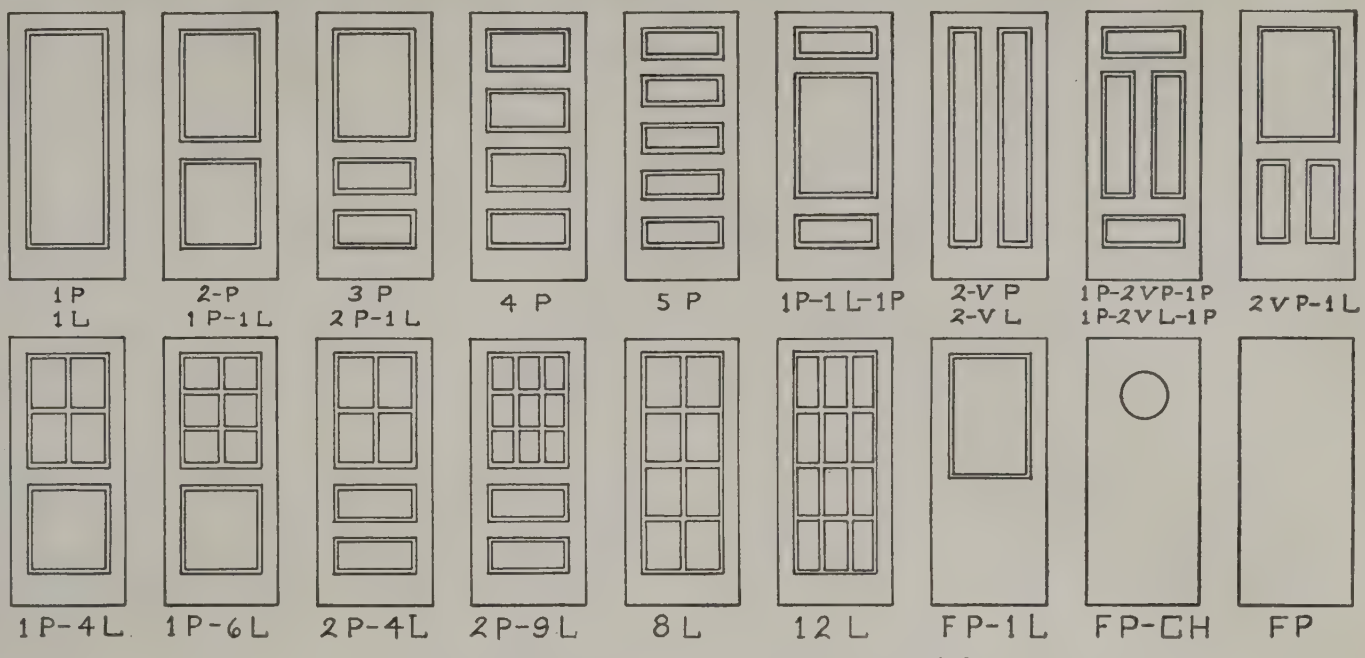
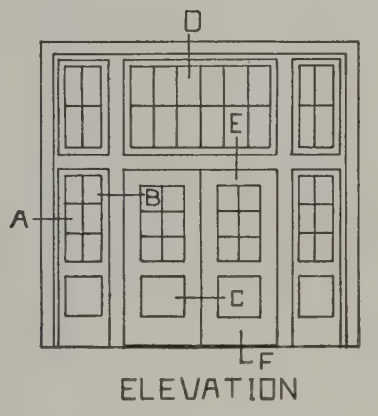
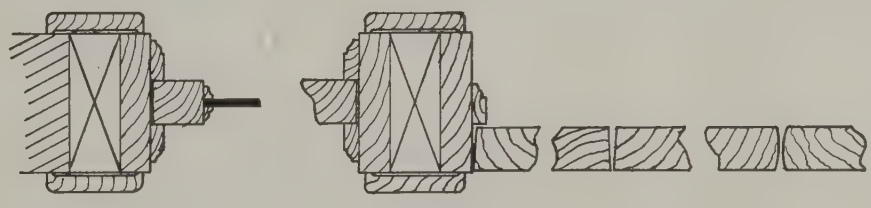


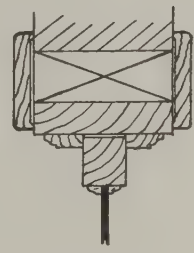
STANDARD KALAMEIN DOORS



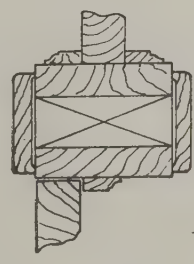
ELEVATION



STANDARD SMOKE SCREEN

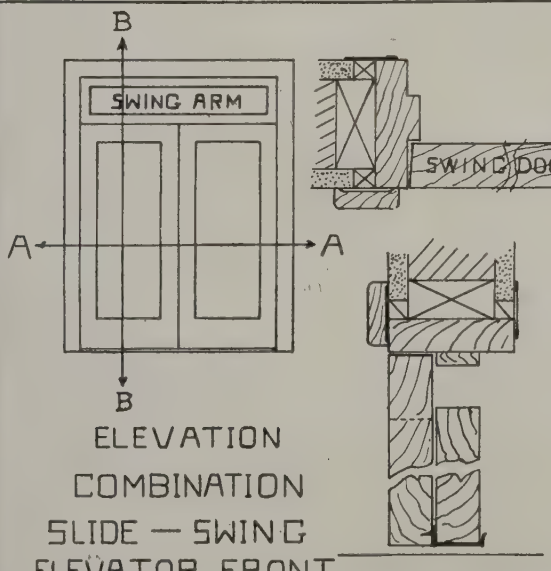


SECTION-D



SECTION-E

SECTION-F



ELEVATION
COMBINATION
SLIDE — SWING
ELEVATOR FRONT

THE PHILIPP MFG. CO.-DWG-1	STANDARD KALAMEIN DETAILS FROM THE PHILIPP MFG. CO.	SCALE - 1½" = 1'-0" MARCH-'27

ESTABLISHED 1910

RELIANCE FIREPROOF DOOR CO.

Manufacturers of Fire Retardant Products and Architectural Ornamental Bronze

Dobbin and Baxter Streets and Norman Avenue
BROOKLYN, N. Y.

REPRESENTATIVES

ALBANY, N. Y., Haefner & Harding, 562 Broadway
ATLANTA, GA., Luke Seawell, 58 Cone Street
BALTIMORE, MD., Brauns & Graham, 509 N. Charles Street
BILLINGS, MONT., F. W. Richardson, Electric Building
BOSTON, MASS., H. A. Seeley Co., 73 Tremont Street
CHARLOTTE, N. C., Luke Seawell, 804 Realty Building
CINCINNATI, OHIO, Central Building Products Co., First Nat'l Bank
DENVER, COLO., Builders Service Bureau, 1729 Champa Street
JACKSONVILLE, FLA., Luke Seawell, 49 St. James Building
OKLAHOMA CITY, OKLA., Bissell Builders Supply Co., Colcord Building
PHILADELPHIA, PA., F. J. Wilson, 1600 Walnut Street
ROCHESTER, N. Y., Building Specialties Co., 61 Mill Street
ST. LOUIS, MO., Sears & Piou, 1001 N. 6th Street

Products

Drawn Metal Covered Doors, Windows, Partitions and Trim.

Furniture Steel Doors.

Combination Steel Bucks.

Allweld Doors.

Elevator Enclosures.

Plate Warehouse Doors.

For Architectural and Ornamental Bronze of every description executed in heavy cast, drawn and extruded material, see page A901.

Facilities

Our new and modern manufacturing plant, containing 80,000 sq. ft. of working space and 25,000 sq. ft. of storage space, is equipped with the latest and most improved metal and wood working machinery, most of which has been specially designed to meet every requirement of producing only the highest standards of quality in all-metal fireproof products. All orders, large or small, can be promptly executed.

Prices furnished on receipt of schedule covering the following data (unless plans and specifications are furnished to us):

Doors: Size and style of each.

Jambs: Width and thickness required.

Casings: Moulded or flat; state width and whether one or both sides of opening, with or without plinths.

Specifications for Metal Covered Doors, Jambs and Trim

Metal Covering—All wood forming parts of doors, jambs and trim to be covered with metal as follows:

Kalamein Iron Covered—Doors and jambs, Nos. 22 to 26 gauge and trim No. 26 gauge.

Furniture Steel Covered—Doors and jambs, Nos. 20 to 24 gauge and trim No. 26 gauge.

Copper Covered—Doors and jambs, 16 to 32 oz.; mouldings and trim, 14 or 16 oz.

Bronze Covered—Doors and jambs, 14 to 20 gauge; mouldings and trim, No. 23 gauge.

Cores—All wood in doors, jambs and trim shall be clear white pine and shall be thoroughly seasoned, dried and free from shakes, sap, loose or large knots, or any defects impairing strength or durability. Doors to be made, 1⅜, 1¼, 1⅜, 1⅜, 2¼ in., or heavier, if required. If doors are either 1⅜ or 2¼ in. thick, stiles, top and cross rails are to be 5 in. wide and bottom rail is to be 10 in. high.

Jambs to be made 1⅜ or 1¾ in. thick, by width shown on drawings, if rabbeted; or ⅞ or 1⅛ in. with loose stop applied.

Trim moulded or plain as shown.

Finishing—All kalamein or galvanized iron material to receive a priming coat of paint in our shop before delivery.

If finish painting is desired, finish to be solid or grained in colors as selected, in air dried enamel finish.

Bronze and copper work to receive an oxidized finish of color as selected.

Underwriters' Labels—Underwriters' labels can be secured for doors leading to stairways, corridors and partitions, fire escapes and fire tower openings, which, when installed in accordance with the following specifications, will procure minimum insurance rate for building and contents.

Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 96 in. wide; made with solid panels hung on channel iron or combination steel frames with 5x5-in. full surface butts, mortise cylinder locks with ¾-in. throw bolt; stair doors should be made self-closing either by coil spring or door check.

Fire Escape and Tower Doors—Labeled for the same size openings as stair and elevator doors, and can be constructed to receive wire glass, not exceeding 5 sq. ft.; hung in the same manner as stair doors.

Corridor and Partition Doors—Constructed to receive 8 sq. ft. of wire glass and bearing the Underwriters' label; may be hung to metal covered jambs when stair and elevator doors are labeled.

Specifications for Plate Warehouse Doors

The contractor shall provide and install, where shown on the drawings, non-automatic swing type steel Underwriters' Labeled doors to all storerooms, similar to those manufactured by the Reliance Fireproof Door Co., Brooklyn, N. Y.

General—The doors shall be non-automatic swing type, equipped with triple latch, all mounted and attached to No. 12 US Standard gauge steel frame.

Frame—Shall be made of No. 12 US Standard gauge furniture steel, free from scale and formed with a 2-in. flange or trim on room side and 3-in. on corridor side, with edges of trim returned to receive finished plaster walls. All miters shall be welded by the oxy-acetylene process. Frames shall extend 2 in. below finished floor [frames shall set on finished floor].

Mullions—Provide 6-in. mullions between doors to receive dividing partition. These shall be constructed as indicated by the detailed drawing.

Anchors—Strap iron anchors shall be attached to the jambs of each frame placed 12 in. above floor and below head and 24 in. apart. Frame shall be slotted to permit adjustment of anchors.

Note: Where frames extend 2 in. below finished floor the following clause should be included in specification.

Sills—Provide channel shaped sills properly welded to frames.

Doors—Shall be made of No. 14 US Standard gauge steel. The elges shall be folded over 1½ in., enveloping one leg of a Z-shaped reinforcing frame in the fold, with miters welded. The Z-shaped frame and horizontal stiffening members shall be made of No. 12 US Standard gauge steel welded at all joints, with an additional reinforcement of No. 12 US Standard gauge steel knee angles 1½x1½ in. welded to both members. Horizontal members shall be spaced not to exceed 2½ ft. apart.

The finished size of doors shall be 3 ft. 7 in. x 8 ft. 6 in.

Hardware—Hinges shall be strap type with pintles attached to frame. Latches shall be 3-point type made of bar stock with coil spring with handle control both sides of door. Catches for triple latches shall be applied to frame.

Assembly and Installation—Each door and frame shall be shipped separately, all equipped with hardware. Each frame shall be installed as a unit, and door hung to frame.

Painting—The frame and door shall receive a thorough coat of special black fire resisting paint applied at the factory.

Underwriters' Label and Trade-mark—All doors shall bear Underwriters' Laboratories Inc. Label, also the manufacturer's trade-mark or name.

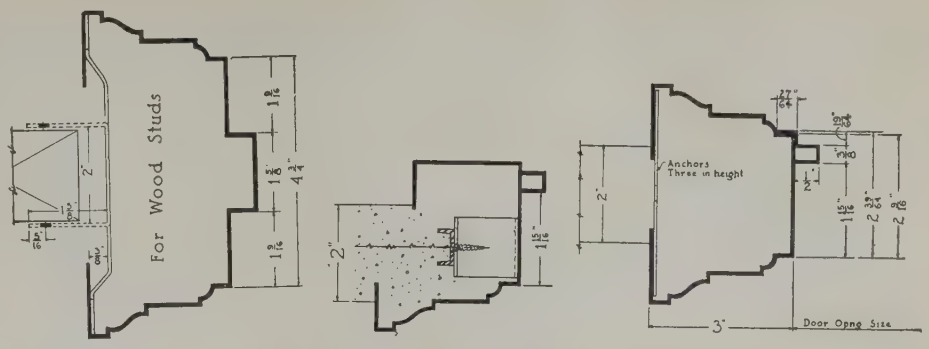
Continued on next page

Specifications for Furniture Steel Door Frames

Frames to be made of furniture steel of not lighter than No. 16 gauge US Standard with all miters and joints to be welded and made smooth. Reinforcement for application of necessary hardware to be electrically welded and of proper size to insure rigid construction. Wire wall anchors to be provided which are installed by mason at intervals to insure rigidity. Each frame to be provided with spreaders for parallel alignment. Templates for all hardware to be furnished in reasonable time prior to the manufacture of these frames.

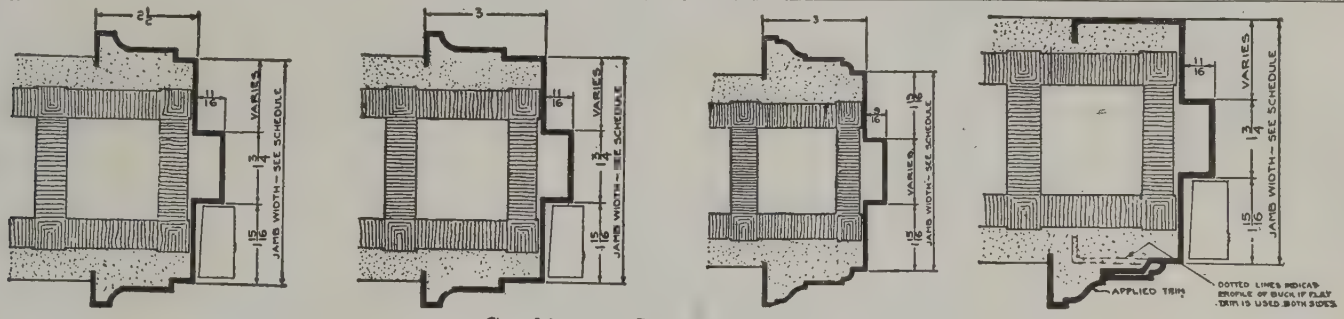
All frames to receive one shop-coat of the best metallic primer and applied in a first-class workmanlike manner to ensure a complete covering on all surfaces, inside and outside.

Note: If required, Underwriters' labels can be secured for openings in vertical shafts, exterior walls, and for openings in corridor and room partitions.



Combination Steel Buck and Trim

Type No.	Wood studs, in.	Jamb width, in.	Stop width, in.	Type No.	Plaster, in.	Jamb, width, in.	Rabbet, in.	Type No.	Plaster, in.	Jamb width, in.	Rabbet, in.
510	2	4¾	⅞	610	2	2⁹⁄₁₆	1¹⁵⁄₁₆	710	2	2⁹⁄₁₆	1⁵⁄₁₆
520	2	4¾	1⅝	620	2	2³⁄₁₆	1⁹⁄₁₆	720	2	2³⁄₁₆	1⁹⁄₁₆
530				630	2			730	2		



Combination Steel Buck and Trim

Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.	Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.	Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.	Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.
110	3	4½	13⁄16	210	3	4½	13⁄16	310	3	4¾	⅞	410	3	4½	13⁄16
120	4	5½	1 13⁄16	220	4	5½	1 13⁄16	320	4	5¾	1⅞	420	4	5½	1 13⁄16
130	6	7½	3 13⁄16	230	6	7½	3 13⁄16	330	6	7¾	3⅞	430	6	7½	3 13⁄16

Elevator Fronts, Hollow Metal

Frames—No. 12, 14 or 16 gauge steel combination buck and jamb trim, either pressed or rolled and applied by means of spot-welding. Dust covers and struts to ceiling where so specified.

Saddles—Cast iron or bronze provided with cast stiffener ribs, grooves, milled so as to provide perfect, noiseless operating of doors.

Doors—Furniture steel of No. 18 gauge for stiles and rails. The stiles on front and back are reinforced with No. 16 gauge bumper channels full height of door.

Mouldings No. 20 gauge cold rolled strip steel formed so as to interlock with stile. Intersections of stiles and rails are welded.

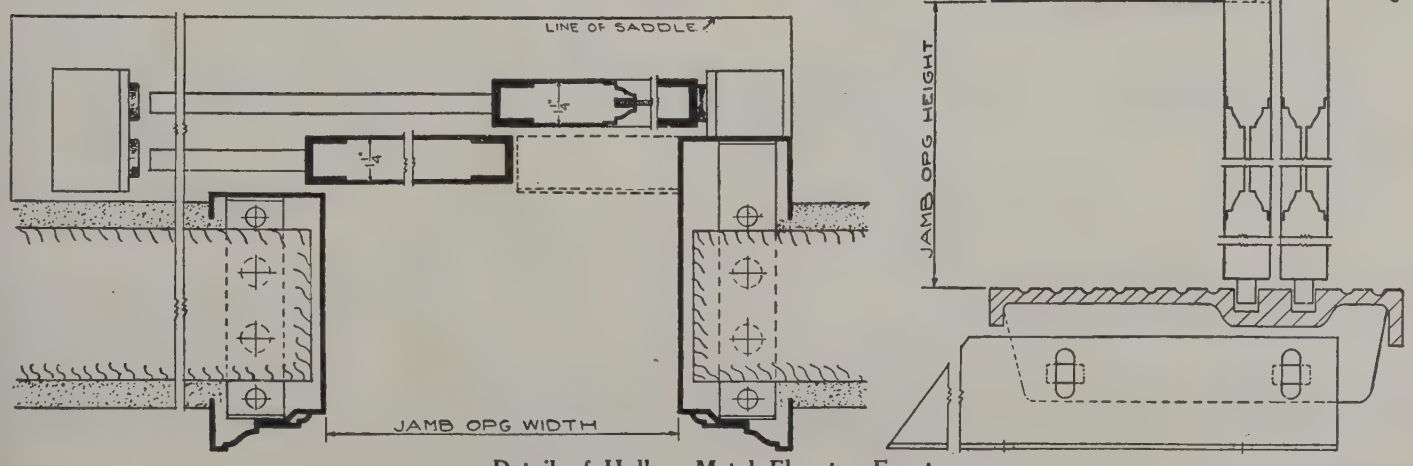
Panels of No. 12 gauge furniture steel are inserted in groove of moulding.

Reinforcements are provided for door closer and hangers.

Painting—All work is finished in our standard primer, or baked enamel as selected.

Erection—We have a staff of competent men engaged in erection of elevator fronts.

Special Service Department—We are prepared to furnish and design elevator fronts in all metals and finishes.



Detail of Hollow Metal Elevator Front

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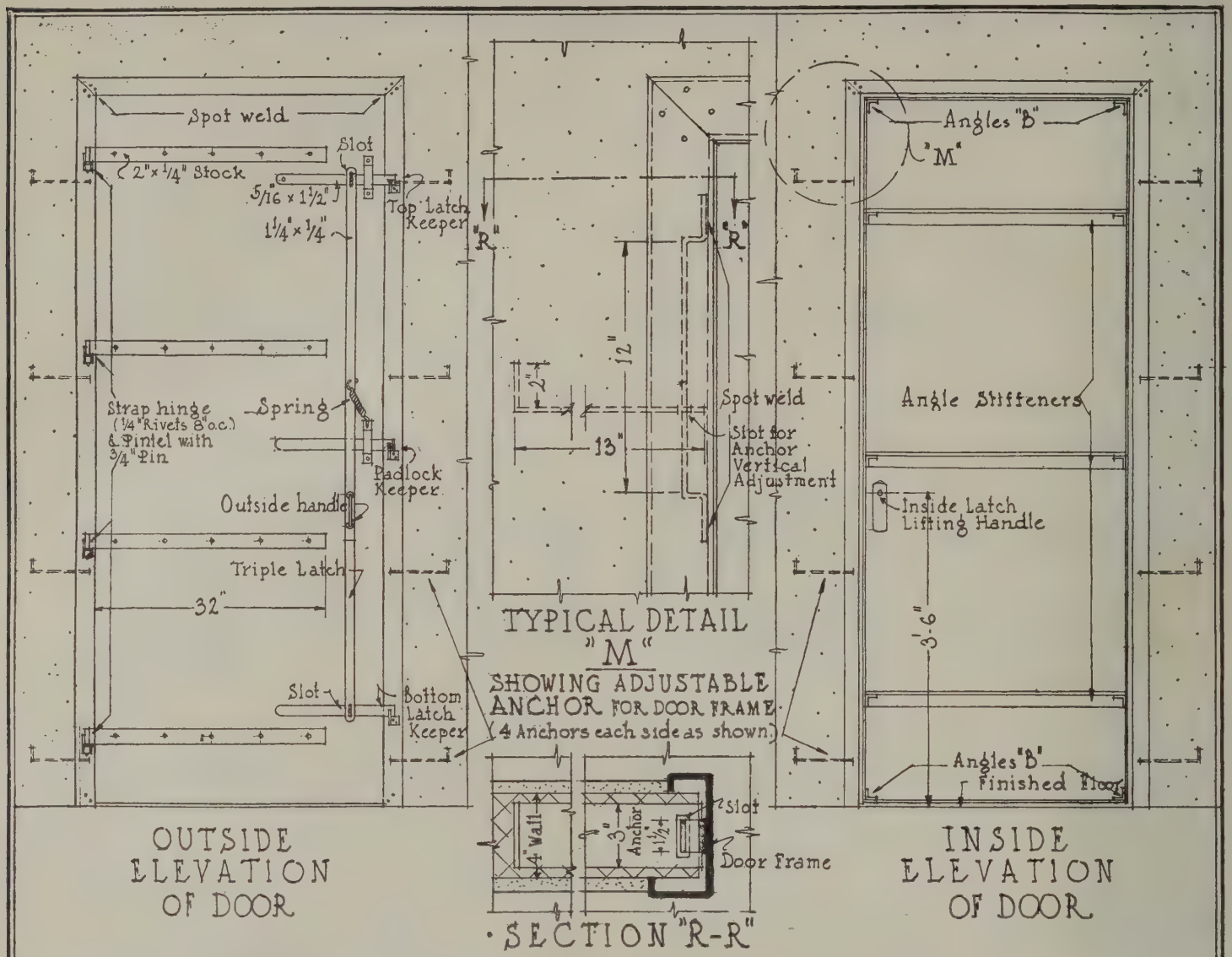
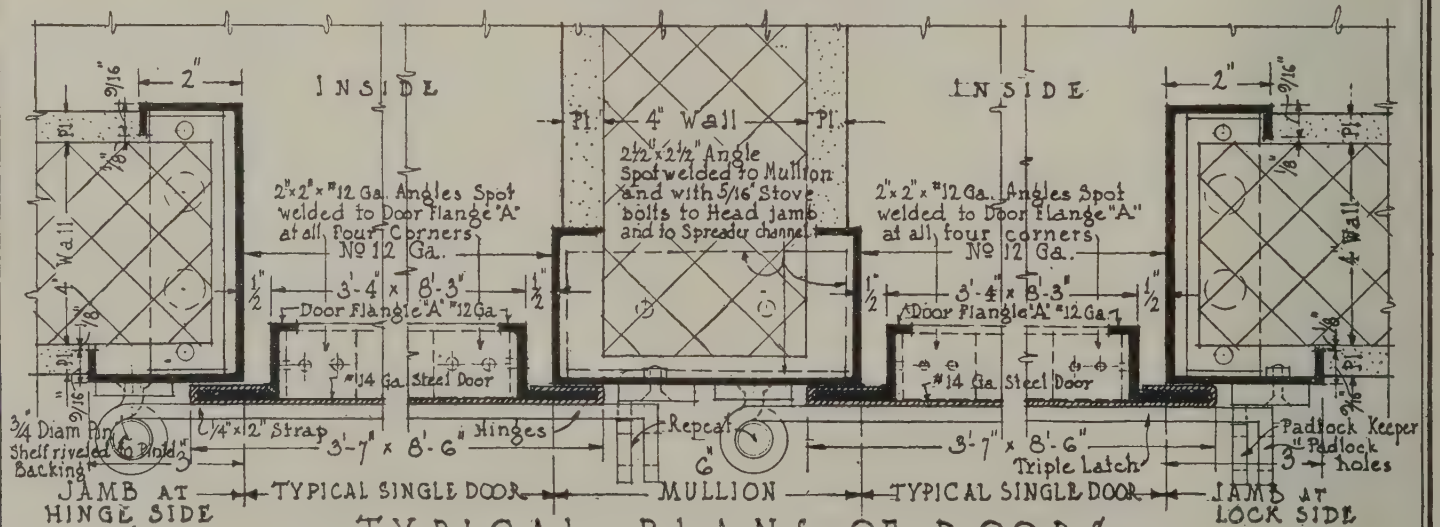


NOTE:
Scale of both Elevations: 1/2" = 1'-0"; Scale of Detail "M" & Section "R"-"R": 1 1/2" = 1'-0", Scale of Plans: 1/4" = 1'-0".



TYPICAL PLANS OF DOORS
SHOWING CONDITIONS WHERE MULLION OCCURS

RELIANCE FIREPROOF DOOR COMPANY	DETAILS OF STEEL PLATE WAREHOUSE DOORS	DRAWING NO 1 SCALE: 1 1/2, 1/2 & 1/4 IN. EQUALS 1 FT.

THE RIESTER & THESMACHER COMPANY

Hollow Metal Doors and Trim

1514-1526 West 25th Street

CLEVELAND, OHIO

Products

Hollow Metal Doors, Partitions, Elevator Fronts, Combination Bucks and Jambs, Metal Base and Picture Mould.

For Steel Stairs, see page A744.

Construction

The R & T hollow metal door with its interlocking joint construction has been developed through nearly twenty years in the door business. Doors are constructed of first grade No. 18 gauge furniture steel, full pickled, full cold rolled, re-annealed, patent leveled, re-squared and oiled. Jambs and casings are of same gauge material. Bucks or frames are fabricated from No. 10 to 14 gauge material in accordance with size of opening and service required. All joints in construction are electric process welded, practically making the door one continuous piece of metal. Proper reinforcements are welded within the door to take care of all hardware requirements and the entire design makes for rigidity, stability, fire protection and neat appearance. These doors can be fitted to either the cabinet jamb design or combination buck and jamb. R & T hollow metal doors, having no combustible material within the door, are fire retarding and fully meet the requirements of the National Board of Fire Underwriters and bear their label, when specified.

Finish

Before assembly, all parts are paint dipped in order to protect the interior of the door. Before final finish, all surfaces are thoroughly cleaned to remove grease or oil.

Each coat of paint or enamel is carefully baked and properly treated to secure the highest possible finish. Doors are finished in prime coat, plain color enamels, stipples and wood graining reproductions.

Hardware

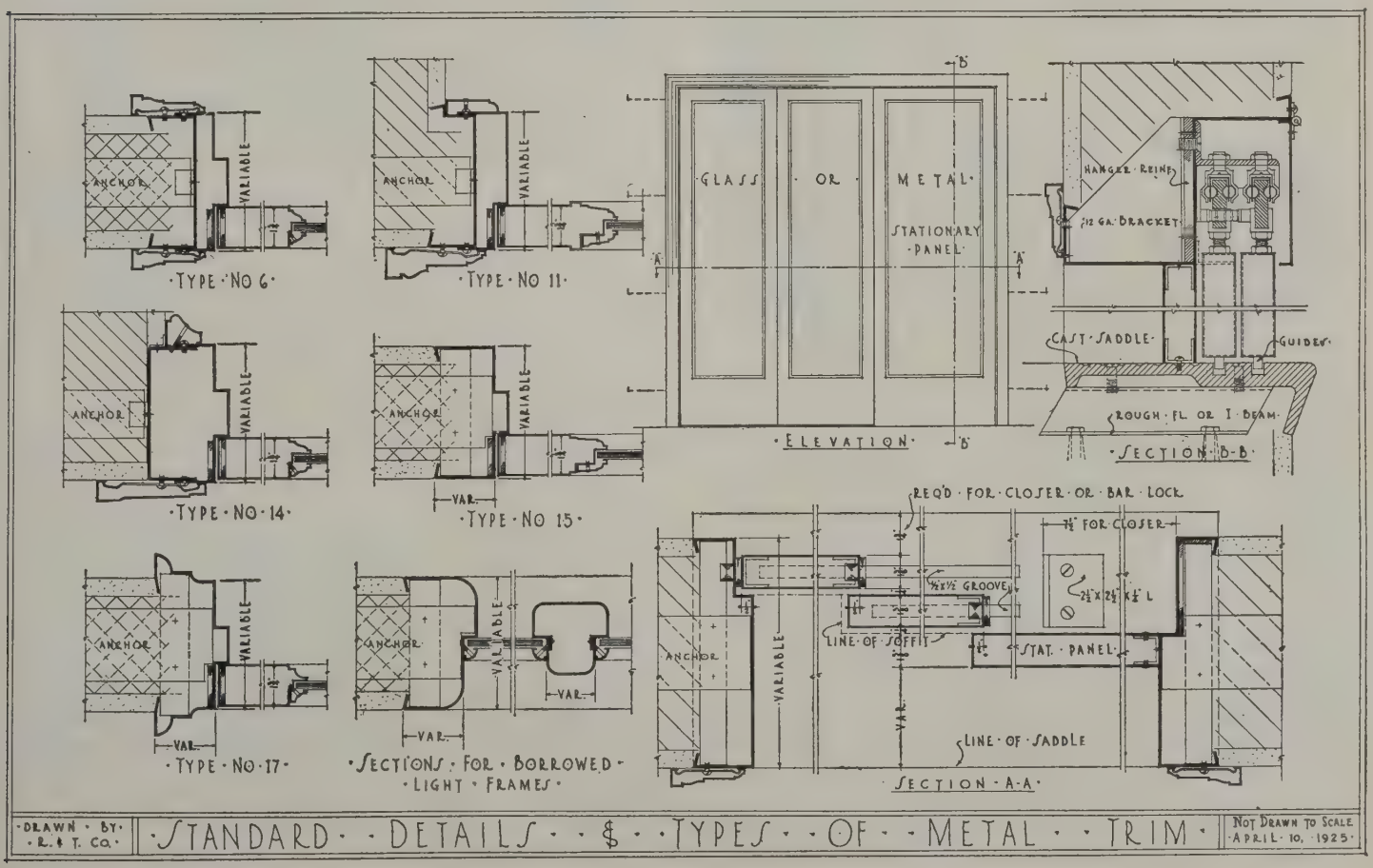
Hardware, as selected and furnished by the owner, is applied at the factory, and we have a good selection of templates of standardized hardware which facilitates delivery and avoids undue delay.

Upon request we are glad to furnish typical details and stock mouldings in order to assist in designing metal trim.

References

A few buildings of varied types in which we have recently made installations of metal trim:

Cleveland Public Auditorium, Cleveland, Ohio
Weymouth Power Station, Boston, Mass.
Maternity and Children's Hospitals, Cleveland, Ohio
Burton Abstract and Title Co., Detroit, Mich.
Elyria Savings & Trust Co., Elyria, Ohio



F. L. SAINO MANUFACTURING COMPANY, INC.

Pioneer Manufacturers of the Saino Type Metal Fire Door

MEMPHIS, TENN.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

SAINO METAL FIRE DOORS.
SAINO JR. METAL DOORS (Unlabeled or Industrial Doors).

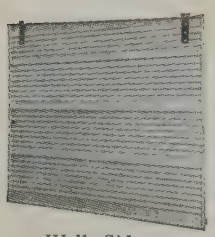
SAINO METAL FIRE DOORS
DEPENDABLE - PERMANENT PROTECTION
TRADE-MARK

Exclusive Manufacturers of Metal Doors for 25 Years

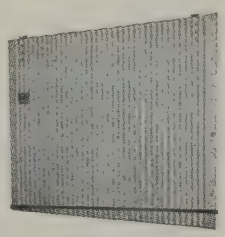
F. L. Saino, president and founder of this company originated the Saino Type metal fire door. For over 25 years our energies have been concentrated on the manufacture of metal doors, exclusively. This specialization has put our organization in a unique position for advising architects and owners soundly on any fire door problem.

Saino Metal Fire Doors

Saino Metal Fire Doors are constructed of two thicknesses of No. 22 gauge 2½-in. corrugated galvanized steel with sheet asbestos lining. As shown below, vertical corrugation is on the exposed side and horizontal corrugation on the wall side. Have a substantial steel frame which together with the Saino exclusive reinforcing bars assures utmost rigidity. Patented features provide for proper expansion and contraction along straight lines—an essential quality to efficiently resist and effectually stop the progress of fire.

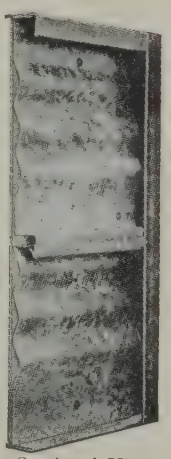


Wall Side

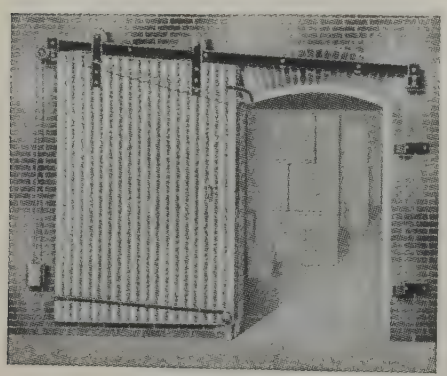


Exposed Side

Standard Saino Metal Fire Door



Sectional View



Type No. 100. Saino Standard Single Sliding Metal Fire Door
Inclined top, 1 link with flat track hardware. Automatic

Types and Limitations of Saino Underwriters' Labeled Fire Doors

Single sliding doors—(incline top, level top and vertical sliding) for openings not exceeding 120 sq. ft. with neither width nor height exceeding 12 ft.

Single swinging doors—for openings not more than 6 ft. wide nor 12 ft. high.

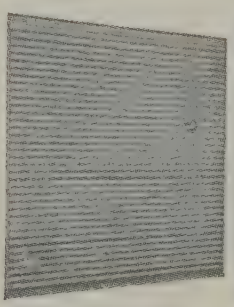
Swinging doors in pairs—for openings not more than 10 ft. wide nor 12 ft. high.

Note: "Saino" Metal Fire Doors too large to ship at regular freight rates can be made in sections and with Underwriters' label for openings not exceeding the above size limitations for single sliding doors.

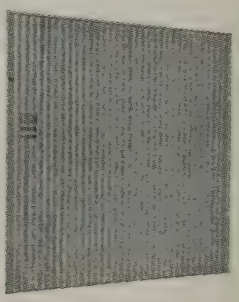
Also "Saino" Metal Fire Doors for openings exceeding the underwriters' limitations can be furnished with Certificate of Inspection which certifies that doors were built according to specifications for a labeled door. This certificate cannot be furnished except when requested at time order is placed.

Saino, Jr. Metal Doors (Unlabeled)

For use where approved and labeled doors are not required. Of substantially the same construction as the fire door, as shown opposite, except for certain extra fire resisting features. Especially designed for cotton mills, industrial plants, warehouses, loading platforms, etc. Exceptionally rigid, durable and economical, affording quite a saving in maintenance cost over the heavy wood doors, which they are designed to replace. Minimum weight; easily and ecoonmically erected by any good building mechanic.

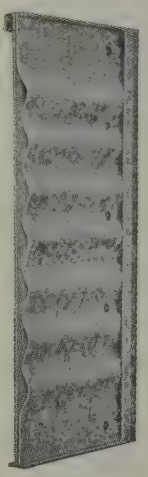


Wall Side



Outer Side

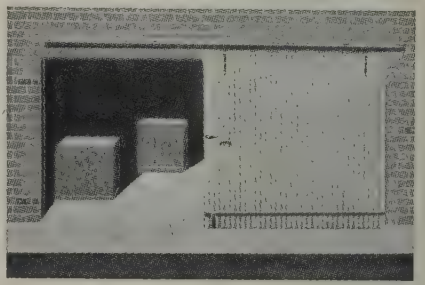
Saino Jr., Metal (Unlabeled) Door



Sectional View

Catalogue

Complete catalogue with detailed drawings and compiled according to A. I. A., free upon request.



Type No. 400. Saino Jr. Metal Door (Unlabeled)
In all types

SYRACUSE FIRE DOOR CORPORATION

INC.

Manufacturers of Metal Covered Doors and Trim and Tin Clad Fire Doors

900 Canal Street

SYRACUSE, N. Y.

Products

UNDERWRITERS' LABELED and NON-LABELED KALAMEIN DOORS, covered with copper, bronze, or kalamein steel, long terne or galvanized; UNDERWRITERS' LABELED TIN CLAD FIRE DOORS and FIRE DOOR HARDWARE.

Also manufacturers of Metal Covered Frames, Trim, Mouldings, etc.; Metal Covered Window Units, Dumbwaiter Units, Elevator Fronts, Smoke Screens, Partitions, Channel and Angle Iron Frames; Hollow Metal Jambs, Bucks, etc.

Syracuse Kalamein Doors

These doors are made in a variety of standard designs for use in office buildings, public buildings, schools, theaters, stores, hospitals, etc.

The wood used in the cores is thoroughly seasoned and air dried before going through the factory. Panels are carefully built up and covered with metal, both sides glued, and placed under heavy pressure to insure good contact and eliminate any buckling. Mouldings are drawn true and accurately mitered. All joints are welded and scraped to smooth surface.

Standard thicknesses for metal covered doors are either 1¾ or 2¼ in.

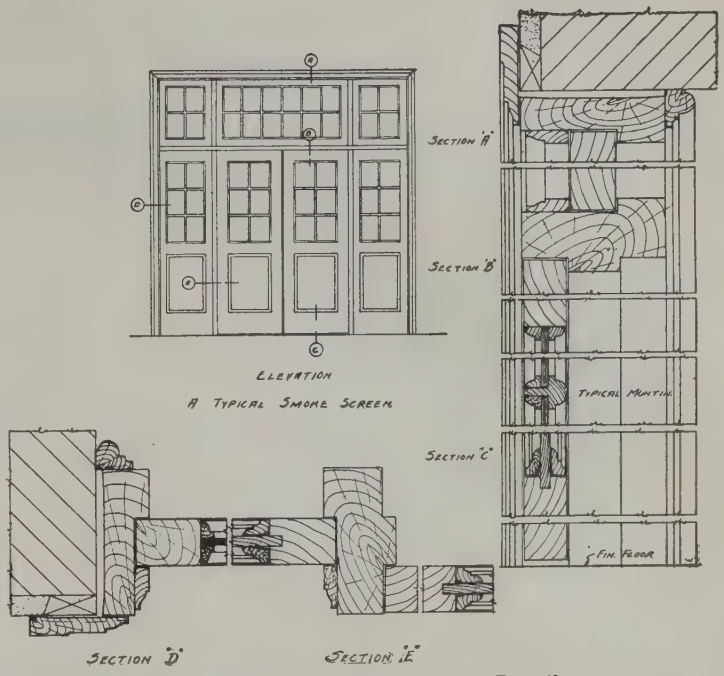
Unless otherwise advised, our doors, etc., are given one shop coat of special metallic primer.

Whenever practical, the metal covering on our kalamein jambs, casings, mouldings, etc., is carefully drawn on the wood cores through steel dies.

Labeled Kalamein Doors

We specialize in labeled kalamein doors.

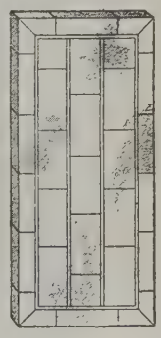
All doors shown below can be labeled excepting doors marked "B," "W" and "X."



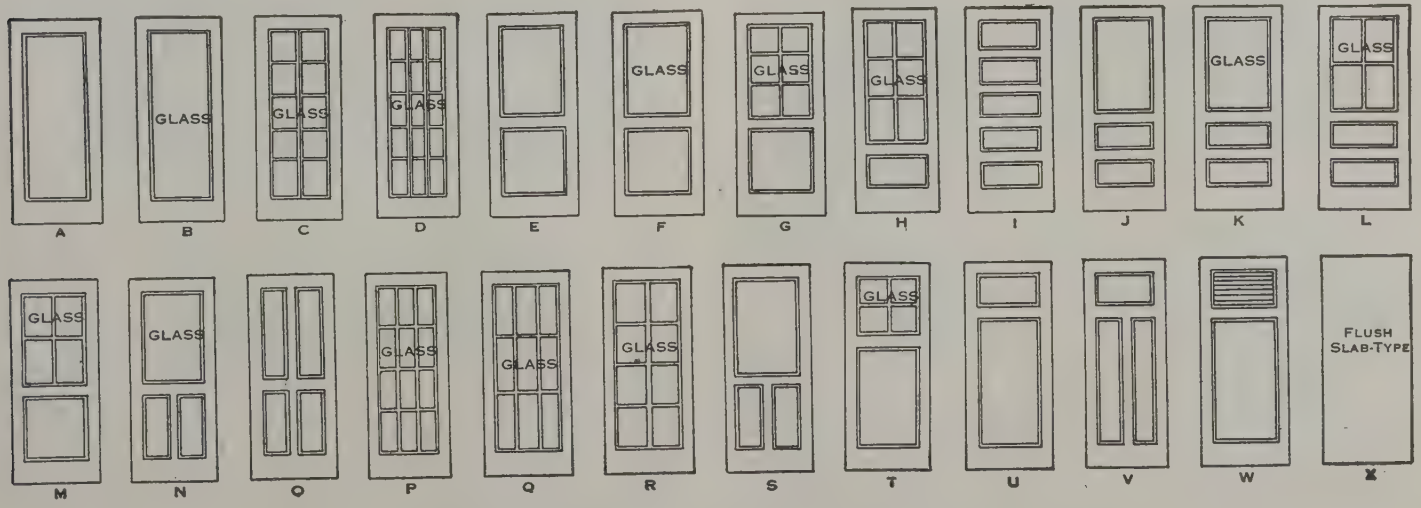
A Typical Smoke Screen Detail

Tin Clad Fire Doors and Shutters

All types of labeled and unlabeled, two-ply and three-ply tin clad fire doors and shutters to fill conditions imposed by insurance and building requirements. First class materials, careful workmanship developed by many years of experience and the most modern and efficient machinery serve to make these fireproof units of most approved design.



Doors and hardware bearing the label of the National Board of Fire Underwriters' are inspected by their representative at our shop. This is an additional warranty of their worth as fire retardants.



Syracuse Standard Kalamein Doors and Units

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Steel Doors

EXECUTIVE OFFICES AND PLANT
YOUNGSTOWN, OHIO
RAILROAD DEPARTMENT, 228 North La Salle Street, Chicago, Ill.
FOREIGN TRADE DIVISION, 90 West Street, New York, N. Y.
TRUSSED CONCRETE STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONT.
THE TRUSCON LABORATORIES, DETROIT, MICH.
Warehouses and Offices in All Principal Cities—see Local Telephone Directory

Products

Truscon manufactures a complete line of STEEL DOORS for public, commercial and industrial buildings.

For other Truscon Products, see pages in this edition as follows:

Concrete Reinforcement, page A151.
Steel Roof Decks, page A213.
Steel Joists, page A674.
Steel Windows, pages A1299-1303.
Metal Lath, pages B1704-1705.

TRUSCON STEEL DOORS

Engineering Service

Suggestions on doors to meet any conditions will be furnished without any obligation whatever by Truscon Engineers.

Truscon's experience and equipment fit it for unexcelled service both in design and manufacture.

Truscon doors of individual design have been furnished for many specialized requirements.

TRUSCON STOCK TYPE DOORS AND FRAMES

Most practical in design and of highest quality material and workmanship, Truscon Stock Type Doors and Frames are moderately priced because of their efficient manufacture in large quantities. Stock doors are especially adapted for use in basements, rear entrances, boiler rooms, fire exits, elevators and similar places in residences, hotels, apartments, schools, churches, institutions, shops, warehouses, filling stations, stores and any other buildings requiring doors not larger than 10x10 ft.

Swing Doors, Stock Types

By fitting stock type door leaves with the proper hardware, furnished by Truscon, they may be used in any openings requiring single swing doors not larger than 5x10 ft. or double swing doors not larger than 10x10 ft.

Door Frames—For stock type swing doors frames are of heavy pressed steel construction with door stop pressed into the frame. They are heavily reinforced at the corners and at the hinges and are easily assembled and erected on the job.

Slide Doors, Stock Types

By fitting stock type door leaves with the proper hardware furnished by Truscon, they may be used in any openings requiring single slide doors or double slide doors not more than 10 ft. high. While the maximum standard width for stock type double slide doors is 10 ft., two or more leaves may be united into single leaves for use in wider openings. These doors are hung with four-wheel type, extra heavy duty, roller bearing hangers and operate over channel tracks.

Single and Double Swing Stock Type Doors

Single and Double Slide Stock Type Doors

STOCK SIZES OF SINGLE AND DOUBLE SWING DOORS

Door No.	Size of door		Size of opening		Glass size, in.
	Width, ft. in.	Height, ft. in.	Width, ft. in.	Height, ft. in.	
Single Swing					
37	3 0	7 0	3 0⅜	7 0¾	12¾x18
38	3 2⅜	7 9	3 2¾	7 9¾	14 x18
48	3 10¾	7 9	3 11⅛	7 9¾	12 x18
510	4 10¾	9 9	4 11⅛	9 9¾	16 x22
Double Swing					
67	6 0⅜	7 0	6 0¾	7 0¾	12¾x18
68	6 5⅛	7 9	6 5½	7 9¾	14 x18
88	7 9⅞	7 9	7 10¼	7 9¾	12 x18
1010	9 9⅞	9 9	9 10¼	9 9¾	16 x22

STOCK SIZES OF SINGLE AND DOUBLE SLIDE DOORS

Door No.	Size of door		Size of opening		Glass size, in.
	Width, ft. in.	Height, ft. in.	Width, ft. in.	Height, ft. in.	
Single Slide					
37	3 0	7 0	2 9	6 11¼	12¾x18
38	3 2⅜	7 9	2 11⅜	7 8¼	14 x18
48	3 10¾	7 9	3 7¾	7 8¼	12 x18
510	4 10¾	9 9	4 7¾	9 8¼	16 x22
Double Slide					
67	6 0⅜	7 0	5 9⅜	6 11¼	12¾x18
68	6 5⅛	7 9	6 2⅛	7 8¼	14 x18
88	7 9⅞	7 9	7 6⅞	7 8¼	12 x18
1010	9 9⅞	9 9	9 6⅞	9 8¼	16 x22

Continued on next page

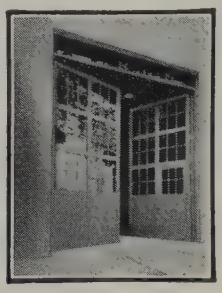
TRUSCON STEEL DOORS FOR LARGE OPENINGS

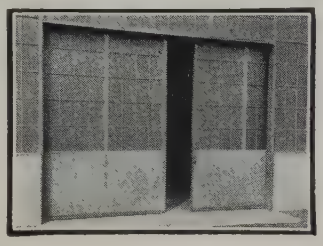
Designed to meet the unusual in door requirements, Truscon Steel Doors for large openings are not limited either as to size or method of operation. They can be furnished in types that swing, slide, fold, roll or operate by a combination of these methods in either vertical or horizontal planes.

All doors coming under this classification are designed by Truscon Engineers to meet the specialized requirements of such buildings as airplane hangars, piers, warehouses, factories, fire stations, garages, roundhouses and similar structures. Truscon's years of experience in designing and manufacturing doors for every conceivable use is available without obligation.

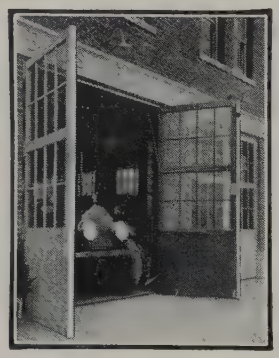
Industrial Type Doors

These doors are intended to supplement the stock type doors in factory, commercial and warehouse buildings requiring doors larger than 10x10 ft., where operating space is not subject to limitations. Made in either the swing or slide type, in practically any size and arrangement, depending upon what is most practical for the building in which they are used.





Fire Department Doors

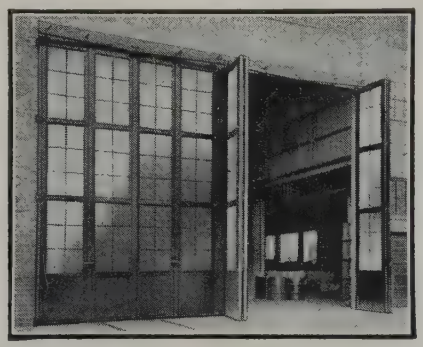


Designed especially to meet the unique requirements of fire and police stations for quick acting sturdy doors that can be relied upon to function perfectly at all times.

Furnished either in the double swing type as illustrated or in the vertical folding type, with or without automatic operating device.

Vertical Folding Doors

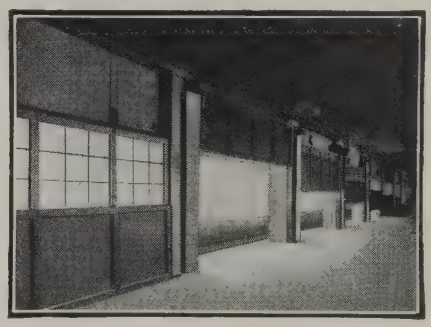
Designed to meet such conditions as are presented by railroad shops, roundhouses, public garages and other buildings where door clearances are limited and maximum unobstructed openings are desired. In



operation the leaves fold like a jack-knife and lie flat against the jamb when fully open. They operate by means of roller-bearing trolleys running on heavy channel tracks.

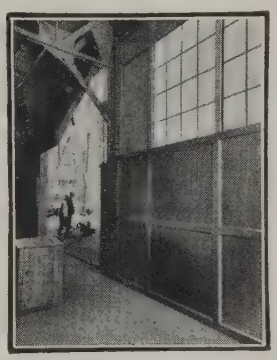
Vertical Lift Doors

Recommended for use in warehouses, freight houses, garages and factories where maximum clearance at the jambs is desired and in which headroom equivalent to half the over-all height of the door opening is available. This door consists of two leaves, hung one above the other. In operation, the lower leaf slides up behind the top leaf and both slide up toward the ceiling, coming to rest above top of door opening. The raising is accomplished by means of hand or power controlled operators.



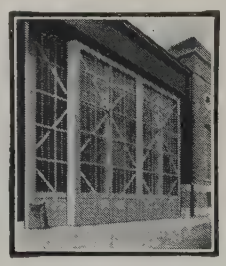
Vertical Lift-Swing Doors

Especially suitable for piers, large warehouses, freight houses and other buildings requiring large doors which must operate easily and swing overhead, out of the way, when opened. This door is divided horizontally into two equal sections. The lower section slides vertically in guides on the jambs into guides on the upper section, nesting snugly behind the upper section. The nested sections can then be swung inward and upward to any angle up to a horizontal position. The raising and swinging is accomplished by operators with either hand or power control.



Airplane Hangar Doors

Truscon Hangar Doors have been perfected to meet aeronautical requirements of any nature and are made in sizes to fit individual installations. They are as light in weight as consistent with proper strength and durability. These doors are usually made of units which run on tracks embedded in the floor, relieving the overhead construction from supporting their weight and effecting important savings in the roof structure. The illustrations show sections of a straight slide and a curved track type.



THORP FIRE PROOF DOOR CO.

1600-1610 Central Avenue
MINNEAPOLIS, MINN.

Products

THORP METAL COVERED DOORS, FRAMES and TRIM.
THORP SMOKE SCREENS.
THORP No. 14 GAUGE TUBULAR ELEVATOR DOORS.
THORP BRONZE and COPPER COVERED ENTRANCES.
THORP HOLLOW METAL FRAMES.

Facilities

All products are made in our new plant which is equipped with the most modern machinery made to suit our individual requirements and fully capable of handling any size order.

Details

Full size and scale details are submitted by our Drafting Department for architects' checking and approval. The requisite number of copies is furnished the general contractor.

Construction and Materials

Thorp Kalamein Doors are made on the basis of the Underwriters' requirements of 3-ply built-up pine core, heavily lined with asbestos and thoroughly nailed with cement-coated nails. All mortises in the core are made and reinforced for hardware at this point.

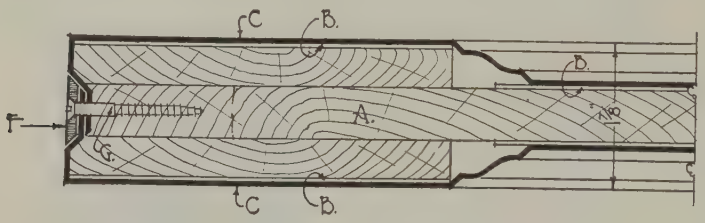
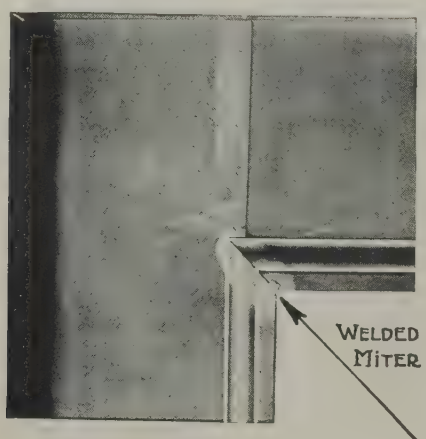


Fig. 1. Section Through Door
A—Wood core. B—Asbestos paper lining. C—Steel sheet. F—Beveled edge band. G—2-in. wood screw

Metal—The steel covering used is No. 1 furniture steel with 24 gauge for stile and rails, and 20 gauge for panels. If desired, 20 gauge may be specified for stiles and rails as well. The panel mouldings are an integral part of the stiles and rails and formed with them, and are not a separate nailed-in mould.



Back of sheet showing the reinforcement at the butt joint of the stiles and rail, and the welded miter joint of the moulding.

Fig. 2. This System of Welding Avoids All Possibility of Breakage and Looseness

Face of the sheet ready for the polishing.

Welding—All stiles, rails, panels, and panel moulds are electrically welded into one sheet. The two sheets thus formed are lapped on all four edges, formed into a groove and held in place by a steel band. No dependence is placed on mortise and tenon joints or (lag) screws to hold the doors together. No solder is used at all, since the door is welded throughout.

Mouldings—We have a large number of dies for both solid panel and glass panel moulding. Since it is more economical to use standard dies, we make our quotations on this basis unless specifically stated otherwise.

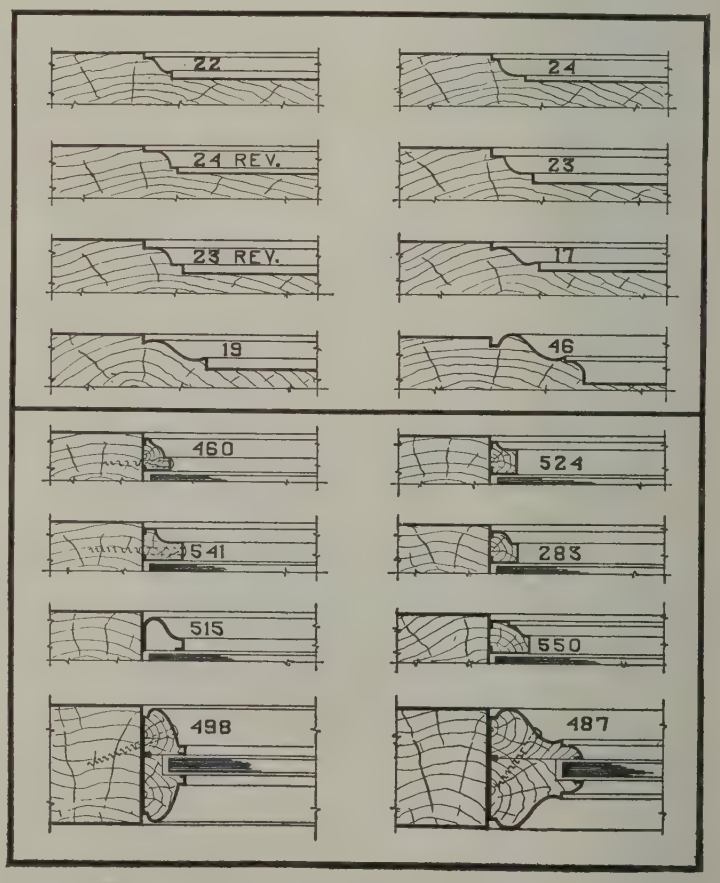


Fig. 3. A Few of Our Many Styles of Casings and Mouldings for Divided Light Panels

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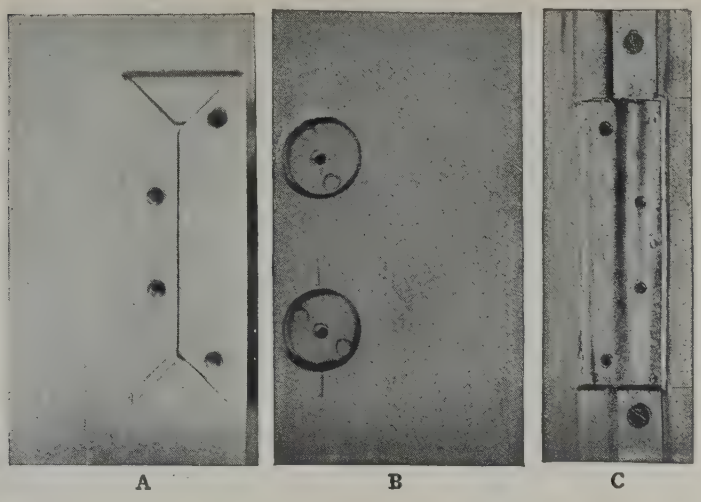

Fig. 4. Details of Hardware Reinforcement

A and B—Photographic section of the jamb at the butt seat, showing the sinkage of the washer nut on the back of the jamb.

C—Section of the back edge of a door showing butt sinkage

These methods are typical of the great care exercised by this organization that all details shall be as strong as possible to resist the action of hard usage and fire. Note that the metal is formed in under the butts

Hardware—All hardware, except checks, is fitted at the factory, provided it is delivered to us with all charges prepaid. In making the mortise seat for the hinge, the metal is not cut away, but formed into the mortise to protect the wood core on both the door and frame. The hinge jambs are suitably reinforced at all hinges to carry the door without any sagging. Necessary reinforcements are placed in the door.

Munt Bars—Our Munt Bar construction is the strongest possible, and the smallest. It consists of ⅛-in. steel bar of door thickness to which the mouldings are machine screwed. When hollow mouldings are used, they are made up in framed, welded units for each glass light opening.

Finish—All grained or enameled finishes are baked and are of the very best seven-coat type. We follow the architect's requirements for each individual order. Unless specifically stated otherwise, all work is primed. Copper-plated finish is electro-copper on steel and may be finished in the various shades of statutary copper. This is practical only for interior use.

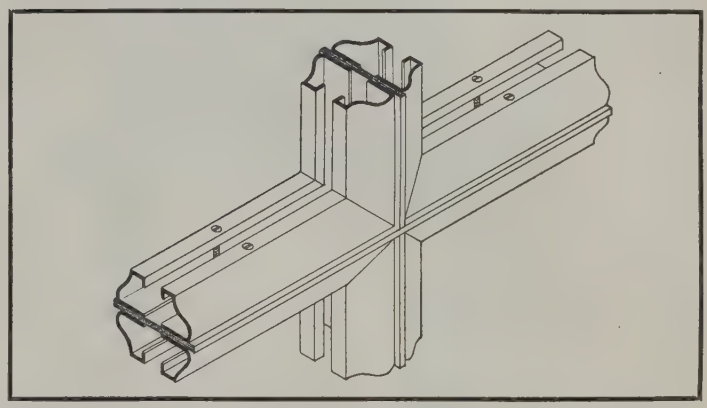

Fig. 6. The Thorp Method of Munt Bar Reinforcement
Insures complete and lasting rigidity in all divided light panels

Hollow Frames

Our frames are adaptable to any type of building or partition construction. They are either 16 or 14 gauge welded joints fully reinforced and fitted for hardware.

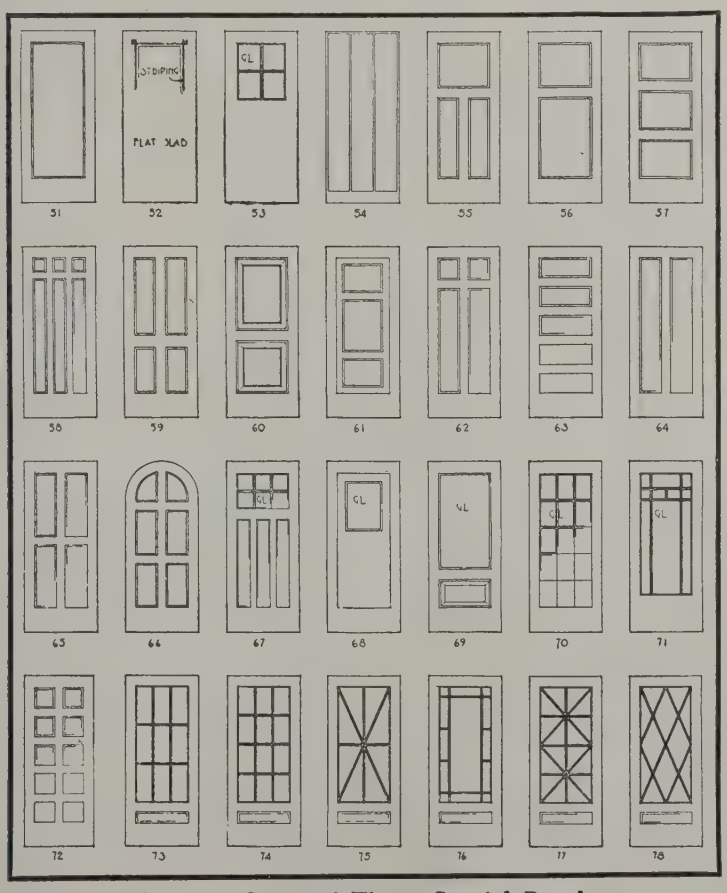

Fig. 5. Some of Thorp Special Panel Layouts

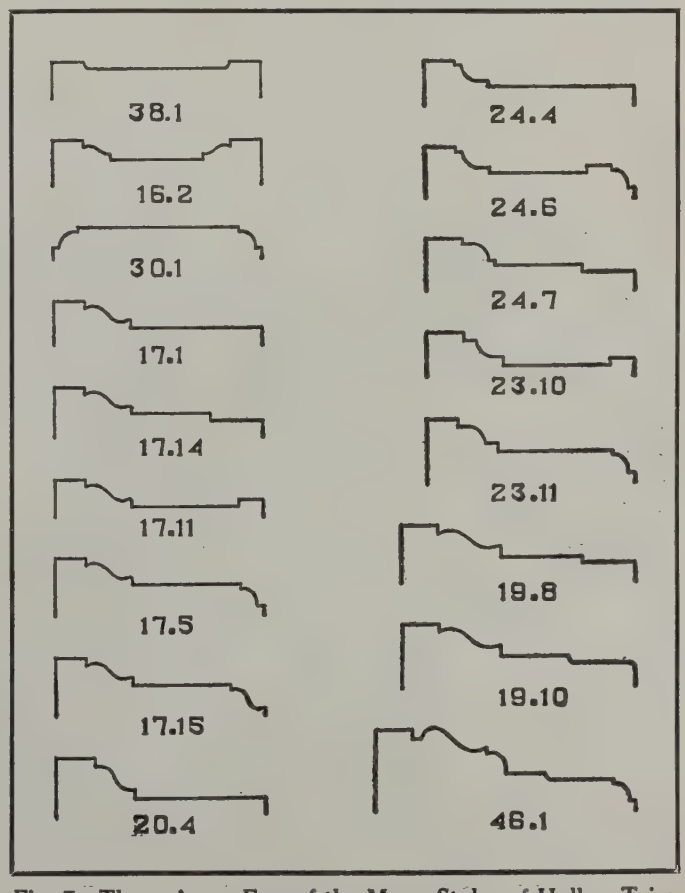

Fig. 7. These Are a Few of the Many Styles of Hollow Trim Architects May Specify

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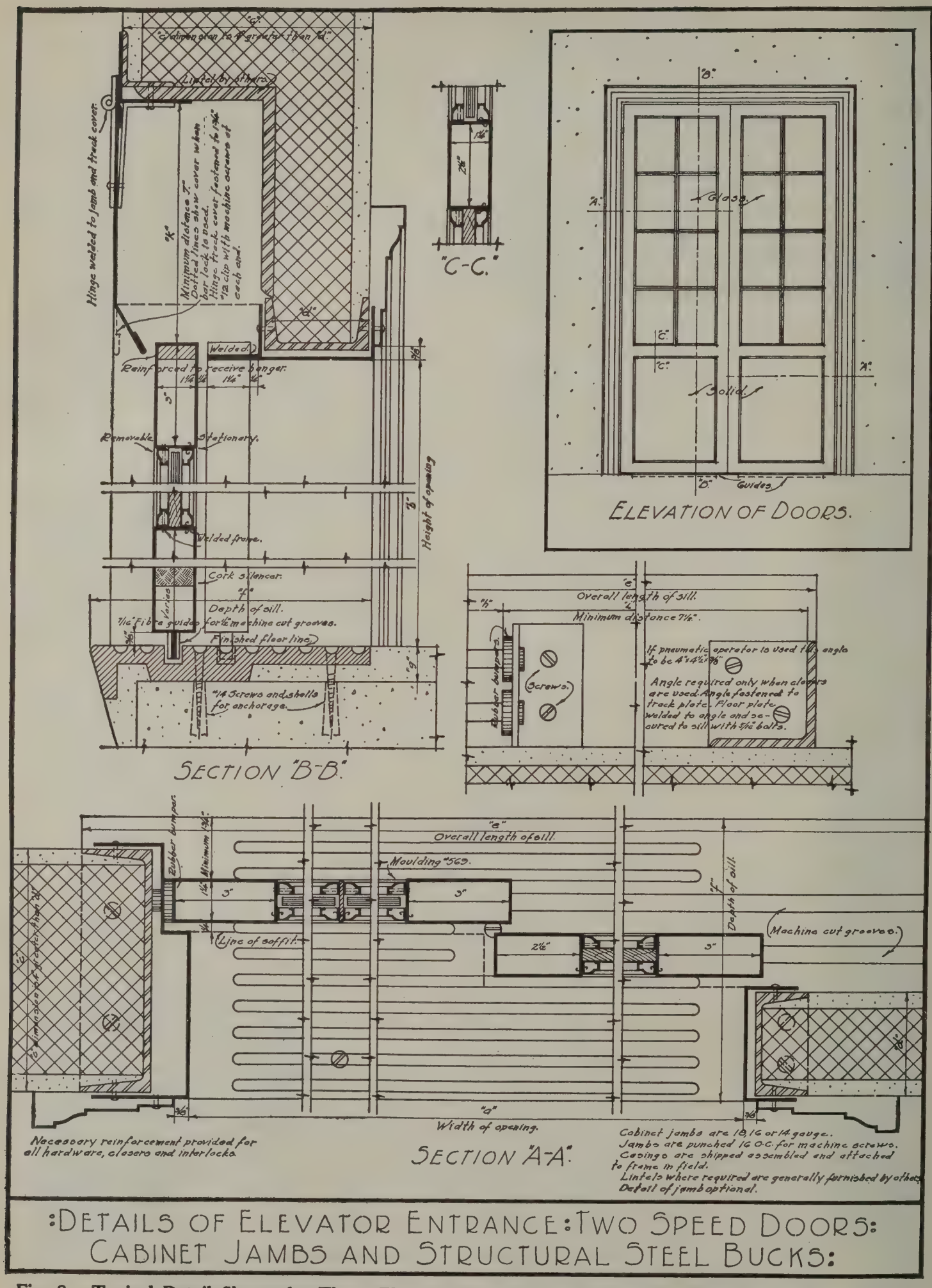


Fig. 8. Typical Detail Sheet of a Thorp Elevator Opening Installation—Note Methods of Construction

Continued on next page

Elevator Openings

These may be of metal covered or tubular steel construction. Tubular doors are 14 gauge drawn steel tubes with all mitres and joints welded. Glass mouldings are in welded frame units. This simplifies glass setting. The Thorp guide is the width of the bottom rail, preventing shaft drafts and light strikes.

The guide is lined both sides with a special grade of hard fibre, obviating metal-to-metal contact, adding to quietness and ease of operation.

We furnish the welded type of hollow metal frame and track cover or cabinet jamb type. Sills and hardware complete are also provided if desired. Sills should be machine grooved or of a similar construction. Elevator openings are finished in baked enamel in any desired wood grain or color. Otherwise it is factory primed.

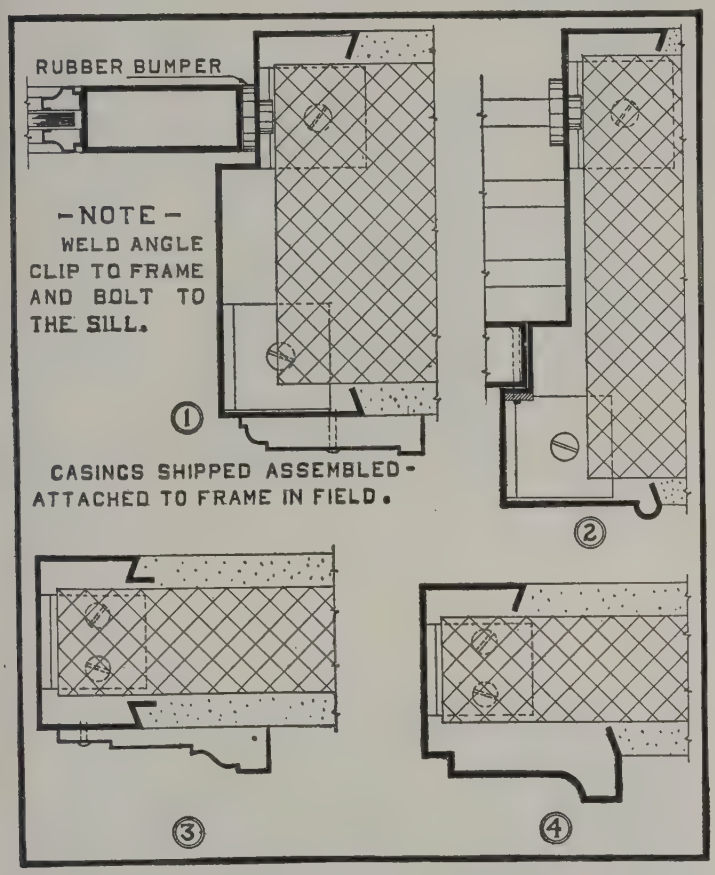


Fig. 9. Four Typical Thorp Elevator Opening Casings

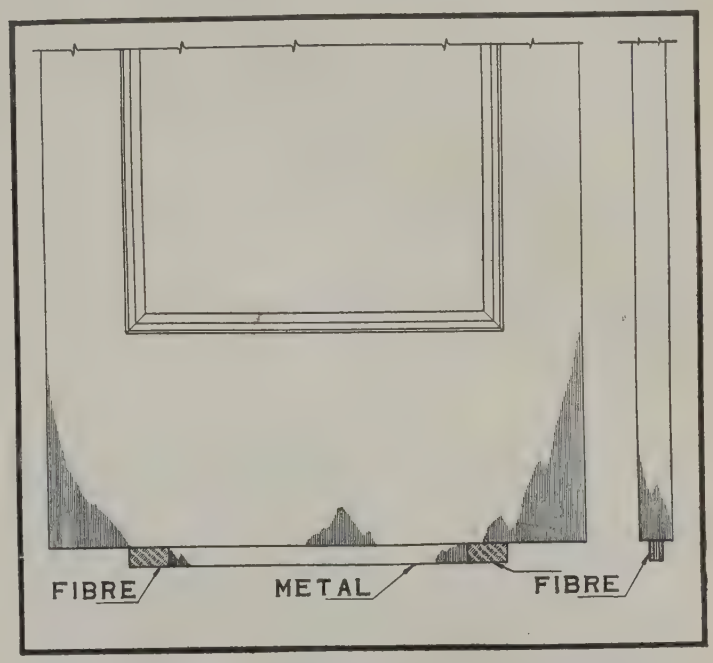


Fig. 10. This Illustrates the Thorp Method of Eliminating Light Strikes Below Elevator Doors and of Reducing Noise
Note hard fibre

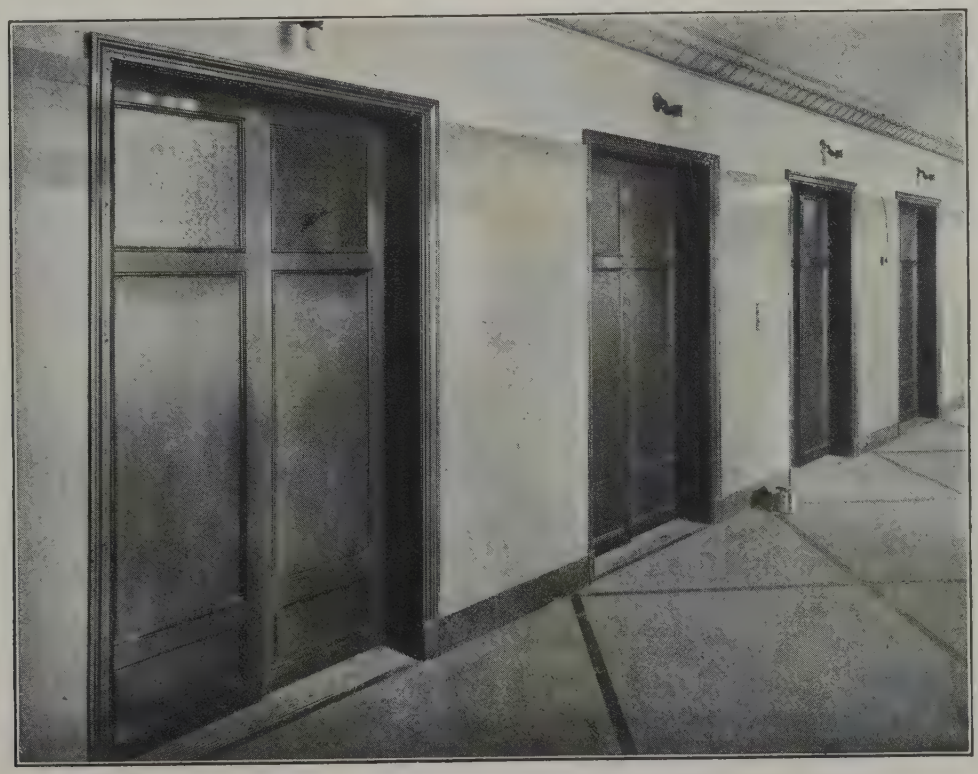


Fig. 11. Thorp Elevator Doors As Installed in the New Baker Building, Minneapolis, Minn.
Larson & McLaren, Architects

Continued on next page

Entrance Doors

Thorp bronze and copper entrances are especially suited to public buildings, such as office buildings, hotels, theaters, etc.

The construction is identical with Thorp steel covered doors except an inside lock seam joint is used instead of welding which is impossible in the case of bronze or copper. No solder is used.

Copper may be 18 oz. to 30 oz. Bronze may be 18 oz. (22 gauge) to 30 oz. (18 gauge). We also use 36 oz. (16 gauge) bronze in hair line joint construction as well as hollow bronze in 16 gauge.

Label Service

If called for, we label doors according to the National Board of Fire Underwriters' requirements for various types of openings. This should be specified when inquiring.

Catalogue

The reference book of Thorp Fire Proof Doors will be sent to any architect who will send for it on his firm stationery. This catalogue of 95 pages will furnish detailed and authoritative information on fire proof doors and allied products.

Fig. 13. Thorp Entrance Doors, Fayette County Courthouse, West Union, Iowa
JOHN G. RALSTON, Waterloo, Iowa, Architect

Fig. 12. Thorp Entrance Doors Were Specified by the Architects of the New Wise Community Center of Holy Congregation
FECHEIMER, IHORST & McCOY, Cincinnati, Architects

Fig. 14. Thorp Entrance Doors, Main Vestibule Richard J. Kinsella School, Hartford, Conn.
WHITON & McMAHON, Architects

VULCAN RAIL & CONSTRUCTION COMPANY

Manufacturers of Underwriters' Fire Doors

MAIN OFFICE AND WORKS

Grand Street and Garrison Avenue, MASPETH, N. Y.

BRANCH OFFICE AND SHOPS: 39th Street and A. V. R. R., PITTSBURGH, PA.

Products

VULCAN "ALL-STEEL" FIRE DOORS.

For Pipe, Stair and Bridge Railings, Steel Gratings, Pipe Bends, etc., see pages A820-823.

Underwriters' Approval

The steel fire doors and frames manufactured by this company, and described below, are made in accordance with the specifications of Underwriters' Laboratories, Inc., are inspected by them and carry their Class "C" label.

TRADE-MARK

Vulcan "All-Steel" Fire Doors

Use—These doors are designed for the protection of corridor and partition openings. They are especially suitable for installation in compartment openings in furniture storage warehouses.

Equipment—This type door is furnished with buck and hardware complete, except padlock.

Construction—The entire door, frame and hardware is of steel construction, and all material is painted one shop coat before shipping.

The door sheet is made of blue annealed steel, securely fastened to an angle iron frame, suitable provision being made for expansion in case of fire. This angle frame is braced at intervals of not over 20 in. by cross angles riveted to the door sheet.

Hardware consists of four strap hinges and a three-point latch with spring to hold latches in their keepers. Latch handles extend through the door to permit opening from both sides.

Buck is made of standard rolled steel channel and is furnished 1 in. wider than partition. It runs from the finished floor to the ceiling and is securely fastened to both. Hinge pintles and latch keepers are riveted to channel jambs in the shop. Doors are usually made 3 ft. x 8 ft. 4 in. or 3 ft. 4 in. x 8 ft. 4 in. but can be furnished in any size up to 4 ft. x 10 ft.

Further Information

Complete detailed drawings, together with further information and prices will be gladly sent on request.

Two Standard Vulcan Doors
One closed and the other partly open

Typical Installation of Vulcan Doors
On both sides of corridor in a furniture storage warehouse

Some Typical Installations

Metropolitan Fireproof Warehouse, New York, N. Y.
Knickerbocker Storage Warehouse Co., New York, N. Y.
Manhattan Storage & Warehouse Co., New York, N. Y.
Job De Camp, Inc., Newark, N. J.
Security Storage Co., Washington, D. C.
Thomas F. Healey & Son, Inc., Brooklyn, N. Y.
Neal Fireproof Storage Co., Cleveland, Ohio
Long Island Storage Warehouse, Brooklyn, N. Y.
Lansing Storage Co., Lansing, Mich.
George B. Holman & Co., Inc., Hackensack, N. J.
W. H. Strang Storage Warehouse, Brooklyn, N. Y.
Flushing Storage Warehouse Co., Flushing, L. I., N. Y.
Neptune Storage Warehouse Co., New Rochelle, N. Y.
O'Brien Express Co., New Rochelle, N. Y.
Eldredge Express & Storage Warehouse Co., Atlantic City, N. J.
Rochester Carting Co., Rochester, N. Y.
Estate of Orrin E. Jones, Providence, R. I.
King-Parker, Inc., New York, N. Y.
Interstate Warehouse Co., Philadelphia, Pa.
Hempstead Storage Corporation, Hempstead, N. Y.
Santini Warehouse, New York, N. Y.
Wm. H. Schaefer & Son, Inc., Stamford, Conn.
J. Kindermann & Sons, Inc., New York, N. Y.
Federal Storage Company, Washington, D. C.
Lehigh & New England Terminal Warehouse, Bethlehem, Pa.
Lincoln Safe Deposit Company, New York, N. Y.
Allport Storage Warehouse Company, Asheville, N. C.
Morgan & Brother Warehouse, New York, N. Y.

THE UNITED METAL PRODUCTS COMPANY

Manufacturers of Hollow Metal Doors and Trim

CANTON, OHIO

DISTRICT OFFICES OR SALES REPRESENTATIVES IN ALL IMPORTANT CITIES

Products

HOLLOW METAL DOORS and TRIM.

UNIT DOOR FRAMES (Combined Buck, Jamb and Casing in one piece).

METAL MOULDINGS, including Picture Moulding, Wire Moulding, Scribe and Closure Moulding, Cornices, Base, Chair Rails, etc.

HOLLOW METAL ELEVATOR DOORS and ENCLOSURES.

CONDUO-BASE (for carrying electric wires).

METAL PARTITIONS.

Plant and Facilities

U.M.P. doors are made in the largest plant in the world devoted exclusively to the manufacture of hollow metal doors, frames and trim. We are equipped to handle contracts of any magnitude, and, as our plant is located in the heart of the steel producing industry, we enjoy unusual facilities in deliveries of raw material. Our plant is equipped with the very latest machinery and our methods of producing the finest type of interior metal trim are most modern.

U.M.P. Standard Hollow Metal Doors and Trim

Stiles and Rails—Formed from U. S. Std. No. 18 gauge steel, thoroughly pickled, double annealed, patent leveled, free from blisters, pits or other imperfections. Stiles are formed of one piece and rails of two pieces, all interlocked with continuous channels constructed to form a reinforcing binder, a deep groove for panel and an interlocking clip for panel moulding (see illustration). All stiles and rails have cork inserts of suitable size to prevent metallic sound.

Doors are 1¾ in. thick.

Panels—Constructed of two sheets of U. S. Std. No. 18 gauge steel between which two sheets of asbestos and one sheet of felt are inserted to make panel ⅝ in. thick over all. Panels are inserted in the groove provided by the interlocking channels. (An exclusive feature of this product.)

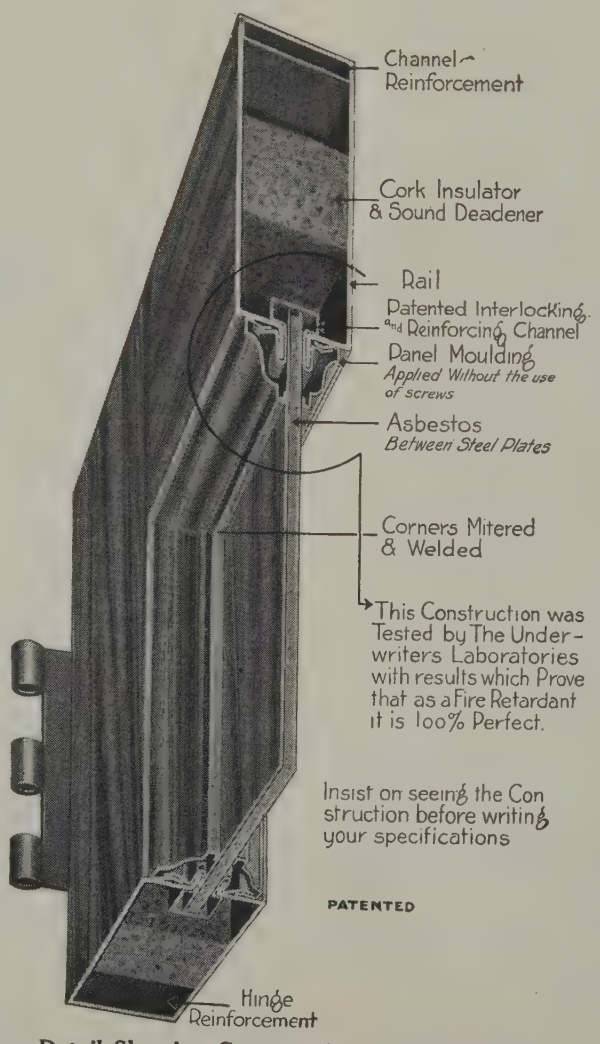
Panel mouldings are neatly mitered or coped at corners and intersections and clipped into interlocking member as described above.

All seams and joints connecting stiles and rails are oxy-acetylene welded their entire length. All joints are made perfectly level and invisible. Steel channels, placed at top and bottom of door full width, are spot-welded in place. Reinforcing bars of sufficient length and thickness are welded in hinge stile at all cut-outs, and are drilled and tapped for butts. Reinforcing plates are spot-welded in lock stile to receive locks, and additional reinforcements are placed in door to receive the hardware specified. All doors are reinforced for door checks, whether specified in hardware schedule or not.

No bolts or rivets are used and no screws are allowed, except where glass panels occur and then oval head machine screws are used to hold glass moulds or beads in place.

This construction has merited the approval of the Underwriters' Laboratories, Inc., it having withstood a fire test of unusual severity without the slightest indication of failure.

We invite investigation and inspection of the U.M.P. standard door and with special reference to the panel construction. Investigation will show as fire tests have proven, that the U.M.P. standard hollow metal door is a fire retardant without equal.



Detail Showing Construction of U.M.P. Door

Jambs—Made of the same quality steel as described for doors—U. S. Std. No. 18 gauge for walls 7½ in. thick or less; No. 16 gauge for walls exceeding 7½ in. thick. Notched and reinforced for all necessary hardware. Jambs are formed to detail and made to fit accurately over buck. All intersecting members are neatly coped and fitted before shipment.

Casings—Made from cold rolled strip steel of not less than .050 in. thick. A large assortment of sizes and profiles designed by architects is available for trimming the opening. All casing corners and miters are neatly welded and ground to insure invisible joints.

Transom Sash—Constructed of U. S. Std. No. 18 gauge steel, similar to doors, and properly reinforced for necessary hardware.

Rough Bucks—Usually made of U. S. Std. No. 14 gauge blue annealed steel. Intersecting joints are acetylene-welded and steel spreaders placed in bottom of all bucks. With rough bucks, we furnish adjustable crimped or corrugated anchors which can be built into the walls. Depth of buck is determined by thickness of wall, including plaster. Rough bucks receive a dip coat before shipment.

Unit Frames (Combined Buck, Jamb, Stop and Casing)—Made from U. S. Std. No. 12, 14, 16 or 18 gauge steel of the same quality described for doors (No. 16 gauge is standard). Hospital type bucks are No. 12 or 14 gauge, as required. All bucks and frames prepared for hardware and heavily reinforced where necessary. Unit frames receive one dip coat and one filler coat. Both coats baked on, after which a prime coat is applied and baked. Finishing coats of paint are applied at building by painting contractor.

Standard Finish—Inside of panels are painted before assembling. After fabrication the door is immersed in enamel. Enamel is then allowed to drain off, after which doors are thoroughly baked. A filler coat is then applied and baked, and the surface sanded or ground perfectly smooth. Two coats of high grade mineral paint are then applied, each baked on separately. All grained finishes receive two coats of best baking varnish, each coat baked on separately. All finished work is rubbed to an eggshell gloss.

Continued on next page

Jambs, casings and mouldings are finished in the same manner as the doors.

Hardware—Applied to doors at factory before shipment, except where crating of materials might be interfered with. Drilling and tapping for such items as doors and transom closers are done at the building by the erector after materials are installed.

Underwriters' Labels—The standard U.M.P. construction has been tested and approved by the Underwriters' Laboratories, Inc., and we have been granted the privilege of applying the Underwriters' label to all doors for corridor, room partition and fire escape openings.

We have also been granted the right to label fire wall doors made from No. 18 gauge steel and of hollow construction. Such doors are of the all-metal type and, while of special construction, they can be divided into any number of panels and grained to match any finish desired.

The U.M.P. fire wall door displaces the old fashioned tin clad type. It can be hung with ordinary butts to a regular standard No. 16 gauge jamb attached to a No. 10 gauge buck. The only item of hardware needed on the U.M.P. inspected fire wall door in excess of what is required on any other door is a 3-point lock.

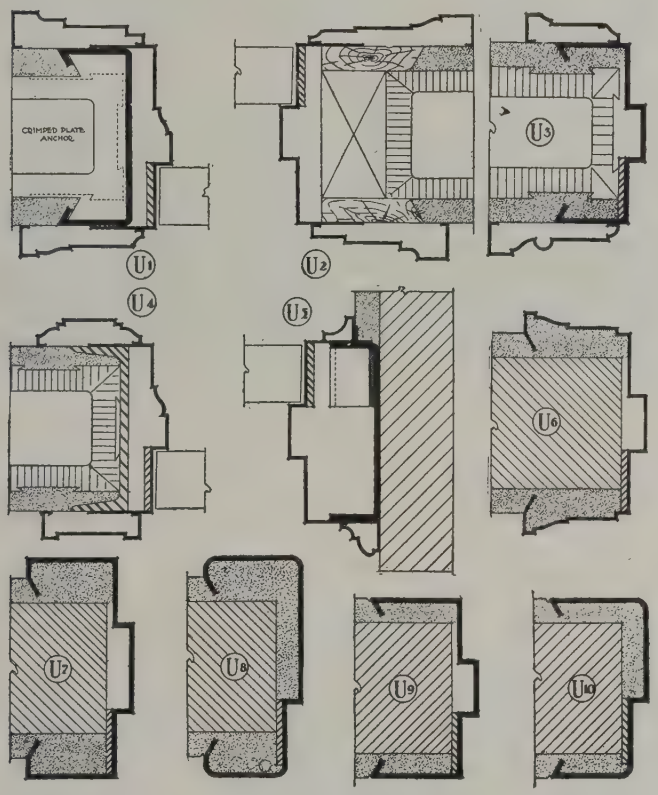
We furnish labeled doors and frames in any size up to and including 4 ft. wide by 8 ft. high for single doors, and up to 8 ft. wide by 8 ft. high for a pair of doors.

Shop Drawings—These illustrate all work in detail and are prepared and submitted for architect's approval before materials are fabricated.

Samples—We will furnish a corner section of this door and suggest that a comparison be made of its construction with the old system of a tubular stile and rail with the panel mouldings simply screwed or spot-welded to it.

Samples of finish are submitted for approval before materials are finished.

Architects' Handbook—Full size sections of all standard U.M.P. door mouldings and casings are shown in our Architects' Handbook, which will be sent on request, without charge.



Details of U.M.P. Standard Buck and Jamb Construction

Type U 1—Rough buck, cabinet jamb and casing construction.
Type U 2—Wood buck, cabinet jamb and casing construction.
Type U 3—Combination buck and jamb, with applied casing.
Type U 4—Channel iron buck, cabinet jamb and casing construction.
Type U 5—Inverted buck. Cabinet jamb and scribe mould construction.
Type U 6—Unit frame (combined buck, jamb and casing).
Type U 7, U 8, U 9 and U 10—Combination frames suitable for hospital or school construction.

Note: When materials must be finished before shipment, constructions shown for Types U 1, U 2, U 4 and U 5 may be used. Rough bucks can be set, walls built and plastered and finished materials installed after all other work is in place.

Type U 3 permits of a more flexible casing design than is possible in a standard unit frame. Casing can be made to match any design required.

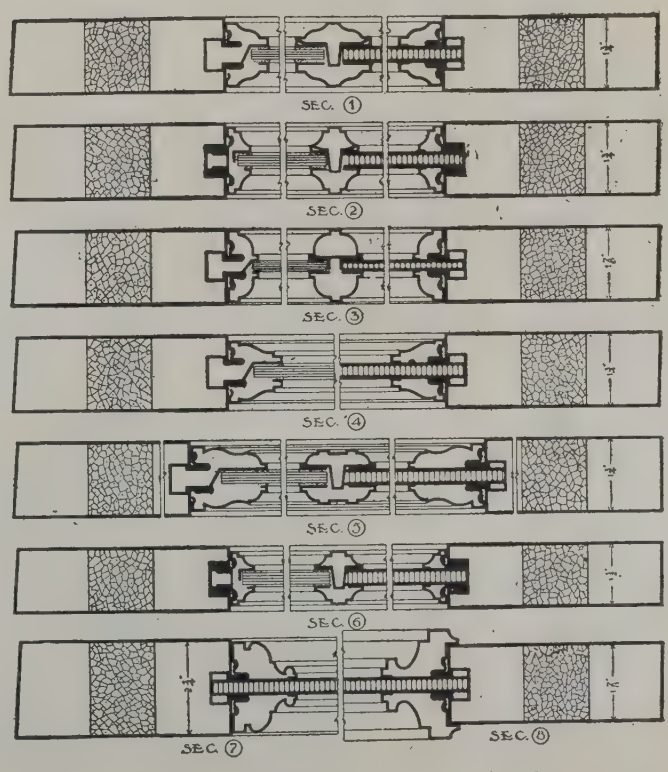
A considerable saving can be effected in cost by specifying construction shown for Types U 6, U 7, U 8, U 9 and U 10.

Unit frames must be built into masonry and should not be shipped to job with finishing coats applied. This work should be done by painting contractor.

We can furnish Underwriters' labels for all types of construction shown with the exception of U 2 and U 5.

Crimped plate anchors furnished with all combination frames.

Standard U.M.P. Hollow Metal Doors



Standard U.M.P. Hollow Metal Door Sections

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Metal Mouldings

We manufacture a complete line of metal mouldings, including picture moulding, wire moulding, scribe enclosure moulding, muntin moulding, chair rail, base, cornices and handrails, which can be furnished promptly in any quantity. These are made from .050-in. cold rolled strip steel.

Special steel or bronze shapes, cold rolled or pressed, can also be furnished.

A large assortment of styles is shown in full size sections in our Architects' Handbook, a copy of which will be sent on request, without charge.

Elevator Enclosures

Doors—Construction of United elevator doors is the same as that of the standard U.M.P. hollow metal doors described on the two preceding pages, except that they are 1½ in. thick and are provided with special noiseless easy-sliding guides at bottom of door to run in sill groove.

Frames—May be of either rough buck, cabinet jamb construction, or of the combination frame type, heavily reinforced for attachment of hardware. Crimped plate anchors furnished with all combination frames and rough steel bucks.

Trim—Made from No. 18 gauge strip steel of stock design or profile, and fastened to frame with concealed clips.

Cover Plates—Protect hangers from dirt and dust. Made of No. 14 or 12 gauge steel, depending on size. Provided with hinges and latches for easy access.

Facia Plates—When specified, Nos. 14 or 12 gauge facia plates are furnished, extending from top of cover plate to sill above and 6 in. wider on each side than jamb opening. Numerals furnished when specified.

Sills—Furnished in either cast iron with fluted surface, or Feralun sills with grooves milled straight and true, in order that the friction of guide pin and groove be reduced to the minimum.

Hanger and Closing Device—Furnished in the type specified. We suggest careful choice in this specification, as poor equipment of this nature will ruin an otherwise perfect installation.

Underwriters' Labels—United elevator enclosures, including doors, bucks and jambs, can be furnished with Underwriters' labels, except enclosures having glass paneled doors.

Owing to varying construction, it is necessary to mention distinctly in the specification that the elevator doors are to bear the Underwriters' label and be manufactured in accordance with the standard construction of United Metal Products Company.

Elevator Specifications—Complete elevator specifications and list of prominent United installations will be mailed on request.

Standard Types of United Elevator Doors

Where two designations are shown for one type, the following applies to panel arrangement:

E 1—Two-panel, all metal
E 2—Two-panel, upper glass
E 3—One metal panel
E 4—One glass panel
E 5—Two-panel, all metal
E 6—Two-panel, upper glass
E 7—Two-panel, all metal
E 8—Two-panel, upper glass

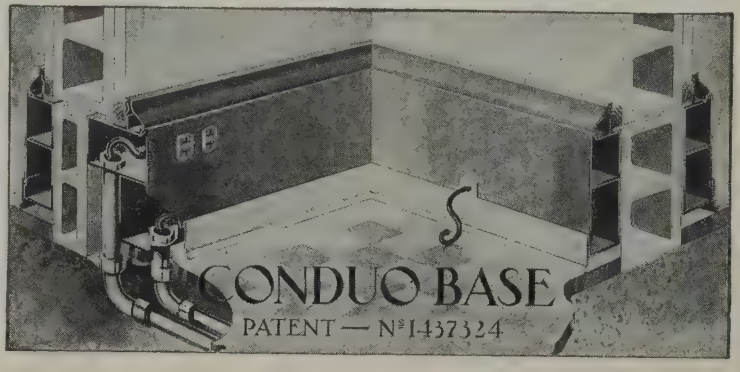
Conduo-Base—Combined Base and Conduit

Conduo-Base serves both as a baseboard and as a raceway or conduit for electric light, telephone and other wires. Conduo-Base is not intended to replace the entire conduit system in a building, but is an extension of that system.

High and low tension feeder conduits located in the floor fill and running from cable shaft or panelboard, are extended to and connected with the Conduo-Base at any convenient point. The wires are then carried around the room in the Conduo-Base and are accessible for outlets at any point along the base. Outlet boxes for the reception of feeder conduits are attached to the raceway, knockouts being provided in these boxes to receive feeder conduits.

Strictly fireproof—every section bears the Underwriters' label. One standard height, 8¼ in. over all.

Raceway—Made of one piece of No. 18 gauge steel and formed into two separate compartments. The upper compartment is used exclusively for light or power wires up to 300 volts; lower compartment for telephone or other low tension signal or communicating wires. Shipped in 10-ft. lengths.



Cover Plate—Made of No. 18 gauge furniture stock steel. Easily removed when additional outlets are required or when access to raceway is desired. Shipped in 10-ft. lengths.

Plaster Mould or Top Member—Made of .050-in. strip steel. Easily clipped in place. No screws or other visible fixing required. Shipped in random lengths of about 15 ft.

Mop Mould or Bottom Member—Made of .050-in. drawn strip bronze. Rests on floor and provides protection against damage to base when floors are swept or scrubbed. Drilled on 15-in. centers and fixed to raceway with round head machine screws (drilling and tapping of raceway done at building). Shipped in random lengths of about 15 ft.

Fittings—Grounding clips, end closers and plaster mould clips are furnished by us with each order.

Finish—All exposed surfaces of Conduo-Base are finished to match sample furnished by architect.

Especially Desirable for Subdivision—When United Metal partitions are used for the subdivision of space, Conduo-Base is especially desirable in that it serves both as a neat, artistic and sanitary base for the

Continued on next page

partition and as a conduit for distribution of light and telephone wires within the rooms. The *combined use of United Metal Partition and United Conduo-Base* simplifies the task of the architect and the building manager in providing for future tenant wiring requirements. The convenience and economy resulting make the use of Conduo-Base desirable and necessary.

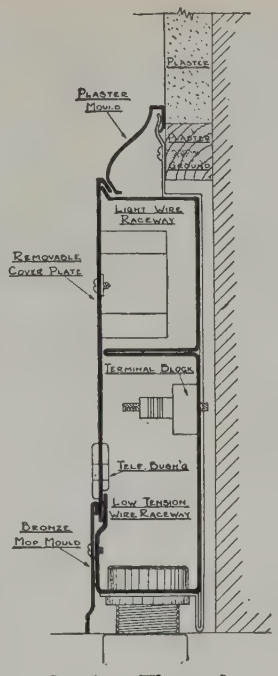
How to Specify—Furnish and install Conduo-Base in all rooms and spaces throughout the building where base of other types is not shown or specified. Base shall be UNITED METAL PRODUCTS COMPANY'S standard patented Conduo-Base, each section bearing the Underwriters' label. All exposed surfaces shall be finished to match sample furnished by the architect.

Conduit Work for Conduo-Base—Extend from each light switch outlet box, one ¾-in. feeder conduit to the upper section of special outlet box which is attached to and forms part of raceway. This box shall be furnished by the Conduo-Base manufacturer. Extend from the nearest low tension panel or junction box at least one ¾-in. feeder conduit to each suite of rooms, connecting same to the lower raceway of outlet box mentioned above.

Note: It is recommended that the above conduit feeders be made at columns, outside walls or permanent partitions where same are not likely to be removed by changes or rearrangements of suites of rooms. Feeder conduits of both light wire and low tension wires to Conduo-Base should be made of number and size so that each isolated run of Conduo-Base or each suite of rooms has ample and independent feeder capacity.

At every door opening, low-set radiator and every other point where the continuous run of Conduo-Base is intercepted by an opening or otherwise, "jumper" both raceways of Conduo-Base with ¾-in. conduits across the opening or interception so that each isolated run of Conduo-Base in every suite of rooms is properly connected with the section of Conduo-Base equipped with the feeder conduits.

Note: Where "jumper" conduits terminate in partitions that are likely to be removed at a future date, we recommend the use of cast elbows and nipples, with the conduit proper finishing at floor level so that it can be capped.



Section Through Conduo-Base

For each light or low tension wire floor outlet shown, extend one ¾-in. conduit "jumper" from the nearest Conduo-Base run, and from its proper potential raceway, terminate same at floor with its axis perpendicular to same, with one adjustable floor outlet fitting with blind cap.

Conduo-Base Installation—After completion of plastering and floor work, install Conduo-Base in the following manner. Attach raceway to plaster ground with round head wood screws through clips which are spot-welded to raceway, special care being exercised to maintain true alignment, elevation from floor and projection from plaster line, in strict accordance with manufacturer's full size details.

When all raceways are installed, wiring in same completed and approved, install Conduo-Base finishing members in accordance with manufacturer's standard directions, with all exposed joints well made, corners neatly fitted and finished surfaces kept unmarred in strict cabinet quality of workmanship.

Electrical Requirements—The entire installation of Conduo-Base shall be made in strict accordance with the Underwriter's rules and regulations, with continuous unbroken grounding of every isolated run of base, with all wiring within free from grounds.

United Metal Partitions

We have perfected and patented an inexpensive metal partition for subdividing office and warehouse space.

Panels are made from two sheets of furniture stock steel, with a layer of asbestos between and joined together under hydraulic pressure. Mullions, and top, bottom and intermediate rails are of hollow construction, all drawn to detail with sharp reveals and pleasing architectural profiles.

Bottom member of partition can be fitted to receive Conduo-Base where desired, so that electric and telephone wires may be distributed throughout the rooms without the necessity of floor conduits, thus enabling the contractor to install finished floors and ceilings throughout the entire floor, subdividing the floor space afterward to suit tenant requirements.

United partitions can be set up and taken down without damage to walls, floors or ceilings. Parts can be moved and stored in a very small space and reset without damage to finish or waste of material. Adjustment to varying conditions is a special feature.

The high cost and scarcity of building labor, together with the inconvenience and expense of pulling down and rebuilding tile and plaster walls in an occupied office or warehouse building, make it imperative that the architect and owner investigate the United partition before deciding on the type of subdividing wall material to be used.

United partitions are made from cold rolled shapes, the members of which are fabricated at our factory and shipped to the job knocked down. The various members are prepared so they can be easily and quickly locked together on the job.

United Metal Partition with Conduo-Base

VARIETY FIRE DOOR COMPANY

Manufacturers of All Kinds of Fireproof Doors

Sacramento and Carroll Avenues, CHICAGO, ILL.

ATLANTA, GA.
BIRMINGHAM, ALA.
BUFFALO, N. Y.
CHARLOTTE, N. C.
CLEVELAND, OHIO
COLUMBUS, OHIO
DALLAS, TEX.
DAVENPORT, IOWA
DAYTON, OHIO
DECATUR, ILL.
DETROIT, MICH.
FORT WAYNE, IND.
GRAND RAPIDS, MICH.
HOUSTON, TEX.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.
RICHMOND, VA.
ST. LOUIS, MO.
SAN ANTONIO, TEX.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
TULSA, OKLA.

Products

UNIVERSAL PASSENGER ELEVATOR DOORS.

HOLLOW METAL FIREPROOF DOORS and TRIM.

KAL-O-MINE METAL COVERED FIREPROOF DOORS and TRIM.

VAMANCO and VARCLAD COUNTERBALANCED FREIGHT ELEVATOR DOORS.

Also manufacturers of Cross Horizontal Folding Doors, Saino Fire Doors and Shutters, Tin Clad and Metal Covered Doors and Trim.

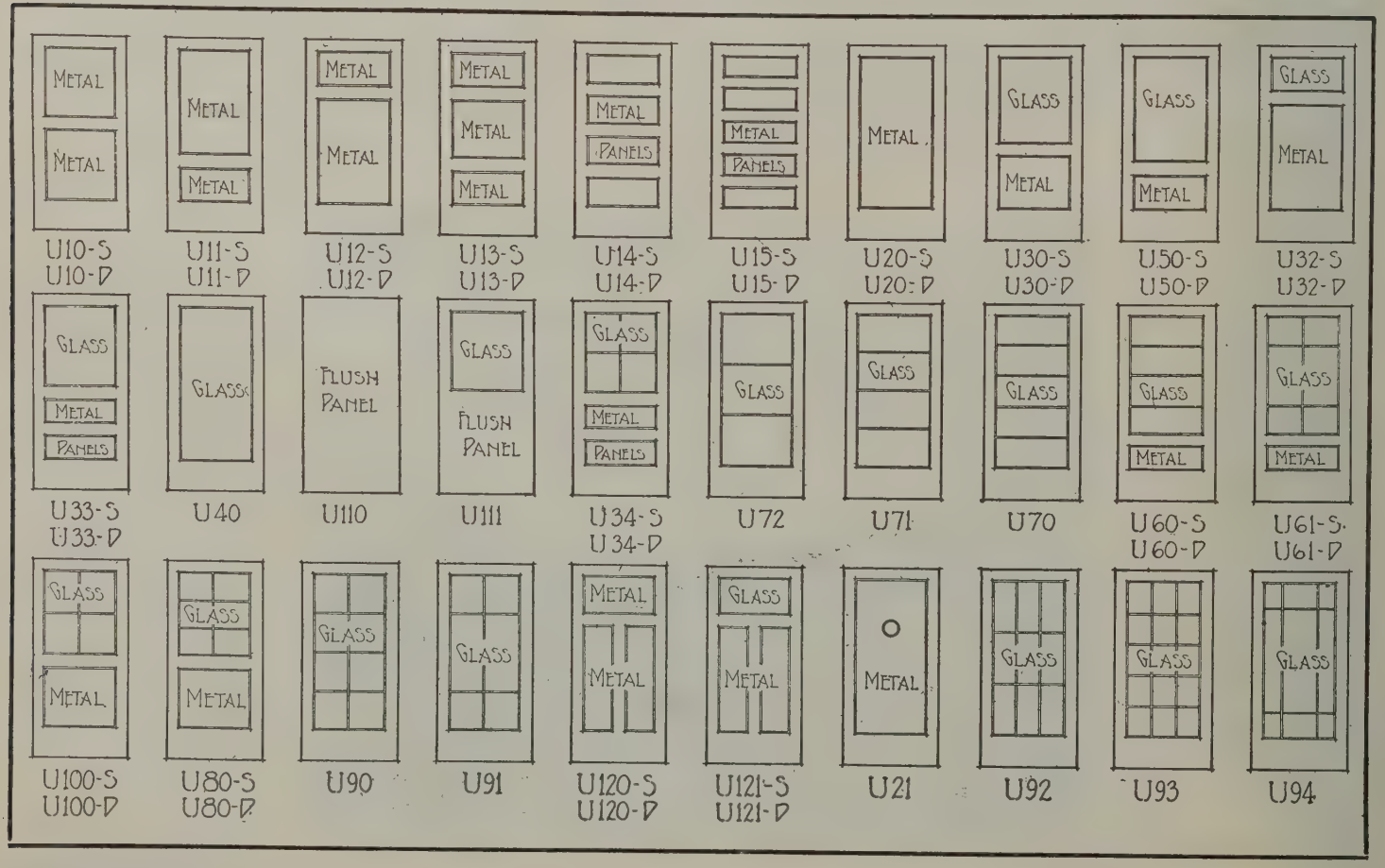
Universal Passenger Elevator Doors

Type V. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type V. U. passenger elevator doors are constructed of No. 18 gauge furniture metal throughout, with all connections between stiles and rails formed by continuous lock joints and solidly welded over entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

Type M. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type M. U. passenger elevator door construction is similar to V. U. type except that both shaft and corridor sides of door have recessed panels finished against stiles and rails with drawn mouldings mitered and welded. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

Type T. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type T. U. passenger elevator doors are constructed of rectangular tubes drawn from No. 14 gauge cold rolled strip stock and welded. All connections between stiles and rails are formed by continuous lock joints and solidly welded over the entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

Universal Passenger Elevator Doors



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Specifications for Counterbalanced Freight Elevator Doors—Vamanco Varclad Doors

(1) Freight Elevator Doors—All door openings to freight elevator, except penthouse doors, shall be counterbalanced doors as sold by Variety Fire Door Company and shall be type known as [Vamanco] [Vamanco Hollow Metal] [Varclad] [Varclad Kal-O-Mine].

(2) Work Furnished by Manufacturer—The manufacturer shall furnish, freight allowed to freight station nearest building site: (a) all doors complete with guides, roller bearing sheaves, bar locks, trucking sills, bolts, anchors and all necessary hardware to properly secure doors to walls of shaft; (b) drawings and full directions required for erection; (c) all parts to receive priming coat of metallic paint at factory.

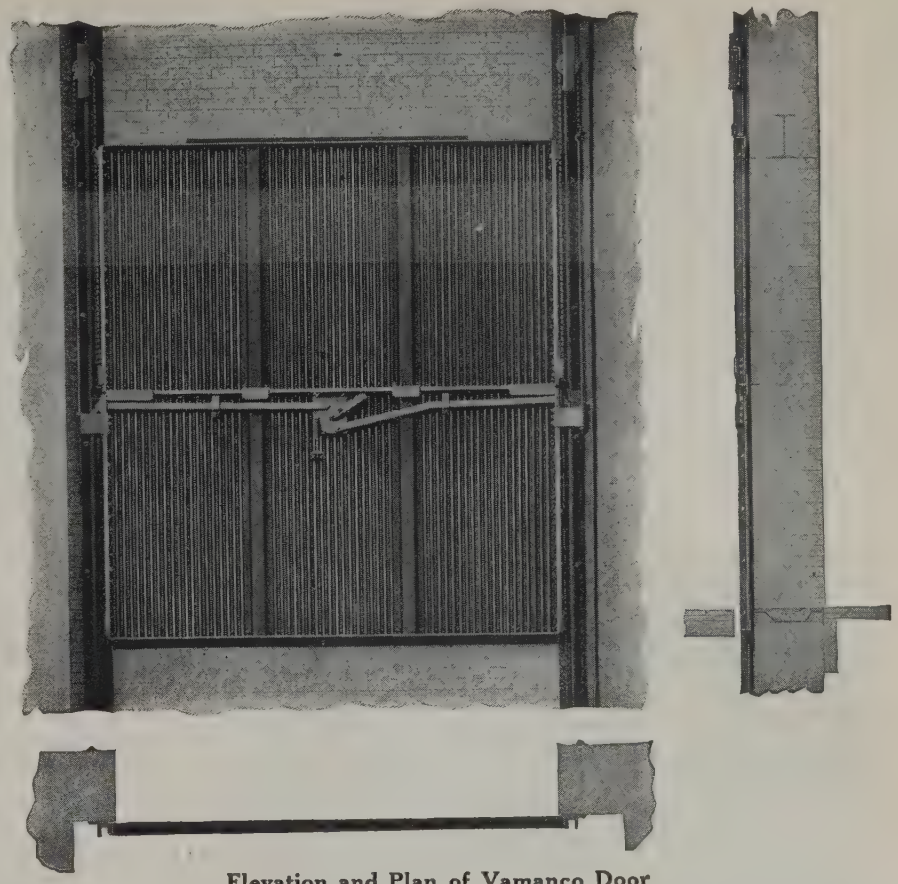
(3) Underwriters' Label—All doors shall be approved and labeled by Underwriters' Laboratories, Inc., for "Fire Door for Vertical Shaft."

(4) Special Lock—Special lock shall be provided at (ground) floor to permit access to elevator shaft when all doors are closed.

(5) Operation—Doors to be manually opened and closed: (a) If electric interlocks are desired add: Each door to be provided with a Varlock operated by bar locks so that when door is *unlocked* the current will be cut off from the car and it will be impossible to run the car until all doors are closed and locked. (b) If full automatic operation is desired add: Door contractor to furnish mechanical operating device to open and close doors automatically by simply pressing button when car is at landing. This device to be full circuit type and to contain interlocks cutting current from car when door is unlocked.

(6) Trucking Sills—All doors shall be provided with special design trucking sills (state if for heavy or light duty) so that no part of load passing over doors will be sustained by door mechanism or guides, but will be carried entirely by sill of building.

(7) Glass Panels—Each door shall be equipped with a panel 12 in. square, arranged to receive ¼-in. wire glass (glass by glazing contractor). The glass panels are to be backed by a sliding metal panel, with fuse link for automatic closing and doors must bear the Underwriters' label.

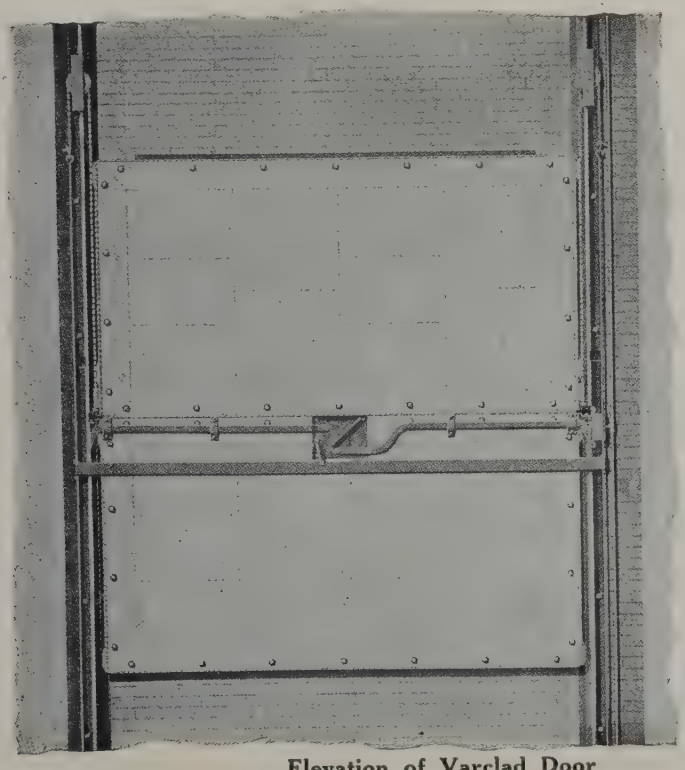


Elevation and Plan of Vamanco Door

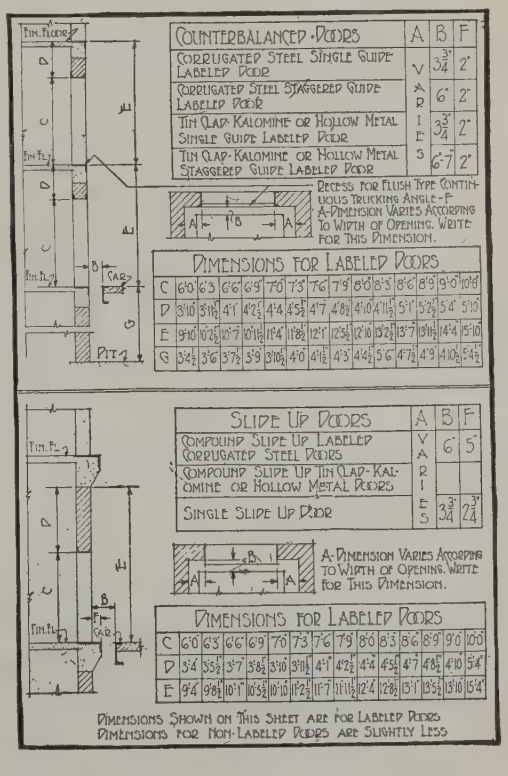
(8) Clearance—There shall be not more than 1½-in. clearance between door and elevator car at all floors. In case there is any inequality of construction of shaft that will not allow this, the architect will decide whether to cut the masonry or put extension on doors to make correction of same, which is to be charged to contractor who built the shaft.

(9) Erection—The manufacturer shall erect the entire equipment in a substantial manner and shall leave the installation in perfect working order.

(10) Painting—The contractor shall apply 2 coats lead and oil paint to all parts exposed to view, in colors selected by the architect, as specified under "painting."



Elevation of Varclad Door



R. V. HARTY CO.

Manufacturers of Special Doors for Large Openings

1316 Maple Street

DETROIT, MICH.

R. V. Harty Doors

R. V. Harty doors and hardware have been developed in answer to the call for sturdier, quicker and easier operating, more reliable entrances to modern garages, warehouses and factories. R. V. Harty doors are designed for openings where continuous performance is a necessity.

R. V. Harty slide doors are designed to be weathertight and to give continuous heavy duty service.

Construction details of the door have been developed to produce the best possible door for strength and for resistance to warping, rotting, splitting and sagging.

A Typical Installation

Description and Advantages of R. V. Harty Door Hardware

Full Ball Bearing—Note on the following page the assembly details of R. V. Harty 6-in. hardware. The lower barrel of each pintle is equipped with a combination radial and thrust bearing and the upper barrel with a radial bearing. The entire weight of the door is thus supported on these bearings which are never loaded beyond 50% of their rated capacity.

Equalization of Load—The combination bearing is supported on a spring which, if the hardware were carefully installed, would suffice to nearly equalize the load on all hinges, but in order to insure each bearing taking its share of the load a compensating screw plug is inserted to support the spring. This allows of very accurate distribution of the load among all bearings. A setscrew holds this plug from turning, thus insuring permanent adjustment. The compensating effect of this screw plug is obtained in the 2½-in. hardware by means of the slotted holes in the pintle.

Lubrication—In each barrel there is considerable dustproof space which is filled with a non-corrosive grease at the time of erection; thus the bearings are permanently lubricated.

Alignment of Hinges—Unit line construction of the hinge is obtained by direct connection through steel of the main hinge eye and the fold hinge pintle as shown on the hinge detail sheet. The Z-bar casting which contains the main hinge eye is welded to a steel plate, the other end of which is welded to the fold pintle. This is done in a jig insuring all hinges being exactly alike. This, together with our method of installation, insures perfect alignment of both main and fold hinges and precludes the possibility of the door being "hingebound."

Clearance—The doors are cut 1¼ in. clear of the floor to prevent jamming over small obstacles on the floor. A rubber sealing strip is applied to close this opening. We would also call your attention to our combination rubberized fabric belt and steel plate astragal at the center of the door.

Other Advantages—The latest developments of jigs and fixtures used in the manufacture insure perfect fit and alignment of all units. It is not just hardware, but a complete unit, scientifically designed and engineered for a specific purpose.

The R. V. Harty unit line, spring compensated, and ball bearing hardware for folding doors shown on these pages is the latest development in hardware.

The unit line principle which combines the jamb eye and the fold pintle in one unit built in a jig insures perfect alignment of hinges. The ball bearings insure easy operation and the spring compensation which distributes load on each hinge equally, insures the owner against cut out bearings due to overload. A large lubricant space is provided, and the slight up and down movement of the compensating springs keeps this lubricant worked through the bearings. The complete weight of the door is carried on the jamb and the free end of the swinging door guided by our patented control rod.

The door construction shown is a product of experience and will give years of service without deterioration.

Operation

Doors are designed for either hand or power operation. We work with all of the operator companies; in fact, most manufacturers of operators demand our doors and hardware to insure a perfect installation.

A control rod is used to guide the free end of the folding leaf. This type of control is positive; it holds the free leaf of the door clear of the opening, and prevents jamming when door starts to close. It is one of the most successful methods of controlling the free end of a fourfold door for power operation.

Service

R. V. Harty doors and hardware are furnished and erected complete by the manufacturer. The complete installation is guaranteed for a period of two years.

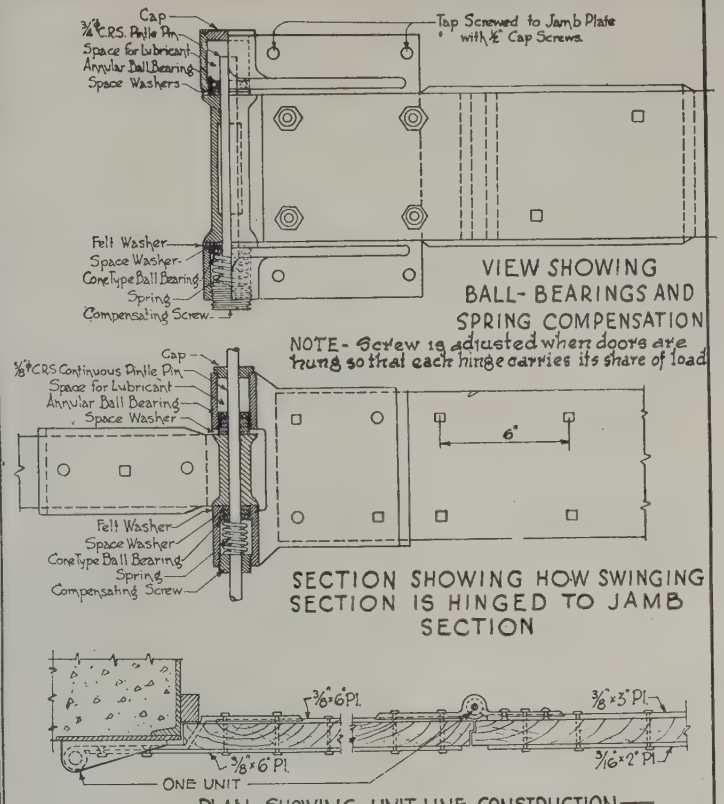
We believe in dependability and service—service when you are designing the building, service in the erection of the building, and last but not least, dependability of operation for the life of the building.

We have no cure-all for all door troubles. Write or take up your requirements with our representatives, and we can and will give you practical solution of your problems.

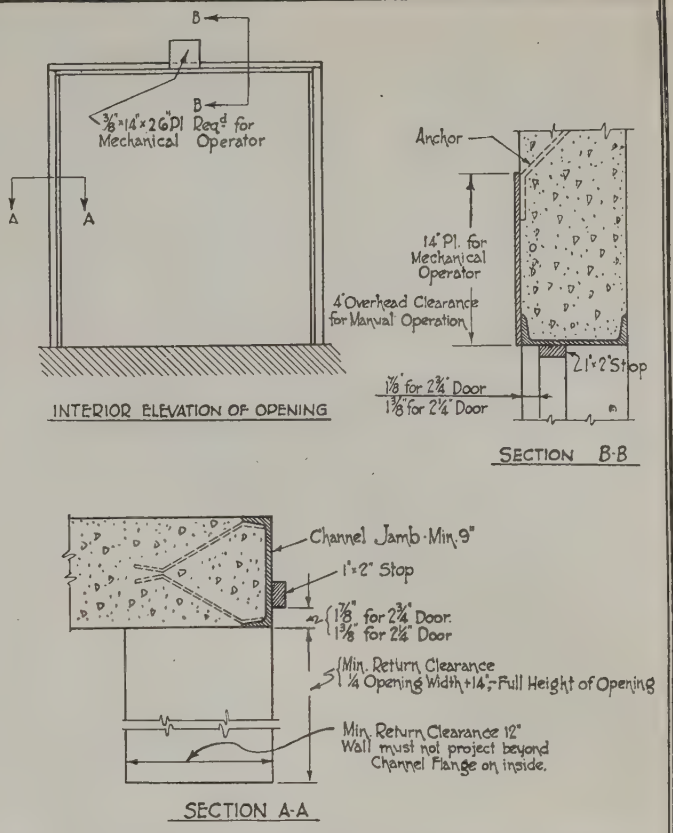
Write for catalogue and list of users in your locality.

"For openings where service and dependability is paramount, specify and use R. V. Harty equipment."

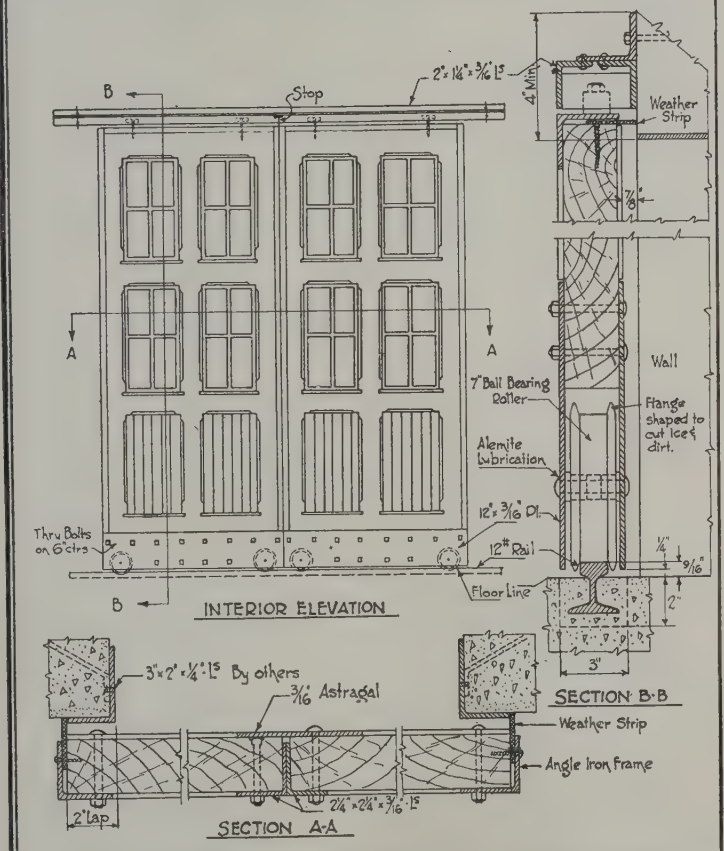
Continued on next page



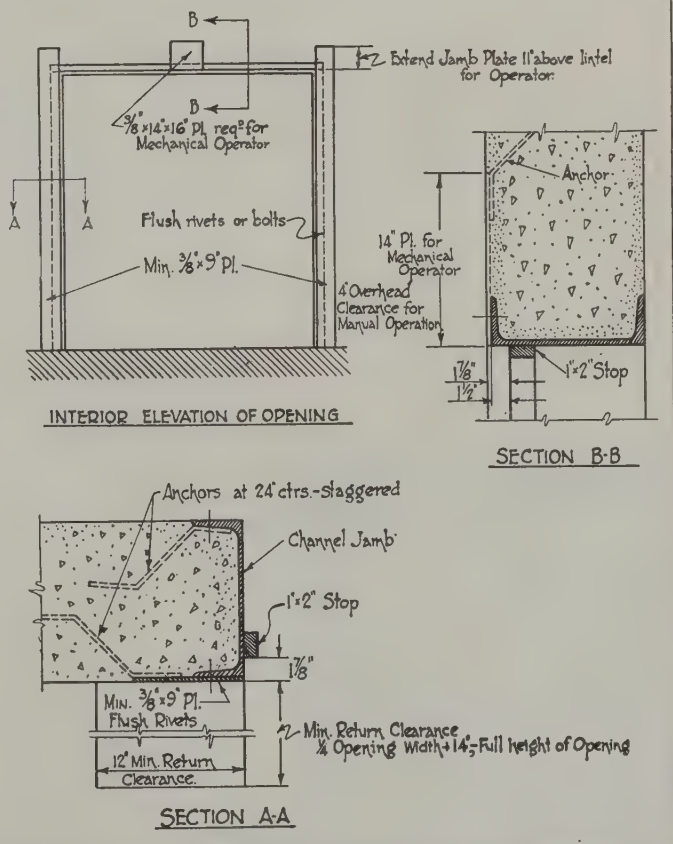
ASSEMBLY DETAILS OF R.V. HARTY 6-INCH UNIT LINE. SPRING COMPENSATED BALL-BEARING HARDWARE



DETAILS OF FRAME REQUIREMENTS FOR R.V. HARTY DOORS EQUIPPED WITH 2 1/2 INCH HARDWARE



R.V. HARTY CENTRE PARTING BALL BEARING ROLLING DOOR GENERAL DETAILS



DETAILS OF FRAME REQUIREMENTS FOR R.V. HARTY DOORS EQUIPPED WITH 6 INCH HARDWARE

THE R.V. HARTY COMPANY	2 1/2 IN HARDWARE EQUIPPED DOORS – CENTER PARTING DOORS AND CONSTRUCTION DETAILS	DRAWING NO. 1 NOT DRAWN TO SCALE

THE PEELLE COMPANY

Manufacturers of Elevator Doors

TELEPHONE
STAGG 0366

47 Stewart Avenue
BROOKLYN, N. Y.

DISTRICT OFFICES
BOSTON, 18 Tremont Street—Telephone, Fort Hill 747
CHICAGO, 333 Michigan Boulevard—Telephone, Superior 6593
CLEVELAND, 605 Caxton Building—Telephone, Main 4053
DETROIT, 611 Lincoln Building—Telephone, Cadillac 4920
AGENCIES IN ALL PROMINENT CITIES IN THE UNITED STATES AND CANADA

Products

PEELLE COUNTERBALANCED TRUCKABLE FREIGHT ELEVATOR DOORS; TEL-CO DOORS; ACCESSORIES for Push Button Controlled Elevators; ELECTRICALLY OPERATED DOORS.

Also Bi-fold Doors, Canopy Doors, One-piece Vertical Sliding Doors; Electric and Mechanical Interlocking Systems, Pneumatic and Electric Door Operators.

For Peelle Dumbwaiter Doors, see page C3728.

Experience and Service

The high regard in which Peelle Products are held by architects and owners is evidenced in the fifteen thousand installations of Peelle Doors in various industries over a period of twenty years of economical service.

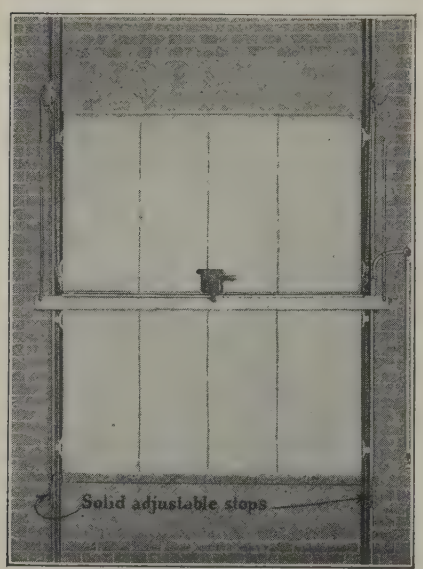
In the further advancement of "elevator door efficiency" our Engineering Staff will be glad to render advice without obligation concerning special conditions or problems of installation. Do not hesitate to "put your elevator door problems up to Peelle."

Estimates will be cheerfully provided.

Counterbalanced Freight Elevator Doors for All Types of Elevator Enclosures

Peelle Counterbalanced Elevator Doors are adaptable to practically every freight elevator door requirement. Their ease of operation and enduring construction have been proven by over twenty years of satisfactory service. Peelle Doors have been specified by architects for thousands of buildings.

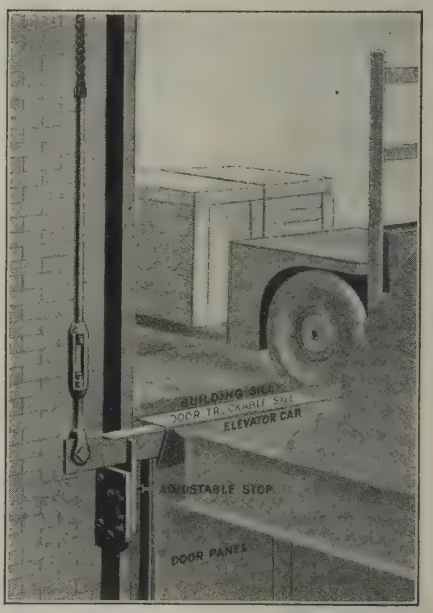
Counterbalanced, Peelle Doors operate vertically inside the elevator shaft affording rapid and full clearance for loading and unloading. No counterweights are used. Anti-friction construction; heavy sheaves provided with double race ball bearings; heavy steel guide rails; smooth running steel chains; large latch handle; balanced design of component parts; all assure smooth mechanical action of Peelle Doors.



Shaft Side View of Peelle Counterbalanced Door

In addition to economically speeding up the handling of vertical traffic, Peelle Doors protect the elevator shafts against accident and the spread of fire. Numerous Peelle Doors installations are equipped for greater efficiency with electric motors controlled by push button switch in car or on shaft side of door. They are also equipped for greater safety with electric interlocking system preventing movement of car until all doors in shaft are closed. Experienced Peelle erectors install each door, making fault-proof operation certain. Consult our Engineering Department before specifying the type of operation.

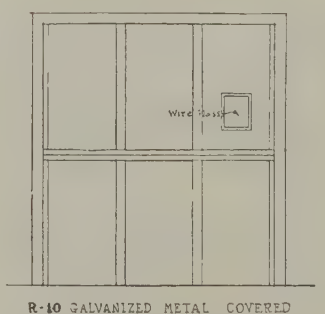
The Exclusive Truckable Feature—One of the cardinal features of Peelle Freight Elevator Doors is the *truckable* sill. It bridges the gap between door opening saddle and the elevator car. This gap ranges from four to six inches. The upper edge of the lower half of the door rests rigidly level with the building floor sill. Besides being specially reinforced to stand the heaviest trucking into and out of elevators, this bar extends beyond the sides of the panel of the door thus forming a bridge for smooth trucking.



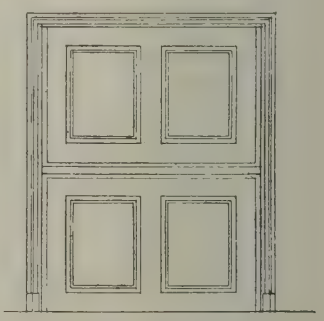
Shaft Side View Showing Manner of Supporting Peelle Counter-balanced Door in an Open Position

Inasmuch as this sill rests on heavy steel stops fastened to the guide rails, there is always perfect and rigid alignment of the building floor and the trucking sill of the door. This *trucking* sill is endorsed as one of the most essential, simple and efficient features in elevator door construction.

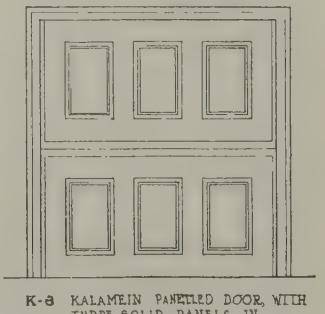
Special Heavy Duty Sill—We also make a reinforced trucking sill for unusually heavy loads. It is also recommended for openings of great widths.



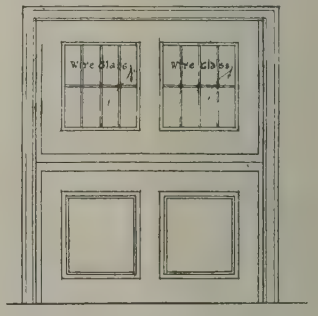
R-10 GALVANIZED METAL COVERED DOOR, WITH FLUSH PANELS
R-9 without Observation Light
R-11 with 2 Observation Lights



K-1. KALAMEIN PANELLED DOOR, WITH TWO SOLID PANELS IN EACH HALF
Observation Light & Lights furnished if desired



K-8 KALAMEIN PANELLED DOOR, WITH THREE SOLID PANELS IN EACH HALF.
Observation Light furnished if desired



O-9 KALAMEIN PANELLED DOOR, WITH STANDARD SIZE STEEL SASH IN UPPER HALF

Continued on next page

Peelle Metal Clad Counterbalanced Doors

The basis of this metal clad door is composed of two layers of ⅞-in. selected white pine, clinch nailed together and covered with 24 gauge stretcher leveled galvanized sheets.

Framework is constructed of heavy angle steel which gives the door great strength and the ability to withstand severe use.

The angle frame and the metal covered panels are bolted together with patented combination lock nut washers, which finish flush on both sides of the door.

Large (patented) anti-friction shoes operate in heavy angle steel guide rails, rigidly fastened to masonry wall construction.

Peelle steel operating chains are permanently locked in place with patented locking device.

These chains operate over double radial ball bearing sheaves, permitting free, easy operation of even extremely large doors.

Drop forged steel adjustable turnbuckle rods aid fine adjustment.

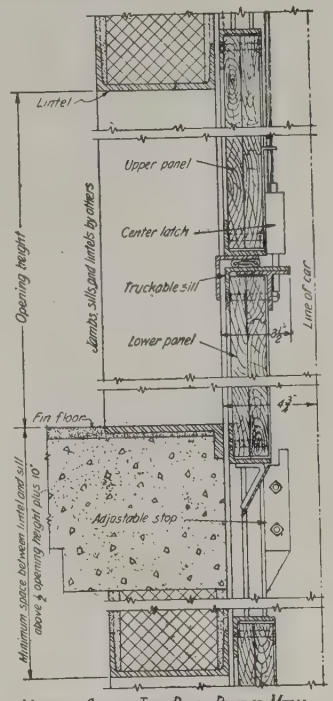
A positive action latch located at the center of each door is so designed that a slight pressure releases doors and exerts the greatest possible vertical pressure.

Where greater safety is required in connection with electric inter-locking switch, special arm latches (type E switch) will be furnished if specified.

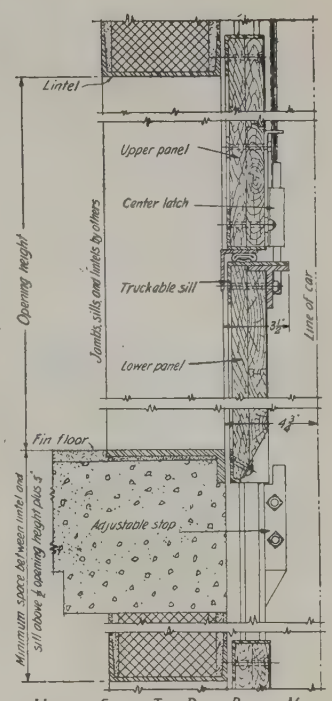
These doors have passed the rigid tests and inspection of the Underwriters' Laboratories Inc., and bear their label.

Labeled doors may not exceed 8 in. width and 10 in. in height.

Label of Factory Mutual Companies should be specified by owners carrying this fire insurance.



VERTICAL SECTION THRU PEELLE REGULAR METAL CLAD (UNDERWRITERS' LABELLED) DOOR



VERTICAL SECTION THRU PEELLE REGULAR METAL CLAD (NON-LABELLED) DOOR

Note: Minimum return from face of jamb to sidewall of shaft is 7 in.

Peelle Pass Type Counterbalanced Doors—Underwriters' Labeled

For openings where story heights are too low to accommodate regular type doors.

These Pass Type doors are demonstrating their excellence by widespread use in factories, garages and warehouses having high door openings and where constant and heavy traffic subjects the doors to heavy use.

The Pass Type door embodies all of the features of the Peelle regular type door as described above. The panels are staggered and operate on separate guide rails. When opened the upper panel of the door is permitted to pass by the lower panel of the door on the floor above, the lower panel likewise lapping the upper panel of the door on the floor below. (See details (A).) A movable, gravity operated, fire retarding steel lintel set on the upper edge of the door, effectively seals the opening between masonry and door.

Detail (B) applies to elevator shaft conditions where story heights are not uniform; one floor permitting the use of Peelle Regular Type Doors, and distance between other floors being less, Pass Type Doors are required. Also where door heights vary and floor heights are uniform, Peelle Pass Type and Regular Type doors are used in conjunction with each other.

Regular and Pass Type Doors are installed one above the other to cover both these conditions. An extended trucking sill is provided on the Regular Type Doors to bridge the clearance between elevator car and building floor sill.

The Underwriters and Factory Mutual Companies label will be furnished with all Pass Type doors when specified.

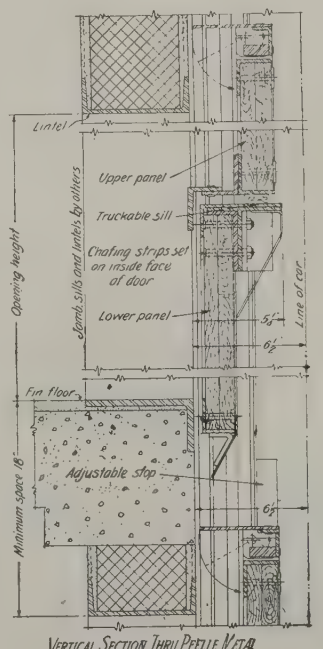
Elevator Shaft Construction Data—All details show the construction of Peelle Freight Elevator Doors when fastened to iron bucks. If no iron bucks are provided, and the jambs are of plain brick or concrete, the angle rail is reversed and the horizontal leg is bolted to the wall with through bolts. The construction in all other details remain unchanged. While Peelle Doors can be attached to walls of any construction, best results are obtained when channel or angle iron bucks securely anchored to the wall are provided. Plain terra cotta walls do not offer secure anchorage. The elevator shaft wall should be plumb and free from projections on the side at which the doors are to be installed. The openings should be built with the jambs flush with wall and in vertical alignment. Angle or channel jamb must be provided and set to reinforce hollow tile walls and should extend from sill to beam. Pressed metal bucks must be reinforced with internal angle on shaft side for fastening of Peelle rails.

If doors are installed directly above the elevator pit, it is necessary that the latter be deep enough to receive the lower half of the door in its descent. The requirement is a distance equal to half the height of the opening plus 3 in. No projection should be allowed for a similar distance above the lintel of the doors on the topmost floor.

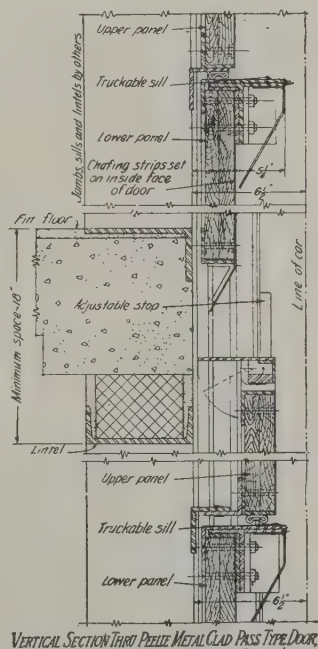
Door Clearance Formula—To determine minimum distance from lintel of door opening to finish floor line above add 10 in. to one-half of door opening height for regular labeled counterbalanced doors, and 5 in. for regular non-labeled counterbalanced doors.

For Pass Type Counterbalanced Doors minimum space, 18 in. from lintel to finish floor line above.

Door openings 12 ft. 0 in. to 16 ft. 0 in. in width should have 9 in. clear jamb return on shaft side of wall for fastening of hardware. Doors over 16 ft. 0 in. in width should be provided with 11 in. jamb return.



VERTICAL SECTION THRU PEELLE METAL CLAD PASS TYPE DOOR



VERTICAL SECTION THRU PEELLE METAL CLAD PASS TYPE DOOR, SHOWING EXTENSION SILL ON REGULAR DOOR ABOVE

Note: Minimum of return from face of jamb to sidewall of shaft is 8 in.

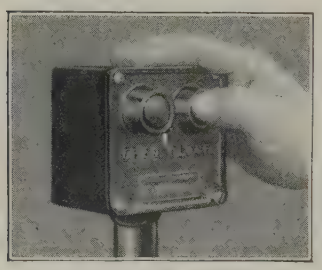
Continued on next page

Peelle Electrically Operated Doors

Peelle Electrically Operated Doors have been developed to a high degree of efficiency and are recommended for speeding up door operation and in freight elevator shafts with door openings at both ends of large cars. In factories, storage buildings, warehouses, market buildings and department stores where cars are used requiring door openings at two ends, Peelle electrically operated doors have proved their worth as time savers and aids to the economical loading and unloading of freight elevators.

Peelle electrically operated doors are also recommended for use in shafts equipped with push-button operated elevators, dispensing with the service of elevator operators.

Operation and Details—These doors are operated by a specially designed motor, located in the elevator penthouse. Two lines of steel tape passing through tape guide made of heavy steel casting attached to the trucking sill of each door, with stop-balls and heavy cushion springs, are fastened to the driving mechanism located in the penthouse. Each door is equipped with side bar latches which engage the trucking bar when door is in a closed position. These latches are operated by cams located on the elevator car, and only those of door opposite stationary elevator are subject to release, insuring door against accident.



Operating Switch for Electrically Operated Door

Operating Buttons—The operating buttons may be located on any floor in the building or each floor if desired, also within the elevator car. Limit switches indicated on details control the vertical movement of these doors and the operation of the motor, automatically cutting motor electrical circuit when doors have reached the maximum opening and closing position.

When specified, the Peelle Motor Operated Doors can be made to open automatically in the self-leveling zone of the elevator.

Specification—Furnish, deliver and erect in complete working order, a Peelle power operator for each line of doors in the freight elevator shafts.

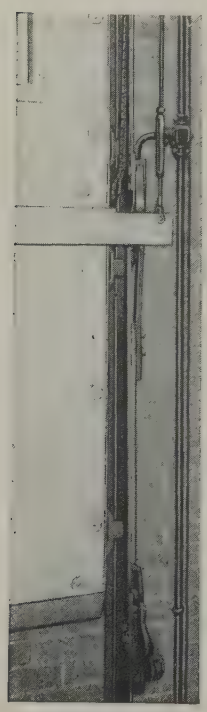
Each operating unit shall consist of a machine placed in the penthouse, with a motor, solenoid brake, worm and gear reduction, with sprocket chain drive. Cold rolled operating rods shall run the full length of the hatchway and shall pass through the hanger bar of each door. The rods shall be properly counterbalanced with a weight running in a steel frame to which interlocking system is attached. This equipment shall include the necessary automatic reversing controller, limit switches, automatic latches and cams for operating the doors.

A three button push button shall be placed in the car within easy reach of the operator.

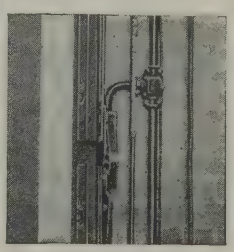
The doors shall be opened by means of a momentary contact push button which shall be supplemented by a stop button so that the doors can be stopped by the momentary pressing of the button while the doors are opening. The doors shall be closed by means of a constant pressure push button which will automatically stop the doors when the button is released.

The installation shall be made by the door manufacturer and guaranteed by him for a period of two years against defects in workmanship or material. Any defective parts shall be replaced free of charge by the manufacturer.

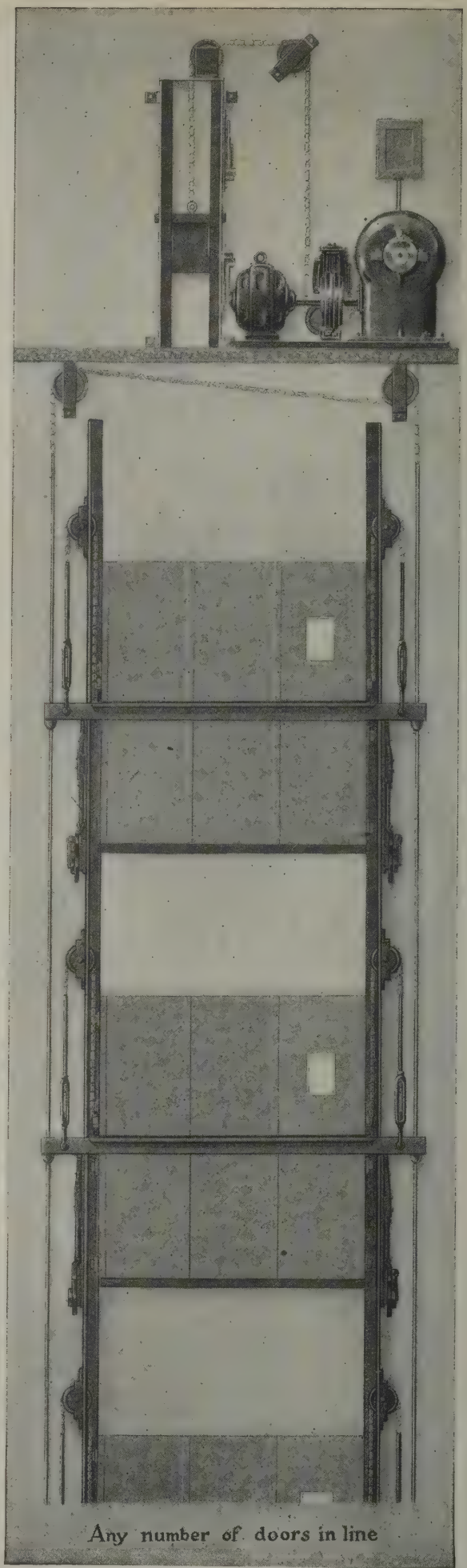
Peelle Accessories for Automatic Push Button Controlled Elevators—Where automatic push button controlled elevators are installed, Peelle Doors are equipped with observation lights and special electrical contact bar lock which permits opening of the door only when car is at the floor level and prevents operation of the car when doors are in an open position.



View Door Closed



View Door Open



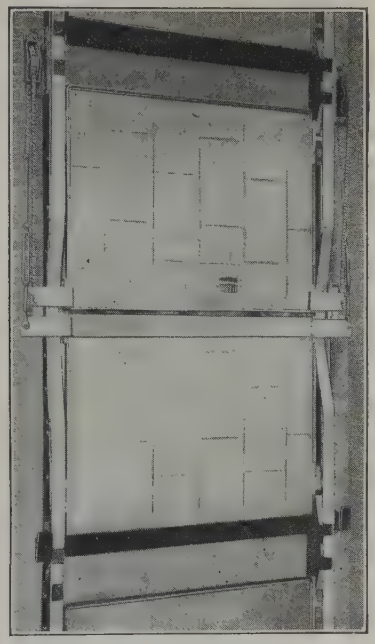
An Electrically Operated Peelle Counterbalanced Door Installation

This illustrates method of control by motor located in elevator penthouse

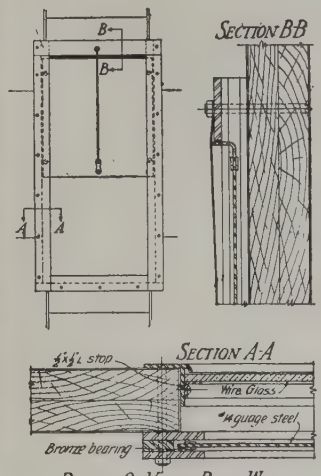
Continued on next page

Self-sealing Pass Type Counterbalanced Doors—Underwriters' Labeled

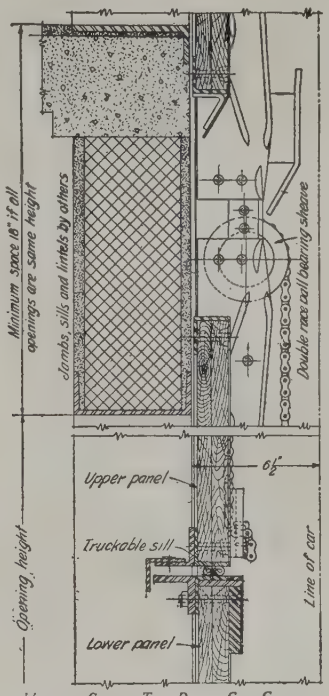
The Peelle Self-sealing Pass Type Door was the first counterbalanced door awarded the label and certificate of the Underwriters' Laboratories, Inc., for use where non-labeled pass type doors were previously used. These doors should be specified where story heights are not sufficient to permit the installation of the Regular Underwriters' Labeled Peelle Doors.



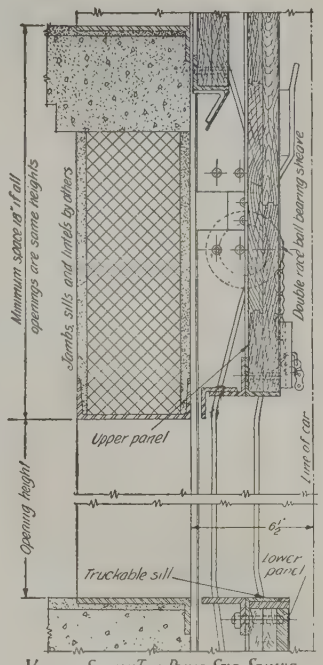
Shaft Side View of Self-sealing Pass Type Door



Details Of Vision Panel With Fuse Linked Shutter



Vertical Section Thru Peelle Self Sealing Door, Showing Door In Closed Position



Vertical Section Thru Peelle Self Sealing Door, Showing Door In Open Position

Note: Minimum return from face of jamb to sidewall of shaft is 8 in.

Analysis of Operation—It is the only door for a pass type condition, which, when in a closed position, allows both halves of the door to rest one directly above the other flush against the door frame. These doors, it will be noted, operate in one horizontal and two vertical planes. Both sections of door move vertically, on a specially designed patented rail away from shaft wall, until the guide shoes engage in the second vertical rail, then continuing in a true vertical position, passing the doors at the floors above and below. They possess all of the features of regular Peelle Counterbalanced Doors.

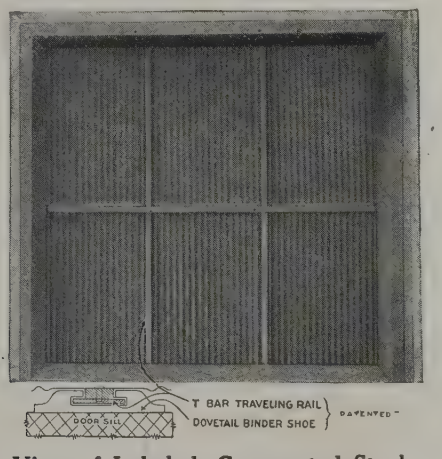
Self-sealing and Smokeproof—When Peelle Self-sealing doors are in a closed position, the angle door frames come into true contact with the iron door jamb (providing jamb is flush and plumb), completely sealing the opening against passage of smoke. This type of Peelle Door has demonstrated its value and efficiency in a great many buildings where high door requirements, heavy service and the advantages of the Underwriters' label make it particularly desirable. It is recommended that Self-sealing doors be equipped with the Peelle electric inter-locking system. Semi-automatic operation and kalamein panels are not advised.

Underwriters' Labeled Vision Panel with Fuse Linked Shutter—The Underwriters' label Peelle Doors equipped with wire glass vision panel. A fuse linked closing steel fire retarding shutter is placed on the shaft side of door as shown, a further protection against fire.

Corrugated Steel Counterbalanced Doors—Underwriters' Labeled

Peelle Corrugated Steel Freight Elevator Doors are used where medium weight doors are desired and where doors are not subject to very heavy service. Securely constructed and reinforced, they will render excellent service under ordinary use. These doors are labeled by the National Board of Fire Underwriters and the Factory Mutual Companies within the size limit of 8 ft. in width and 10 ft. in height. See above for shaft construction data.

Construction Data—Peelle Corrugated Steel Freight Elevator Doors are constructed under the direct supervision of the Underwriters' Laboratories, Inc.



View of Labeled, Corrugated Steel Counterbalanced Door from Loft Side

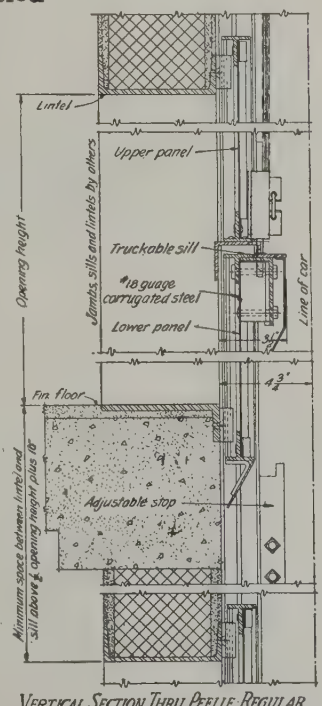
Built of heavy 18 gauge corrugated steel, framed with heavy T-iron structural sections, reinforced at the corners and braced at each side, these doors are furnished with Peelle patented T-bar traveling rail and dovetail binder shoe.

Large, patented, anti-friction shoes and large double radial ball bearing sheaves facilitate easy operation.

Peelle steel chains and heavy turnbuckle rods are fastened to each half of the door by means of a patented safety fastening, thereby insuring continuous and uninterrupted operation.

A positive action latch is standard equipment, operating at the center of the door, designed so that a slight pressure will release the doors and exert the greatest upward leverage.

The T-Bar Traveling Rail—The patented T-bar traveling rail and dovetailed binder shoe are used only in the construction of Underwriters' Labeled corru-



Vertical Section Thru Peelle Regular (Underwriters'-labelled) Corrugated Steel Door

Note: Minimum return from face of jamb to sidewall of shaft is 7 in.

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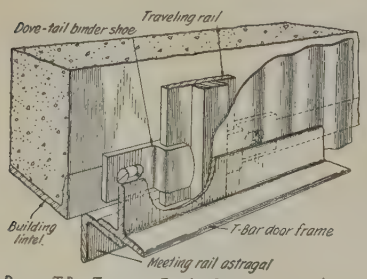


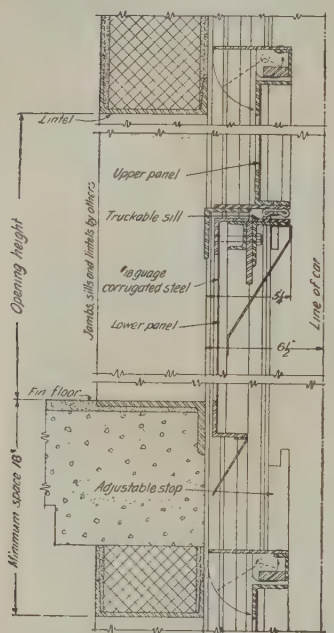
PATENT T-BAR TRAVELING RAIL AND DOVETAIL BINDER SHOE. SECTION THRU LINTEL SHOWING LOWER PART OF UPPER PANEL WITH CORRUGATIONS CUT AWAY

gated Steel Counterbalanced and Tel-co Doors. If specified, non-labeled doors may also be equipped with this device. The T-bar travelling rail and dovetail shoe tie both panels of the door securely to the sill and lintel. Doors in any position are held close to the wall. A steel facia 2 in. or more in width at lintel and sill is required for attachment of these shoes.

Peelle Corrugated Steel Pass Type Counterbalanced Doors—Underwriters' Labeled

This style of Pass Type door fills the need for a counterbalanced steel door, but is only recommended where trucking is not very heavy. Its construction is similar to the regular corrugated steel doors, except that it has the Pass Type door features, including the movable lintel.

Method of Operation—The panels are not mounted one directly above the other, but are staggered and run on separate guides. The upper panel is thus enabled to pass by the lower panel of the door on the floor above, the lower panel likewise lapping the upper panel of the door on floor below. (See vertical section.) The gap formed at the lintel is effectually closed by a movable gravity operated steel lintel.



VERTICAL SECTION THRU PEELLE CORRUGATED STEEL PASS TYPE DOOR

Construction—All regular Peelle features, the reinforced trucking sill, large patented anti-friction shoes, heavy angle steel guide rails, Peelle steel chains, double radial ball bearing sheaves and adjustable turnbuckle rods are part of the Peelle Pass Type counterbalanced door.

A positive action latch, operating at the center of the door, is designed so that a slight pressure will release the door and exert the greatest upward leverage. All fastenings are hand riveted.

Corrugated steel panels are not recommended for large sized openings; the wood metal-covered panels are more substantial.

Peelle Electric Inter-locking Systems

The Peele Electric Inter-locking System is applicable to any type door and all electrically operated elevators. It prevents the operation of elevator car until all doors in the shaft are closed. Approved by all departments having jurisdiction, it is an important factor in securing the lowest rate of casualty insurance. With magnetically controlled elevators the type B switches are wired in series with the elevator operating circuit. The opening of any door breaks the circuit and the car can be started again only when all doors are closed.

An emergency switch is furnished if required. Installed in the elevator car it permits operation of the car with doors open, in case of fire or accident.

Outline Specifications for Counterbalanced Doors

(Outline specifications for use where detailed standard specifications are not desired.)

To all openings in freight elevator shafts, except as otherwise noted, furnish and install in complete working order, Peelle Counterbalanced Truckable Doors, manufactured by THE PEELLE COMPANY, Brooklyn, N. Y.

All doors will be of [metal clad construction] [kalamein construction, type .....].

These doors [will] [will not] bear the Underwriters' label.

Peelle Electric Inter-locks and Emergency Switch in the elevator car, will be furnished. Elevator will be [car switch controlled type] [double button type] [automatic push button type].

Physical connection of the inter-locking system wires to the elevator control board will be made by the elevator contractor. Door contractor is to have the free and continuous use of the running elevator car for the installation of his work. This contractor is to guarantee for two years, workmanship and material.

Standard Specifications for Counterbalanced Doors

To all openings in the freight elevator shafts, except as otherwise noted, furnish and install in complete working order Peelle Patented Counterbalanced Truckable Doors, as manufactured by THE PEELLE COMPANY, Brooklyn, N. Y.

(1) The hanger bar at the upper surface of the lower panel is to be reinforced and extended beyond the panel frame, to rest on solid adjustable stops riveted to the guide rails so that all weight is removed from the turnbuckles and chains when the door is opened, and to permit of continuous trucking upon the smooth sill thus formed. The door shall sustain a maximum load of .... pounds.

(2) (a) These doors are to be made of two thicknesses white pine covered with 24 gauge stretcher leveled galvanized steel sheets set and bolted into angle iron frames with reinforced corners, hung on ⅝-in. turnbuckle rods and special Peelle steel cable chain running over 4½-in. double race ball bearing pulleys, and operating on the inside of the hatch in anti-friction shoes working in substantial steel guides, or (b) These doors are to be made of two thicknesses of white pine covered with smooth kalamein iron tightly drawn, set and bolted into angle iron frames with reinforced corners, hung from ⅝-in. turnbuckle rods, and special Peelle steel chain running over 4½-in. double race ball bearing pulleys, and operating on the inside of the hatch on anti-friction shoes working in substantial steel guides. Each door is to be paneled as shown in Peelle Co. catalogue over Key number ..... Provision to be made for glazing as per detail.

(3) The door on the ....floor is to be arranged with a lock and key to enable it to be opened from the floor side; all other doors shall open from the shaft side only.

(4) All doors to be constructed and erected in accordance with the rules and regulations of the National Board of Fire Underwriters, the Factory Mutual Companies and all local boards having jurisdiction where conditions so permit.

(5) All doors are to be guaranteed by the sub-contractor against defects in workmanship and material for a period of two years from date of installation.

(6) (a) These doors are to be manual opening and closing, or (b) These doors are to be manually operated and equipped with electric interlocking devices manufactured by THE PEELLE COMPANY which shall prevent the elevator car from leaving the floor until all doors are first closed and locked. (If elevator is to be controlled by a pull-rope add the following sentence: Install in complete working order one Peelle Clutch in each elevator shaft, which is to grip the shipper cable when any door is opened.) Include emergency switch in elevator car. Physical connection of wires to elevator control board to be made by elevator contractor.

(c) These doors are to be arranged to operate manually in conjunction with double button, (automatic push button elevator). This contract is to include necessary observation lights in each door and electro mechanical interlocks so door may be operated only when car is at floor level. Cam for operation of electro mechanical interlock will be furnished and installed by THE PEELLE COMPANY.

(7) These doors are to be electrically operated by means of the Peelle Door Motor located in the elevator penthouse and push button switch installed in elevator car.

(8) Door contractor is to have the free and continuous use of the running elevator car for installation of his material.

(9) Web strap closers shall be supplied on all manually operated doors exceeding 6 ft. 6 in. in height.

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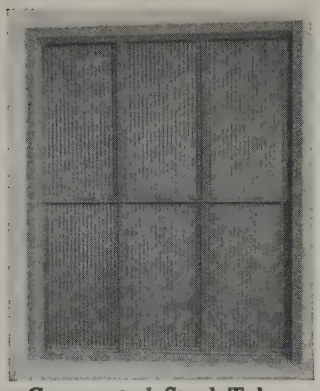
Peelle Corrugated Steel Tel-co Doors—Underwriters' Labeled



Corrugated Steel Tel-co Door

While there are many types of paneling in which Peelle Tel-co Doors may be had, for installation in freight elevator shafts, the corrugated steel type, Underwriters' labeled, is recommended to withstand average use. All corrugated doors of this type are reinforced with the patented T-bar traveling rail and dovetail binder shoes, one or more to the door, according to size. See preceding page for detail of T-bar traveling rail and dovetail binder shoes.

Construction—Labeled by the Underwriters' Laboratories, Inc., and the Factory Mutual Companies and acceptable to all State and labor departments, this door has been rendering long and uninterrupted service. The 18 gauge corrugated steel panels are framed with heavy T-iron which is further strengthened with vertical iron members at each side. Tel-co doors are operated over extra heavy steel rails in patented anti-friction steel shoes and counterweighted very evenly. Counterweight and enclosure of heavy steel is furnished with all doors. The bar-latch used on all Peelle Tel-co Doors is arranged to engage the rails at each jamb, thereby insuring perfect protection against illegal entry to the building when doors are installed at exterior entrance to elevator shafts, and for safety when doors are installed at interior elevator entrances.

Double Sprocketed Tel-co Sheaves

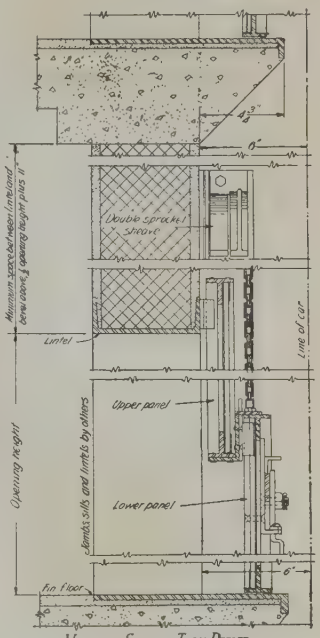
Clearances—If other than the corrugated steel panels are desired, please consult the Engineering Department before establishing jambs or headroom clearances.

It is necessary to allow clear travel space above the lintel of half the door height opening, plus 11 in. These figures apply only to doors whose width does not exceed the height, and where over-all sizes are not greater than 8 ft. in width and 8 ft. in height.

Double Sprocketed Tel-co Sheaves (Patented)—Illustration shows the ball bearing double-sprocketed sheave of heavy malleable iron in one piece. (Designed and patented by The Peelle Company.) The chain fastened to the lower panel is engaged by the large sprocket and connected to the counterweights on the other side of the rail.

The chain of the upper panel is run over the small sprocket and left to idle on the opposite side.

Lifting of the lower panel causes the large sprocket to revolve and the small sprocket which forms a part of the sheave also revolves, carrying with it the weight of the upper panel. The number of teeth in the gears are as two to one. Thus, both panels arrive at the lintel simultaneously.



Vertical Section Thru Peelle Medium Type Tel-Co Door

Note: Minimum return from face of jamb to sidewall of shaft is 8 in.

Outline Specifications—At openings (insert locations), furnish and install in complete working order, Peelle Standard Type Tel-co Doors manufactured by The Peelle Company, Brooklyn, N. Y.

These doors are to be constructed with [metal clad], [kalamein], [wood], [18 gauge corrugated steel] panels. Corrugated steel doors in elevator shafts only will bear the Underwriters' label.

Doors will be equipped with the Peelle Electric Interlocks and Emergency Switch in the elevator car. The elevator contractor will make the physical connection between interlocking system wires and the elevator control board.

All workmanship and materials will be guaranteed against defects for a period of two years.

Peelle Heavy Service Tel-co Doors

The heavy type Peelle Tel-co Door is recommended for use at driveway entrances, railroad sidings, entrances to buildings where provision is made for loading freight cars within the building, at piers and other conditions where door openings are unusually large, and quick and easy vertical operation is desired.

Both halves of the door travel upward simultaneously, the lower half moving twice as fast as the upper half, reaching the lintel of the opening together.

Each condition requires special engineering study. The doors operate manually, by means of a chain joist, winch hoist or motor.

For doors which will be constantly in use, the Peelle electric motor operation is recommended.

A switch, conveniently located, operates this type of door, permitting rapid handling of traffic.

In the installation of four Peelle Tel-co Doors in the Manhattan Storage and Warehouse Building Peelle engineers were called upon to assist in planning structural conditions necessitated by the problem of providing clearance for door operation upward, through and into the second floor to allow maximum headroom for entrance and exit on ground floor.

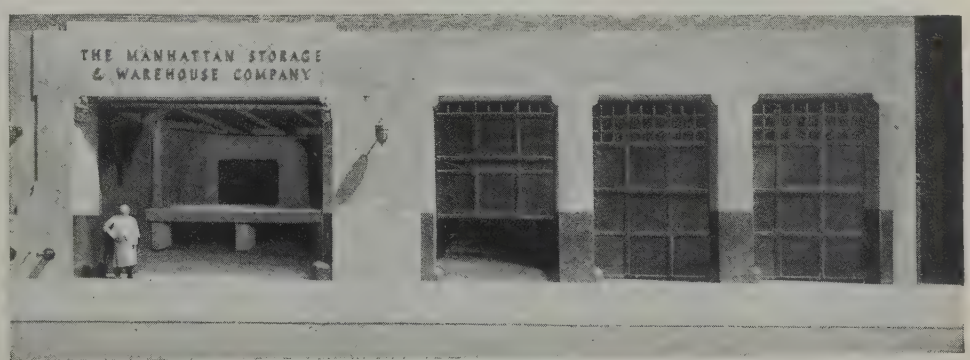
All four doors are operated from a central control point located conveniently over checking clerk's desk.

Construction Data—The doors are heavily constructed and will be furnished with wood or wood metal-covered panels, framed in heavy structural angle iron reinforced at the sides and operated in the Peelle patented anti-friction shoes over heavy steel guides.

Large sheaves, especially designed to increase the ease of operation, necessitates a clearance over the door opening lintel of one-half the height of the door plus 2 ft. 2 in.

Where the width of the door exceeds the height, additional return space at the jambs may be necessary for standard cast iron counterweights.

Interior View of Hand Operated Heavy Service Tel-co Doors
Installed in the Daniel Reeves Warehouse, New York, N. Y.



Exterior View of Four Motor Operated Tel-co Doors, Manhattan Storage & Warehouse Co., New York, N. Y.

RICHMOND FIREPROOF DOOR CO.

RICHMOND, IND.

Branch Offices and Agents with Sales, Erection and Service Facilities in 50 Principal Cities Throughout the United States, including

NEW YORK, N. Y.	LOS ANGELES, CAL.	PHILADELPHIA, PA.	CINCINNATI, OHIO	MINNEAPOLIS, MINN.
CHICAGO, ILL.	SAN ANTONIO, TEX.	CLEVELAND, OHIO	LOUISVILLE, KY.	SYRACUSE, N. Y.
BALTIMORE, MD.	ST. LOUIS, MO.	BOSTON, MASS.	MIAMI, FLA.	PITTSBURGH, PA.
TAMPA, FLA.	WASHINGTON, D. C.	ATLANTA, GA.	CHARLOTTE, N. C.	RICHMOND, VA.
KANSAS CITY, MO.	MILWAUKEE, WIS.	HARRISBURG, PA.	DETROIT, MICH.	BUFFALO, N. Y.

Products

Richmond Fireproof Door Co. has been engaged continuously for thirty-seven years in the manufacture, sale and erection of the following products:

Fire Doors: Tin clad, corrugated iron, kalamein and steel plate.

Counterbalanced Freight Elevator Doors: Tin clad, corrugated iron, kalamein, wood and steel plate.

Bi-folding, Single Slide-up, Telescoping, Turnover, Double and Single Swinging and Sliding Doors made of all the preceding materials for industrial purposes.

Storage Room Units.

Kalamein Frames, Trim, Casings, Mouldings and Smoke Screens.

Richmond Rolled Steel Combination Bucks and Trim.

Also Electric Interlocks.

All of the preceding products are labeled when permissible under the regulations of the Underwriters' Laboratories, Inc., Chicago.

This Company manufactures every type of Fire Retardant Door except hollow metal and rolling steel curtains.

Kalamein doors may be finished shop coat or durable baked enamel, plain color or wood grained. We use the term "kalamein" in its modern sense—metal covered. Our metal is patent leveled galvanized stock. Specify *galvanized* sheet—it lasts.

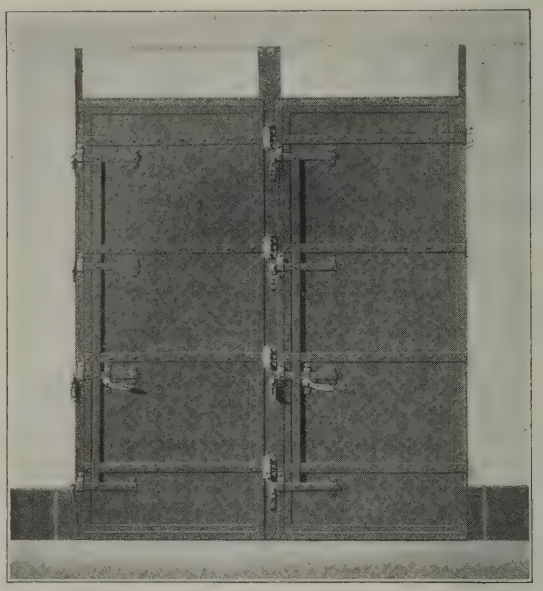
Fire Doors

The three illustrations show the swinging and sliding corrugated iron fire doors and storage room steel plate door, all being labeled by the Underwriters Laboratories, Inc.

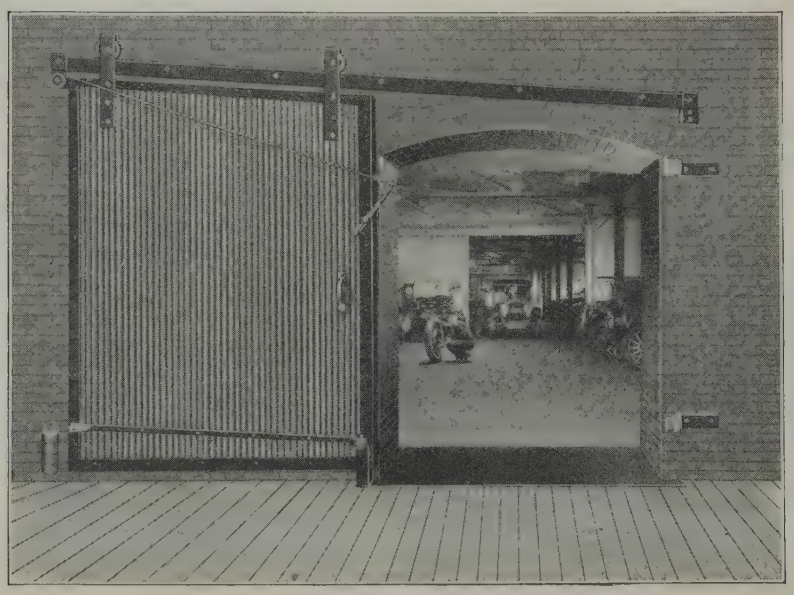
The relative appearance of the doors is clearly shown. The corrugated iron doors may have wickets. The swinging type may be single or in pairs, to lap the openings or to close into wall frames, to suit all conditions and openings, and may be labeled for all situations similar to tin clad doors. They may have glass panels for Class C and D openings.

The steel plate doors are labeled for storage room openings only.

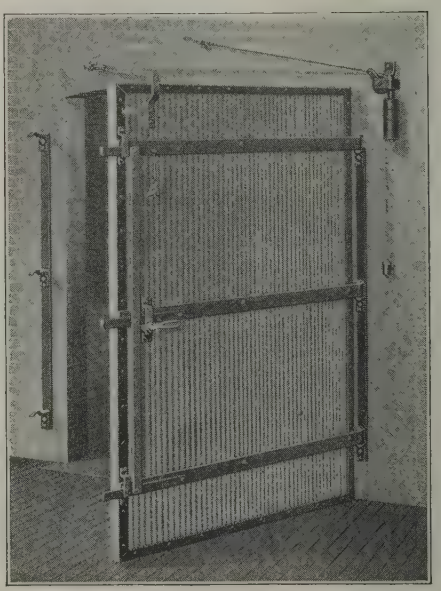
Write for catalogue—it contains a full description of the various types with useful information regarding layout and clearances.



Steel Plate Storage Room Door



Corrugated Iron Sliding Fire Door



Corrugated Iron Swinging Fire Door

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Elevator and Dumbwaiter Doors

Counterbalanced elevator doors are now universally preferred for freight elevator shafts because they are installed entirely on the inside of the shaft and do not encroach either on floor space or car platform. They provide maximum clear opening.

The door is divided into two equal sections, one half sliding up and the other half sliding down. The guides are bolted to the wall or opening frame.

Vertical telescoping doors are similar in design except that both halves slide upwards, the lower section traveling twice as fast as the upper.

For these types, regular installation requires a distance from floor to floor of one and one-half times the opening height, plus 9 in. for counterbalanced, and 24 in. for vertical telescoping doors, respectively. For limited floor heights the counterbalanced door may be furnished in pass type construction.

Corrugated iron vertical telescoping and counterbalanced doors of the tin clad, kalamein or corrugated iron construction may be labeled by the Underwriters. Both types may also be made of wood for exterior openings or shipping platforms, but are not labeled.

Operation may be manual, semi-automatic closing or electric interlocking.

Vertical telescoping doors are especially adapted to use for shipping platforms or garage and similar openings.

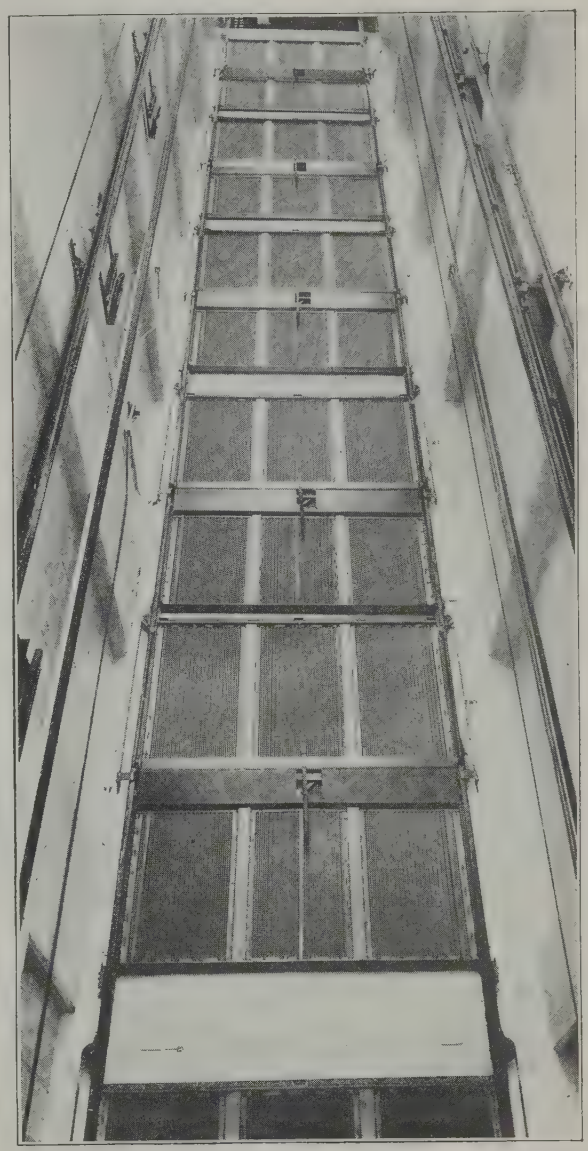
Both types require approximately 8 in. side room each side, but the telescoping door, being counterweighted, needs in addition space at both sides for 8x8-in. weight box.

Richmond counterbalanced doors are furnished with roller or ball bearing sheaves as may be desired, vision panels of labeled construction, if specified, and all modern improvements.

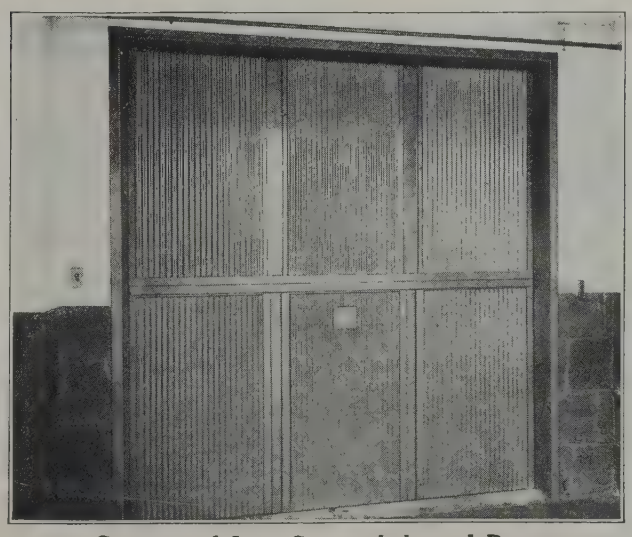
The upper rail of the lower section of the door is so reinforced and constructed that when the door is open a "bridge" is formed between the car and the building sill and, like a bridge, the span is supported at each end by substantial parts of the door assembly. This "bridge" provides a smooth trucking surface over the door.

Richmond counterbalanced dumbwaiter doors, kalamein, tin clad or steel plate, are similar in design and operation, but adapted to dumbwaiter shaft use. They require only 3 in. at each side.

Our catalogue gives all details of construction including shaft space requirements. Let us place a copy in your files.



Corrugated Iron Counterbalanced Doors in Shaft



Corrugated Iron Counterbalanced Door

Tin Clad Counterbalanced Doors

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Industrial or Warehouse Doors

Richmond horizontal bi-folding doors are widely used for driveways and shipping platforms. Built in two sections, this door folds along horizontal meeting rails at the center, in jack-knife form, and rises upward, leaving a clear opening. The turnover door, made in one piece and adapted to the smaller size openings, operates in somewhat similar fashion, turning up inward overhead. For the two types, a space of 6 in. is required inside of one jamb and 16 in. inside the other jamb, with clear headroom varying according to weight and size of door. While the latter may be as little as 12 to 15 in., the efficient operating minimum is 24 in.

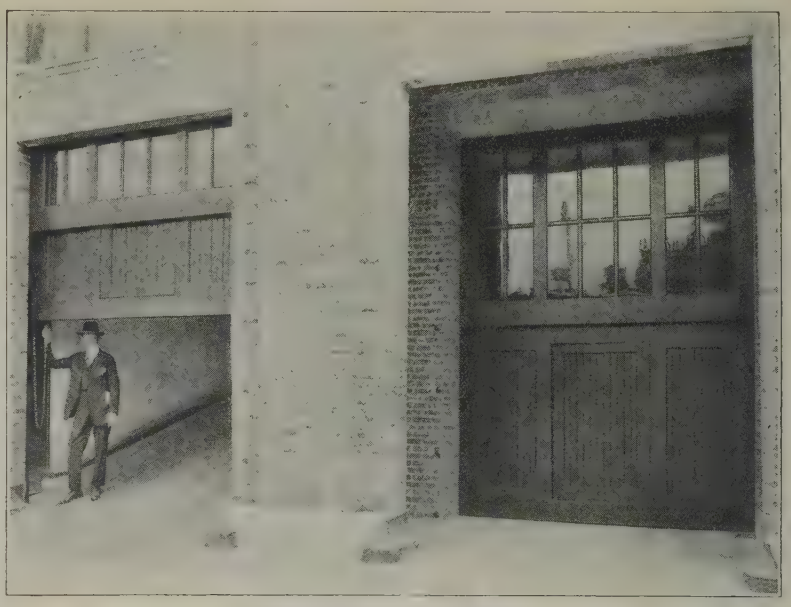
The telescoping or two-piece slide-up door, also in wide use for driveway and shipping platform openings, was described in connection with counterbalanced doors on the preceding page.

All types of doors may be had in wood, kalamein, tin clad, corrugated iron or steel plate, and all may be paneled for glass to permit the access of light, irrespective of material. In addition, we manufacture single and double swinging, sliding, side-folding and single-piece slide-up doors, for industrial purposes, of all the materials mentioned.

Hardware for all these doors, as well as that for fire doors and counterbalanced doors, is manufactured by us in our own factory, being of exceptionally sturdy and attractive design.

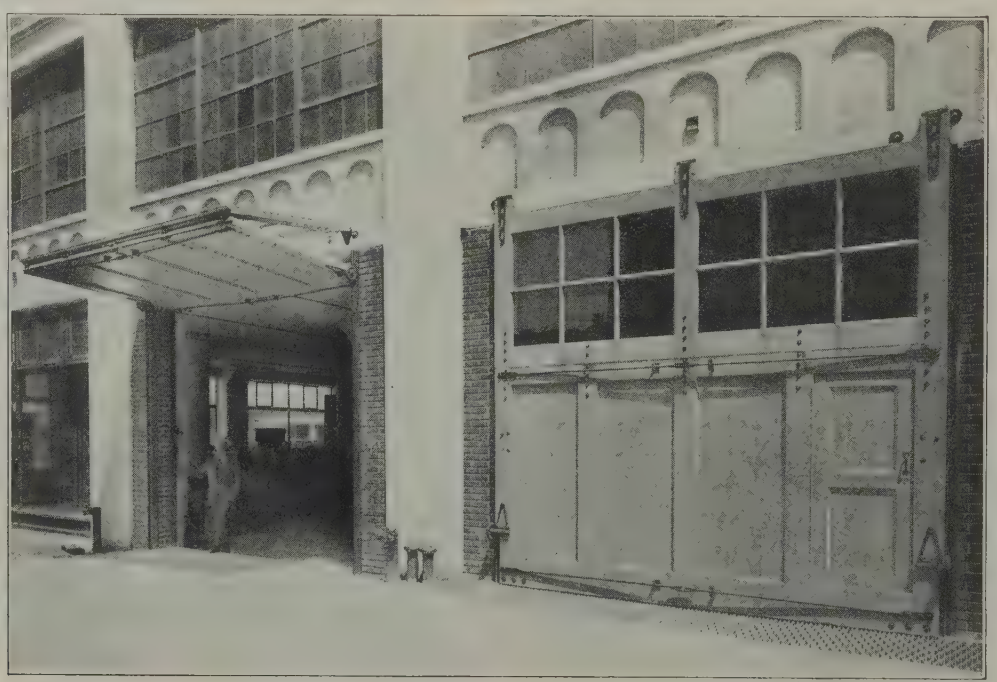
Industrial doors are described, together with suggestions as to the appropriate use of the different types, in a special pamphlet which we will be pleased to mail you.

The new Richmond patented *fire-panic* type handles for application to regular triple latches operate with direct, easy, horizontal push and pull, speeding up use of openings in congested factories. Sure locking and easy opening, they are a truly modern type of fire-door hardware operating handles. Specify them exclusively.



Wood Telescoping Doors

Wood Turnover Door



Kalamein Bi-folding Door (Outside Construction)

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Kalamein Doors

Richmond kalamein doors are covered with No. 26 and No. 24 gauge galvanized patent leveled special door stock—the highest grade material in use in the trade. All work is die drawn in accordance with the usual architectural specifications. Grades heavier than No. 24 gauge are practically always brake formed.

All wood used is thoroughly dried in our own kilns.

We have dies for an unusually large variety of casings and mouldings. Kalamein frames and trim, or combination pressed steel bucks, can be provided with doors. Doors are available with a wide range of panel arrangement and may be labeled within limitations set by the Underwriters.

Our Catalogue contains illustrations of paneling types, moulding shapes, standard specifications, details of construction and other valuable information.

Richmond kalamein frames are formed upon cores rabbetted from one solid piece of wood, and casings, mouldings, etc., are of solid wood lengths up to standard sizes. No piecing or patching is permitted.

For elevator enclosures, our doors are specially reinforced at the head to receive hardware when appropriate.

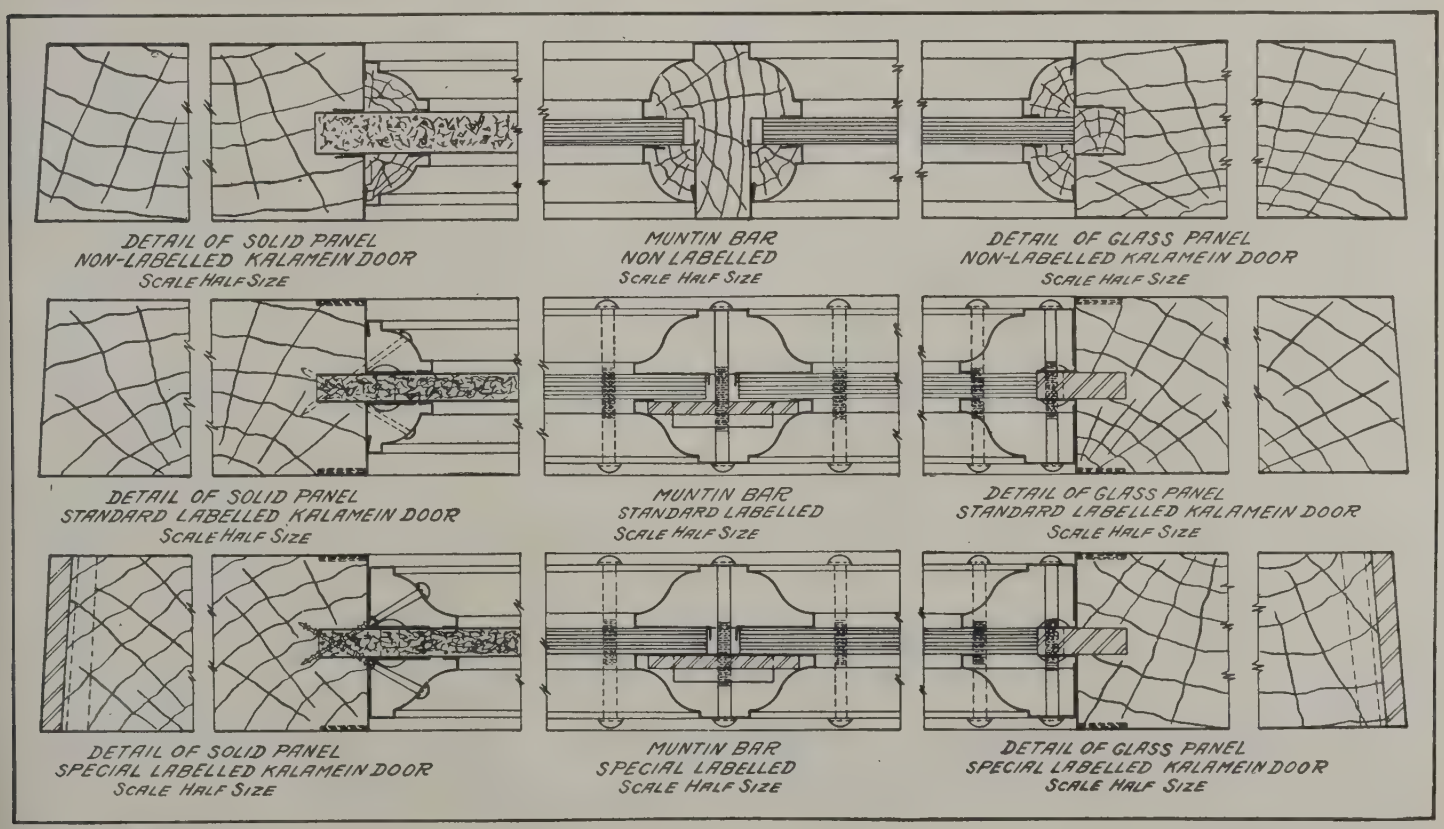
Durable baked enamel, plain color or wood grained, is applied in our own ovens, when desired.

Particular attention is drawn to the Richmond special labeled kalamein door, which is manufactured with a steel edge underneath metal covering and a fireproof metal lock box. This door is furnished only when definitely specified.

Richmond Fireproof Door Co. is prepared to furnish when desired, special Underwriters' labeled finished hardware completely installed in doors.

Kalamein Faced Counterbalanced Door

Kalamein Door and Partition



Continued on next page

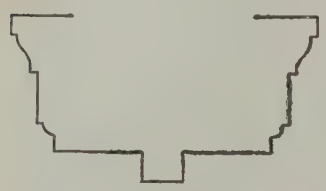
Richmond Rolled Steel Combination Bucks and Trim

Richmond rolled steel combination bucks and trim are distinguished by a new beauty and sharpness of line, made possible through the use of rolled steel from our recently installed, specially designed machinery. They can be furnished in handsome imitation natural wood baked enamel finishes, either oak, walnut or mahogany.

The three standard types—A, B and C—as shown by detail drawings on the following page, provide for most interior door openings. Combinations of Types B and C frames are readily utilized for sliding elevator door openings.

Richmond rolled steel combination bucks and trim are easily and neatly prepared at the factory to accommodate transoms; side or borrowed light frames, attached to the Richmond rolled steel combination bucks and trim, can be furnished when desired.

An angle iron strip may be attached across the bottoms of frames to keep the frames from spreading or buckling. These spreader stays save installing time, for the frames are held firmly, square and plumb, requiring little or no leveling after setting up. Doors are more easily hung and fit more perfectly on frames thus set.



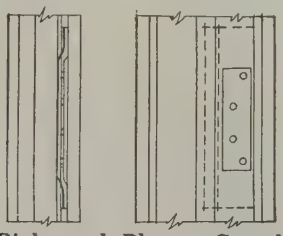
Note the Clean Sharp Lines

Underwriters' label service may be furnished on frames for openings up to 3x7 ft. in size.

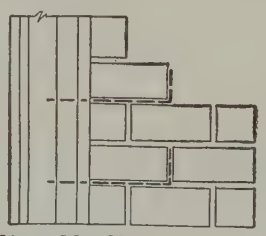
Richmond Construction Features—At all hinge and striker plate locations steel reinforcements are spot-welded to the inner surfaces of the jambs. Holes are accurately drilled with templates through these reinforcing plates at the factory, providing for the rapid attachment of the hardware.

Plaster guards of No. 26 gauge galvanized steel are welded inside of the reinforcing plates to protect the screwholes from mortar and plaster. This saves time in the attachment of the hardware.

Adjustable T-shaped sliding anchors, made of No. 16 gauge stock, are furnished with Richmond rolled steel combination bucks and trim. These anchors can be set wherever desired between courses of a masonry wall as the wall is built. The anchors require no adaptation of plan, yet bond the frames solidly to the finished wall.



Richmond Plaster Guards



Adjustable Sliding Anchors

Richmond Service—When your plans call for special frames you are invited to consult our engineers; they will be glad to co-operate in working out the designs for special frames or shapes. Our years of experience in this special field may be of value to you.

With the recent installation of the very latest type of rolling machinery we are now equipped to handle large contracts very efficiently.

We also maintain facilities for erecting Richmond rolled steel combination bucks and trim on any job where desired.

The branch offices and agents, with sales, erection and other service facilities, which we maintain in 50 principal cities throughout the United States, will be pleased to co-operate with you in every way; they have samples of Richmond rolled steel combination bucks and trim ready for your inspection.

Specifications for Rolled Steel Combination Bucks and Trim

The contractor shall furnish and install Richmond Rolled Steel Combination Bucks and Trim, as manufactured by the Richmond Fireproof Door Co., of Richmond, Ind., for all interior door openings (excepting those door openings otherwise noted on drawings or specifically mentioned hereinafter).

Note: The types of Richmond rolled steel combination bucks and trim are designated on the drawings by the symbols A, B and C, corresponding to similar symbols used by the manufacturer to identify the three basic types of frames.

Types and Sizes—***Openings Trimmed Both Sides***—For openings which are to be trimmed on both sides, Type A frames shall be used in 4½, 5½, 6½, 7½ and 8½-in. widths for 3, 4, 5, 6, 7, and 8-in. partitions, respectively. The plaster returns shall be of proper dimensions to meet the particular building conditions. The rebates shall be of uniform width for all frames but with variations, as required, in the widths of the rebate stops.

Openings Trimmed One Side, No Rebates—For openings which are to be trimmed on one side only, and for which no rebates are necessary, Type B frames shall be used in 3½, 4¾, 5¾ and 6¾-in. widths, as the respective openings may require. The plaster returns shall be of proper dimensions to meet the particular building conditions.

Openings Trimmed One Side, with Rebates—For openings which are to be trimmed on one side only, and for which rebates are necessary, Type C frames shall be used in 6¾, 7¾, 8¾, 9¾ and 10¾-in. widths, as the respective openings may require. The plaster returns shall be of proper dimensions to meet the particular building conditions.

Elevator Door Openings, etc.—For sliding door elevator openings, and elsewhere as noted on drawings, combinations of Types B and C frames shall be installed in widths to properly meet the requirements of the respective openings.

Construction—***Material***—All frames shall be made of No. 16 gauge cold rolled steel, with all angles, moulds, returns and miters neatly made and maintained in true alignment.

Reinforcing for Hardware—At the hinge and ock locations ⅛x1¾x12-in. reinforcing plates shall be spot-welded to the inner surfaces of the jambs; No. 26 gauge galvanized plaster guards shall be welded to the jambs in such manner as to prevent mortar and plaster from contact with the reinforcing plates, and to keep the screwholes free and clean for hinge and strike plate connections. The holes shall be drilled and tapped at the factory, making the frames ready for the attachment of the finish hardware.

Note: Templates for this purpose to be furnished to this contractor by the hardware contractor promptly upon request.

Slip Anchors and Sill Clips—Sufficient slip anchors shall be provided with each frame to permit anchoring each jamb (including head if desired) at intervals not to exceed 2 ft. The base of each jamb

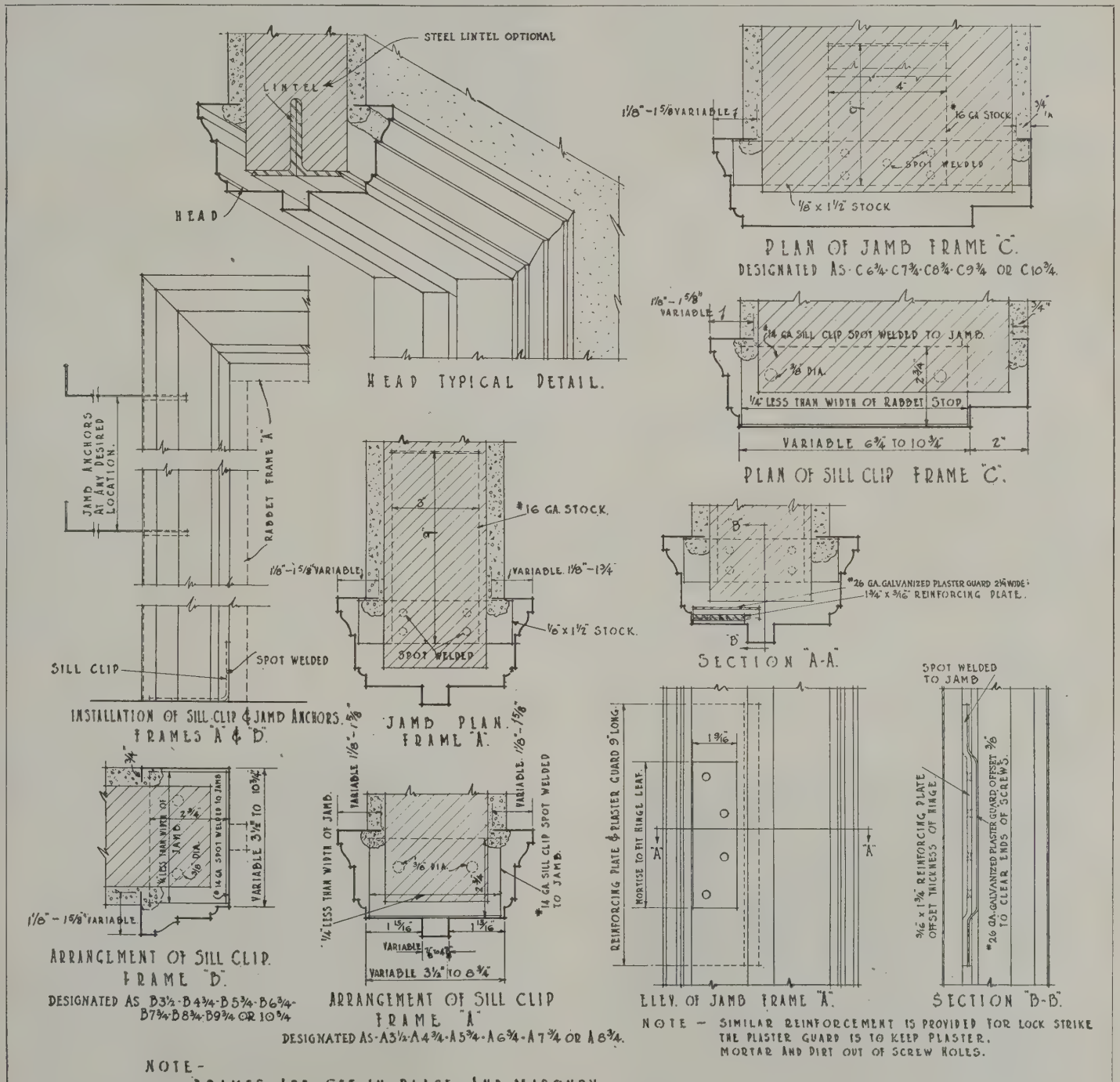
Continued on next page

shall be provided with a sill clip, welded to the jamb and punched with two 3/8-in. holes to facilitate anchoring to the floor construction. The form and construction of these anchors and sill clips shall be as shown and described by the manufacturer for the respective types of frames included in this specification.

Painting—All concealed and exposed surfaces of frames shall be given a good prime coat of rust-resisting paint at the factory prior to shipment.

Trim and jamb surfaces which are to remain permanently exposed shall have applied at the factory [oak] [walnut] [mahogany] imitation natural wood baked enamel finish.

Erection—All frames shall be set in their proper places in the building prior to the erection of the adjacent partition work; frames shall be securely anchored to the floor construction by means of screws or expansion bolts through the sill clips, as the nature of the floor construction may require. Each frame shall be set true and plumb and shall be securely braced and so maintained by this contractor during building operations. The slip anchors shall be inserted in the frames at proper intervals and built into the adjacent partition work during construction. At completion each frame shall be plumb, in true alignment, clean and rigid, ready for the attachment of hardware.



Construction Details, Types A, B and C, Richmond Rolled Steel Combination Bucks and Trim

SECURITY FIRE DOOR CO.

Counterbalanced Truckable and Other Fireproof Freight Elevator Doors

3036-3048 Lambdin Avenue, ST. LOUIS, MO.

AGENCIES

AKRON, OHIO, 429 Ohio Building
ALBANY, N. Y.
ATLANTA, GA., 101 Marietta Street
BALTIMORE, MD., Maryland Avenue and 22nd Street
BIRMINGHAM, ALA., 1008 Martin Building
BOSTON, MASS., 333 Washington Street
BUFFALO, N. Y., 382 Michigan Avenue
CHARLOTTE, N. C., 408 Builders Building
CHICAGO, ILL., Room 618, 612 No. Michigan Avenue
CINCINNATI, OHIO, 534 Main Street
CLEVELAND, OHIO, 308 Euclid Avenue Building
COLUMBUS, OHIO, 975 West Goodale Street
DALLAS, TEX., 401 Construction Industries Building
DENVER, COLO., 1199 Stout Street
DES MOINES, IOWA, Hubbell Building
DETROIT, MICH., 1758 Penobscot Building
GRAND RAPIDS, MICH., 429 Houseman Building
HOUSTON, TEX., 929 Electric Building
INDIANAPOLIS, IND., 119 West Norwood Street
KANSAS CITY, MO., La Salle Building
KNOXVILLE, TENN., Holston Bank Building
LANSING, MICH., 410 West Saginaw Street
LITTLE ROCK, ARK., Riegler Building
LOS ANGELES, CAL., 1931 S. Los Angeles Street
LOUISVILLE, KY., 128 East Main Street
MEMPHIS, TENN., 229 Madison Avenue
MILWAUKEE, WIS., 1311 Majestic Building
MINNEAPOLIS, MINN., 700 Builders Exchange
NASHVILLE, TENN., 1033 Hamilton Avenue
NEW ORLEANS, LA., 319 Dryades Street
TORONTO, CAN., Union Trust Building
NEW YORK, N. Y., 452 Tenth Avenue
NORFOLK, VA., Citizens Bank Building
OKLAHOMA CITY, OKLA., 705 Colcord Building
OMAHA, NEB., 511 Baum Building
PHILADELPHIA, PA., 1215 Frankford Avenue
PITTSBURGH, PA., 523 First Avenue
PORTLAND, ORE., 247 Fifth Street
ROCHESTER, N. Y., 52 Brown's Race
ST. PAUL, MINN., 903 Builders Exchange
SAN ANTONIO, TEX., 303 Builders Exchange
SAN FRANCISCO, CAL., 534 Sixth Street
SCRANTON, PA., 317 Madison Avenue
SEATTLE, WASH., 314 Seneca Street
TAMPA, FLA., 230 Allied Building
TOLEDO, OHIO, 901 Water Street
WASHINGTON, D.C., 315 Investment Building
WICHITA, KAN., Brown Building

Products

"Sec-Tel" Corrugated, Metal Clad and Kalamein Two-section Slide-up Freight Elevator Door.

"Seco" Corrugated, Metal Clad and Kalamein Counterbalanced Freight Elevator Door.

"Horifold" Warehouse, Freight House Shipping Platform and Garage Door.

"Vertel" Corrugated Warehouse, Freight House and Shipping Platform Two-Section Slide-up Door.

"Seco" Door Electric Interlocks.

Also Dumbwaiter Doors for department stores, hotels, hospitals, restaurants and factories.

Underwriters' Approval

All "Sec-Tel" and "Seco" freight elevator doors are inspected and labeled by the Underwriters' Laboratories, Inc., and the Factory Mutuals, when so desired, provided they are within the size limits that permit labeling: viz., 8x10 ft.

The services of our Engineering Department, as well as those of our representatives in all the leading cities of the United States are at your disposal in solving door problems.

Write for Catalogue "C" covering our "Horifold" and "Vertel" doors, or for Catalogue "D2," giving complete information about our "Sec-Tel," "Seco" and dumbwaiter doors.

"Seco" Counterbalanced Freight Elevator Doors

"Seco" doors are of the *truckable* counterbalanced type, being made in two sections, which slide in opposite directions on the shaft face of the wall. The sections are of equal weight, evenly counterbalancing each other, eliminating all counterweights.

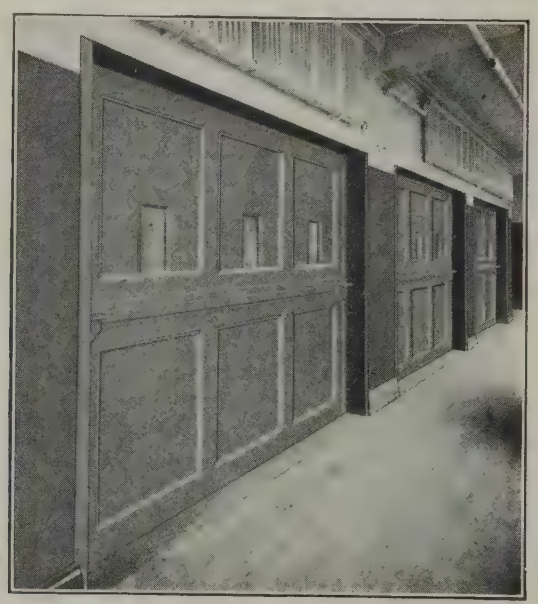
"Seco" doors can be furnished with metal clad, kalamein or corrugated steel panels.

"Seco" doors are provided with heavy steel angle or *tee trucking bars*. The *trucking bars* form the top edge of the lower section and are supported in *perfect alignment* with the opening or floor sill when the door is in the open position by means of heavy *angle trucking bar supports* at each end of the trucking bar.

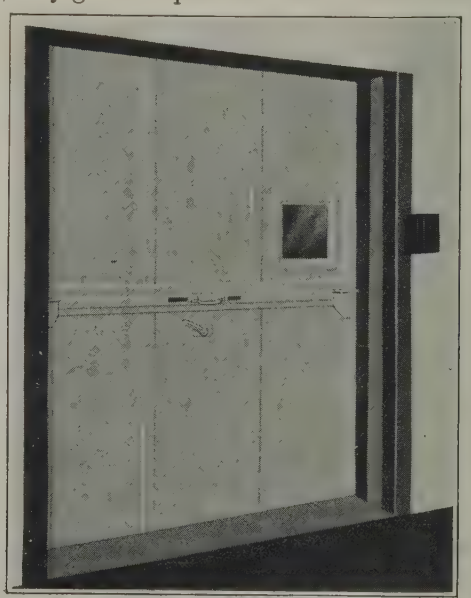
These sill or trucking bar supports rest on the solid opening sill, require no adjustment, and always remain in the same permanent position. The supports are designed to act as gusset plates in the upper corners of the lower section, reinforcing it and securely joining the section frame to the trucking bar.

"Seco" doors are hung with heavy adjustable chain rods and cable chain operating over large double race ball bearing sheaves.

No safety gates required when "Seco" doors are used.



Kalamein "Seco" Door Installation



Room Side of Type M-6 "Seco" Door
Arranged for room side operation in connection with double button elevator

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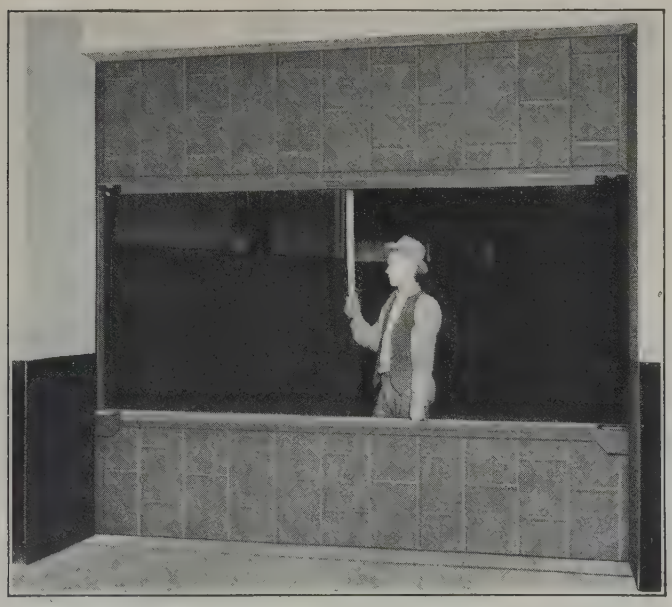


Large Metal Clad "Seco" Door—Partly Open

"Seco" Door Construction

Metal Clad Panels—These doors are constructed of two thicknesses of white pine, and covered on both sides with fire door terne plate or flat galvanized sheets, and securely bolted into heavy angle frames.

Kalamein Panels—These doors are constructed of white pine cores, paneled on the room side, flush on the shaft side. Room side of panels is covered with smooth kalamein iron, glued to the core, and has drawn steel mouldings around panels fastened in place so that no nail or screw heads show.

The shaft side of doors is covered with flat galvanized steel sheets. All seams between stiles and rails are clipped, filled with solder and ground smooth.

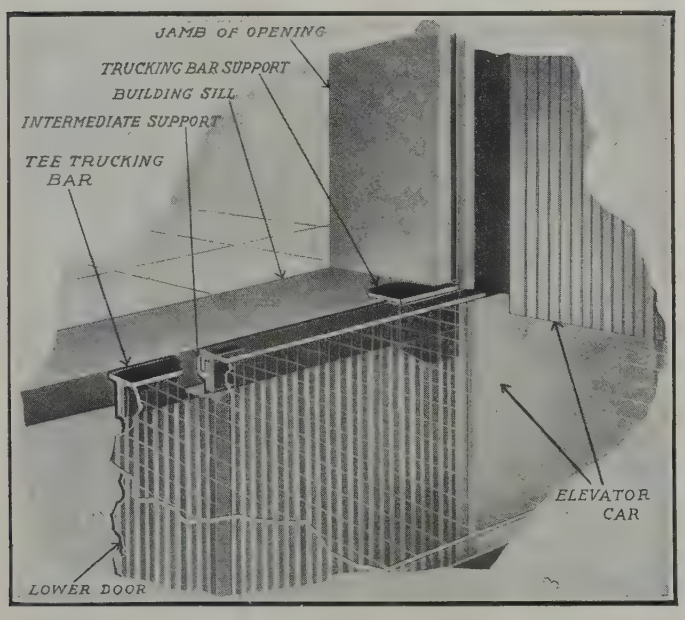
Corrugated Steel Panels—These doors are made of corrugated steel sheets riveted into angle frames forming door sections, and are stiffened vertically with flat steel reinforcing bars.

Adjustable Shoes (Patented)—"Seco" Doors are equipped with patented adjustable shoes. These eliminate friction and permit adjustment to reduce side play between the doors and guides caused by wear and spreading of guides.

Space Requirements—Schedule below should be consulted in order to determine highest opening obtainable in certain story heights for Regular and Pass Type "Seco" doors.

Also note other space requirements to insure a perfect installation.

When story heights are such that Regular Type "Seco" doors can not be used for opening heights desired, Pass Type "Seco" doors should be used.

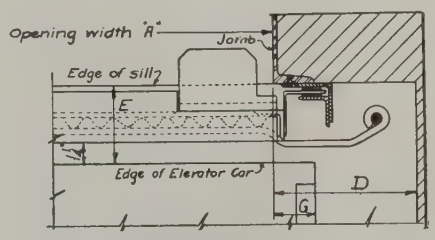


"Seco" Door with Self-Aligning Trucking Bar Support
Note that trucking load is supported by opening sill
Angle trucking bars are used on metal clad doors

SCHEDULE OF MAXIMUM OPENING HEIGHTS "SECO" DOORS
For Various Floor Heights

Opening height "B" ft.	Opening height "B" in.	Minimum "C" for regular type ft.	Minimum "C" for regular type in.	Minimum "C" for pass type ft.	Minimum "C" for pass type in.
6	0	9	9	7	6
6	6	10	6	8	0
6	8	10	9	8	2
6	10	11	0	8	4
7	0	11	3	8	6
7	6	12	0	9	0
8	0	12	9	9	6
8	6	13	6	10	0
9	0	14	3	10	6
9	6	15	0	11	0
10	0	15	9	11	6

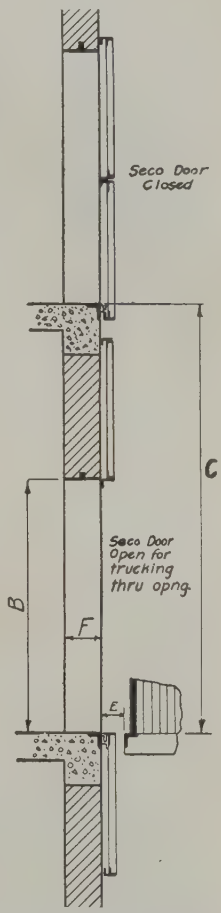
Note: Minimum "C" for Regular Type doors can be slightly decreased in special cases. Consult factory.



Plan of Shaft at Jamb—Regular Type "Seco" Door

CLEARANCE REQUIRED FOR "SECO" DOOR

Corrugated "Seco" Door	D, in.	E, in.
Regular type	7 1/2	4 1/4
Pass type	7 1/2	5 1/2
Metal Clad "Seco" Door	**D, in.**	**E, in.**
Regular type	7 1/2	4 1/2
Pass type	8	6 1/2



Section Through Opening Showing Regular Type "Seco" Door

"Seco" Door Interlocks (Patented)

"Seco" Doors when equipped with Security Patented Electric Interlocks provide maximum protection against fire and accident.

Security Electric Interlocks are especially designed for vertically sliding doors and have been approved by the Underwriters and various State and municipal departments, assuring low casualty insurance rates.

Security Electric Interlocks are used with electric elevators, are attached to each door and are connected in series to the elevator control board, so that the elevator can not be operated until all doors in the shaft are closed and contact is made in the door interlocks.

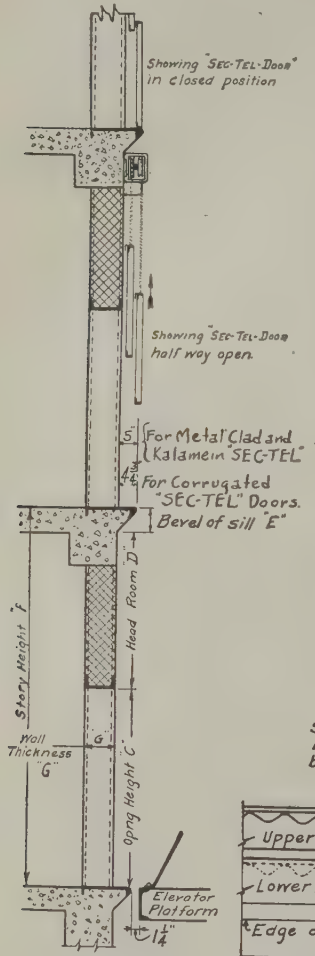
Specify Type "C" or Type "D" Interlocks for car switch controlled elevators, Type "DL" Interlocks for "push button" or "double button" operated elevators.

Send for a copy of Catalogue "D2."

Continued on next page

"Sec-Tel" Door

The "Sec-Tel" door is a two-section slide-up or vertical telescoping elevator door with corrugated steel, metal clad or kalamein panels. It permits the use of the permanent building sill for trucking over on to the elevator car. It operates in double guides, the lower half traveling twice as fast as the upper, so that as the lower section is raised, both sections are simultaneously set in motion and reach the lintel of the opening at the same time, giving a perfectly clear opening. The use of double race ball bearing sheaves and antifriction door guides assures ease of operation.



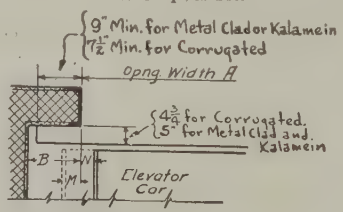
Section Through Opening Showing "Sec-Tel" Door Space Requirements

SCHEDULE OF OPENING HEIGHTS "SEC-TEL" DOORS

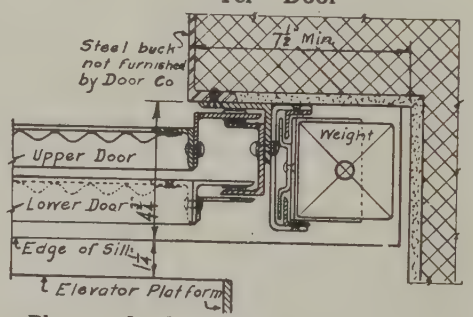
For Various Floor Heights Allowing 4 in. for Bevel "E" of Sill

Opening height "C" ft.	Opening height "C" in.	Minimum headroom "D" ft.	Minimum headroom "D" in.	Story height "F" ft.	Story height "F" in.
6	0	3	5	9	9
6	6	3	8	10	6
6	8	3	9	10	9
6	10	3	10	11	0
7	0	3	11	11	3
7	6	4	2	12	0
8	0	4	5	12	9
8	6	4	8	13	6
9	0	4	11	14	3
9	6	5	2	15	0
10	0	5	5	15	9

Note: Space "D" for metal clad or kalamein "Sec-Tel" doors should be increased 6 in. if possible.



Plan of Shaft at Jamb—"Sec-Tel" Door



Plan at Jamb—Corrugated "Sec-Tel" Door

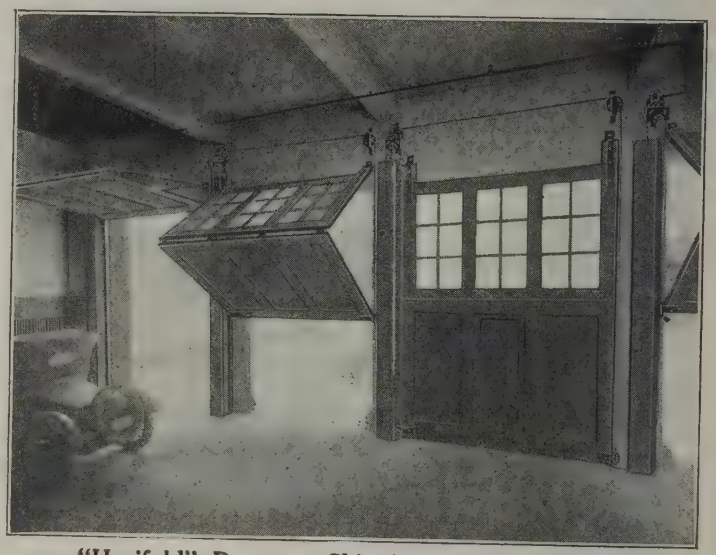
Kalamein and metal clad doors require 9-in. space at sides and 5-in. projecting sills

Corrugated "Sec-Tel" Door

"Horifold" Door

The "Horifold" door is a horizontal folding-up door, and can be made of wood, corrugated steel, tin clad or paneled wood metal covered sections. "Horifold" doors are suited for shipping platforms of warehouses, factory buildings, freight houses and garages.

"Horifold" doors are of rigid construction, operate with ease, and are unexcelled for withstanding severe weather conditions.



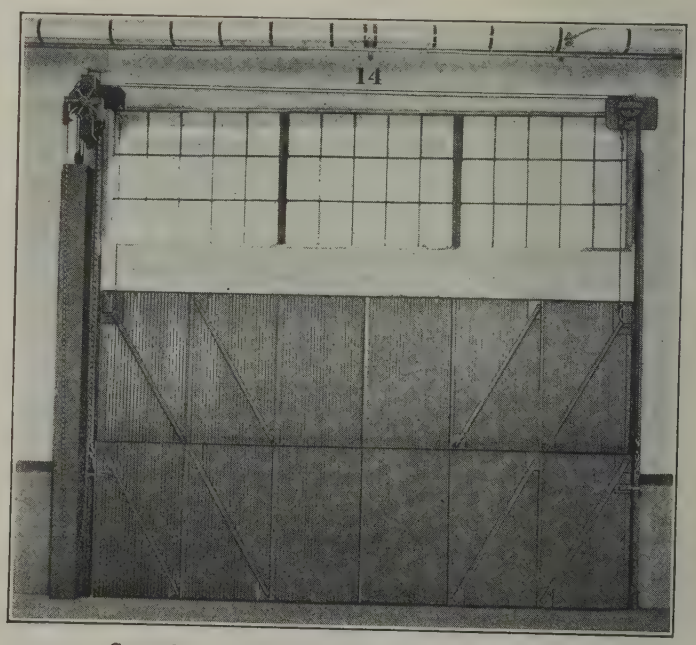
"Horifold" Doors to Shipping or Garage Space

"Vertel" Door

"Vertel" doors are made of corrugated steel sheets riveted into angle frames. They can be arranged for glass in upper half to admit light, and with a wicket door in lower section.

"Vertel" doors are made in two sections, both of which travel upwards; the lower section traveling twice as fast as the upper section, reaching the lintel of the opening at the same time.

"Vertel" doors permit storage of material within a few inches of the door without affecting its operation.



Security "Vertel" Door (Interior View)

Used for shipping platform and freight house openings. Above door is used on opening 16x9 ft. showing both door sections solid

QUINCY ELEVATOR GATE COMPANY

Manufacturers of Power Operators for Elevator Doors and Gates

TIFFIN, OHIO

Products

FREIGHT ELEVATOR DOOR OPERATORS for opening and closing landing gates, counterbalanced doors, telescoping fire doors, steel rolling doors and riding car gates.

FREIGHT ELEVATOR GATES.

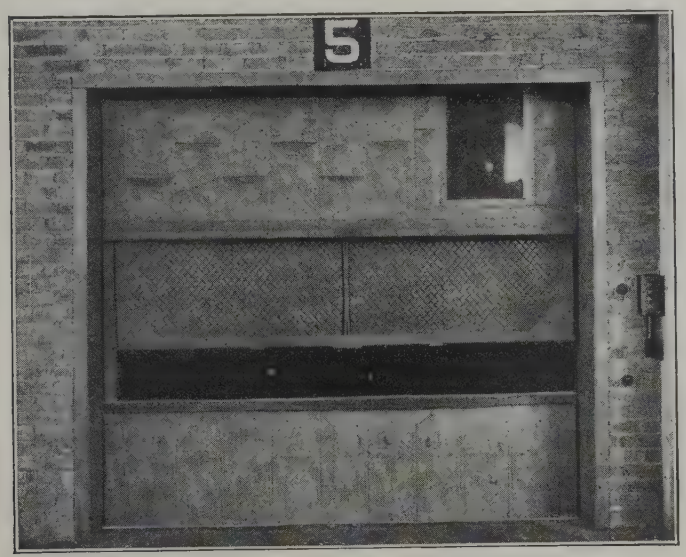
Also manufacturers of Operators for opening and closing garage doors and steel rolling entrance doors.

Recommendations

Recommendations on power operators cheerfully furnished for any project. With thirty years' experience as elevator gate and operator manufacturers, we are pioneers in this specialized line of activity.

Quincy Door Operator

The annunciator informs the elevator operator of the stop to be made. When reaching that floor he releases his elevator control switch handle and the doors open automatically. The operator can at all times instantly stop the doors while opening or closing by pressing "Stop" button.



Door Partially Opened (Riding Car Gate Is An Optional Feature)
Lift rods and operating device inside of hatch

In addition to automatic opening device, there is a three-button station on the car marked "Open," "Close" and "Stop" and a duplicate station in a locked box at outside of hatch wall at any one designated floor.

Quincy Friction Grip System for Power Operation of Counterbalanced Elevator Doors

The Quincy Friction Grip System has two 5/8-in. round rods (one on each end of the door) connected to cables which pass over drums in the penthouse. Doors remain evenly balanced. Any one or more doors can be quickly changed to manual operation, remaining doors can continue to be operated by electric machine.

Door Device and Lock—To each side of the top door section a friction block is attached by means of a 3/8x3½-in. flat bracket.

A friction block can only engage with the vertical rod when the car is at its landing; thus the vertical rods slip through the open friction blocks on the other doors.

The combination lock and interlock is mechanical in operation and positively prevents operation of the elevator when any door is opened or unlocked.

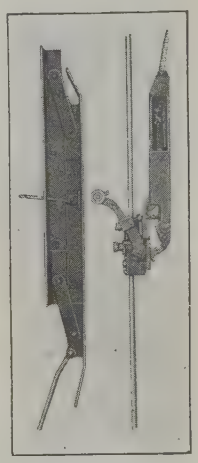
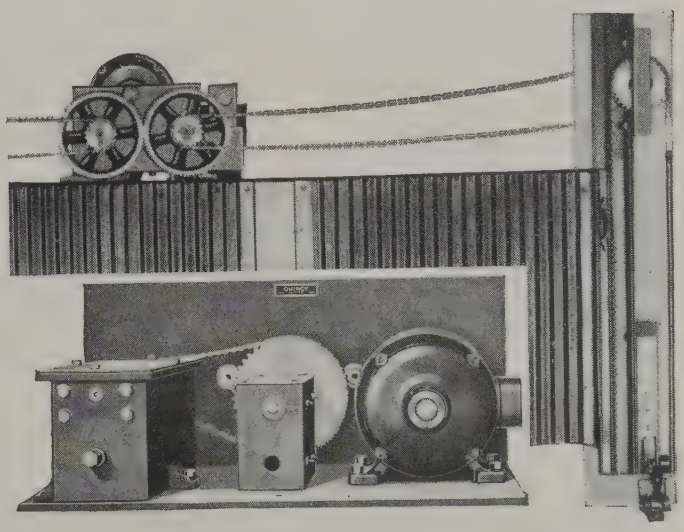


Fig. 4. Retiring Cam on Car; Friction Block on Door; Lock on Door Guide



Individual Machine System
An alternate for the Quincy Friction Grip System on elevators having three or less openings in a single line

Other Equipment

We manufacture the following standardized operating equipment—

Friction Grip System
Individual Machine System
Universal Lift Bar System
Two-rod Gravity System
Car Head Beam System
Riding Car Gate Operators

ESTABLISHED 1846

CORNELL IRON WORKS, INC.

Steel Rolling Shutters and Doors; Underwriters' Labeled Fire Doors and Shutters

TELEPHONE
STILLWELL 3880, 3881
3882, 3883

36-20 13th Street (Marion Street)
LONG ISLAND CITY, N. Y.

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Baltimore
MICHIGAN
Detroit
Grand Rapids
MINNESOTA
Minneapolis
MISSISSIPPI
Jackson
MISSOURI
St. Louis
MONTANA
Helena
NEBRASKA
Lincoln
NEW JERSEY
Newark
New Brunswick
NEW YORK
Albany
Buffalo
Rochester
Syracuse
Utica
NORTH CAROLINA
Asheville
Charlotte
Winston-Salem
OHIO
Akron
Canton
Cincinnati
Cleveland
OHIO (Cont.)
Dayton
Toledo
Youngstown
OKLAHOMA
Oklahoma City
OREGON
Portland
PENNSYLVANIA
Philadelphia
Pittsburgh
SOUTH CAROLINA
Greenville
SOUTH DAKOTA
Rapid City
TENNESSEE
Chattanooga
Knoxville
Nashville
TEXAS
Dallas
Fort Worth
Houston
San Antonio
UTAH
Salt Lake City
VIRGINIA
Bristol
Lynchburg
Norfolk
Richmond
Roanoke
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Charleston
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WASHINGTON
Seattle
WISCONSIN
Milwaukee
WASHINGTON, D. C.

Products

CORNELL IMPROVED DEEP ARCH INTERLOCKING SLAT STEEL ROLLING SHUTTERS and DOORS, handle, chain, crank, or motor operated, for residences, office buildings, garages, wharves and piers, warehouses, elevator shafts, store fronts, craneway openings, etc.

UNDERWRITERS' LABELED FIRE DOORS and SHUTTERS.

Send for 32-page, 1928, Catalogue, with complete dimensions, specifications, etc.

Location

Cornell doors are manufactured in Greater New York in a modern one-story factory.

Unexampled shipping facilities by all railroads, as well as water routes to all points on the east, south and west coasts, and the Great Lakes.

Experience

CORNELL IRON WORKS, INC., is the oldest rolling door manufacturer in the United States. Cornell doors have been in use for over 50 years. Our later types embody many modern improvements.

CORNELL ROLLING DOORS

Description

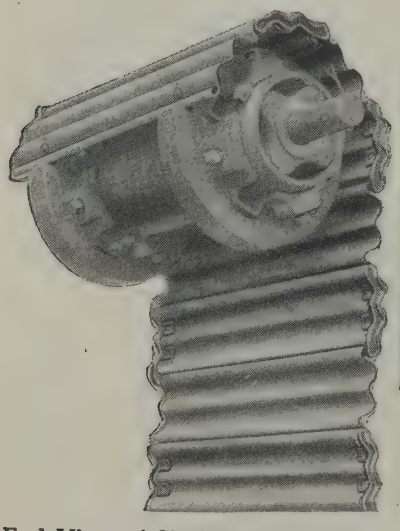
Cornell steel rolling doors are designed for the closure of all types of openings. They offer fire and burglar protection, combined with neat appearance and economy of space.

The curtains run in vertical side guides, and coil around a horizontal shaft above the opening.

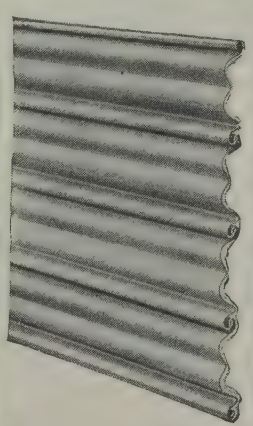
The weight of the curtain is counterbalanced by springs in the shaft, which permit it to remain stationary in any position.

Why Cornell Rolling Doors

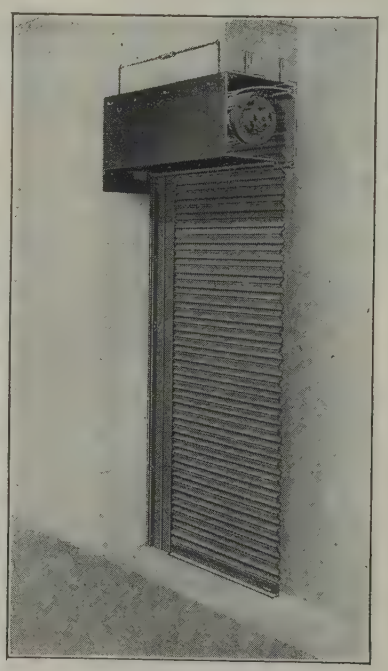
They take the minimum of room. They are all-steel and will last as long as the building. They operate with surprising ease in the largest sizes. They are easily repaired, after accident, with a few new slats quickly inserted.



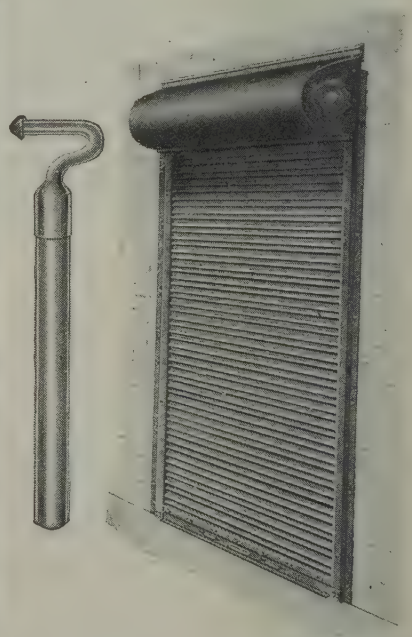
End View of Shaft and Curtain
Note malleable iron end locks and deep arch of slat



Front View of Slat Curtain
End locks removed



Sectional View of Llenroc Labeled Door, Between Jamb Location
Note the fuse link and the hinged baffle plate which drops on the curtain top in case of fire

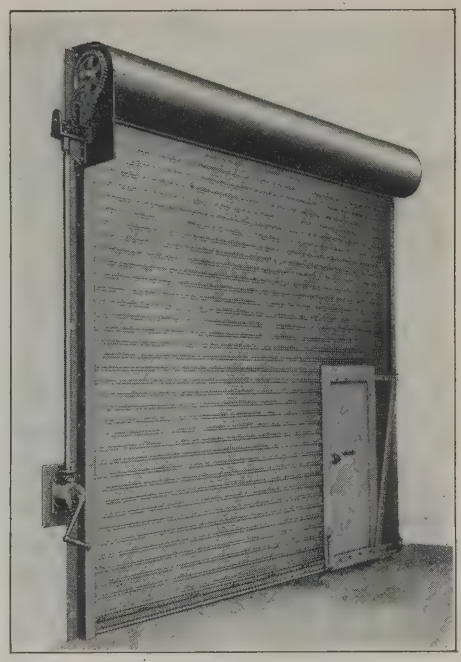


Type SCF Door
Abbreviation for self-coiling operation, face of wall location. Standard up to 80 sq. ft. It can be operated from either side by handles. Pole furnished gratis where required

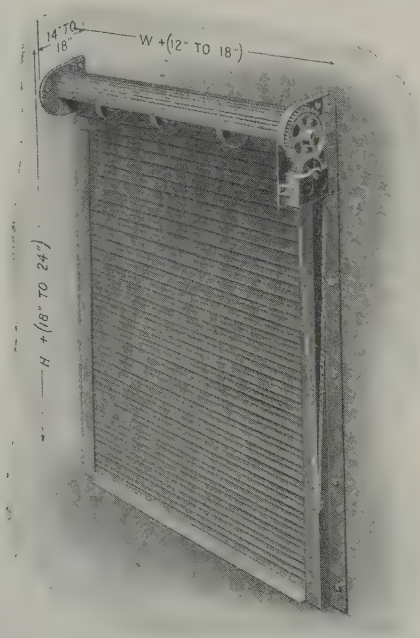
Continued on next page

1st Step
Channel shaped guides in place. Fastened at the top with a through bolt. Expansion bolts below

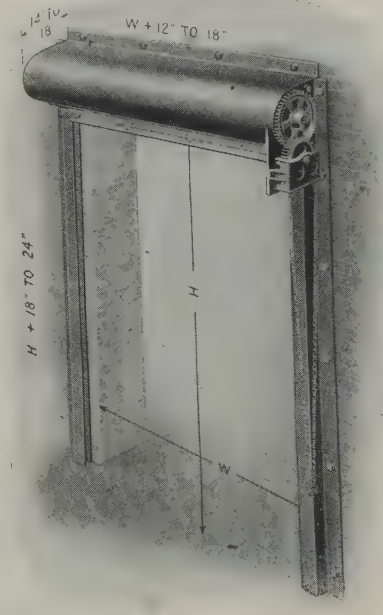
2nd Step
Steel brackets attached supporting the shaft. Note the self-contained construction, making for easy erection



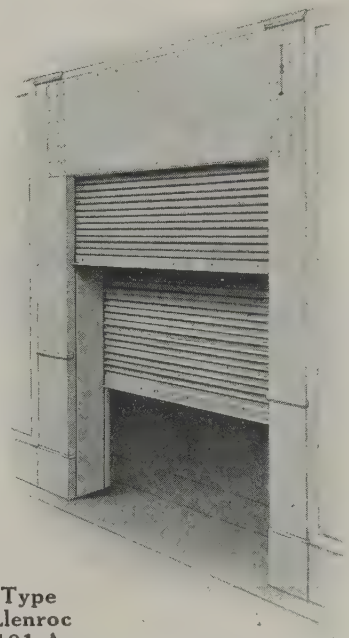
Type HCF Door
Abbreviation for hand crank operation, face of wall location. Easily operated from either side of wall. Note the small wicket, or pilot, door, the frame of which swings out when the big door has coiled



3rd Step
Steel curtain in place. Note the dimension limits giving approximate clearances required

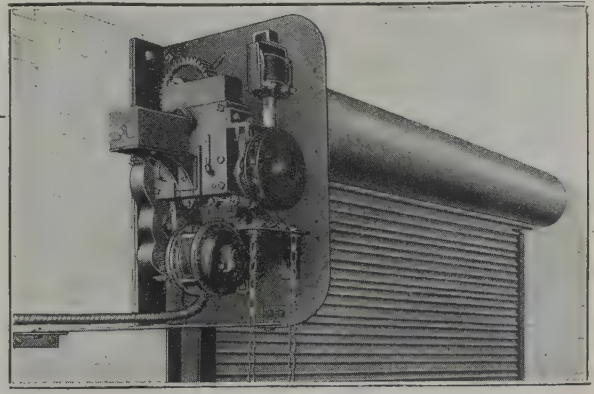


4th Step
Curtain rolled up with hood in place. The cylindrical hood is fastened to the wall with expansion nails. Note approximate clearances



Type Llenroc 101-A
Double and Superimposed
One door coils above the other thus economizing space. Makes a neatly concealed installation for fine buildings. Both doors labeled

Erection of a Cornell Chain Gear Face of Wall Door Type CGF
Four steps in the erection of a Cornell chain gear face of wall door. Abbreviation "CGF," specifying the type. The chain and gearing may be placed on the left side if preferred. The pipe shaft contains the counterbalancing springs. This is the standard door for openings over 80 sq. ft. up to the large motor driven installations



Type MX Door
Standard electric motor drive for smaller doors. Note the self-contained, direct connected construction, the enclosed gears, the limit switch, solenoid brake and emergency hand chain

Operation

There are four typical methods of operation:

Self-coiling Type—Standard for openings up to 80 sq. ft. and below 8 ft. in height. Push up and pull down by handles on the bottom bar. The quickest acting construction possible.

Hand Chain and Gearing Type—Standard for larger openings. Shaft revolved by endless hand chain, acting through single, or compound, gearing on an overhead gear bracket.

Motor Drive Type—Standard for the largest openings up to 45 ft. in width.

Continued on next page

Automatic Closing Type—Controlled by fusible links. Made to Underwriters' standards, labeled by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories. Thirty designs of labeled fire doors, including: Fire wall doors, Class "A"; vertical shaft doors, Class "B"; corridor and room partition doors, Class "C," and exterior doors and shutters, Class "D."

Llenroc Type

The most used construction for automatic fire doors. Placed on the face of the wall and carrying A, B, C or D label. Note the fuse link.

Llenroc is Cornell spelt backwards and denotes automatic doors labeled by Underwriters Laboratories, Inc.

Cornell Improved Interlocking Steel Slat Curtains

Designed to give unusual rigidity against wind pressure, having a depth at the crown of 7/8 in. The appearance is attractive from either side, as the curtain is made up of a series of cold rolled steel mouldings with deep relief.

The end locks are made of malleable iron, designed for maximum wear and strength. Furnished in U. S. gauges from No. 16 to 22, cold rolled and galvanized.

Non-corroding Curtains

Of cold rolled bronze, aluminum or zinc, interlocking slats. An original Cornell product. Require no painting. Of great service in resisting coal gas, acid fumes, severe salt water exposure, etc. Give a very handsome finish at comparatively small extra cost.

Cornell Patented Non-corroding Curtain Bottoms

Experience proves that all exposed doors and shutters of steel corrode fastest at the bottom.

To neutralize this, Cornell Iron Works, Inc., has originated the feature of using 12 to 18 in. of bronze bottom slats for exposed doors.

The extra cost is small and the life of the installation may often be more than doubled by this method.

Widest Rolling Door Ever Made—45 ft., Motor Driven

Motor Driven Units

Cornell motor drives are made in a self-contained unit, completely assembled in the shop. The gears can not get out of alignment.

The worm is placed under the worm wheel, is completely enclosed, and runs in an oil bath.

Automatic starters are furnished with all installations.

Electric brakes are furnished where required.

Equipment is G-E material.

Operation—On pushing the proper button, the solenoid acts to open the brake and the door moves up or down, as the case may be, at a rate of approximately 1 ft. per second.

On reaching the top or bottom of the door travel, the limit switch operates, automatically cuts off the current, stops the motor, cuts out the brake magnet and lets the brake go on with full power, locking the entire mechanism against further travel.

The action is foolproof.

Door may be stopped at any point in its travel, by simply throwing the switch. This operation automatically puts on the brake, and the door stops promptly.

Underwriters' Labeled Fire Doors

Cornell rolling doors have been thoroughly tested by Underwriters' Laboratories, Inc., Chicago, and carry their label for the following types of openings:

Fire Wall Doors—Made of No. 16 gauge and labeled up to 80 sq. ft. in size—Class A.

Vertical Shaft Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class B.

Corridor and Room Partition Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class C.

Exterior Doors and Shutters—Made of No. 22, or No. 20 gauge, and labeled up to 100 sq. ft. in size—Class D.

Note: Doors larger than the above limits can be made to Underwriters' specification and a certificate of inspection furnished.

Catalogue and Service

Write for 32-page 1928 catalogue, and call on our Engineering Department for free advice and suggestions.

Double Fire Doors, with Concealed Coils, Horn and Hardart Restaurant, New York, N. Y.

THE KINNEAR MANUFACTURING CO.

Exclusively Door Manufacturers

820-870 Field Avenue
COLUMBUS, OHIO

BRANCH OFFICES

BOSTON, MASS., 294 Washington Street
NEW YORK, N. Y., 342 Madison Avenue
PHILADELPHIA, PA., 503 Wesley Building
WASHINGTON, D. C., 915 Investment Building
PITTSBURGH, PA., 617 Oliver Building
NEW ORLEANS, LA., 730 Hibernia Bank Building
CLEVELAND, OHIO, 528 Union Building
CINCINNATI, OHIO, 528 Walnut Street
DETROIT, MICH., 812 Ford Building
CHICAGO, ILL., 128 Wells Street
KANSAS CITY, MO., 503 Railway Exchange
SAN FRANCISCO, CAL., 444 Market Street

AGENTS IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.
FIRE DOORS and SHUTTERS.
WOOD ROLLING DOORS for Roundhouses.
WOOD ROLLING INTERIOR PARTITIONS.
WOOD BIFOLDING DOORS.
STEEL BIFOLDING DOORS.
VERTICAL SLIDING DOORS.
STEEL ROLLING DOORS and SHUTTERS for service purposes.

KINNEAR ROLLING DOORS
TRADE-MARK

Types

Kinnear steel rolling doors and shutters are manufactured and sold under two distinct classifications, viz., Service and Labeled Types. Service doors are designed entirely for such openings as do not require underwriters' label and where insurance rates are not a consideration.

Construction of Steel Rolling Doors

Kinnear steel rolling doors are constructed of the highest class of materials by mechanics especially trained in the exclusive manufacture of doors.

Curtain proper on all Kinnear doors is made of open hearth interlocking steel slats galvanized and equipped with malleable iron endlocks. Curtain is coiled upon barrel journalled in heavy cast iron brackets and travels in steel guides mounted at sides of openings.

Curtain is counterbalanced by means of helical springs which are enclosed in barrel.

Galvanized hood of steel of suitable design is supplied with each door.

Method of Installing Rolling Doors

Service doors in general are mounted on face of wall with brackets and coil entirely above the bottom of lintel and with inside face of guides flush with face of brick or concrete jamb.

Where headroom is limited and door can not be mounted on face of wall, it can be mounted in the opening, in which case the brackets and coil would be mounted directly under lintel and guides would be located on the jamb.

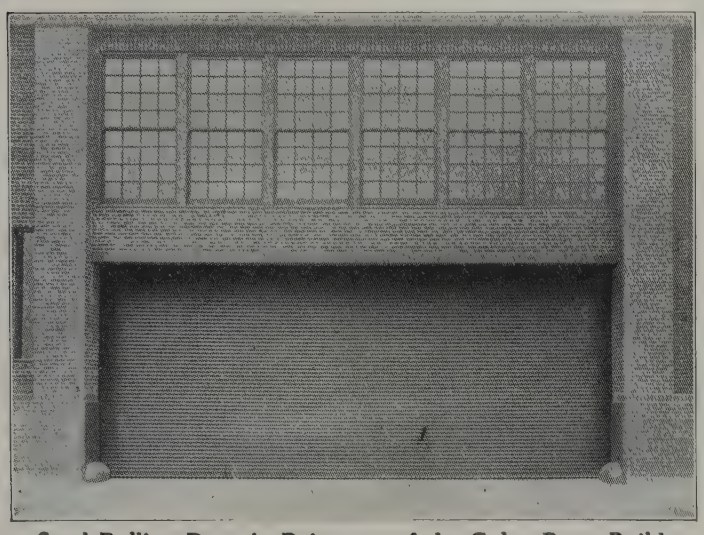
Operation of Rolling Doors

Doors may be operated as follows:

Push-up type of doors for openings not exceeding 100 sq. ft. can be operated in the same manner as window shade, being perfectly counterbalanced and same can be opened from either side.

Doors can be operated by means of reduction gearing and endless chain, or by means of crank, shafting and gear.

Where motor operation is desired, it is necessary to have complete description of current and drawing showing clearances and general conditions.



Steel Rolling Door in Driveway of the Color Press Building, Chicago Tribune, Chicago, Ill.

Bifolding No. 3 Doors Closing the First Floor of the Boston Army Supply Base—130 in All

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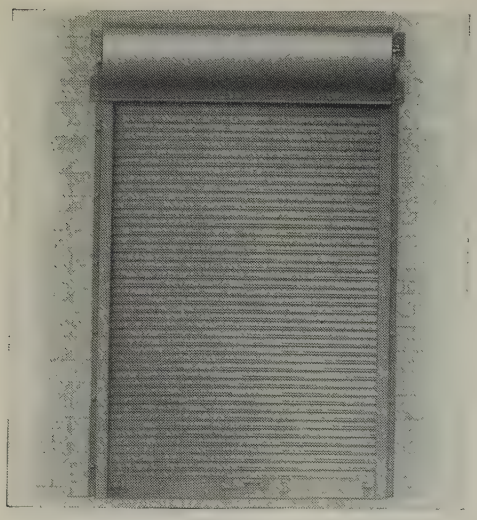
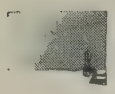
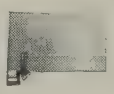


Elevation

Vertical Section

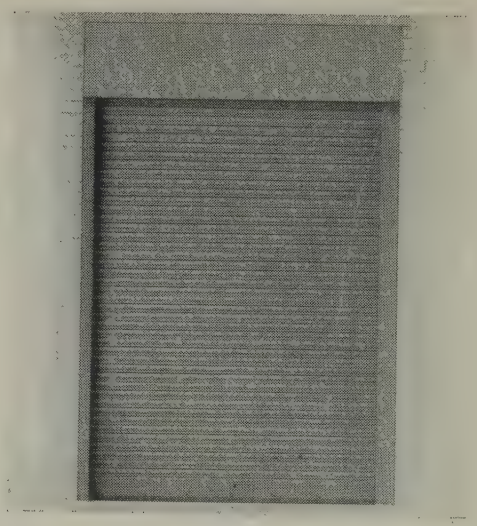




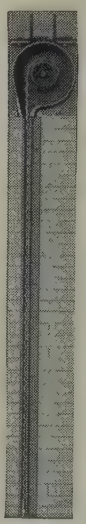
Cross Section

F.M. 10. Construction

Mounted on face of wall.
Push-up type, entirely counterbalanced.
Can be opened or closed from either side.
Provided with suitable lock.
Available for openings not in excess of 100 sq. ft.



Elevation

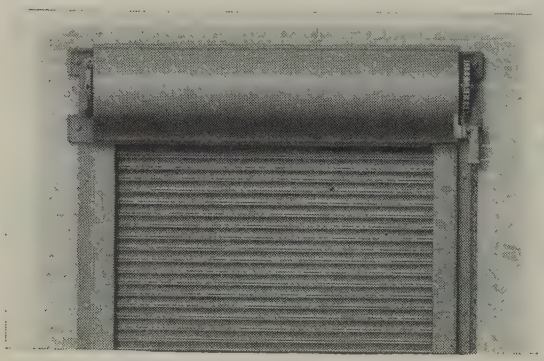


Vertical Section

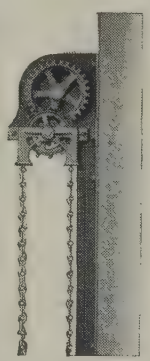
Cross Section

B.M. 10. Construction

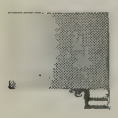
Mounted in opening.
Can be opened or closed from either side.
Curtain entirely counterbalanced.
Paneled hoods can be provided

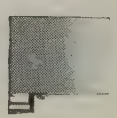


Elevation



End View

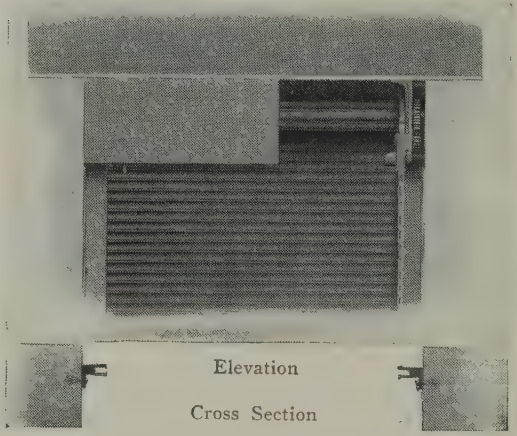




Cross Section

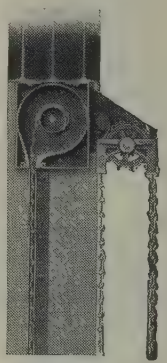
Construction No. F.H. 20

Mounted on face of wall; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear



Elevation

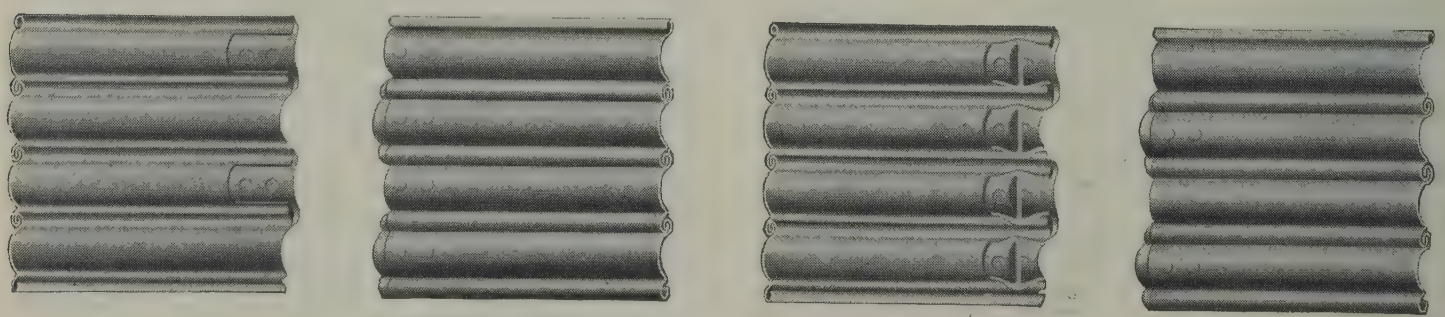
Cross Section



Vertical Section

Construction No. B.H. 20

Mounted in opening; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear



Concave and Convex Sides of Interlocking Steel Slat No. 2

Illustrations to the left show slat No. 2 fitted with alternate endlocks; those to the right, fitted with continuous endlocks. Slat No. 2 is 1⅞ in. wide on centers; depth of crown, ½ in. Made in gauges Nos. 24, 22, 20, 18 and 16.
Especially adaptable to shutters equipped with mechanical operating device.
In cases of extremely wide openings, Kinnear No. 4 slat is used. This type of slat is larger than the No. 2 slat

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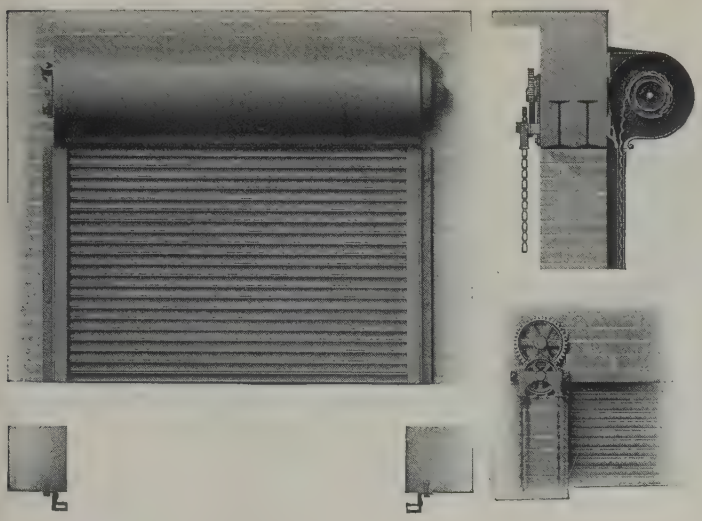
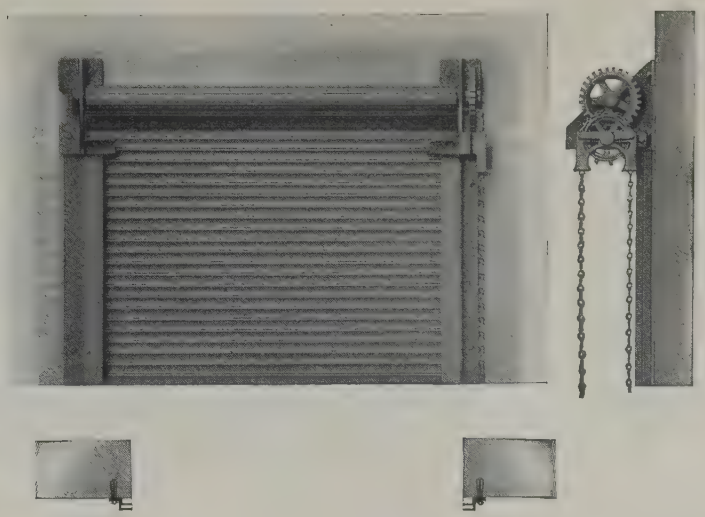


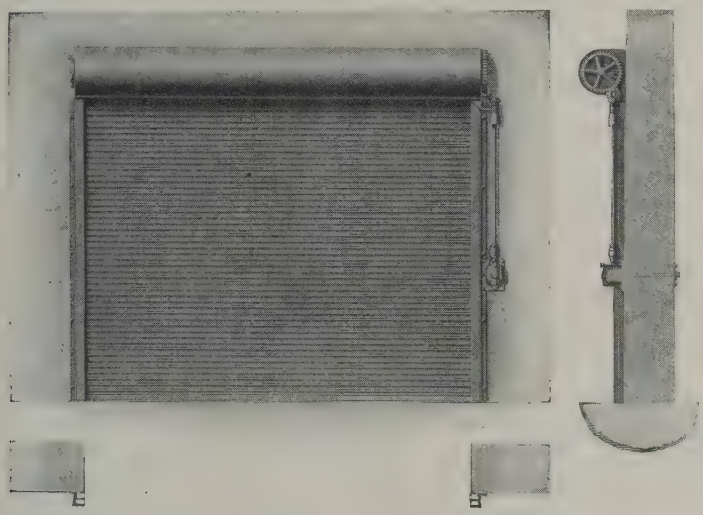
Construction No. F.H. 61

Door mounted on exterior face of wall. Operated from within building by means of endless chain, sprocket and gear, and by shaft extending through the wall. May be locked on inside by means of a chain lock



Construction No. F.H. 30

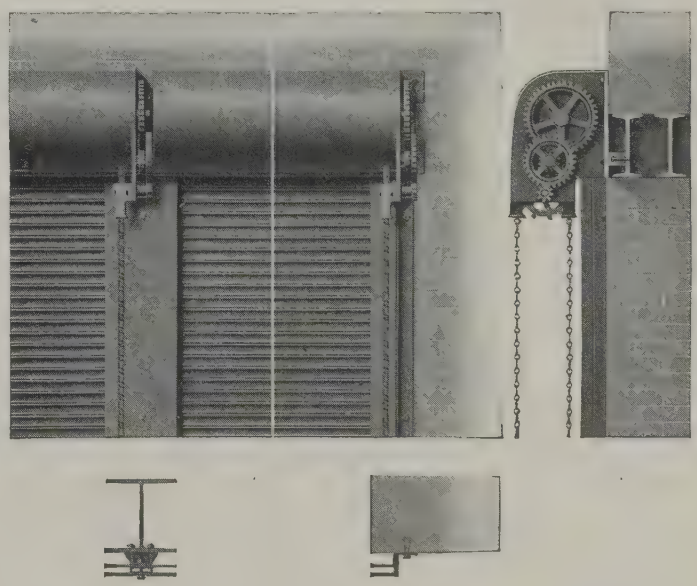
Mounted on interior face of wall; not furnished with hood. Open type of bracket facilitates erection. After brackets are in place, curtain barrel can be dropped into bearings. Closed brackets necessitate erection of both brackets and barrel together



Construction No. F.C. 20

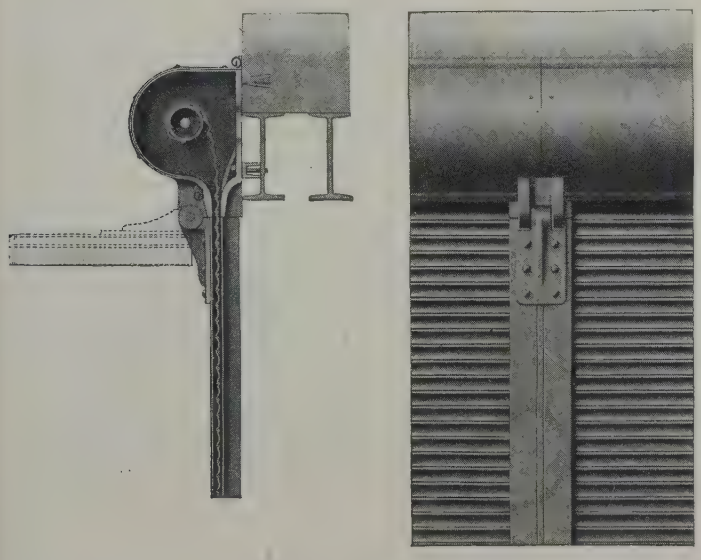
Mounted on face of wall. Operated by means of crank, imparting movement to the curtain barrel through shaft and suitable gear. Can be made to operate from either inside or outside of building, or both.

Operation from one side only is standard arrangement



Construction No. F.H. 23

Modification of construction No. F. H. 20. A compact design well adapted to large openings, separated by narrow post



Intermediate Movable Posts

Wide openings can be frequently more economically closed by a number of small doors, than by a single large one, using, between doors, movable posts hinged to brackets. After doors are open, posts are swung up out of the way by ropes and pulleys

Interior of Pier 32, San Francisco

Steel rolling doors arranged with movable intermediate posts shown above, making entire opening available

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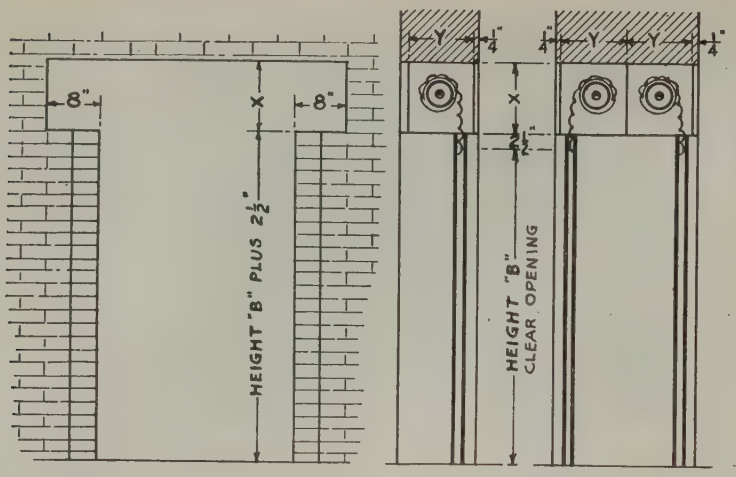
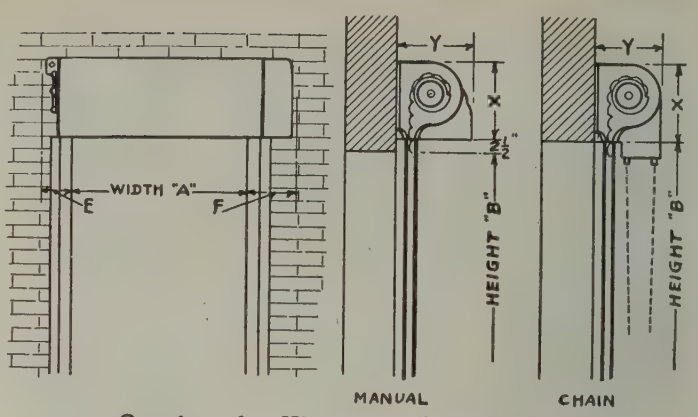
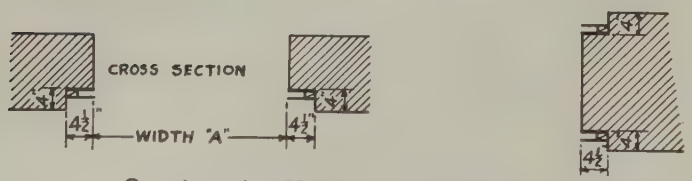




Openings for Kinnear Rolling Shutters

FACE OF WALL—MANUAL—AUTOMATIC

Height B, ft.	Width A, ft. 3	4	5	6	7	8	9	10
6	E = 6 in. X = 15½ in.		F = 12½ in. Y = 15½ in.		E = 6 in. F = 12½ in.			
7								
8			X = 16 in. Y = 15½ in.			E = 6 in. X = 18 in.	F = 12½ in. Y = 18 in.	
9	E = 6 in. X = 17 in.	F = 12 in. Y = 17½ in.						
10								
11				E = 6 in. X = 19 in.	F = 12½ in. Y = 18½ in.			
12								



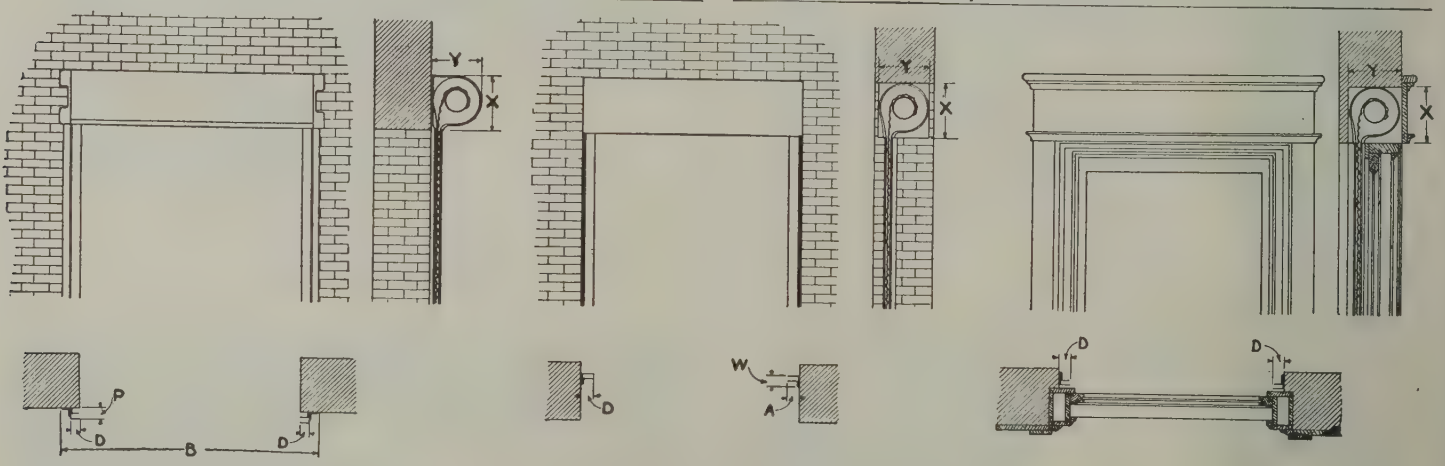
Openings for Kinnear Rolling Shutters

BETWEEN JAMB AUTOMATIC

Height B, ft.	Width A, ft. 3	4	5	6	7	8	9	10
6	X = 16½ in. Y = 12¾ in.							
7								
8			X = 17 in. Y = 13¾ in.					
9					X = 19 in. Y = 15¾ in.			
10	X = 18 in. Y = 14¾ in.							
11								
12				X = 20 in. Y = 16¾ in.				

FACE OF WALL—CHAIN—AUTOMATIC

Height B, ft.	Width A, ft. 5	6	7	8	9	10	11	12
6								
7								
8	E = 8 in. X = 16½ in.		F = 12 in. Y = 20 in.					
9								
10								
11								
12							E = 8 in. X = 18 in.	F = 13 in. Y = 21 in.



Projections (Schedule Below)

Above are indicated the salient dimensions of usual sizes of standard service types of Kinnear steel rolling shutters. View to the left shows shutter placed on face of wall; central view shows shutter placed between jambs, and that to the right shows curtain with concealed coil. The following dimensions are for shutters of height and width indicated:

Height ft.	Width 3 to 7 ft. Groove depth "D," 2 in. Y in.	X in.	P in.	A in.	W in.	Width 7 to 11 ft. Groove depth "D," 2½ in. Y in.	X in.	P in.	A in.	W in.	Width 11 to 14 ft. Groove depth "D," 3 in. Y in.	X in.	P in.	A in.	W in.	Width 14 to 20 ft. Groove depth "D," 3½ in. Y in.	X in.	P in.	A in.	W in.
6	12¾	12¾	3	4	3	12¾	14	3	4½	3½										
8	14¼	14¼	3	4	3	16½	18	3	4½	3½										
10	15¼	17	3	4	3	17½	19	3	4½	3½										
6	11	13	2½	5	3	11	13	2½	5½	3½	12¾	14	2½	6	4	15	17	3½	8	4½
8	11	13	2½	5	3	11¼	13½	2½	5½	3½	12¾	14	3½	6	4	15	17	3½	8	4½
10	11¾	13½	3½	5	3	11¾	13½	3½	5½	3½	13½	15	3½	6	4	15½	18	4	8	4½
12	13½	15	3½	5	3	13½	16	3½	5½	3½	13½	16	3½	7½	4	17	19	4	8	4½
14	14¼	16	3½	5	3	14¼	16½	3½	5½	3½	15¼	17	3½	7½	4	17½	19	4	8	4½
16	15¼	17	3½	5	3	15¼	17	3½	7	3½	16¼	18	4	7½	4	20	22	4	8	4½
18	15¾	17	3½	5	3	15½	18	3½	7	3½	17	19	4	7½	4	22	24	4	8	4½

Sizes above division line apply to shutters operated by handle in bottom of curtain. Those below division line apply to shutters operated by endless chain or crank and bevel gear. Dimension "P" applies only to face of wall constructions. Dimension "W" only to "between jamb" constructions. Dimension "D" in the between jamb section applies only to manually operated shutters. Use projection "A" for both sides where chain operation is used. Dimension "B" should always be at least 8 in. wider than width of door opening for moderate sized shutters, and for very large shutters 10 or 12 in. and more if possible. We do not recommend manually operated construction for curtains of larger area than approximately 100 sq. ft.; chain hoist should be used on larger sizes. Any unusual sizes, direct correspondence is advisable.

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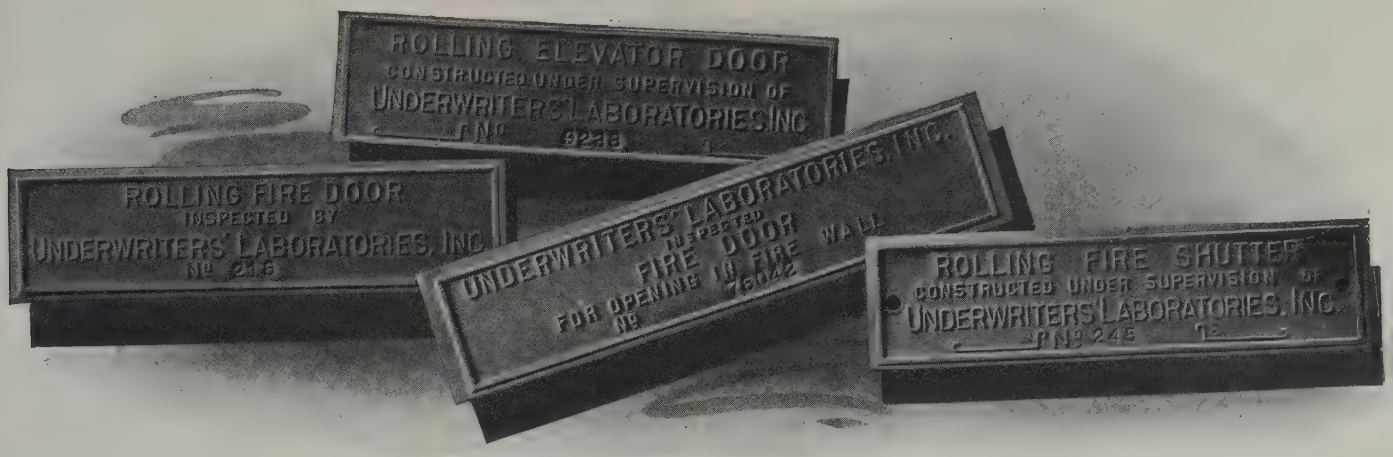


Underwriters' Labels

Fire Doors and Shutters

Constructed under the supervision of the Underwriters' Laboratories, Inc., and labeled as above.

Important Features—Kinnear fire doors and shutters are specially designed for fire protection.

Details of construction have been carefully developed. The following are some of the important features:

(1) An auxiliary or inner hood is automatically dropped and closes the space between the barrel and outer hood, thereby preventing the passage of flame over the barrel.

(2) Special endlocks closing the concaved ends of slats and preventing the passage of flame around the edge of the curtain.

(3) Fusible washers employed in the construction of grooves which melt and allow the members composing the grooves to expand without buckling.

(4) Non-corrodible metal used for bearings and contact points of the automatic release.

(5) Single line contact bearings in releasing levers.

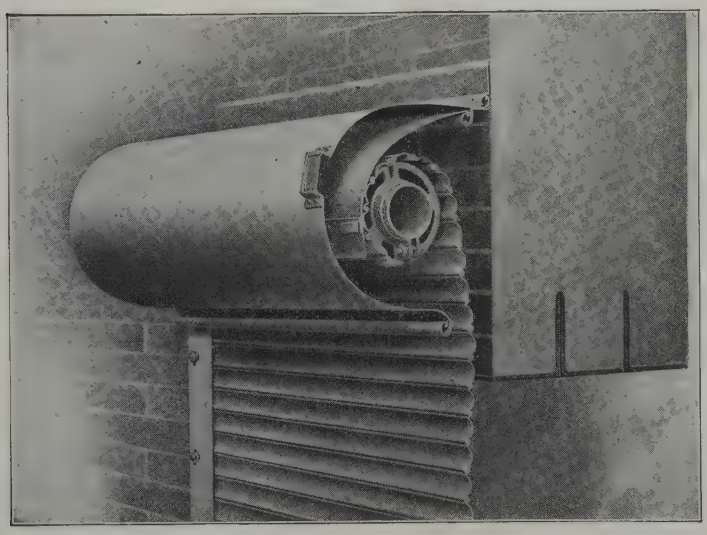
(6) Provision made for expansion of parts for all temperatures up to 2000° F.

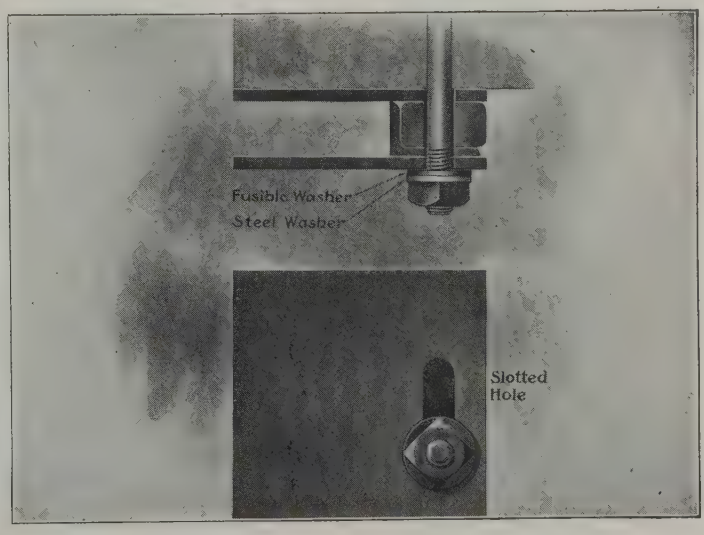
(7) Disposition of fusible links, insuring prompt closing.

(8) The enclosure of automatic release, protecting it from the weather.

(9) Safety device controlling the speed of curtain in automatic closure.

Catalogues—General Catalogue No. 51 and the special Fire Door Catalogue No. 53 illustrate many additional types and their applications. These doors and shutters are designed to obtain easy operation in normal service, and are easily opened and reset by a single person after automatic closure.





Salient Features of Kinnear Fire Doors and Shutters

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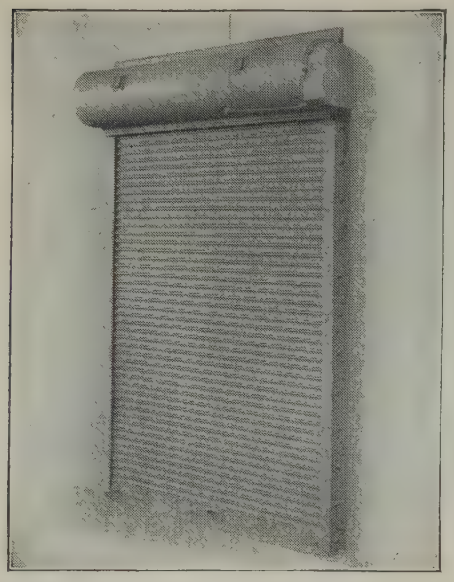
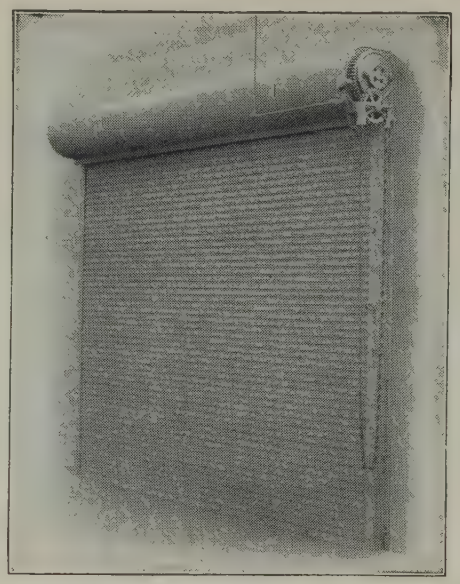
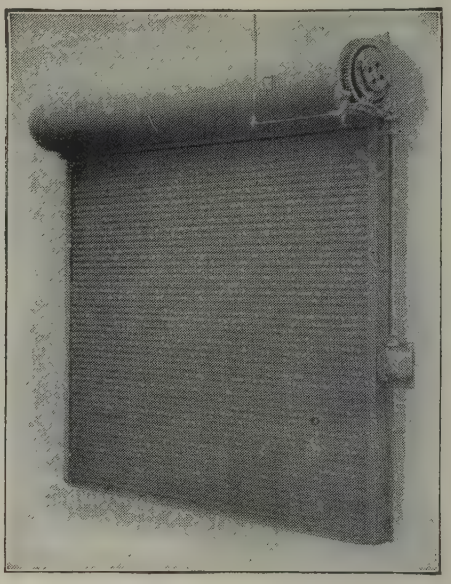


Manual Operation



Chain Operation



Crank and Shaft Operation

A Few Types of Akbar Construction

Salient Features of Akbar Construction, a Distinctive Kinnear Product

(1) The automatic closing of this type of door is insured by a powerful starting force which diminishes as door is set in motion.

(2) A special safety device is provided on each door which controls drop of door in automatic closure and which eliminates every element of danger, as well as the violent impact common to other types.

(3) Can be opened and reset without difficulty after automatic closure.

(4) Are available for service purposes at all times and will close automatically from any open position.

Types—Akbar doors are made in the following types:

Akbar No. 1, manual operation
Akbar No. 2, chain operation
Akbar No. 3, crank operation

The above three types are labeled for openings in vertical shafts, partition walls, bridge and tunnel entrances where openings do not exceed 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 4, manual operation
Akbar No. 6, chain operation
Akbar No. 7, crank operation
Akbar No. 8, crank operation

The above four types are labeled for openings in fire walls not in excess of 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 11, manual operation.
Akbar No. 9, chain operation
Akbar No. 10, crank operation

The above three types are labeled for openings in exterior walls for openings not in excess of 100 sq. ft., and where width or height is not in excess of 12 ft.

Other types similar to Akbar manual operation are available for exterior openings.

Salient Features of Superior No. 1 and No. 2 Constructions

Labeled for exterior window openings not in excess of 100 sq. ft., neither dimension exceeding 12 ft.

Normally remains in open position, closing automatically by means of fusible link.

Actuated by a powerful starting force which diminishes as shutters are set in motion.

Equipped with *safety device* which controls drop of door in automatic closure, eliminating all danger, as well as impact on sill.

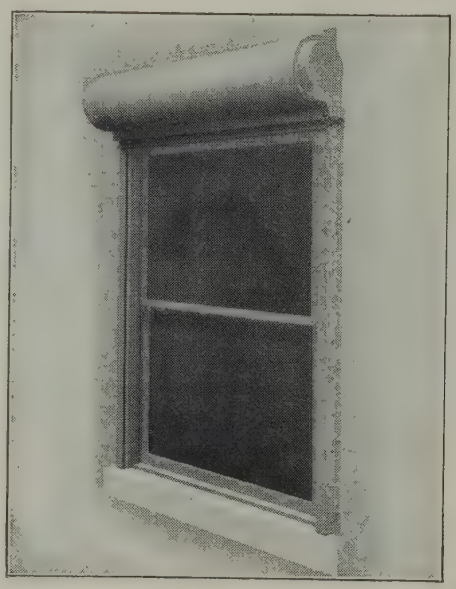
Equipped with testing device by which periodical tests can be made as often as desired.

Can be raised after automatic closure with least possible difficulty.

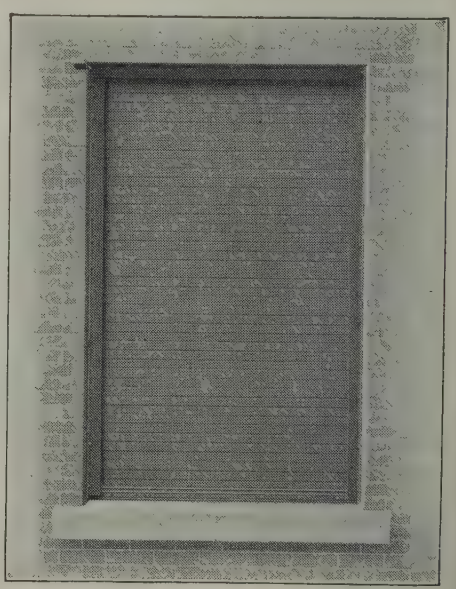
After lever is reset, can be pushed and locked in any open position without adjustment.

Superior No. 1 to be mounted on face of wall.

Superior No. 2 to be mounted in opening.



Superior No. 1



Superior No. 2

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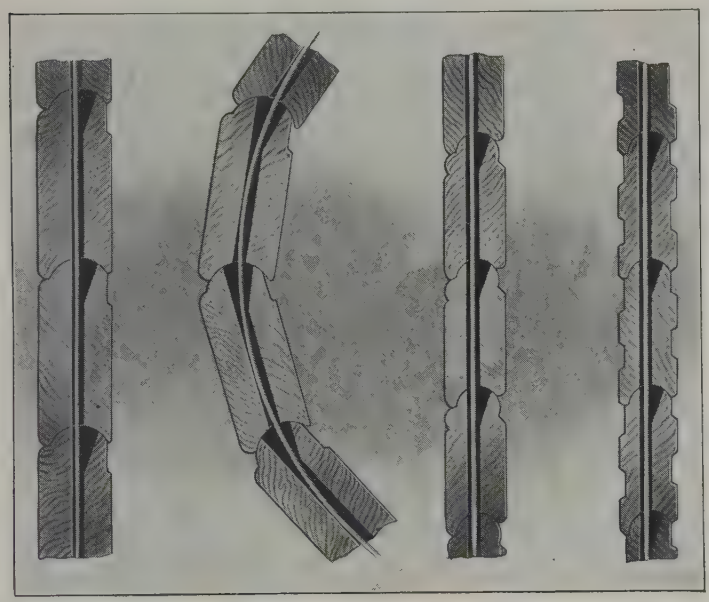
Wood Rolling Doors and Partitions

For Roundhouses—Wood rolling doors are particularly desirable in cases where chemical action is liable to deteriorate steel. This is particularly true in roundhouses and chemical plants.

These doors are constructed of wood slats assembled on phosphor bronze ribbons placed at proper intervals. Slats are made of cypress and treated with a coat of wood preservative.

Slat No. 27 is used on exterior doors.



No. 27 No. 27 No. 26 No. 24

Sections of Wood Slats

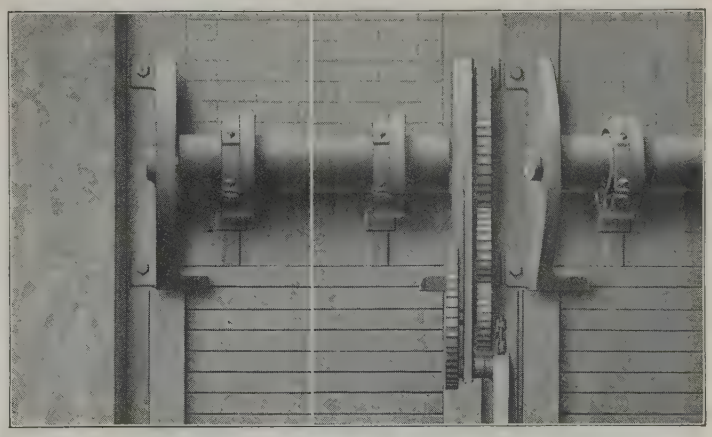
For Schools, Churches, etc.—Curtains are composed of slats assembled on phosphor bronze ribbons.

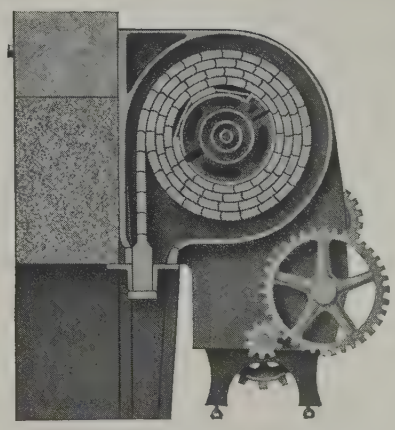
Made in long leaf yellow pine, cypress, quarter sawed oak and birch.

Slats Nos. 24 and 26 are for interior work; slat No. 27 for exterior work.

Illustration shows cross section through slats.

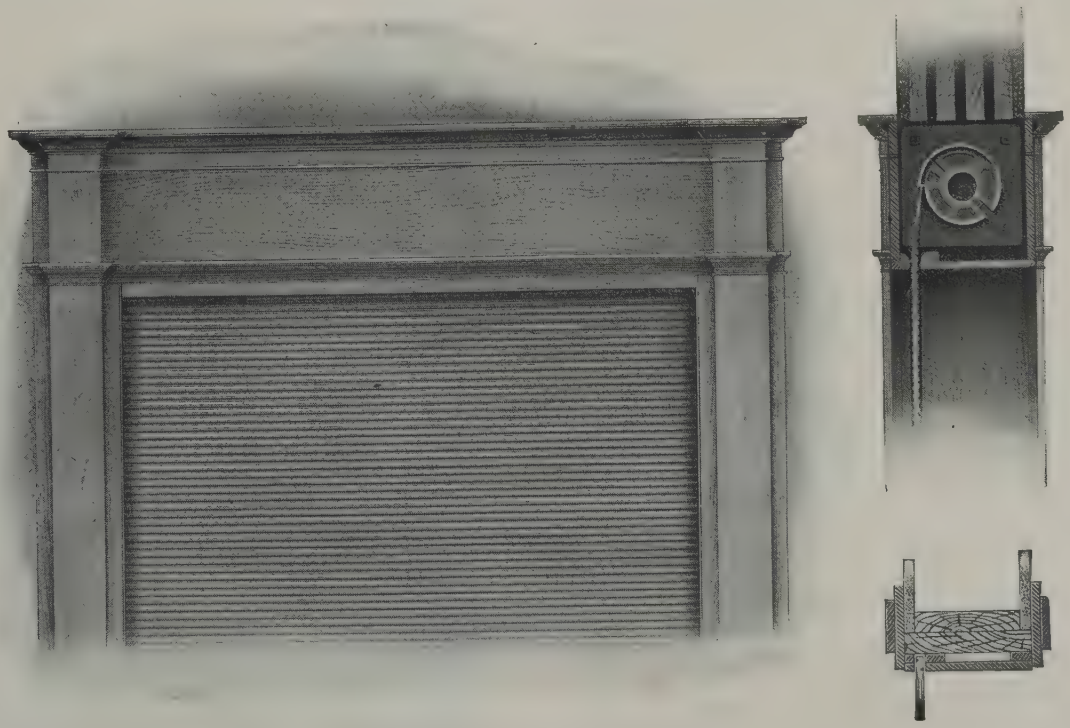
The opening through which the ribbon passes is so shaped that, during flexure of the curtain, there is no change in the relative length of the slats or curtain; nor is there any danger of pinching the ribbon.





Construction No. F.H.W. 22

Designed especially for roundhouses. Doors mounted on face of wall above opening; travel in grooves at sides. Counterbalanced by springs; operated by means of endless chain and reduction gear



Construction No. W.B.M. 10

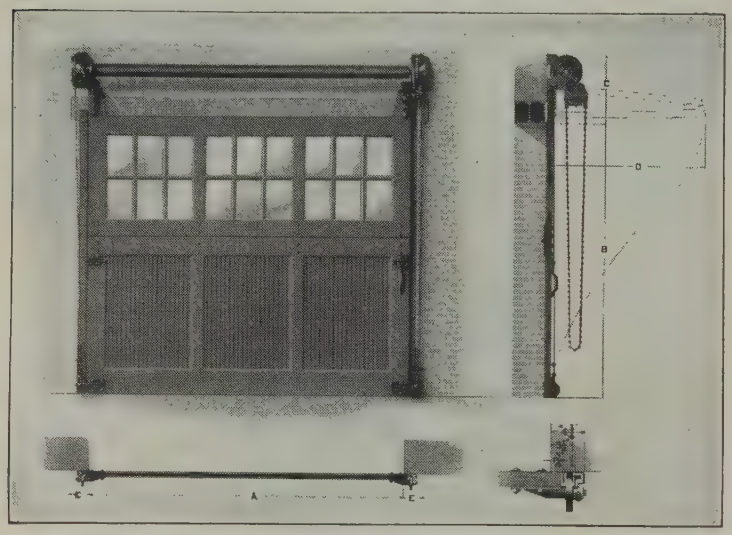
Application of wood rolling door for interior partition. Coil is concealed under lintel; operated by means of handle in bottom of rail. Mechanical operating devices are arranged for large doors. Can be concealed within the casing. Casing and grooves are not supplied, but should be included in general carpenter work.

Continued on next page

Bifolding Doors, Wood or Steel

In cases where light is desired through doors, the bifolding type lends itself readily to such condition. These doors may be constructed either of wood or steel, and are of two sections hinged at the center and pivoted at top of opening. The upper panel may be fitted with sash, giving a glass area of about two-thirds the total area of the panel.

Bifold No. 5—This is without doubt the most practical bifolding door now on the market, requiring less clearance at both head and sides of opening than do most other types.



Bifold No. 5

CLEARANCES REQUIRED FOR BIFOLD NO. 5

Height										
B	6′ 0″	7′ 0″	8′ 0″	9′ 0″	10′ 0″	11′ 0″	12′ 0″	13′ 0″	14′ 0″	15′ 0″
C	26½″	26½″	26½″	26½″	28½″	31″	33″	35″	35″	37″
D	3′ 10″	4′ 4″	4′ 10″	5′ 4″	5′ 11″	6′ 6″	7′ 1″	7′ 8″	8′ 2″	8′ 9″
E	8″	8″	8″	8″	8″	10″	10″	10″	10″	10″

Dimension A should not exceed 18 ft; dimension B should not exceed 15 ft.

Kinnear Bifold No. 5 is designed with a spring counterbalance, eliminating the heavy counterweights usually used on this type of door. Steel cables connect the door to the counterbalancing device at the top of the opening. Bottom panel is fitted with rollers which travel in guides attached to wall and transmit the thrust.

The simplicity and sturdiness of the mechanism reduces maintenance to a negligible factor and renders quick and easy operation. Less side clearance is required as there are no counterweights. Send us a sketch showing conditions as they actually exist and we will show how this flexible construction adapts itself to other than standard conditions.

Kinnear panels are fabricated in our own factory from extra heavy materials and are built on a purely quality basis. Write for prices and catalogue.

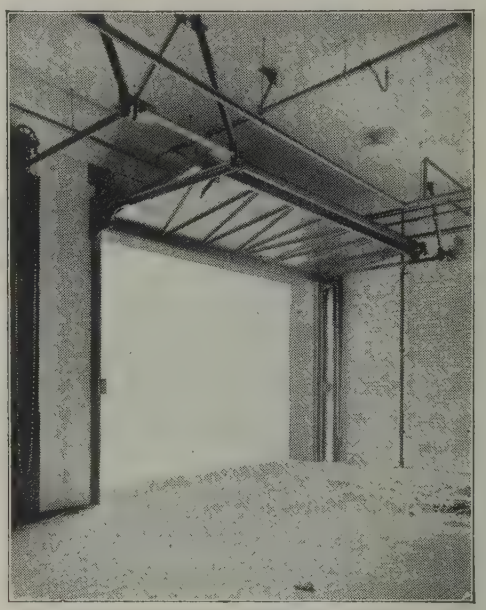
Bifold No. 3—Designed for large openings. Panels are built in two sections. Upper section may carry glass if desired.

In operating, the lower section rises to half the height of opening. The door then breaks, and both sections move simultaneously, the lower edge vertically, the upper edge horizontally, on suspended tracks to a position above the opening.

Panels are entirely counterweighted and operated by means of reduction gearing and endless chain.

This type of door was used in the Boston, Brooklyn, and Charleston army bases by the United States government.

Panels can be constructed either of wood or steel.



Bifold No. 3 in Open Position

Vertical Sliding Doors

This type of door is particularly suitable for freight houses, piers and warehouses where light is essential through doors.

The door comprises two or more sections consisting of trussed frame covered with corrugated iron, hung independently with chains connected with counterbalance weights. Operated by means of endless chain and suitable reduction gearing.

Where doors are mounted on steel columns, guides and weight boxes should be incorporated as a part of the column, and should be supplied by the steel contractor, according to details supplied by our Engineering Department.

This type can also be supplied to be mounted on the face of the wall, in which case we furnish weight box and guides as part of the equipment.

It is advisable to procure definite information from the factory in connection with the above type of door.

Vertical Sliding Doors, Installed in Santa Fe Freight Shed

Continued on next page

Kinnear Power Units

Rolling doors are especially adaptable to electric motor operation and Kinnear power units are available for all sizes of rolling doors. If the arrangement as shown in the illustration is not feasible other applications can be provided.

Electric Power Operation—

The rolling doors are operated by means of the motor driving the curtainbarrel through reduction gearing. The operation is accomplished by the following means:

By pushing a button on the operating switch the pilot circuit is closed through the magnet of the automatic starter which then closes the main circuit through the motor. The motor then operates the door. The limit switch will at the termination of the travel break the current through the automatic starter magnet, which will consequently interrupt the motor circuit and simultaneously the magnet brake will close, stopping the motor. The door can be stopped at any intermediate point by means of the stop button on the switch from where it can be operated either up or down.

Electric Motor—

Series wound motors with high starting torques are used for direct currents and high torque elevator motors for alternating currents.

Lubrication—

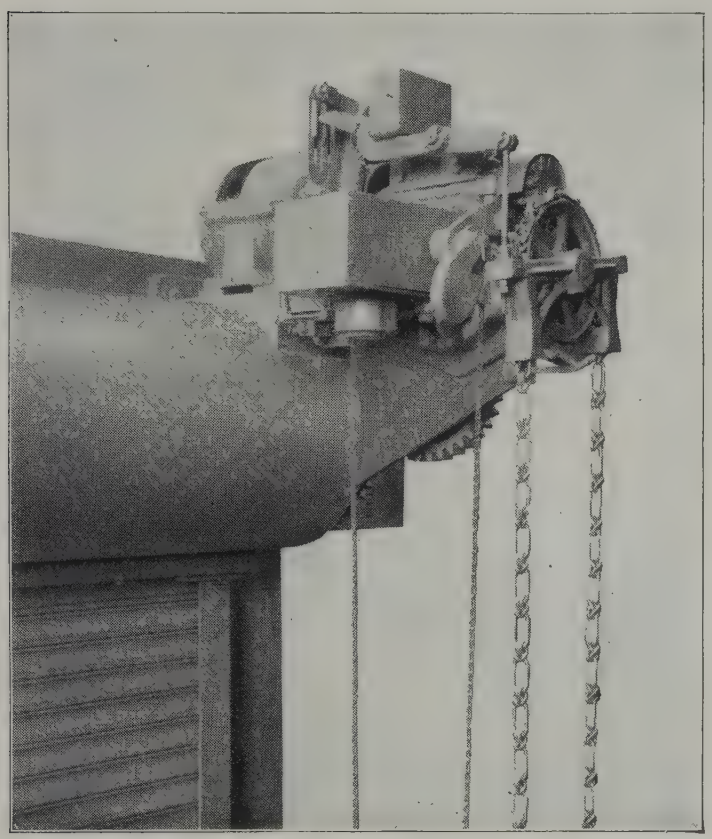
Means are provided for the lubrication of all bearings.

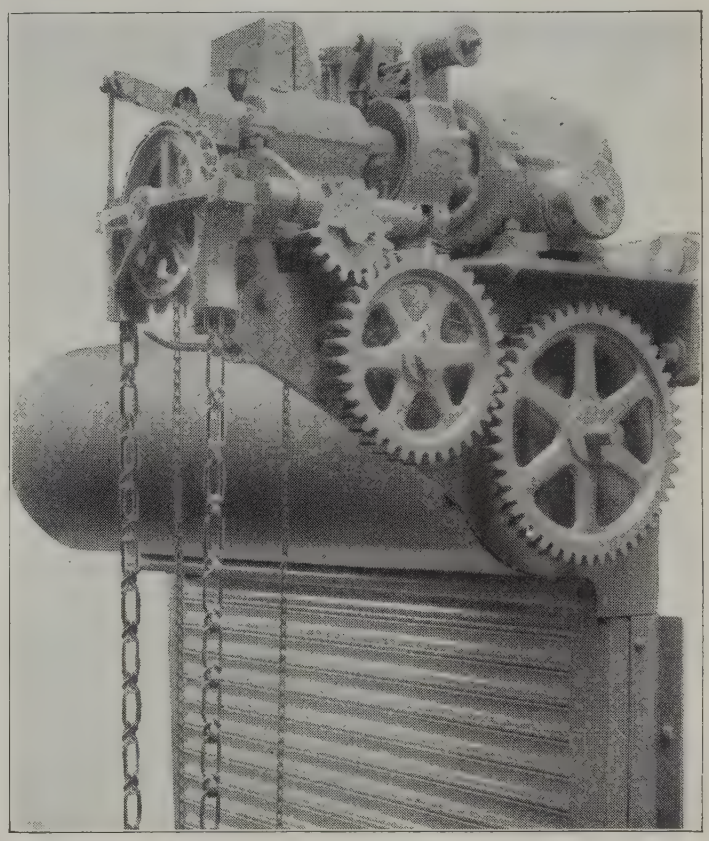
Emergency Operation—

For cases of emergency, means are provided for the operation of the door manually with sprocket and chain. This emergency device is disengaged during motor operation and the control for engaging and disengaging this device from the driving mechanism is operated from the floor. Arrangements are provided that prevent the motor from operating until this device is disengaged.

Control Switches—

The control switches consist of a fused service switch, enclosed safety type and externally operated; heavy duty 3 push button switches with open, close and stop buttons, and a remote control magnet reversing panel switch. The reversing panel is enclosed and furnished with a thermal overload relay.





Kinnear Power Units

Wiring—

The wires, wire conduit and fuses are not furnished or installed by The Kinnear Manufacturing Co., but are to be established in accordance with the diagram supplied by the Kinnear Company.

Engineering—

Details, specifications and other information will be furnished upon request. All requests for engineering data or quotations must be accompanied by the electrical current characteristics as follows:

Alternating current: voltage .... phase .... cycle ....; direct current: voltage.

In General—Kinnear power units are the result of years of painstaking effort, are compact, sturdy, and are long past the experimental stage.

Kinnear motor operated doors are in general use everywhere and are great time savers on large openings.

If you have door problems it will give us pleasure to help develop them.

Write for detailed information.

ESTABLISHED 1900

GEO. W. JOHNSON MFG. CO.

INCORPORATED 1906

Johnson Steel Rolling Doors and Shutters

ST. LOUIS, MO. KANSAS CITY, MO.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.

Types

Johnson Steel Rolling Doors and Shutters are furnished in two general types:

(1) Service doors and shutters—where labels are not required;

(2) Underwriters' labeled doors and shutters—for the protection of openings where insurance rates are a consideration.

Labeled doors and shutters are built in strict accordance with the Underwriters' requirements for proper classification of the openings for which they are intended. They are inspected and labeled at our factory by a representative of the Underwriters' Laboratories, Inc.

The Underwriters classify openings, and specify gauges of curtains as follows:

Division fire wall	Class A—No. 16 U. S. gauge
Interior vertical shaft	Class B—No. 20 U. S. gauge
Corridor or room partition	Class C—No. 20 U. S. gauge
Exterior wall	Class D—No. 22 U. S. gauge

Labels are attached to doors for openings not over 80 sq. ft. in area for classes A, B, and C, and not over 100 sq. ft. for class D, with a maximum allowable dimension of 12 ft. in either width or height for all classes. "Certificates of Inspection" are furnished in lieu of labels for doors exceeding these limits.

Operation

Push-up, by means of handles on bottom plates of nominal sized doors.

By chain, sprocket and reduction gearing.

By crank, shafting and reduction gearing.

By electric motor operating equipment.

Installation

Generally on face of wall with brackets and shaft above the lintel. Where necessary or desirable, with brackets within the opening under the lintel and with guides attached to the jambs. Such an installation can be made in existing openings, but better method is to prepare the opening by providing pockets for the brackets and rabetted jambs to receive and protect the guides.

Advantages

Steel rolling doors leave entire floor space available; are easily operated regardless of size, are economical in maintainance, are long lived, and are unaffected by climatic changes.

Construction Features

The drum, on which the curtain coils, revolves on *roller bearings* around a center shaft which is *stationary* and is supported by the end brackets. Highest grade oil-tempered flat motor springs, contained in the drum, are used to counterbalance the weight of the curtain. *Speed and ease of operation are assured by the use of roller bearings, and adequate provision for lubrication is supplied by alemite fittings installed on all principal bearings.* This drum also supplies continuous support to the top end of the door curtain.

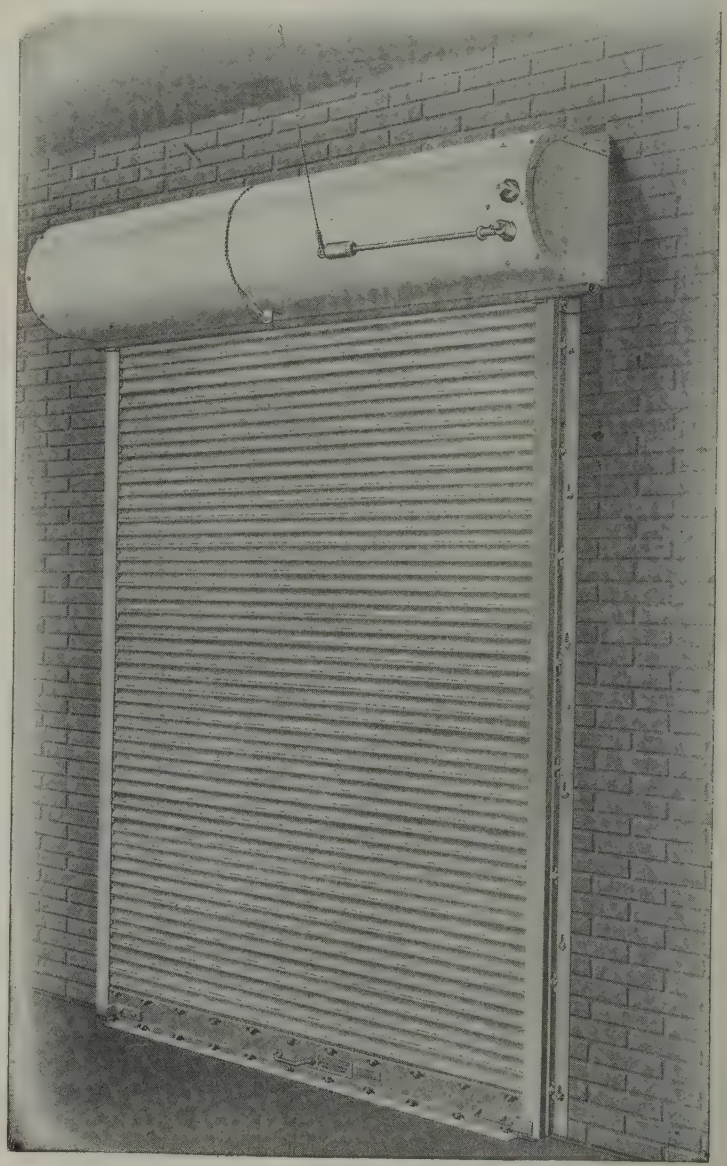
Curtains are constructed of interlocking slats formed from rust-resisting cold rolled steel galvanized to meet the requirements of the Underwriters' Laboratories, Inc. Malleable iron endlocks, riveted to the curtain edges, prevent lateral movement of the slats and provide a wearing surface in the guides.

Brackets are constructed of reinforced steel plates, this construction combining great strength with minimum weight, and readily adapting itself to the difficult and unusual requirements often encountered.

Castings are soft gray iron, malleable or steel, moulded from properly designed metal patterns and fully machined where required. Steel or malleable iron castings are used for all parts requiring great strength, and all gear shafts are of cold rolled steel.

Sheet metal hoods are furnished on all doors, and where required, doors are provided with means for locking.

Motor Operators—Assembled at our factory from standard units. The motor, magnetic solenoid brake, enclosed reduction gears running in oil, and power driven limit switch, are compactly mounted on a bed plate. Control equipment usually consists of a magnetic reversing switch in conjunction with one or more push button stations with "open," "close" and "stop" buttons. All gears employed on motor operated doors are machine cut from steel, and provision is made for emergency operation by hand.



Johnson Face of Wall Automatic Fire Door

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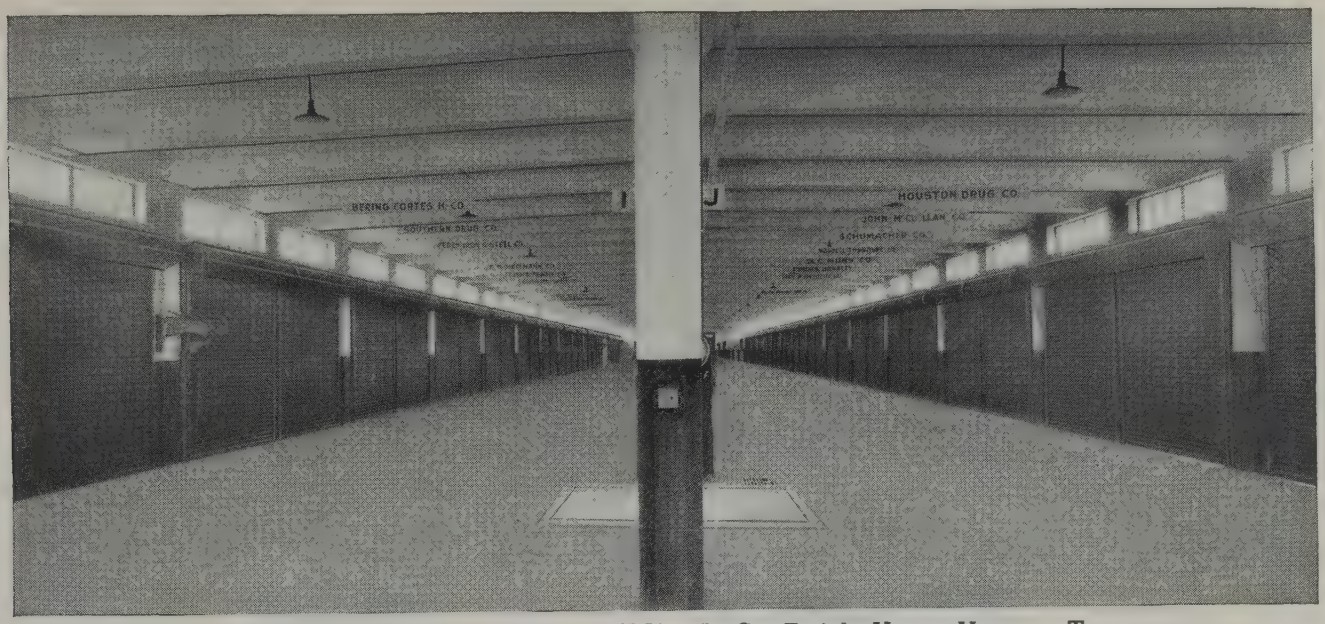
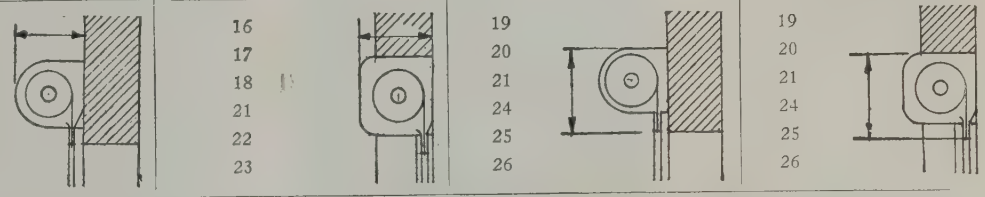


Johnson Steel Rolling Doors on M-K-T R.R. Co. Freight House, Houston, Tex.

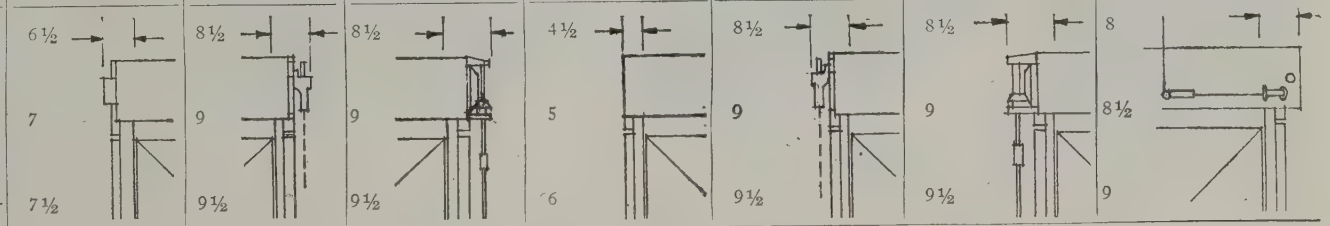
STANDARD CLEARANCES REQUIRED FOR DOOR COILS

Clear opening height, ft.	Face at wall doors, projection from wall, in.	Between jamb doors, dimension through wall, in.	Face of wall doors, distance above lintel, in.	Between jamb doors, clear opening to lintel, in.
Up to 9	16	16	19	19
9 to 12	17	17	20	20
12 to 16	18	18	21	21
16 to 18	21	21	24	24
18 to 21	22	22	25	25
21 to 25	23	23	26	26



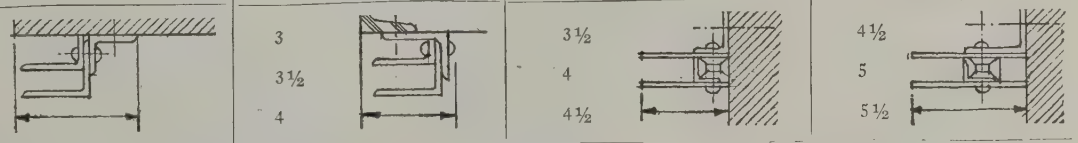
DIMENSIONS REQUIRED FOR STANDARD OPERATING MECHANISMS: MEASUREMENTS TAKEN FROM LINE OF OPENING JAMB

Opening width, ft.	Non-automatic doors, in.			Automatic doors, in.			
	Adjusting end	Chain end	Crank end	Plain end	Chain end	Crank end	Automatic end
Up to 10	6½	8½	8½	4½	8½	8½	8
10 to 14	7	9	9	5	9	9	8½
14 and over	7½	9½	9½	6	9½	9½	9



CLEARANCES REQUIRED FOR STANDARD GUIDES

Clear opening width, in.	Face of wall construction, in.		Between jamb construction, in.	
	For attachment to masonry	For attachment to steel	Plain end of door	Operating end
Up to 8	4½	3	3½	4½
8 to 10	5	3½	4	5
10 and over	6	4	4½	5½



Note: Dimensions given above include $\frac{5}{16}$-in. distance the front edges of guides set back from jambs.

SPECIFICATION NUMBERS FOR "JOHNSON" STEEL ROLLING DOORS AND SHUTTERS

Types	Face of wall installation			Between jamb installation						Where motor operated door is desired, specify simply—"Motor Operated"
				In prepared opening			In plain opening			
Service, non-aut.	Push-up	Chain	Crank	Push-up	Chain	Crank	Push-up	Chain	Crank	**Classification of Opening**
	100	110	120	10R	11R	12R	10P	11P	12P	
	700	710	720	70R	71R	72R	70P	71P	72P	"A" division fire wall openings
Underwriters' labeled automatic	600	610	620	60R	61E	62R	60P	61P	62P	"B" interior vertical shaft "C" corridor or room partition
	500	510	520	50R	51R	52R	50P	51P	52P	"D" exterior door openings
	400	410	420	40R	41R	42R	40P	41P	42P	window openings
Non-aut. labeled	300	310	320	30R	31R	32R	30P	31P	32P	"D" exterior door openings

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Steel Rolling Doors
CINCINNATI, OHIO

Products

"Mecco" Steel Rolling Doors.
"Mecco" Fireproof Kalamein Doors.
"Mecco" Fireproof Hollow Metal Windows.

Also manufacturers of Tin Clad Doors; Kalamein Smoke Screens; "Mecco" Spanish Metal Tile; Garages; Marquise; Shingles (tin, galvanized or copper), Painted and Galvanized Roofing, Siding and Corrugated Sheets.

TRADE-MARK

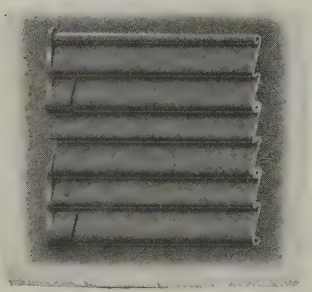
"Mecco" Steel Rolling Doors

Advantages—All-steel rolling doors have certain recognized general advantages over doors of other types. "Mecco" doors have other points of superiority that have won general recognition and are of special interest to architects, engineers, owners and contractors, viz.:

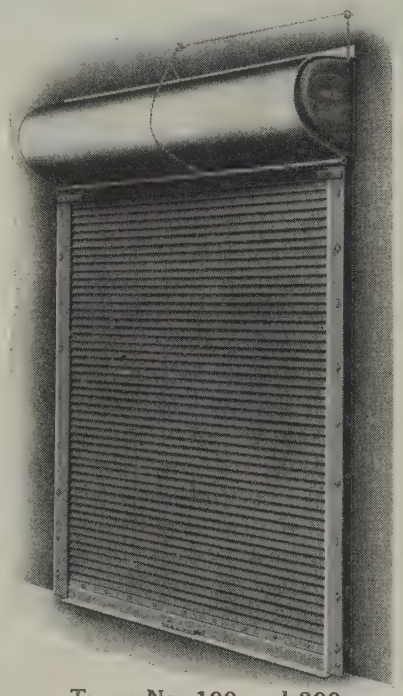
(1) Ease of erecting "Mecco" doors.

(2) Ease of operating "Mecco" doors.

(3) Extremely low maintenance cost.



Slats with Malleable End Locks Attached



Types No. 100 and 200
Labeled for interior opening not exceeding 80 sq. ft. in area or 12 ft. in width or height

Underwriters' Labeled Doors—The following "Mecco" doors are approved and labeled by the National Board of Underwriters for openings, methods of operation and mounting as listed:

Type No.	Operation	Location	Operated by
Fire Wall Doors			
100	Automatic	Face of wall	Handles
102	Automatic	Face of wall	Crank
104	Automatic	In opening*	Handles
106	Automatic	In opening*	Crank
Doors for Vertical Shaft, Corridors and Room Partitions			
200	Automatic	Face of wall	Handles
202	Non-automatic	Face of wall	Handles
204	Non-automatic	Face of wall	Chain
206	Automatic	Face of wall	Crank
208	Non-automatic	Face of wall	Crank
210	Automatic	In opening*	Handles
212	Non-automatic	In opening*	Handles
214	Non-automatic	In opening*	Chain
216	Automatic	In opening*	Crank
218	Non-automatic	In opening*	Crank
Doors and Shutters for Exterior Openings			
300	Automatic	Face of wall	Handles
302	Non-automatic	Face of wall	Handles
304	Non-automatic	Face of wall	Chain
306	Automatic	Face of wall	Crank
308	Non-automatic	Face of wall	Crank
310	Automatic	In opening*	Handles
312	Non-automatic	In opening*	Handles
314	Non-automatic	In opening*	Chain
316	Automatic	In opening*	Crank
318	Non-automatic	In opening*	Crank

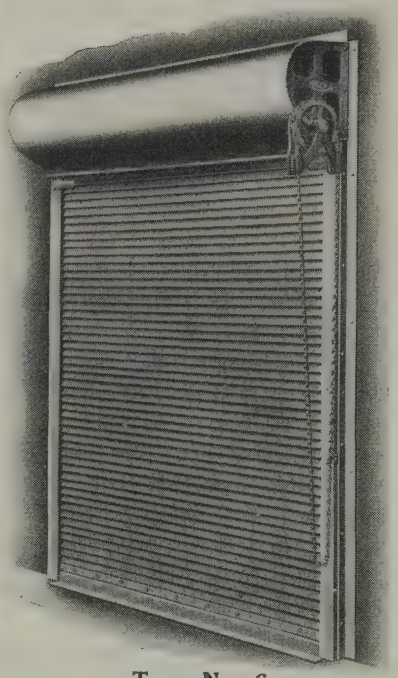
Note: "In opening" refers to doors under the lintel and between jambs.

Types of Installation—The type of installation most frequently used has the coil mounted on the face of the wall above the opening. Where headroom is limited, the coil and the brackets are mounted under the lintel and guides placed on the jambs. A large opening may be filled with several doors using removable posts.

Slat Construction—"Mecco" slats are rolled from galvanized copper bearing open hearth steel of best grade, with easy curves to prevent crystallization.

The modified Z-form makes this slat unusually strong and able to resist great pressure.

"Mecco" slats are extra wide, thus reducing the joints by 50%—a real advantage needing no explanation.



Type No. 6
Erected on face of wall, operation by chain and gear

Methods of Operation—(1) Handle on bottom bar. This is the push-up type, operated like a window shade. May be operated from either side of the opening. The area for the push-up type should not exceed 100 sq. ft.

(2) Operation by reduction gears and an endless chain.

(3) Operation by gears, shafting and crank.

(4) We also build electric motor operated doors. We must have a complete description of current to quote on or build motor equipment.

"Mecco" Service

Our engineers are at your service at all times to give any data required. Quotations will be furnished on any quantity or type. Get "Mecco" service and quality.

A Few Users of "Mecco" Doors

Cleveland Fruit Auction House, Big Four R. R., Cleveland, Ohio
U. S. Parcel Post Terminal Building, Cincinnati, Ohio
National Biscuit Co., Cincinnati, Ohio
Atlantic Coast Line R. R. Co., machine and erection shops, Montgomery, Ala.
Louisville & Nashville R. R. Co., freight house, Covington, Ky.
Donaldson Lithographing Co., Newport, Ky.
B. F. Goodrich Co., Akron, Ohio
Northern Ohio Power & Light Co., Akron, Ohio
Penn Public Service Corporation, Johnstown, Pa.
Allis-Chalmers Co., Cincinnati, Ohio
Wm. Powell Co., Cincinnati, Ohio
Henke Building, Houston, Tex.
Geo. L. Williams Building, Cleveland, Ohio
U. S. Industrial Alcohol Co., Peoria, Ill.
F. W. Albrecht Grocery Co., Warehouse, Akron, Ohio
City Garage, Houston, Tex.
Arrow Electric Company, Hartford, Conn.
Burbank Hospital, Burbank, Calif.
Florida Agricultural Supply Company, Orlando, Fla.

Continued on next page

"Mecco" Kalamein Doors

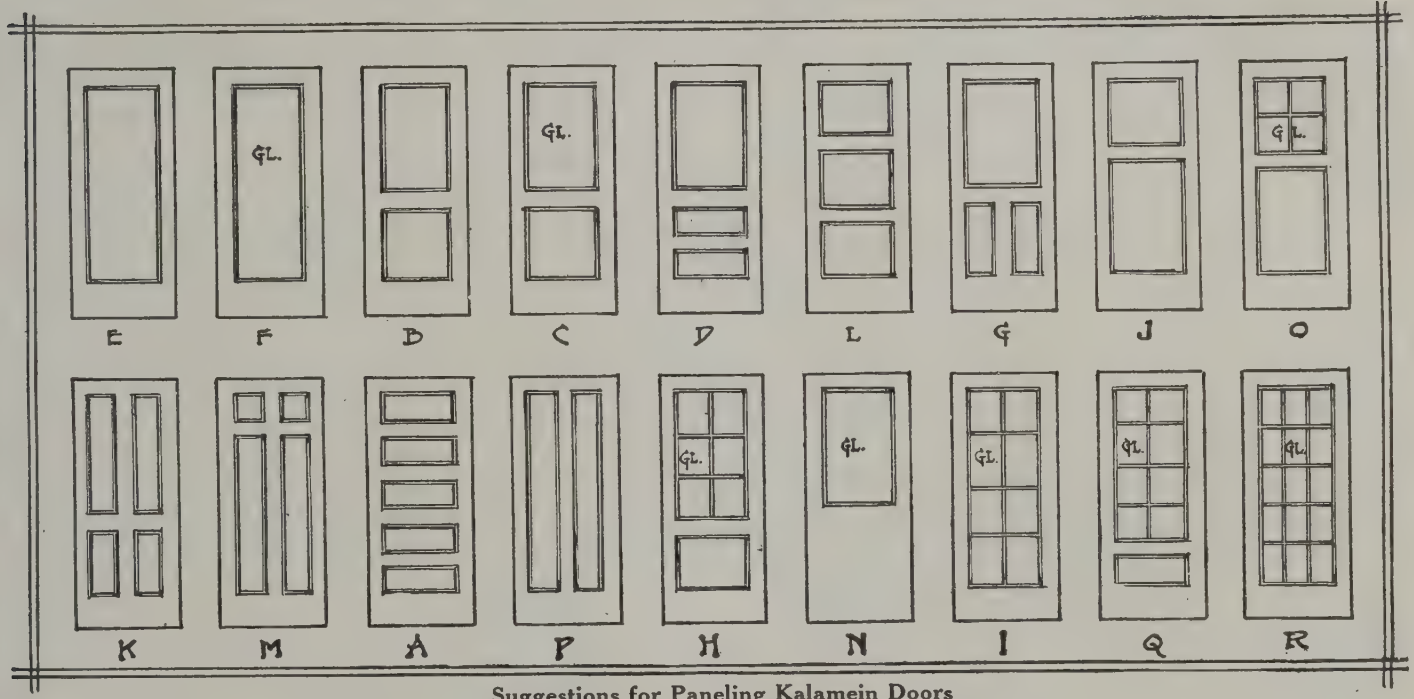
We manufacture a complete line of kalamein doors, covered with stretcher leveled kalamein iron, copper or bronze. Frames may be wood core, metal covered, or of steel, either hollow or solid.

Doors covered with kalamein iron are ordinarily supplied with a prime coat of paint. We, however, can supply any desired enamel finish, or doors grained in imitation of any kind of wood. Cut shown to right is of doors covered with No. 20 gauge bronze.

Labeled Kalamein Doors

We can supply labeled kalamein doors or frames. Doors with metal panels may be labeled for "Vertical Shaft," "Corridor" openings or "Fire Escape" openings. Doors with glass can not be labeled for vertical shaft.

Installation of Bronze Kalamein Doors



Suggestions for Paneling Kalamein Doors

Ball Gymnasium, Indiana State Normal School, Muncie, Ind.

"Mecco" Hollow Metal Windows

We manufacture a complete line of hollow metal windows of every type, labeled by the National Board of Fire Underwriters.

Double Hung Type—The cut to the left shows an installation of "Mecco" double hung windows.

We have hundreds of such installations in high class office buildings, terminal buildings, stores and other semipublic and private structures.

The sash of windows are made to slide perfectly and yet the design and workmanship are such as to exclude the elements. "Mecco" windows are labeled.

MAJESTIC IRON WORKS, INC.

Standard and Underwriter's Labeled Steel Rolling Shutters and Doors; Electric Motor Equipment for Standard Doors

TELEPHONE
RANDOLPH 7375, 7376

559-561 West Fulton Street
CHICAGO, ILL.

Products

MAJESTIC STEEL ROLLING SHUTTERS; ELECTRIC MOTOR EQUIPMENT for standard doors.

Majestic Steel Rolling Shutters

Important Features—The shutter revolves on hardened steel roller bearings which facilitates operation so that any one can raise or lower shutter with ease.

Spool-shaped flanged gears, each end of barrel, which eliminates friction and make curtain self-aligning when revolving.

One-piece sprocket and pinion gear enclosed in housing. Gear lubricated with cup grease.

Hood angular shaped; acts as water shed, protecting gears and mechanism against dirt and weather conditions. No gears exposed.

Bracket bearings on wall self-adjusting should building settle.

Curtain made of No. 16, 18, 20 or 22 gauge galvanized copper-bearing steel which prevents corrosion. Slats interlocking type, malleable iron ends, operating in heavy iron guides.

Each shutter has a counterbalancing helical oil tempered spring. Size and strength determined by size of shutter; enclosed in steel tubing which protects it against atmospheric conditions.

Curtain fastened to barrel on adjustable rings with special attachments—no holes drilled in slats. Bottom of curtain strong and rigidly built.

Guides of extra heavy material able to withstand heavy bumps.

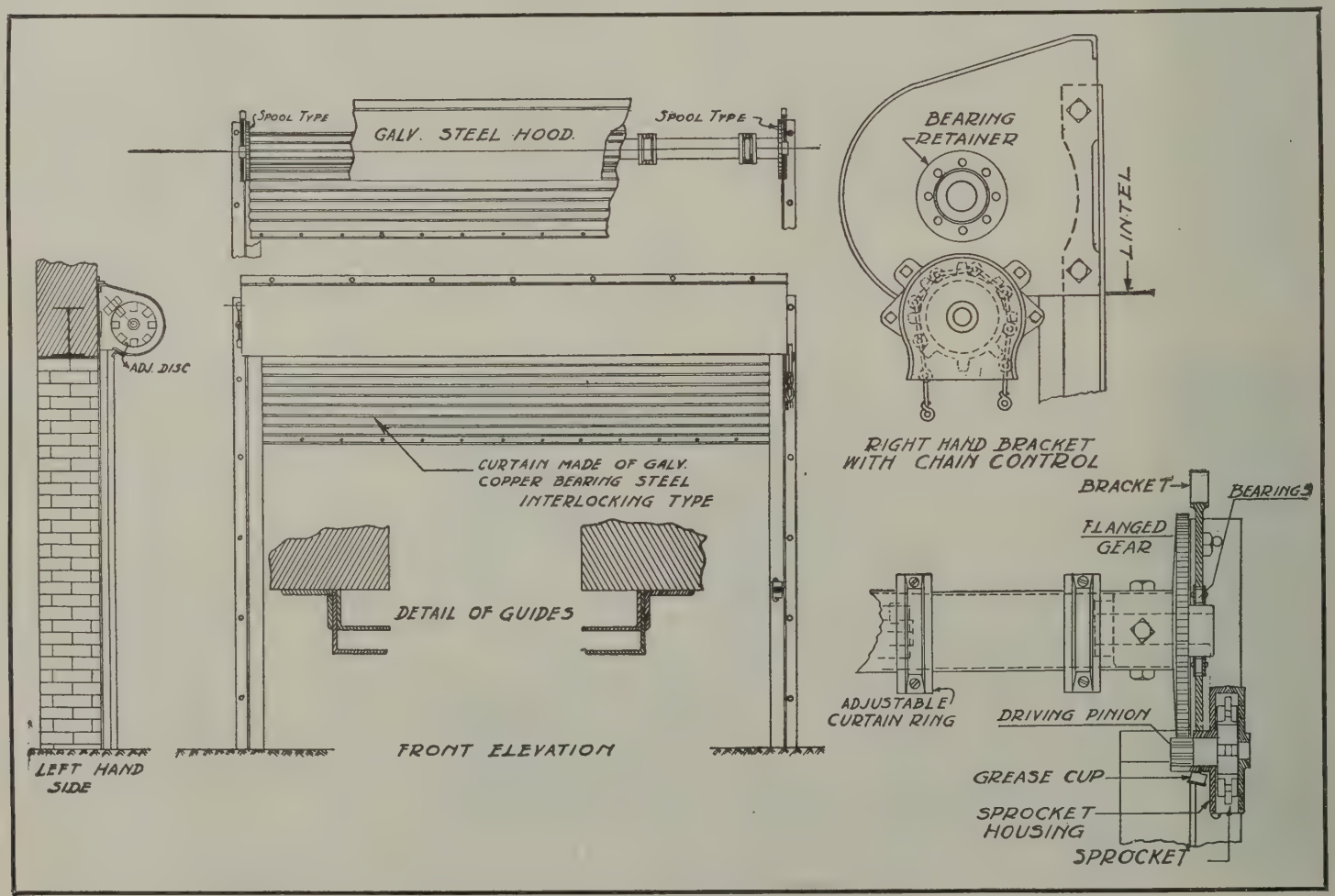
Types—Brackets either on face of wall, under lintel or hung on ceiling.

Installation—Simple to install; any mechanic with ordinary tools can set up. Instruction sheet furnished. Special locking attachment for each shutter.

Service—Consult with us regarding your rolling shutter problems. Our engineers are competent to recommend the type best suited for the conditions existing.

Electric Motor Equipment for Standard Doors

Electric motor operator fully equipped for electrical operation and control, including all standard equipment: motor, limit switch, automatic control, automatic safety device, push button station, etc. All equipment guaranteed by the highest grade manufacturer of electrical motor devices. Hand emergency chain operator is part of the motor equipment.



Standard Detail Majestic Steel Rolling Shutter

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

Manufacturers of Rolling Steel and Wood Doors and Shutters

TELEPHONE
CALEDONIA 8970, 8971, 8972
CABLE
"WILCORP, NEW YORK"

GENERAL OFFICES
11 East 38th Street
NEW YORK, N. Y.

FACTORY
NORFOLK, VA.

BRANCH OFFICES
ATLANTA, J. M. VAN HARLINGEN
BOSTON, THE J. G. WILSON CORPORATION
BUFFALO, THE J. G. WILSON CORPORATION
CHICAGO, H. B. DODGE & CO.
HOUSTON, WALCOTT & MAISEY
LOS ANGELES, THE J. G. WILSON CORPORATION
PHILADELPHIA, THE J. G. WILSON CORPORATION
PITTSBURGH, H. H. CHARLES
SAN FRANCISCO, THE J. G. WILSON CORPORATION

AGENTS IN PRINCIPAL CITIES

Products

ROLLING STEEL DOORS and SHUTTERS, Wilson Standard and Underwriter Labeled.

ROLLING WOOD DOORS and SHUTTERS.

For Partitions and Wardrobes, see pages B2683-2685; for Blinds and Awnings, see page C3839.

TRADE-MARK

Where Wilson Rolling Steel Doors Are Used

Wilson rolling steel doors and shutters are designed to meet all classes of service; first, effective closure of openings against weather and intrusion, second, closure of openings where fire doors are required.

Wilson Interlocking Slat Curtain

The Wilson curtain, that part of the door closing the opening, is formed of a series of interlocking slats of Wilson special copper-bearing galvanized steel, conceded by all metallurgical authorities to be more effective in retarding corrosion than any other similar product. By actual experience and practical test Wilson doors will greatly outlast all others.

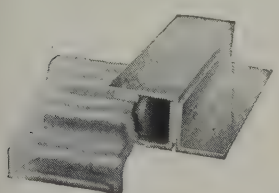
Wilson interlocking slats are made in the three following types:

"Big 4" Interlocking Slat—This slat has distinct advantages possessed by no other slat. Being of corrugated form it has far greater rigidity than the ordinary channel form slat. Its design permits of end-shields which actually do take all wear from that part of the curtain sliding in the grooves. Every part of the Wilson end-shields functions in a definite way, adding considerably to the life of the door.

"Big 4" Interlocking Slat

Deep corrugations also protect the interlocks from damage when hit by moving vehicles. Kinks and dented interlocks will materially affect the operation of other doors.

An exclusive Wilson feature is the patented safety grooves and wind locks which are standard equipment on doors over 14 ft. in width. Doors so equipped cannot possibly be blown from grooves and will withstand any conceivable wind pressure without excessive deflection of the curtain, at the same time minimizing possible damage to curtain from whatever cause.



Safety Groove and Wind Lock

The wind pressure necessary per square foot of shutter to overcome the resistance of Wilson safety knobs is as follows:

18-ft. span 1000 lb. 24-ft. span 500 lb.
30-ft. span 300 lb.

A wind velocity of 120 miles exerts a pressure of 43 lb. per sq. ft.

Curtain has same appearance on either side, thus preserving symmetry when it becomes necessary to hang some doors on inside and others on outside of same elevation.

Made in Nos. 22, 20, 18 and 16 gauge—depending wholly on size of opening.

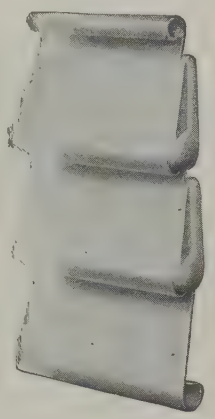
"Little 4" Interlocking Slat—Similar to "Big 4" slat in appearance and design; the depth of corrugation being slightly less, but possessing the same advantages as the "Big 4." Used in small doors for openings where coil must be made as small as possible and for underwriter labeled exterior wall doors. Fitted with fire stops when necessary.

Made in Nos. 22 and 20 U. S. standard gauges.

No. 2 Interlocking Slat—Especially designed for use on underwriter labeled fire doors and other doors installed on interior of buildings when not subjected to wind pressure or unusual hard service.

Made in Nos. 20, 18 and 16 U. S. standard gauges.

The curtains of the underwriter type are equipped with fire stops on the ends of slats, baffle plates in the hood, and (where permitted) automatic devices which cause them to close in case of fire.



No. 2 Interlocking Slat with Fire Stops

Operation of Wilson Rolling Steel Doors

Wilson rolling steel doors may be operated from either one or both sides of opening. Small doors are usually raised and lowered by handles on bottom bar, and large doors are usually operated by chain gear, crank gear, or electrically.

Self-coiling Operation—Wilson types S. C. 11 and 22 are operated by hand by means of handles on bottom bar of door. This type is not recommended on openings over 10 ft. wide or more than 8 ft. in height, or exceeding 80 sq. ft.

Chain or Crank Operation—Should be used for doors larger than the limitations of self-coiling operation. Wilson types C. G. 11 and 22 are operated by means of chain and gear. Wilson type K. G. 11 is operated by crank gear. The chain operated door has been universally adopted as the standard service door.

Motor Operation—Coming into general use since the perfection of Wilson super-equipment, constructed entirely of General Electric products, is being used on doors of most any size and type depending largely on the use of the door.

In view of details envolved, we solicit the opportunity of working on any such installations to insure provisions being made for the proper equipment at a minimum cost.

Continued on next page

Hinged Wicket Doors

Standard size, 2x6 ft., may be placed in any door. Designed so that wicket door with its frame can be swung back out of way with a minimum effort. Substantially built and very practical—used for passage when opening is a means of exit to part of building in which located.

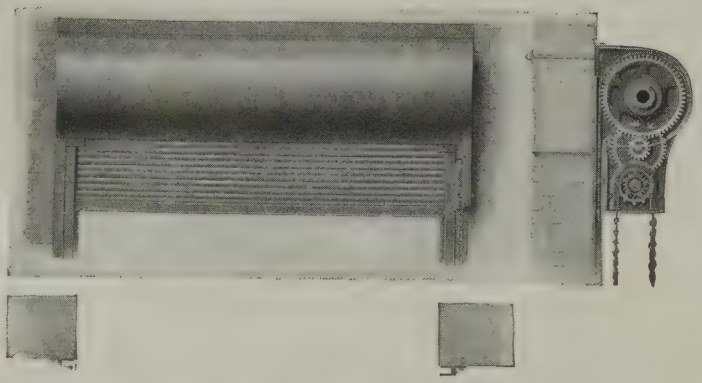
Wilson Rolling Steel Fire Doors (Underwriter Labeled)

Exceptionally durable and equipped with special fire protective devices. Close automatically in case of fire and are approved and labeled by the Underwriters' Laboratories, Inc. for the following services:

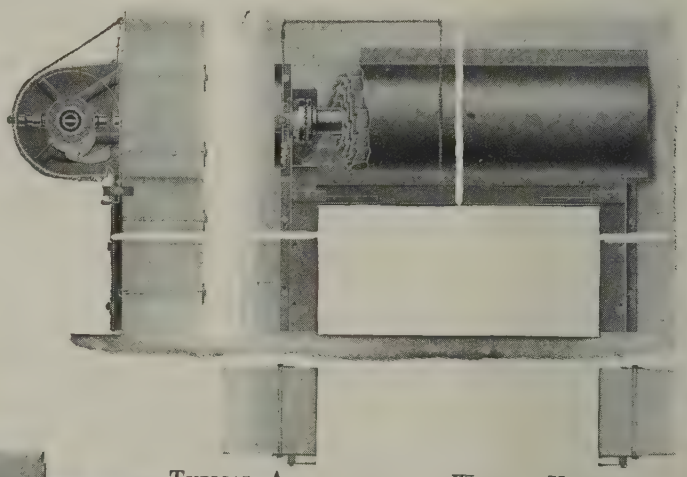
Vertical Shafts, Corridors and Room Partitions—Area of opening not to exceed 80 sq. ft.; neither width nor height of opening to exceed 12 ft. Curtains may be hung on face of wall or between jambs, self-coiling or crank operation, and where required are automatic closing in case of fire. Specify Wilson type Nos. 21 to 26, inclusive, interlocking slat No. 2, No. 20 gauge.

Fire Walls—Area of wall opening not to exceed 80 sq. ft.; neither width nor height to exceed 12 ft. Two doors are required and may be hung on face of wall or between jambs, self-coiling or crank operation, and close automatically in case of fire. Specify Wilson type Nos. 31 to 35, inclusive, interlocking slat No. 2, No. 16 gauge.

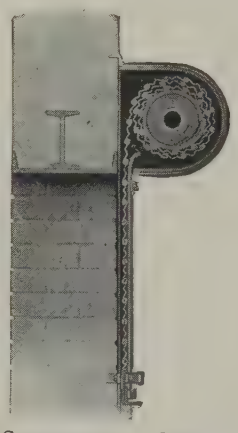
Exterior Walls—Area of wall opening not to exceed 100 sq. ft.; neither width nor height to exceed 12 ft. Curtain may be hung on face of wall or between jambs,



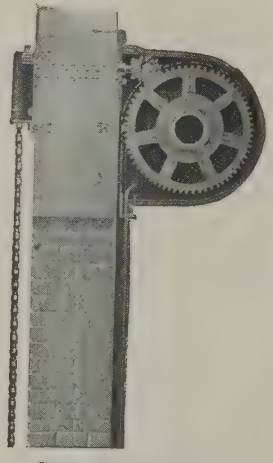
Chain Gear Operation, Type C. G. 11



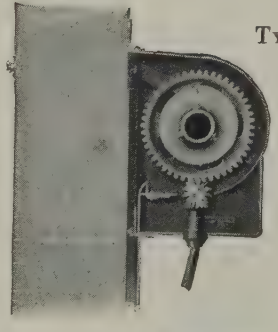
Typical Application of Wilson Underwriter Labeled Door



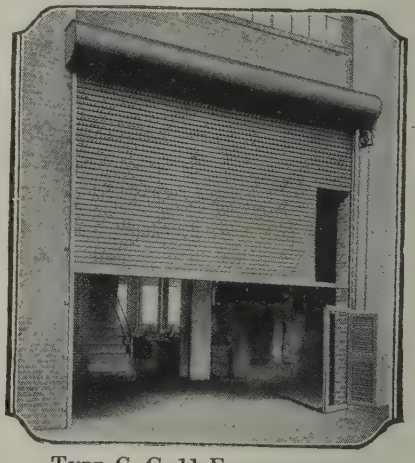
Self-coiling Operation, Type S. C. 11



Chain Operation Through Wall, Type C. G. O. 11



Crank Operation, Type K. G. 11



Type C. G. 11 Equipped with Wicket Door

Coils and grooves are shown on face of wall but can be located between jambs if desired

SCHEDULE OF COIL AND GROOVE CLEARANCES

Underwriter Labeled Doors				Self-coiling Operation Wilson Standard Doors				Chain or Crank Operation Wilson Standard Doors			
Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.	Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.	Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.
6	15½	3 to 6	6	6	14½	3 to 6	6	10	16½		
8	16½	7 to 12	6½	8	15½	7 to 10	6	12	18½		
10	18½			10	15½			14	19½		
12	19½			12	18½			16	21½	6 to 12	6½
								18	22½	13 to 15	7½
								20	23½	16 to 20	7½
								22	24½		
								24	25½		
								26	26½		

Dimensions shown are recommended standard sizes, subject to modification.
Advise us your requirements. We will send representative or details to assist you.

Details of Wilson Rolling Steel Doors

Continued on next page

self-coiling, chain or crank operation, and, where permitted, may be automatic closing in case of fire. Specify Wilson type Nos. 41 to 51, inclusive, interlocking slat "Little 4," No. 22 gauge.

Automatic Closing Device—Where required, doors close automatically by the fusing of one of two links located at the head or side of opening, and near the ceiling.

Doors close easily on the sill and can be raised immediately after without difficulty. Automatic device can be reset and new link inserted without removing the hood or dismantling the door.

Grooves and bottom bar of door are provided with slotted holes to allow for expansion. Special fusible galvanizing is applied to grooves, allowing freedom of movement during expansion. Bolts for brackets and grooves are bolted through wall or attached to iron inserts furnished and installed by others.

Consultation—Inasmuch as fire doors usually present problems and difficulties, it is suggested that we be consulted for definite details and requirements. A door may be labeled, but will not pass inspection because installation does not meet requirements of the local board, due to construction of opening or conditions surrounding opening.

Wilson Rolling Wood Doors and Shutters

Especially made to withstand the corrosive fumes so destructive to iron and steel. Recommended for roundhouses, powerhouses, chemical plants, refrigerating plants, etc.

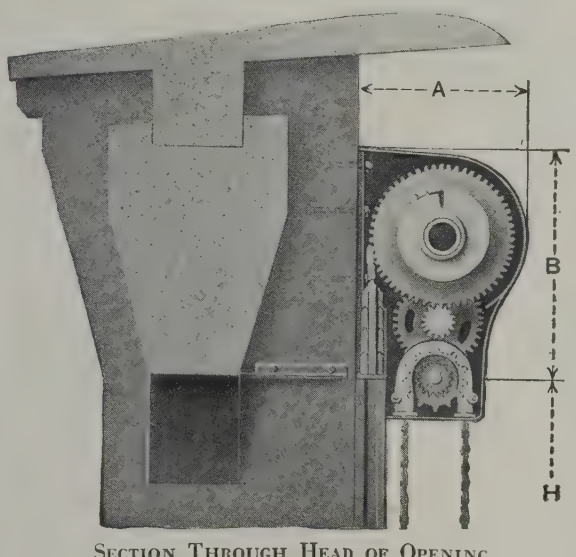
Heavy Slat Doors—Made of wood slats 2 in. wide and about 1⅛ in. thick, threaded on bronze bands running from top to bottom about 18 in. apart. Each band is riveted to top slat and attached at bottom to a strong spiral spring anchor of phosphor bronze. This construction allows for shrinking and swelling of door due to atmospheric changes. It requires less than one minute to raise or lower the door.

The doors are treated with carbolineum, reducing to a minimum any expansion or contraction, and acting as a preservative.

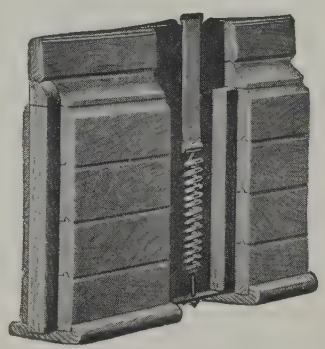
Light Slat Doors—Similar to heavy slat type except slats are $\frac{13}{16}$ in. thick. Used on smaller openings or where not subjected to as heavy wear as the heavy slat door.

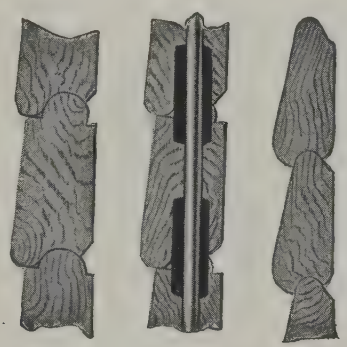
SCHEDULE OF COIL SIZES

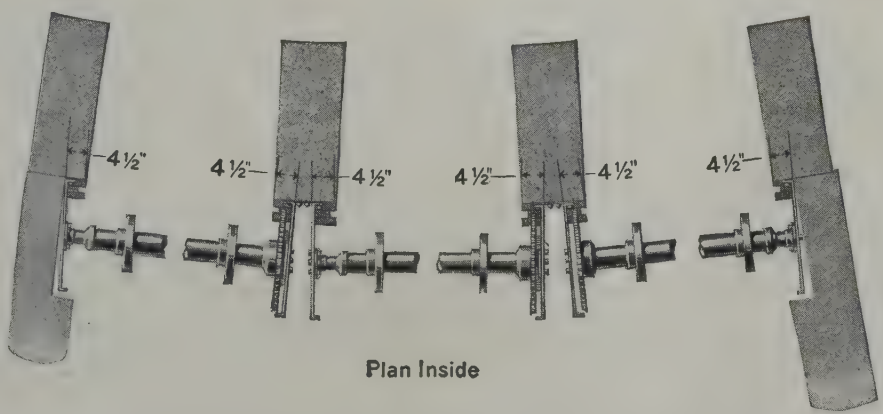
Height of opening, ft.	Heavy slat, in.		Light slat, in.	
	A	B	A	B
8	18	26½	14	20½
10	18	26½	15	21½
12	21	29½	16	22½
14	22	30½	16	22½
16	23	31½	18	24½
18	23	31½	19	25½



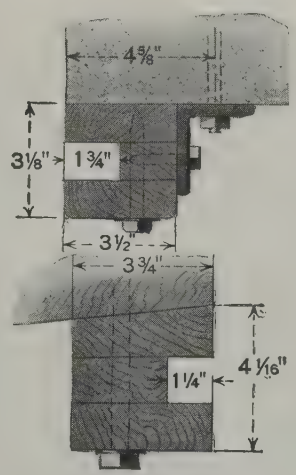
Section Through Head of Opening


Section of Bottom Bar Showing Bronze Anchor Spring and Band


Heavy Slat Light Slat



Plan Inside



Section Through Light and Heavy Slat Door Grooves

Details of Wilson Rolling Wood Doors

THE VARIETY ROLLING DOOR CO.

Manufacturers of Steel Rolling Doors

FACTORY AND GENERAL OFFICE

221 East Broadway, WESTERVILLE, OHIO

Non-labeled Rolling Doors

Types—Made in construction types: Nos. 20 DM, DH, DC and DHTW; Nos. 41 UM and UH.

Construction No. 20—Simple type of non-labeled shutter mounted on face of wall. It is most frequently used on exterior openings not exposed to fire hazards, and is not automatic unless so specified. Made in all gauges according to size of the opening. Operated manually or with chain hoists. Can also be operated with crank arrangement or by chain hoist from opposite side of wall.

Construction No. 41—Simple type of non-labeled shutter mounted under the lintel. Uses, sizes and operation are the same as No. 20 except that this type is not operated with crank or by chain from opposite side.

Labeled Rolling Doors

For Openings in Exterior Walls—Labeled for openings not exceeding 100 sq. ft. in area or 12 ft. in width or height. Whenever automatic labeled doors are supplied on openings of such size as to necessitate the use of auxiliary gearing, automatic drop hoists are supplied.

Made in construction types: Nos. 60 and 61 DM, DH, UM, UH, DC and DHTW.

Construction No. 60—Simple type of labeled shutter mounted on face of wall or under lintel as desired. This type is not automatic and is generally used on exterior openings, adjacent to a fire hazard which is not sufficiently close to necessitate the use of automatic shutters. Similar in appearance and operation to Type No. 20 or No. 41, with the exception that all requirements of the Underwriters' Laboratories have been met and the door bears their label.

Construction No. 61—Identical in construction with No. 60, except that it is equipped with automatic closing device. Generally used on exterior openings where fire hazards are sufficiently close to cause the Underwriters to demand automatic closing devices.

For Openings in Vertical Hatches and Corridor or Room Partitions—Labeled for openings not exceeding 80 sq. ft. in area or 12 ft. in height or width. Made in construction types: Nos. 33 DM, DH, DHTW, UM and UH.

Construction No. 33—Made in No. 20 gauge or heavier, according to size of opening. It is always automatic. Must have continuous end locks and baffle plates, and governor. Mounted either on face of wall or under lintel, and is operated manually or by means of chain hoist from either side of wall.

For Openings in Fire or Dividing Walls—Labeled for openings not exceeding 80 sq. ft. in area or 12 ft. in height or width. To get maximum credit, doors must be installed on both sides of wall. Made in construction types: Nos. 33-33 DM and DH; Nos. 33-3 UM and UH.

Construction No. 33-33—Similar in construction to No. 33, except that it is always made of No. 16 gauge material and is labeled by the Underwriters for use on fire walls. Mounted on face of wall only, and is operated either manually or by means of chain hoist.

Construction No. 33-3—Similar in construction to No. 33-33, except that it is mounted under the lintel only.

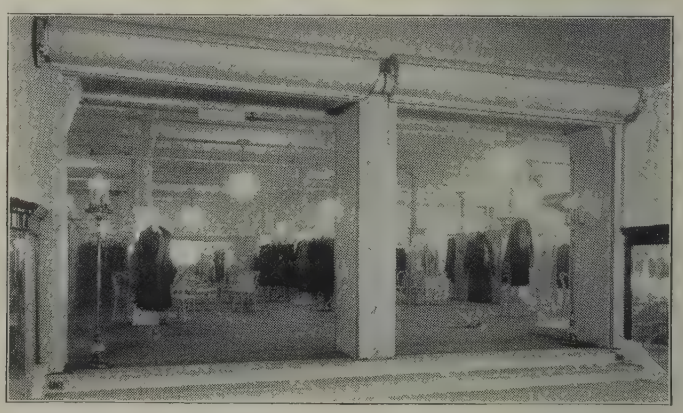
Motor Operated Doors—All service doors may be equipped with motors. The motor units are compactly designed, of sturdy construction and comprise all reduction gears, magnetic brake, limit switches, reversing panel. Emergency hand chain, push buttons or knife switches can be supplied. Conduits or wiring are not included with power units.

Explanation of Construction Letters

The construction numbers and letters used in the legends of the illustrations on the following page completely identify each type and style of door. The first letter refers to the type—"D" indicates that the door is mounted on the face of the wall; "U" indicates that mounting is done under the lintel. The second letter always refers to the method of operation—"M" for manual, "H" for hoist, and "C" for crank. Where shutters are placed on one side of the wall and operated from the opposite side by a chain hoist, the letters "TW" are used. The numbers refer to the particular classification and use for which the door is designed.

Wrigley Building, 35th Street and Ashland Avenue, Chicago, Ill.

Shipping room openings enclosed by 11 rolling doors, 14 ft. 6 in. x 7 ft. 6 in., chain operated. Large doors of similar construction used on their garage on opposite side of Ashland Avenue



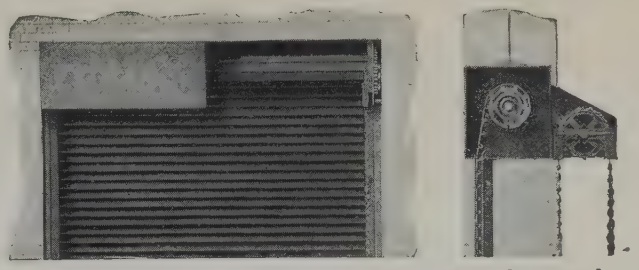
E. E. Atchinson Department Store, Minneapolis, Minn.

BERTRAND & CHAMBERLAIN, Architects

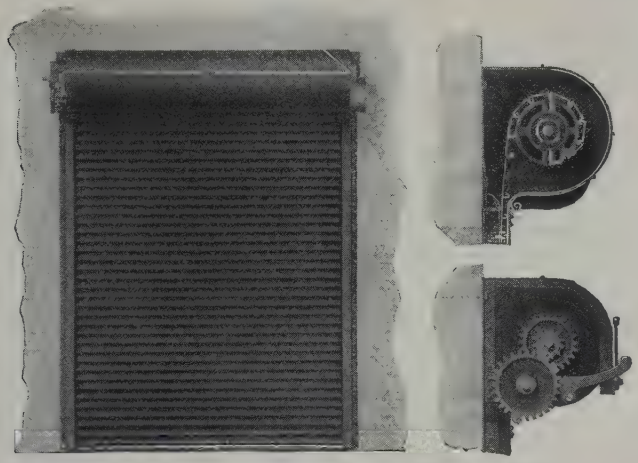
Eighteen rolling doors approximately 10x8 ft. placed on fire walls throughout this building. All doors manually operated, automatic, labeled and equipped with centrifugal governors

Continued on next page

No. 20 DH—Non-labeled, Chain Operated
No. 20 DM similar to above, except manually operated
No. 60 DH similar to No. 20 DH, except labeled
No. 60 DM similar to No. 20 DM, except labeled

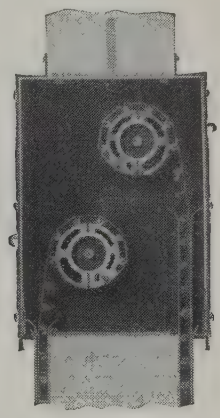


No. 41 UH—Non-labeled, Exterior, Chain Operated
No. 41 UM similar to above, except manually operated
No. 60 UH similar to No. 41 UH, except labeled
No. 60 UM similar to No. 41 UM, except labeled

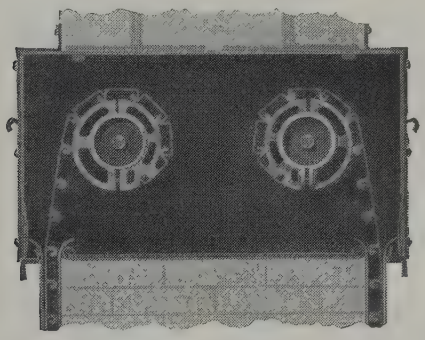


No. 33 DM—Labeled, Manually Operated, Automatic Closing
No. 33 DH similar to above, except chain operated
No. 61 DM similar to No. 33 DM, except used on exterior walls
No. 61 DH similar to No. 33 DH, except used on exterior walls
Nos. 33 and 61 DHTW similar, except shutter and hoist are on opposite sides

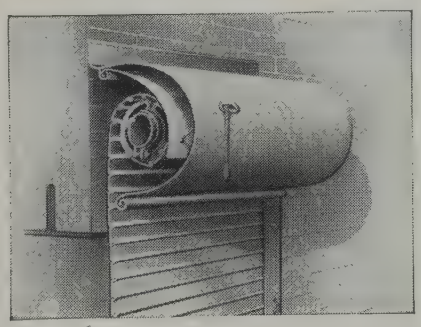
No. 33-33 DM—Labeled, Fire Wall, Manually Operated
Approved for doors on both sides of wall.
No. 33-33 DH similar, except chain operated



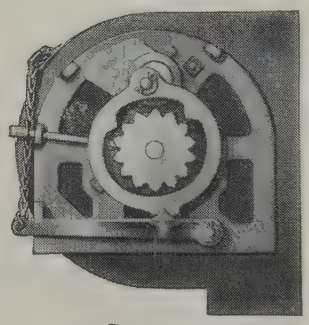
No. 33-3 UM—Labeled, Fire Wall, Manually Operated
Approved for doors on both sides of wall.
No. 33-3 UH similar, except chain operated



No. 33-3—Labeled, Fire Wall, Automatic Closing
Similar in construction to Type No. 33-33, except mounted under lintel only. In order to obtain full credit from the Underwriters where openings occur in fire walls it is necessary to protect each opening on each side of the wall



Baffle Plate
Hinged to outer hood and held in raised position. On fusing of link, baffle drops on coil, closing space between slats and wall and forming an effective flame stop



Governor
Escapement oscillating type out of engagement when door is operated normally either up or down; automatically engaged on fusing of link. A positive safety device

Chicago Railway Co. Car Terminal, Chicago, Ill., where 24 Variety Steel Rolling Doors Are Installed

ALLEN & DREW, INC.

Specializing Entirely in Motor Operation of Doors and Gates

43-45 Brookford Street
CAMBRIDGE, MASS.
NEW YORK OFFICE, 50 Church Street

MOTOR OPERATION OF DOORS A SPECIALIZED ENGINEERING PROBLEM

Manufacturer of Electric Door Operator and Doors Only

Our entire plant is devoted exclusively to the manufacturing of motor driven units and apparatus for the operation of doors of all types, gates, theater curtains, gymnasium division, movable bleachers for gymnasiums, movable partitions, etc.

If architects so desire, we will also manufacture doors as well as the operator in order to make a complete installation.

Our doors are made to special details which we have found through years of experience will stand up best under constant use and abuse, or to architects' details if so desired.

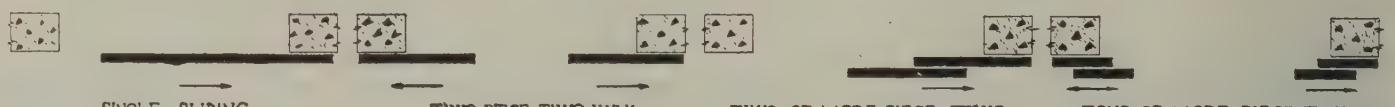
We always install our own apparatus whether we supply only the apparatus or both the door and apparatus.

Almost Every Door Presents a Different Problem of Operation and Mechanism

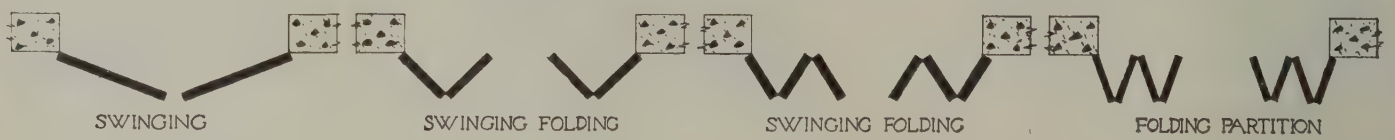
It is rarely that doors, even of the same character, in different installations can be operated in exactly the same manner. The way the doors are installed; the amount of headroom and space at the sides; the speed of operation desired; all help to determine the size of the motor and the general arrangement of the operating mechanism. The means of operating each door is therefore carefully considered and the best method of operation and the size of the unit is then determined.

TYPES OF DOORS WHICH OUR EQUIPMENT OPERATES

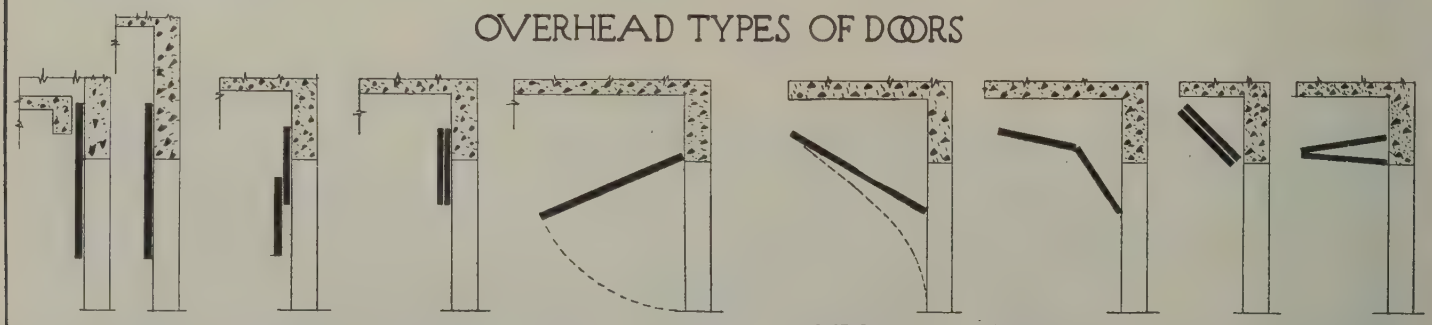
HORIZONTAL TYPES OF DOORS



VERTICAL FOLDING DOORS



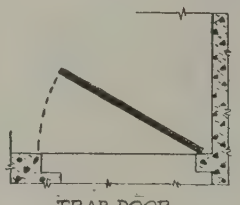
OVERHEAD TYPES OF DOORS



Types of Doors Recommended for Various Purposes

GARAGES—Sliding, swinging, vertical-sliding and swinging-folding types, see Allen & Drew Pages 3, 4, 5, 6 and 8.

WAREHOUSES, INDUSTRIAL PLANTS, PIER SHEDS—Turnover, and fold-up and canopy types, see Allen & Drew Pages 7 and 9.



AIRPLANE HANGARS—Larger sliding types, see Allen & Drew Page 4.

SCHOOL BUILDINGS—For dividing gymnasiums, etc., Vertical sliding types, see Allen & Drew, Page 11.

FIRE STATIONS—Two-way, two-speed sliding, also swinging types, see Allen & Drew Pages 4 and 8.

Continued on next page

ALLEN & DREW MOTOR DRIVEN UNITS

We Manufacture Six Sizes of Motor Units to Meet All Conditions

In order to fully cover the power requirements of every type of door we make six different sizes of machines. These have motors ranging from ¼ to 20 hp. Doors of practically any size and type can be operated by these machines. We are operating doors for openings 90 ft. wide and some weighing up to 15 tons.

The units are numbered from 100 to 600 as follows:

No. 100 powered by ¼ to ½ hp. motor.
No. 200 powered by ¾ to 1½ hp. motor.
No. 300 powered by 1½ to 3 hp. motor.
No. 400 powered by 3 to 7½ hp. motor.
No. 500 powered by 7½ to 12 hp. motor.
No. 600 powered by 12 to 20 hp. motor.

Guaranteed for One Year

Each machine is guaranteed for one year after installation. If anything wrong is discovered in the operation of the door due to a defective machine or through faulty installation during time of guarantee we will repair or put the machine in first class operating condition.

Quality and Cost

We endeavor to make the very best machine it is possible for us to produce both as to quality of materials, size of parts, as well as workmanship. Although the cost is thereby somewhat more than a cheaper made machine, it is amply repaid when perfect and constant operation and lack of repair bills are considered.

THE SPECIAL FEATURES OF THE ALLEN & DREW MOTOR DRIVEN UNITS

Worm Gear Drive Assures Safety

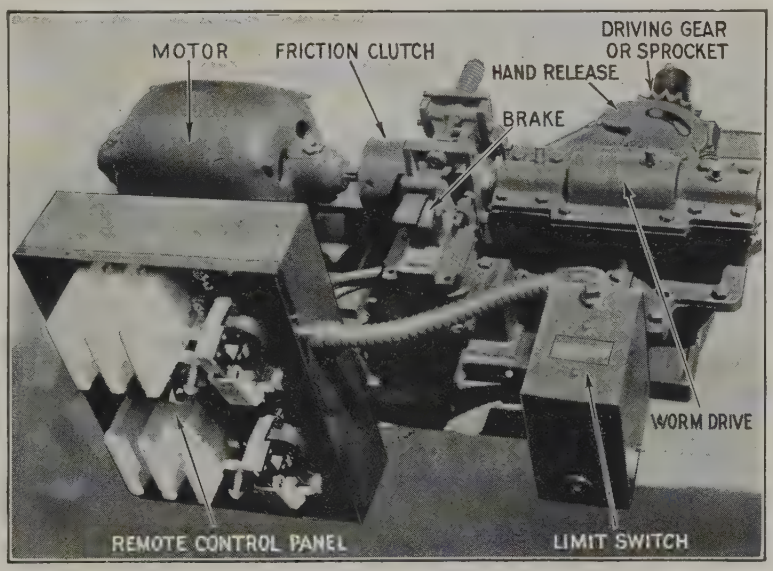
All our machines are of the worm type drive. By the use of the worm drive the load is always held and cannot release itself even though the magnetic brake be noneffective. The worm gears are of phosphor bronze and worms of hardened steel, the longest wearing worm drive construction possible.

The machines are all directly connected with the doors through the gears and there are no friction clutches or belts at this point to cause trouble and annoyance.

The overhead types of doors are counterweighted and include an equalizing shaft to which the door supports are attached and to which the worm gear drive is directly connected.

Importance of the Special Safety Friction Clutch

One of the most important and distinctive features of the units is the *safety friction clutch.* The motor is connected through the clutch to the worm shaft. The clutch is so adjusted that at a predetermined pressure, more than that required to operate the door, the clutch will slip and disconnect the machine as long as the pressure is applied. That is, if any obstruction, such as a person, were to press against the door as it was closing or opening, the added pressure would cause the disconnection of the motor through the clutch. This clutch can be accurately adjusted to operate under any pressure desired.



View Looking Down on One of the Units

The clutch consists of a seven-plate friction clutch of the oil type in which the pressure is applied by a hardened coil spring. This spring is adjusted accurately by an adjusting nut in order that the proper slippage may be obtained in starting the door from rest and in case of being obstructed. It will also pick up the load gradually and resume its normal operation after the obstruction has been removed.

Other Safety Features

The units are equipped with automatic stop, automatic brakes, and any other safety devices necessary, which may vary according to the type of door to be operated.

All the outfits may be released, usually by a convenient hand chain and then the door may be hand operated.

Electrical Equipment

All of our units are fully automatic in operation, involving no manual effort other than operating the push buttons. The operating of the doors will vary from 1 ft. per second to 3 ft. per second according to design and clearances.

The control is furnished either in remote control two-button momentary contact, the movement of the door stopping on releasing the button, or three-button maintain contact, the stop button for stopping the door at any point in its travel other than full open and full closed, these positions being controlled by the limit switches.

Each unit is fully equipped with limit switching devices, solenoid brakes and an emergency hand operator.

The control stations should always be in a position that will give the attendant an unobstructed view of the door opening and, if possible, for a considerable distance outside of the opening. This gives the attendant sufficient opportunity to reverse the action of the door in case he should be closing it in the path of an incoming automobile.

Automatic Electric Floor Trips

When so desired the doors can be operated automatically by the movement of motor vehicles entering or leaving the building. This is accomplished by our standard floor trip which will function when a car passes over it, opening the door and closing it when the car has passed over the trip on the other side of the building. For other than private garages we advise a special floor trip which will prevent the door from closing in the path of a following automobile.

These trips are so constructed that the lightest motor car will operate them but cannot be operated by pedestrians. The trips are watertight and will operate through snow or thin ice. The trips can be arranged to be disconnected by a switch inside the building when it is desired to use the push button control.

Signal Lights

In conjunction with the operation of the doors, it is desirable, especially where floor trips are used, to have signal light equipment for checking the operation of the doors and also warning the operators of the motor vehicles in order that they will not enter until the doors are fully open, otherwise damage may result to the door and car.

It is very desirable when overhead types of doors are used, the door opening to a position that is above the vision of the automobile operator, to use a "Stop and Go" signal operated automatically with the door controls, informing the operator of the automobile when the opening is clear for him to proceed.

Continued on next page

SINGLE HORIZONTAL SLIDING DOORS

Notes Regarding Horizontal Sliding Door Operation

Special attention is called to the fact that the ordinary type of hanger used for sliding doors is entirely unsuitable for use with motor operated units. It will not stand up under constant usage. (See hangers recommended under Overhead Support Hardware below.)

Bottom Supported Door Hardware—Where it is possible to use it, we recommend the bottom supported type door. The weight of the door is carried on special roller bearing, malleable iron wheels placed at the bottom of the door and running on a track. This track is a specal heavy type which is concreted into the floor, eliminating all possibility of sag and binding. (See detail of track.) It is also especially useful where headroom is limited as shown in illustration.

Interior Showing Single Sliding Door with Bottom Support There Being Practically No Headroom

Overhead Supported Door Hardware—For this type of support we recommend the heaviest and easiest operation that can be purchased. Any extra cost will be made up by the saving in power and maintenance cost of hardware and operating equipment. Light track and hangers wear out quickly when doors are motor operated.

Pass or Wicket Doors—If desired to use a wicket door for use of pedestrians, wicket door should be interlocked with the electric drive equipment to prevent operation of the main door while wicket is open.

General Specification for Horizontal Sliding Doors

Scope—All one-piece horizontal sliding doors shall be operated by electric drive unit as manufactured and installed by Allen & Drew, Inc., Cambridge, Mass. Unit shall be controlled from push button stations as located on plans. Door shall operate at a speed of over 1 ft. per second.

Doors—Shall be made to special detail. (Here state size and thickness of door, stiles, rails, panels, material, glazing, wickets) as made by Allen & Drew, Inc. Joints shall be made with hardwood dowels and glued with waterproof glue. For size see detail drawings (or elevation).

Note: If doors are to be supplied in the millwork contract give full requirements for door construction under millwork.

Hardware—Shall be special extra heavy as manufactured by Allen & Drew, Inc. It shall be so constructed, that weight of the door is carried on roller bearing wheels at the bottom of the door and of the number required to properly operate and support the weight. Wheels shall be grooved to run on 12-lb. industrial track.

Note: State whether the roller bearings are to be concealed in a steel door or on the outside of wood doors.

Head Guide—Shall be built up of steel and be of proper size to guide door, and door shall have steel angle rubbing strip at top and two edges as detailed.

Floor Track—Shall be 12 lb. industrial rail with anchors for setting in concrete floor.

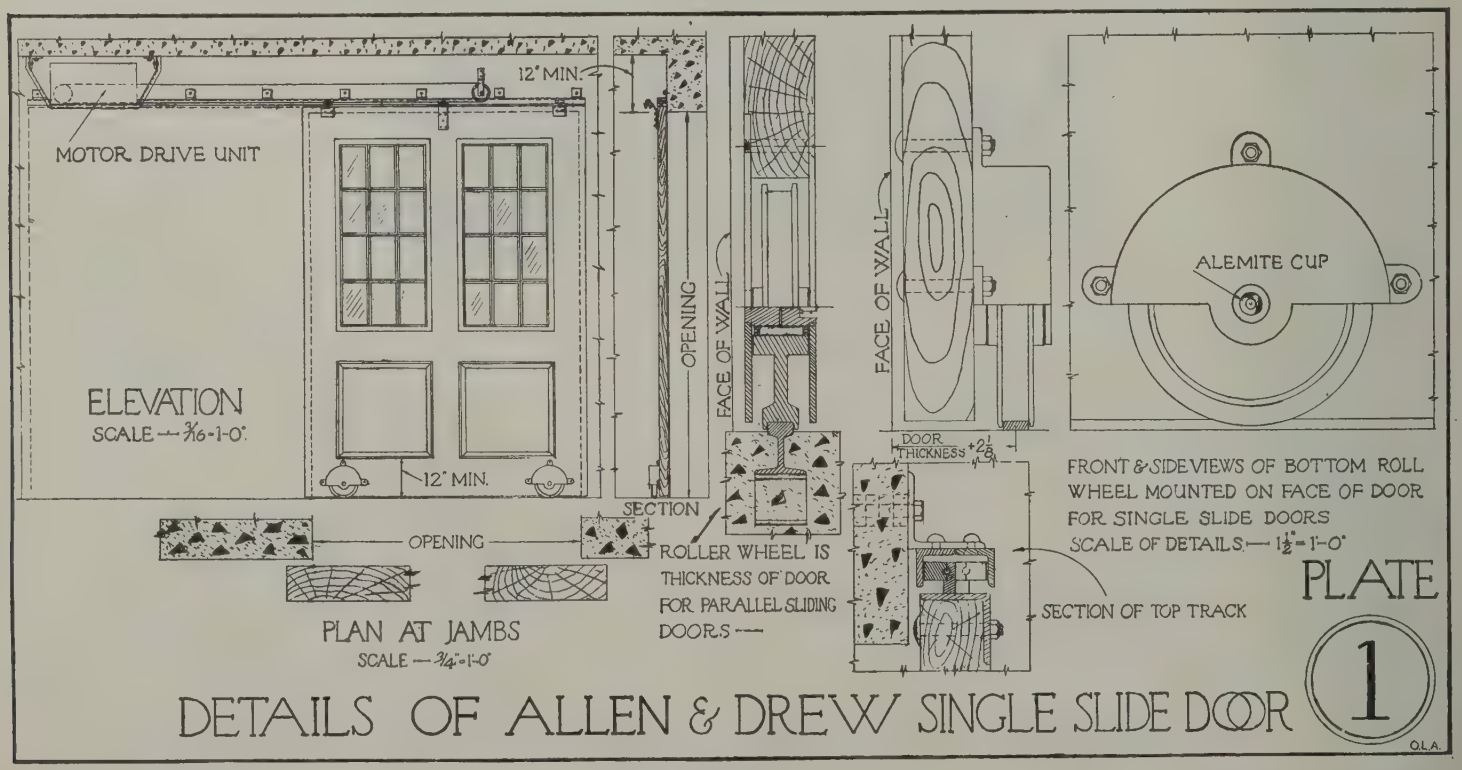
Track, and instructions for installing in floor by mason contractor, shall be supplied by Allen & Drew, Inc.

Motor Connection—The door shall be operated by endless chain, directly connected by sprocket with the driving unit. Chain drive shall be arranged for disconnection from door, allowing hand operation of door if current fails. All other mechanism necessary to make a complete installation such as idler, etc. shall be furnished and installed by Allen & Drew, Inc.

Motor Unit—Shall be a remote controlled unit, having specially wound high torque reversible motor with solenoid brake and shall include limit switches, as located on plan, which are actuated by worm screw directly connected with the motor drive. All parts are to have a factor of safety of six and the motor to be operated at 50% of its capacity under normal conditions.

Electric Control—Remote control panel shall be enclosed in a surface type steel box, and shall contain the switches, overload and under voltage relays, which shall protect the motor in the case of overload or an abnormal drop in voltage.

Guarantee—The complete installation shall be guaranteed and serviced by the manufacturer for the period of one year from time of completion.



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TWO OR MORE PIECE, ONE OR TWO-WAY, TWO OR MORE SPEED HORIZONTAL SLIDING DOORS

Notes Regarding the Above Types of Doors

The two or more piece door operating either one or two ways is very adaptable to the modern garage. It takes up less sideroom than the single door and the opening can be cleared more quickly. The same type of hardware is used as described on Plate 1 and gives a very rigid and substantial installation free from sagging and binding.

Door Hardware—For doors operating in tandem in one direction, the lower corners of the doors are equipped with steel plates carrying the roller bearing wheels in the thickness of the door. This requires a door 2⅝ in. thick minimum and with 12-in. bottom rail. The track is double the width of that for single sliding doors.

See description of hardware (Plate 1) for single sliding doors.

Speed of Doors—Doors of two-piece type sliding parallel are controlled so that one section will move at double the speed of that section nearest the opening jamb.

Two-piece, Two-speed, One-way Horizontal Sliding Door

General Specification Notes

For Two-piece, Two-speed, One-way Horizontal Sliding Door—Doors shall be so controlled that one section shall move at double the speed of that section nearest the opening jamb. Doors are to be controlled from push button station and the slow door to move at better speed than 1 ft. per second.

For Two-piece, Two-way Sliding Type Door—Doors shall be so controlled that the two sections shall part at the center and each operate in an opposite direction.

Note: The hardware is similar to that for the single door except that two sets of roller bearing wheels or two sets of hangers are required.

Four-piece, Two-way, Two-speed Sliding Type Door—Doors shall be so controlled that the two center sections shall part at the center and each side pair shall operate at a two-speed operation. The two middle sections shall operate at double the speed of the two jamb side sections.

Doors—See specification on Plate 1.

Hardware—Similar to specification on Plate 1, except that the number of roller bearing wheels or hangers will be increased as well as one or two tracks shall be used.

Head Guide—See specification Plate 1.

Floor Track—See specification Plate 1. Provide for extra track when doors are parallel.

Motor Connection—See specification Plate 1. Add method of operation whether two-speed, or in opposite direction, etc.

Motor Unit—See specification Plate 1.

Electric Control—See specification Plate 1.

Guarantee—See specification Plate 1.

Continued on next page

ONE-PIECE VERTICAL SLIDING DOOR

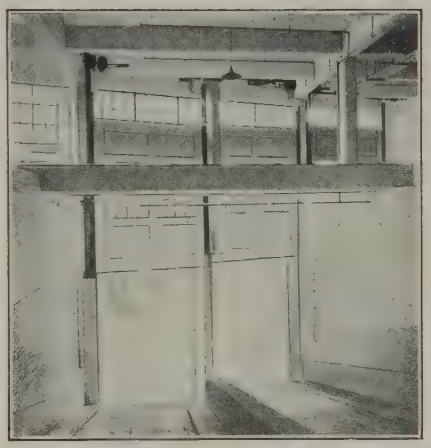
Notes Regarding One-piece Vertical Sliding Doors for Piers, Warehouses, Garages, etc.

This type of door is constructed in one section. It takes up very little space in the building but requires clearance above the door equal to the height of the door plus 1 ft. 10 in. In cases where the story height is not sufficient to allow this clearance, and if the building is more than one story in height, the second floor may be slotted, if the structural design permits, and the door operated through the slot. An automatic fire stop shuts off the slot when door is closed. The operating mechanism is then located on the underside of the third floor or roof. We have doors of this type covering very large openings and running into tons in weight.

Vertical Sliding Door

How Door Is Supported—The door is supported and operated from an equalizing shaft to which it is connected by two cables or two chains. Counterweights equal to the weight of the door are also supported from this shaft. The shaft is directly connected by gears to the worm gear drive. By this means the door is safely supported at all times even if the counterweights be released. The counterweights may be either simple or compound according to the story height, in order that the counterweight will operate in a single story height.

The shaft is supported by hangers having self-aligning roller bearings, which distribute the load of the doors and counterweights equally on the masonry across the width of the door opening.



Vertical Sliding Doors Passing into Second Story

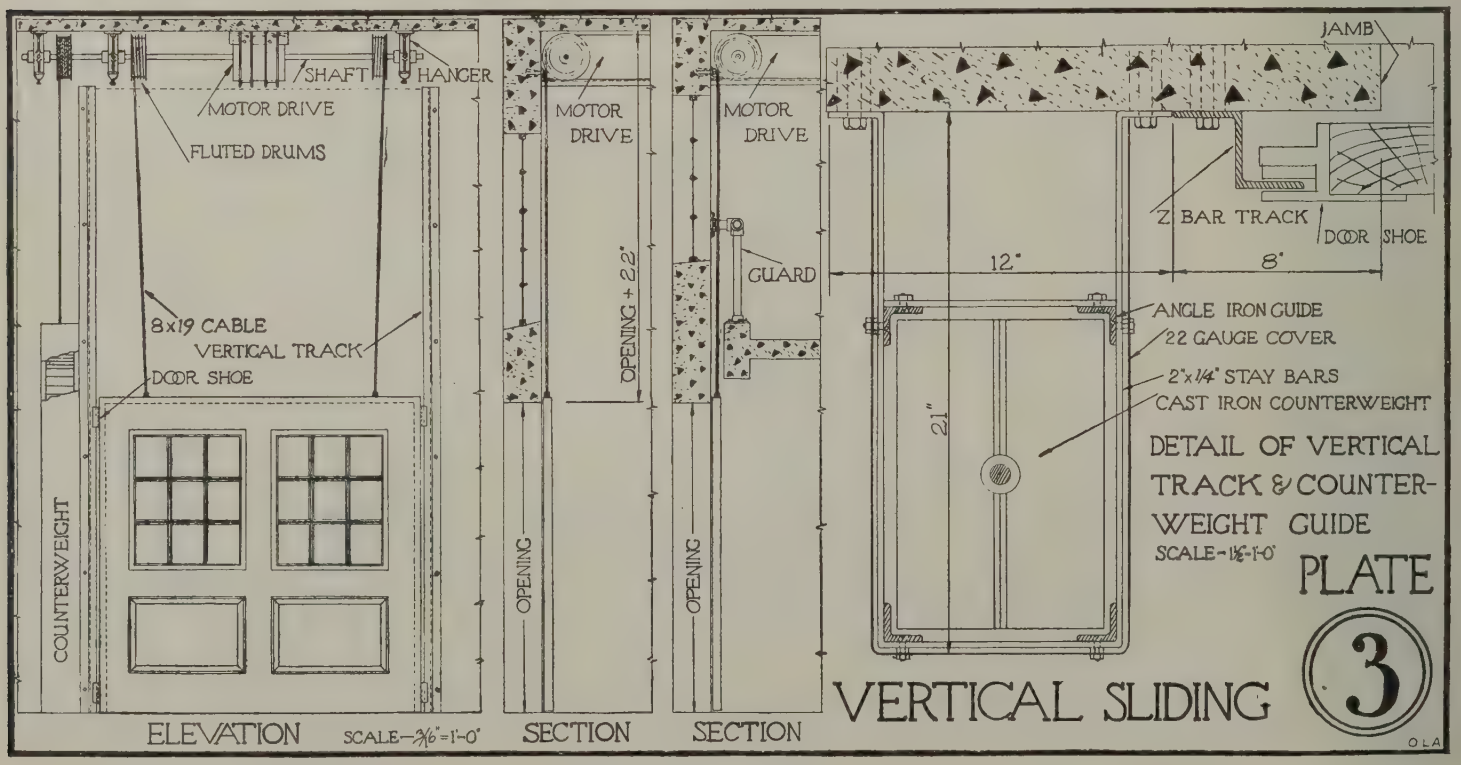
General Specification for One-piece Vertical Sliding Doors

Scope—All one-piece vertical sliding doors shall be operated by electric drive unit as manufactured and installed by Allen & Drew, Inc., Cambridge, Mass. The units shall be remote controlled from push button stations as located on plans. Doors shall operate at a speed of approximately 2 ft. per second.

Doors—See specification Plate 1. Flexible rubber tubing shall be secured on bottom of the door to take up any unequalities and make tight joint.

Tracks—Shall be placed at sides of openings to guide the door throughout its full travel. Roller guides to fit the track shall be installed on doors.

Equalizing Shaft and Motor Connection—Each door shall be supported on an equalizing shaft to which the supporting cable or chain, at each end of the door, shall be attached. Doors shall be evenly counterbalanced by weights running either at one side or both as required. Counterweights shall be guided in light iron guides completely enclosed in sheet metal box. There shall be at least three shaft hangers with self-aligning bearings to each door to distribute load on shaft.



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TWO-PIECE, TWO-SPEED VERTICAL SLIDING DOORS

Notes Regarding Two-piece, Two-speed Vertical Sliding Doors for Garages, Warehouses, etc.

This type of door is for uses similar to the single vertical sliding door. It has the advantage of using only half the headroom required by the single door. The door is made in two sections of equal height which slide vertically and require one-half the height of the opening plus 1 ft. 6 in. minimum.

One of the important advantages this type has is the speed at which the door can be opened, approximately 2 ft. per second.

How the Doors Are Supported—Both sections of the doors are attached to an equalizing shaft by cables or chains, each part being supported by two chains or two cables. Each section is counterbalanced so that the weight is evenly carried at all times on the equalizing shaft to which the counterbalances are also attached.

A Special Construction Showing Interior of a Double Two-piece, Two-speed Vertical Sliding Door without Dividing Mullion

The motor driven unit is a worm drive machine directly connected with the equalizing shaft, and the door sections cannot drop even though the counterweight be released. The equalizing shaft is also hung in the same manner as for the single vertical type door.

General Specification for Two-piece, Two-speed Vertical Sliding Doors

Scope—All two-piece, two-speed vertical sliding doors shall be operated by electric drive unit as manufactured and installed by Allen & Drew, Inc., Cambridge, Mass. The units shall be remote controlled from push button stations as located on plans. Lower section of door shall travel at the rate of approximately 2 ft. per second or double the speed of the upper section.

Door — See specification Plate No. 1. Flexible rubber tubing shall be secured to bottom of the door to take up any unequalities and make it tight.

Tracks — Double steel tracks shall be placed at sides of opening to guide the door section throughout their full travel. Roller guides to fit the track shall be installed on the door.

Equalizing Shaft and Motor Connection—Each section of the door shall be supported on an equalizing shaft to which the supporting cable or chain, at each end of the door sections, shall be attached. Door sections shall be evenly counterbalanced by weight running either at one side or both as required. Counterweights shall be guided in light iron guides completely enclosed in sheet metal box.

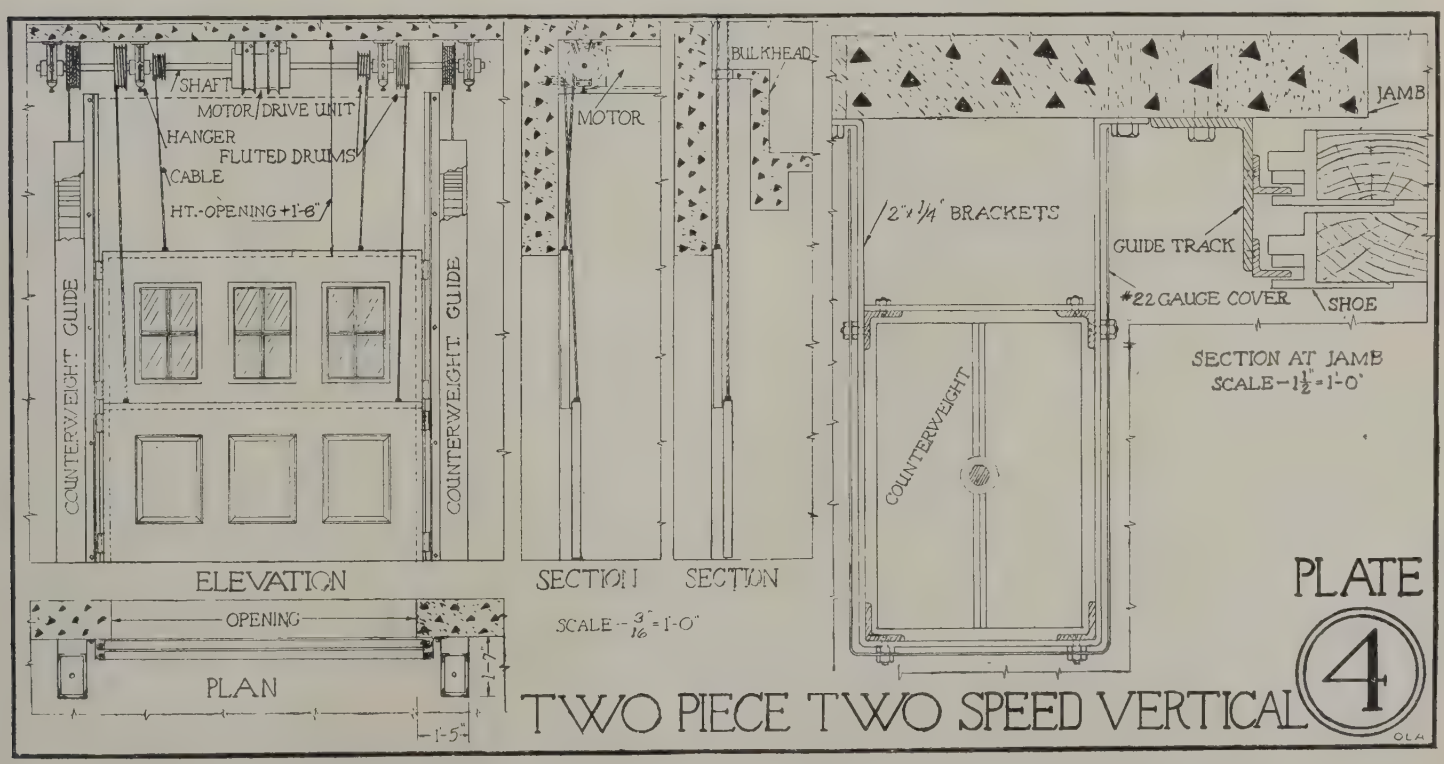
There shall be at least three shaft hangers with self-aligning bearings to each equalizing shaft to distribute the load on the shaft.

Shaft shall be directly connected to the operating unit and so arranged that the electric machine may be released and the door hand operated when required.

Motor Unit—See specification Plate No. 1.

Electric Control—See specification Plate No. 1.

Guarantee—See specification Plate No. 1.



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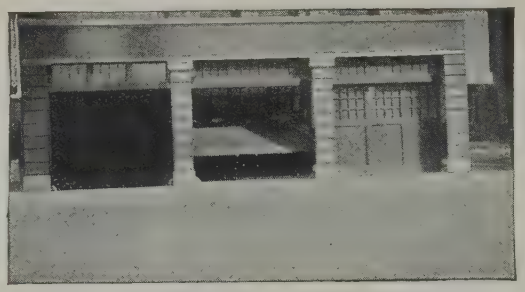
FOLD-UP AND CANOPY DOORS

Notes Regarding Fold-up and Canopy Doors for Garages, Warehouses, etc.

This type of door is of use where there is little headroom above the door opening. It occupies very little sideroom and when open the door is entirely out of the way. They are made in two horizontal sections which fold up horizontally instead of sliding vertically as the two-piece vertical sliding doors do. Both sections are on the same plane and hinged together at the horizontal joint. The door is counterbalanced to add to the ease of operation. We have doors in operation 10 to 27 ft. wide and height varying from 9 to 15 ft.



Exterior View Showing Fold-up Doors in Three Stages of Operation

The canopy door operates just the opposite from the fold-up door. The canopy doors as they are opened, project outward and not inward as the fold-up doors do. As they open out they form a canopy or shelter over the door opening. This is useful in warehouses or shipping platforms where trucks or wagons are loaded from platform.

Interior Showing Condition Where Operating Unit Is Located on Floor Above on Account of Lack of Headroom

The doors may be made of any material or of any design desired to carry out an architectural scheme.

The driving equipment may be placed on an upper floor if the design is such that clearances are slight over the head of the opening.

General Specification for Fold-up and Canopy Doors

Scope—All fold-up and canopy doors shall be operated by electric drive unit as manufactured and installed by Allen & Drew, Inc., Cambridge, Mass. The units shall be remote controlled from push button station as located on plans. Door shall operate at a speed of [1] [2] ft. per second.

Fold-up Doors—All fold-up doors shall operate to fold inward and upward toward the ceiling.

The doors shall be made in two flush horizontal sections hinged in the middle and shall operate at a speed of at least 1 ft. per second in both opening and closing.

Canopy Doors—(Same as for fold-up, except open outwards.)

Door Construction—See specification Plate No. 1.

Tracks—Steel tracks shall be placed each side of the opening to act as a guide for the roller wheels on the bottom of lower panel.

Equalizing Shaft and Motor Connection—The door shall be lifted by means of a cable or chain attached to the roll wheel shaft at the bottom of the lower section and to an overhead equalizing shaft. This shaft shall be directly connected with the counterweight and electric driving unit. Counterweight shall be guided in light iron guides completely enclosed in sheet metal box.

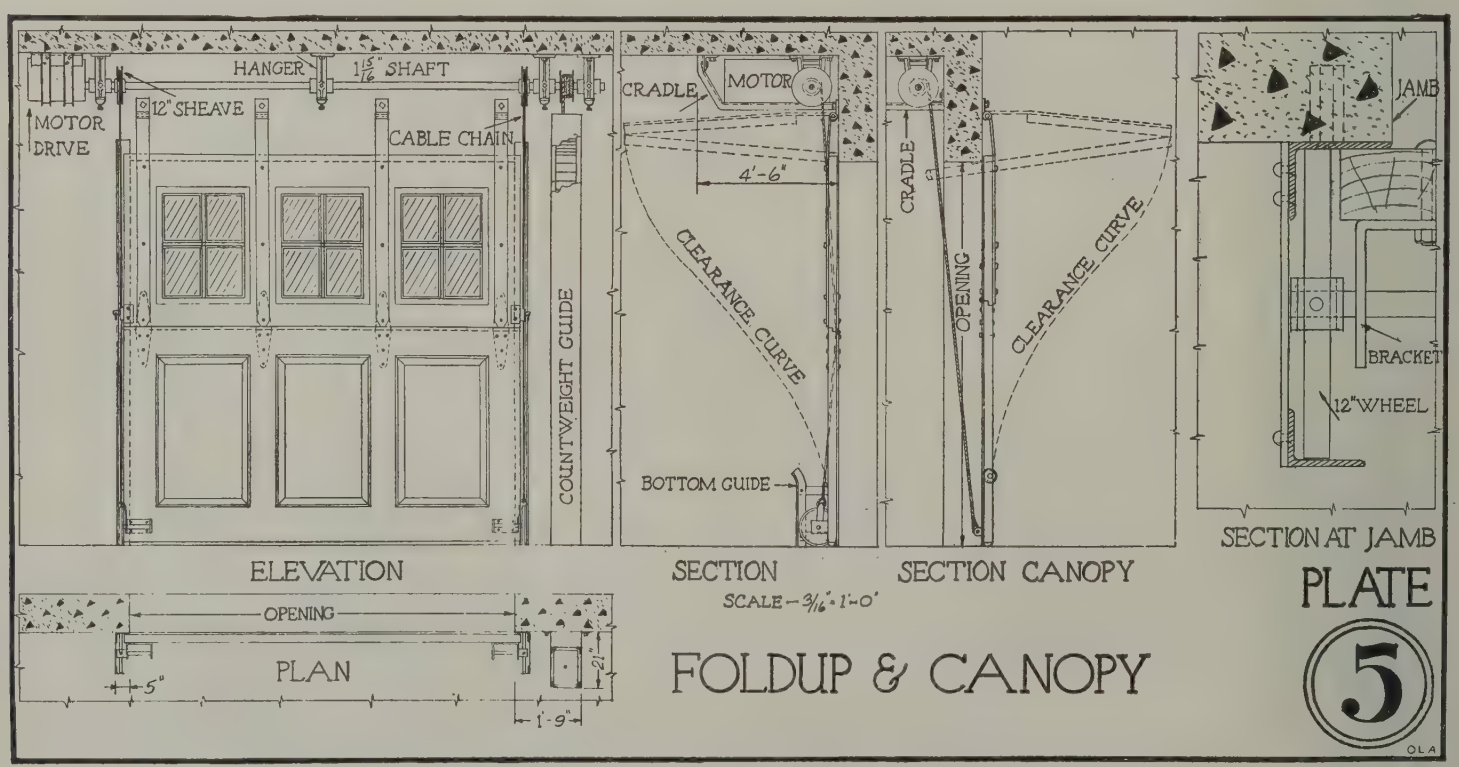
There shall be at least three shaft hangers with self-aligning bearings to each equalizing shaft to distribute the load on the shaft and its support.

Shaft shall be directly connected to the operating unit and so arranged that the electric machine may be released and the door hand operated when required.

Motor Unit—See specification Plate No. 1.

Electric Control—See specification Plate No. 1.

Guarantee—See specification Plate No. 1.



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TWO AND FOUR-PIECE SWING DOORS

Notes Regarding Two and Four-piece Swing Doors

This type of door has fulfilled a service where it was not desirable to use other types of doors. The pair of single swinging doors open either inward or outward at each side of the opening. The doors are hinged with heavy strap hinges which are in turn operated by heavy steel shafts placed in a vertical position at each side of the door opening. The entire mechanism requires only 8 in. at each side of the opening and 1 ft. 6 in. above the opening. Doors may be arranged to swing at different angles if required, as at 90° for one and 180° for the other. The doors operate very rapidly and on account of the manner in which they are hung they are prevented from sagging.

The four-piece swing doors are a combination of the hinged swinging door and the overhead trolley type. The jamb section swing and the middle section slide and swing being hinged to the jamb section and the inside upper corner hung from an overhead track.

Four-piece Swinging Folding Door

General Specification for Two-piece Swing Doors

This hardware should be used on doors of over 165 sq. ft. of opening. Hardware for operating doors of 165 sq. ft. and under, special design heavy strap hinges shall be furnished for each door and shall be rigidly connected with vertical shafts placed at each side of the door opening. Each shaft shall turn in and be supported by substantial brackets at both sides and the upper end connected by means of cranks and tubular steel arms to an Allen & Drew motor unit of the crank drive type. (Details shown on cut below.)

Scope—All [two-piece swing] [4-piece swing] doors as noted on drawings shall be operated by one electric drive unit, for each set of doors, as manufactured and installed by Allen & Drew, Inc., Cambridge, Mass. Each unit shall be remotely controlled from push button station as located on plans. Door shall operate at a speed of 2 ft. per second.

Door Construction—See specification Plate 1.

Hardware — Special design extra heavy strap hinges shall be furnished for each door (number depends on size and design of doors), and shall be rigidly connected with vertical shafts placed at each side of the door opening. These shafts shall turn in and be supported by substantial brackets at both sides and the upper end connected with horizontal equalizing shaft through a bevel gear box.

The motor drive unit shall be directly connected with the equalizing shaft and so arranged that the electric machine may be released and the doors hand operated in case of failure of the electric current. All parts shall have a factor of safety of six and the motor operate at 50% of the rating.

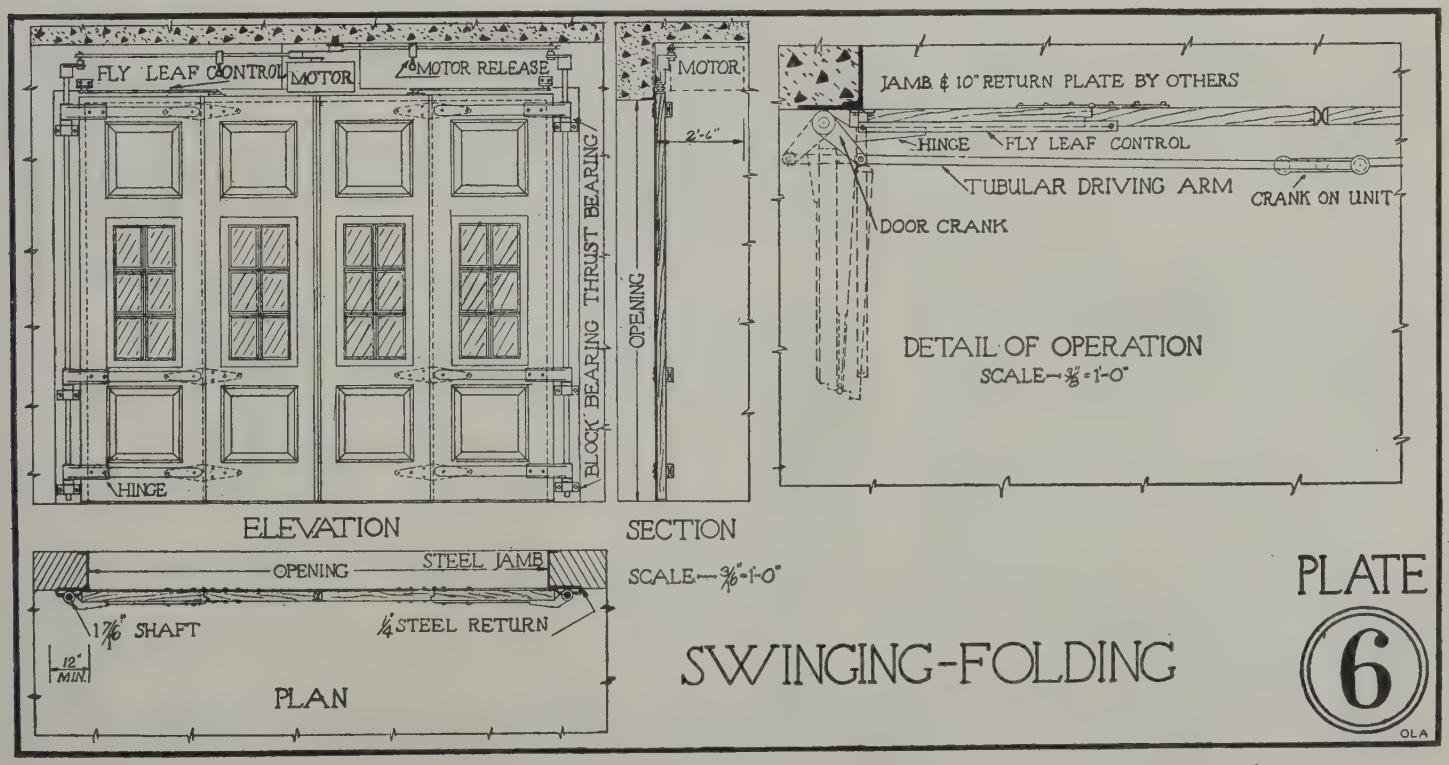
Hardware for Four-piece Swing Type—(In addition to the hardware required for the two-piece unit add as follows.)

The two middle sections shall be hinged to the jamb sections and in addition shall be guided at the outer upper corner on a special overhead swivel hanger and track as made by Allen & Drew, Inc., Cambridge, Mass., or by substantial guides of other makes.

Motor Unit—See specification Plate 1.

Electric Control—See specification Plate 1.

Guarantee—See specification Plate 1.



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ONE AND TWO-PIECE SLIDE-UP TURNOVER DOORS

Notes Regarding One and Two-piece Slide-up Turnover Doors for Warehouses, Industrial Plants and Pier Sheds

This type of door is valuable when it is necessary to conserve floor space and it requires little headroom. It is made of one or two sections according to the clearance required about the opening. The two-section type occupies less space, as a turnover, than the one-piece type.

The doors, either in one or two sections, slide vertically and horizontally at the same time and assume a horizontal position against the ceiling.

The doors are counterbalanced and can be operated at a speed of about 1½ ft. per second, depending on the size of the door. The design of the side and overhead track vary with the size, weight and speed of the door.

Two-piece Slide-up Turnover Doors in Three Positions

How the Doors Are Supported — The lower section of the door is directly connected to an equalizing shaft by cable or chain on each side of the door. The counterweight for the door is also connected to the equalizing shaft. The shaft in turn is directly connected to the electric operator, but so arranged that it may be released and the door operated by hand in case of failure of the electric current.

General Specification for Slide-up Turnover Doors

Scope—Doors of the slide-up turnover type (one or two sections) shall be manufactured by Allen & Drew, Inc., Cambridge, Mass., and shall be so constructed that they will slide vertically and horizontally to a turned over position above the opening. The units shall be remote controlled from push button stations as located on the plans. Doors shall operate at a speed of approximately 1½ ft. per second both opening and closing.

Doors shall be made in [one] [two] horizontal flush section[s], hinged in the middle.

Door Construction—See specification Plate 1.

Tracks—Steel tracks shall be placed at each side of the door and also in a partially horizontal position over the opening to guide the door section[s] to a full open position. Each door section is held in place by steel rollers running in the tracks.

Equalizing Shaft and Motor Connection—The doors shall be lifted by means of a cable or chain attached to the roller or wheel shaft at the bottom of the lower door section and to an overhead equalizing shaft. This shaft shall be directly connected with the counterweight and electric driving unit. Counterweight shall be guided in light iron guides completely enclosed in sheet metal box.

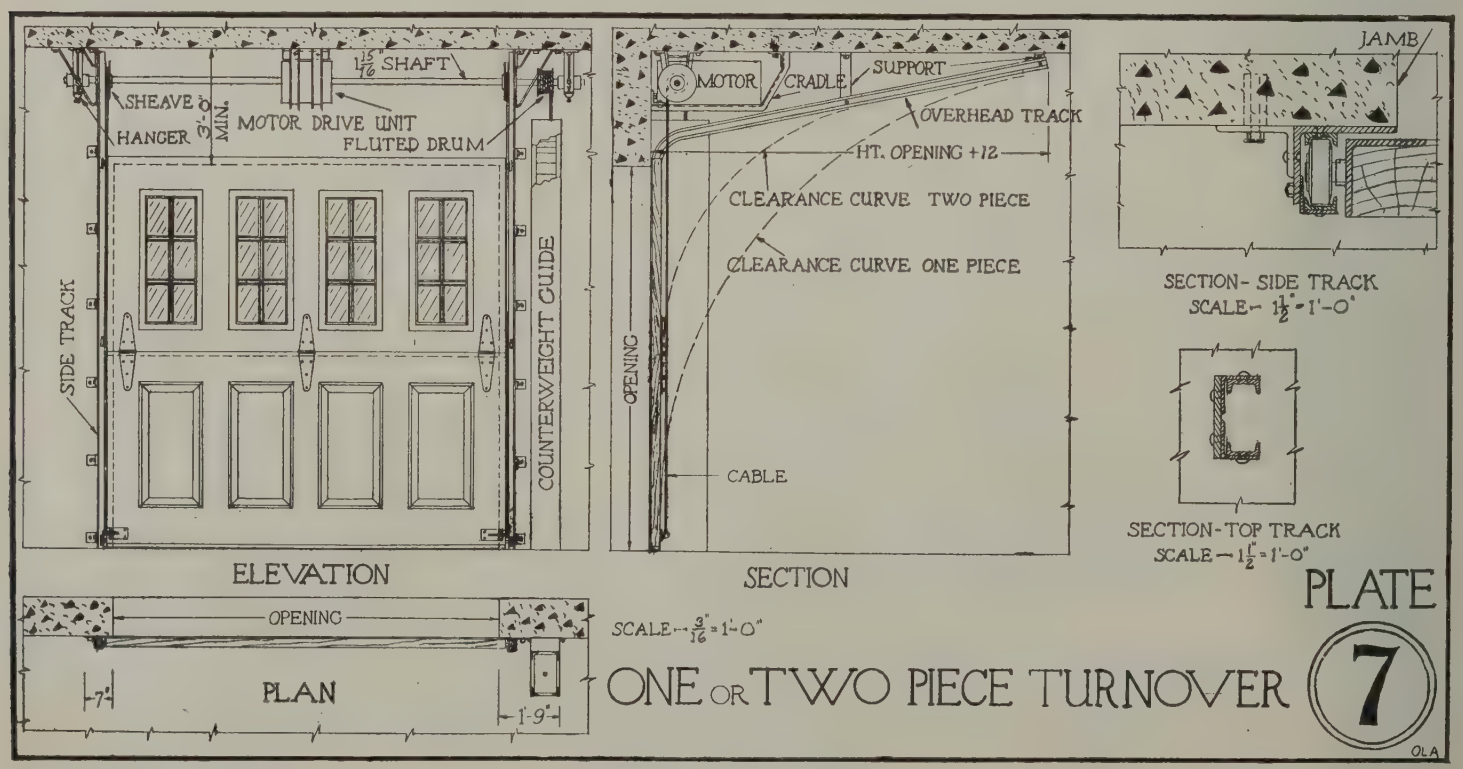
There shall be at least three shaft hangers with self-aligning bearings to each equalizing shaft to distribute the load on the shaft and its supports.

Shaft shall be directly connected to the operating unit and so arranged that the electric machine may be released and the doors hand operated when required.

Motor Unit—See specification Plate 1.

Electric Control—See specification Plate 1.

Guarantee—See specification Plate 1.



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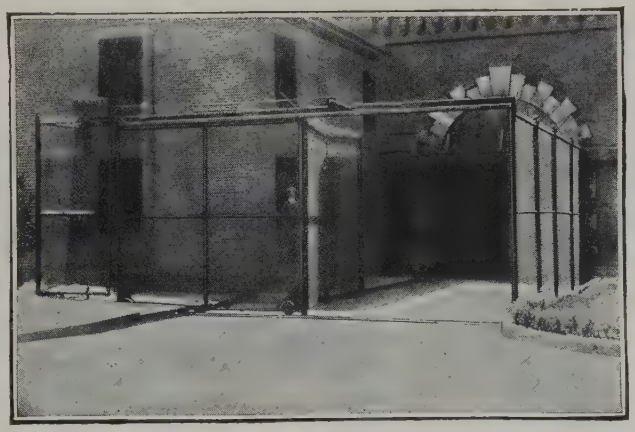
ELECTRICALLY OPERATED GATES

Gates for Jails

On this page we show an illustration of an installation made in a modern jail building, there being two gates which form a box in order that there may always be one gate closed while a vehicle is entering or leaving the grounds. Both equipments are installed on the exterior and housed against the action of the elements.

Both gates are operated from the gate house by one man who also checks the vehicles as they enter or leave. It took three men to operate the gates and check the vehicles previous to our making this installation. The outside gate is constructed of solid steel plate and weighs about 2 tons.

We have a large number of installations of gates in jails in various parts of the country.



Two Electrically Operated Sliding Gates at Suffolk County Jail, Massachusetts

A list of installations and references will gladly be sent on request.

Gates for Industrial Plants

One of the important uses for motor operated gates is in large industrial plants. The gates may be made either sliding or hinged. The remote control devices allow the guard to operate the gates without having to go outside the gate house.

Gates on Estates

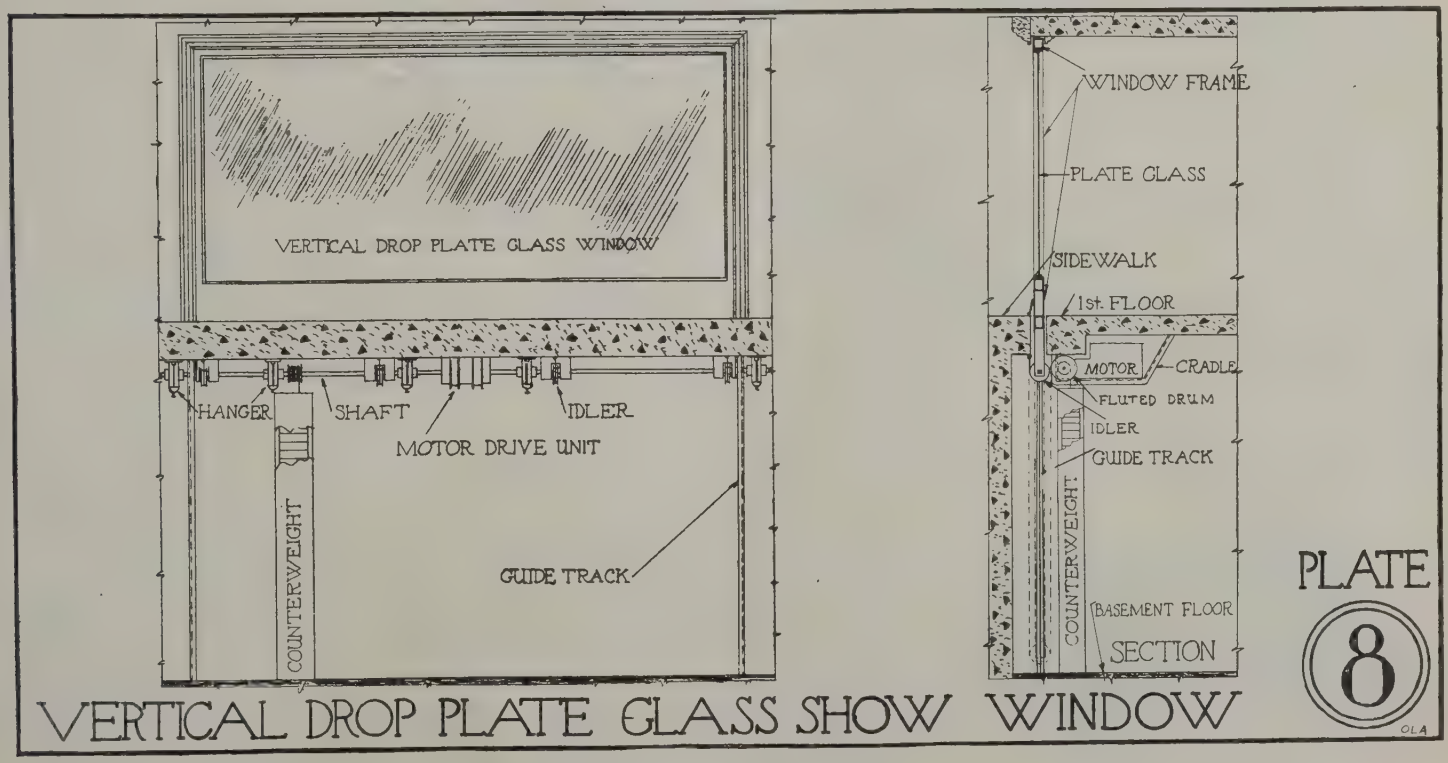
For large estates where the utmost privacy is desired by the owner, double gates are often used on the service entrance similar to the jail gates and they may be operated in a similar manner. For main entrance gates of wrought iron or bronze our equipment can be designed to operate gates of any size.

SPECIAL VERTICAL DISAPPEARING PLATE GLASS SHOW WINDOWS

It is sometimes desirable, in the case of large department stores, to take advantage of a space used during business hours as a lobby, for show purposes after hours. This presents intricate problems to take care of the disappearance of the show window during business hours. We illustrate in the accompanying detail one type of installation which we have made for automobile showrooms.

The windows can be arranged to slide either overhead or down into a basement. This type of installation is very desirable in showrooms when bulky articles are shown, such as automobiles, boats, etc.

There are no standard specifications for this type of installation due to the variety of ways the window may be made to disappear. Each installation is built to suit the conditions.



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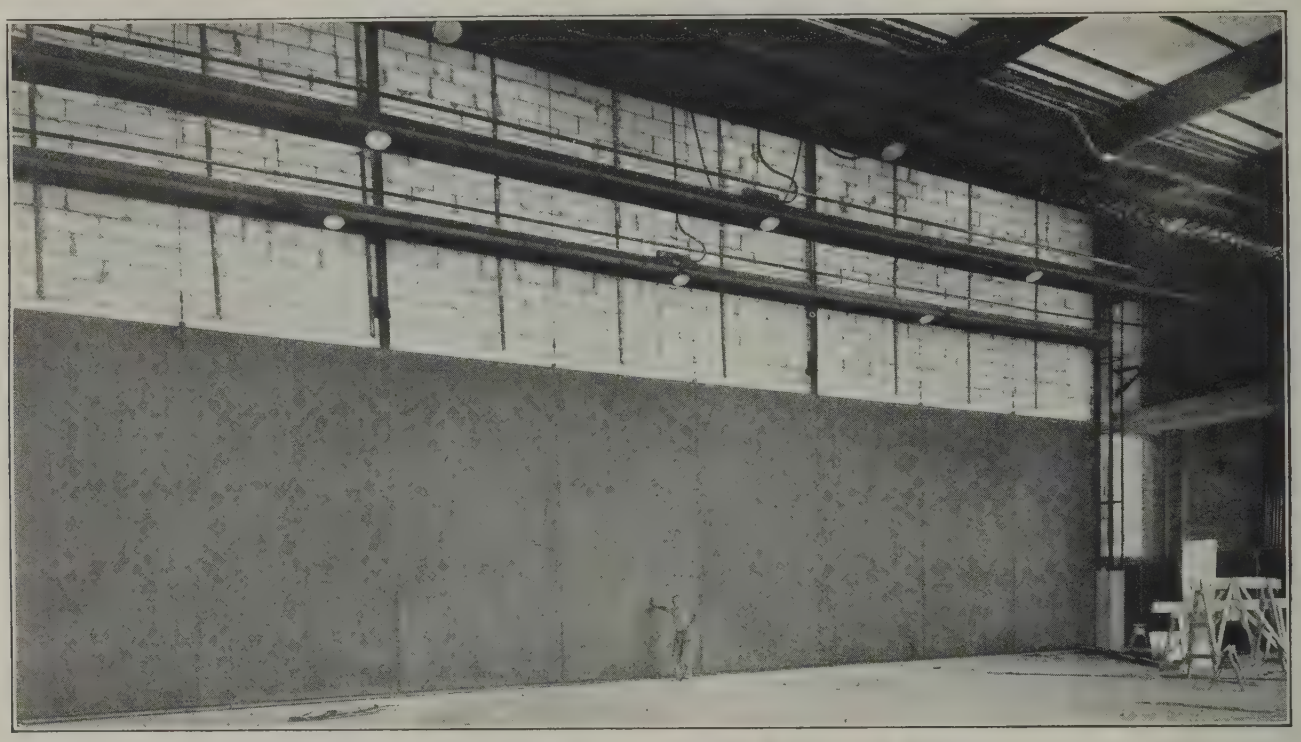
VERTICAL SLIDING PARTITIONS FOR ALL SERVICES AS THEATER CURTAINS AND GYMNASIUM DIVISIONS

The Allen & Drew Vertical Sliding Partition is built of a properly constructed channel frame covered on both sides with sheet metal, the hollow space being filled with fireproof sound retarding material. The size of the channel framing and gauge of sheet metal varies according to the use to which the "partition or curtain" will be put.

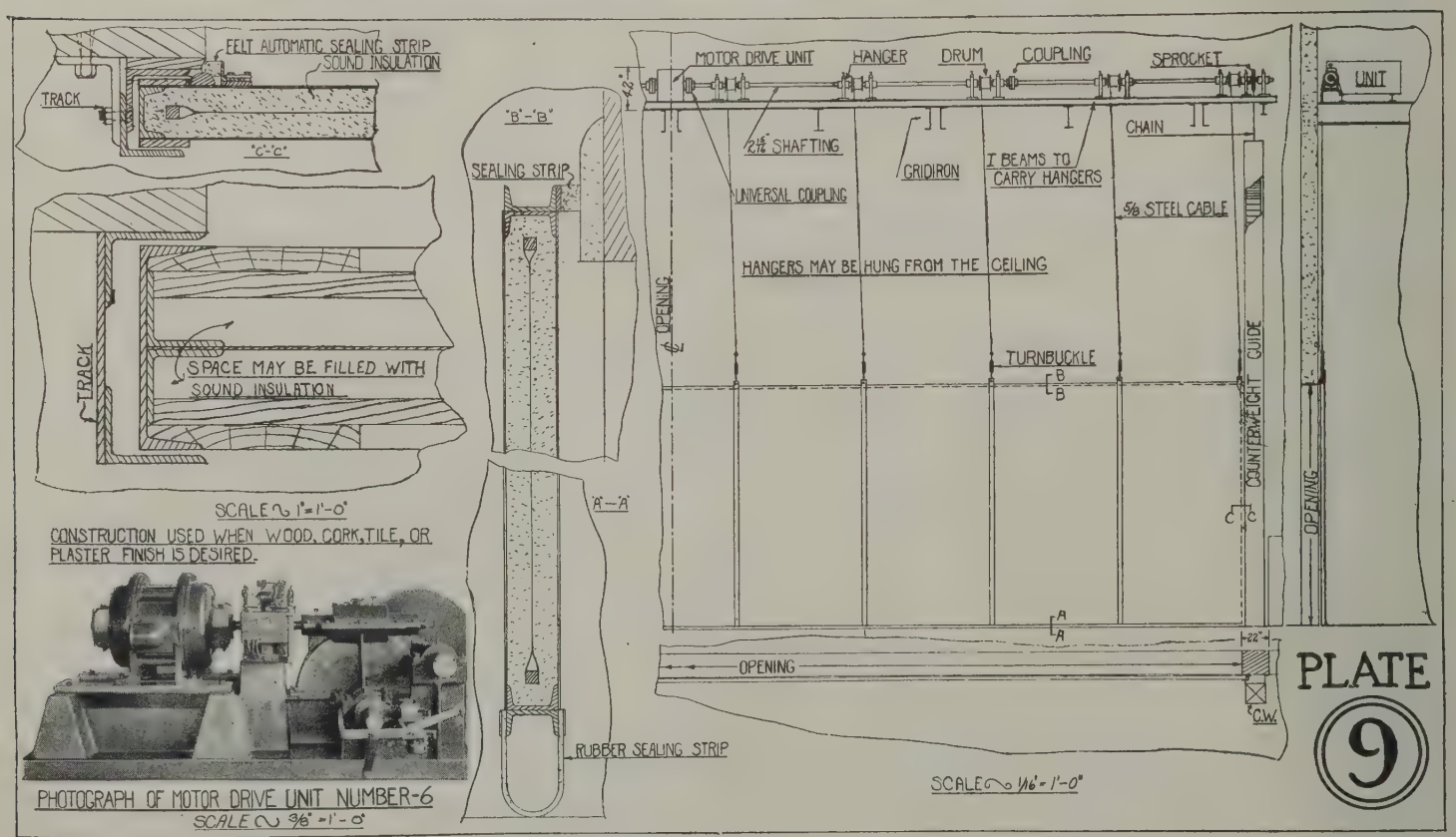
The Allen & Drew partition has fixed guides at each end and several telescoping guides at intermediate points. The bottom of the partition is equipped with dowel pins to lock it to the floor.

The partition is lifted by cables or chains attached to the top. It is raised by means of an overhead equalizing shaft extending the entire width of the opening. A motor drive unit is directly connected to this shaft, making it impossible for the partition to move without releasing the electric brake and rotating the worm.

Estimates and Service—All installations of this nature present problems requiring individual attention. We shall be pleased to receive sketches for any proposed use of curtains or partitions of this type and will gladly furnish detailed drawings, specifications and formal quotations for the complete installation of this equipment in any part of the United States.



Partition Installation on Opening 90 Ft. Wide by 19 Ft. High



AUTOMATIC DOOR & EQUIPMENT COMPANY

Manufacturers of Vehicle Entrance Equipment

664 North Michigan Avenue

CHICAGO, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

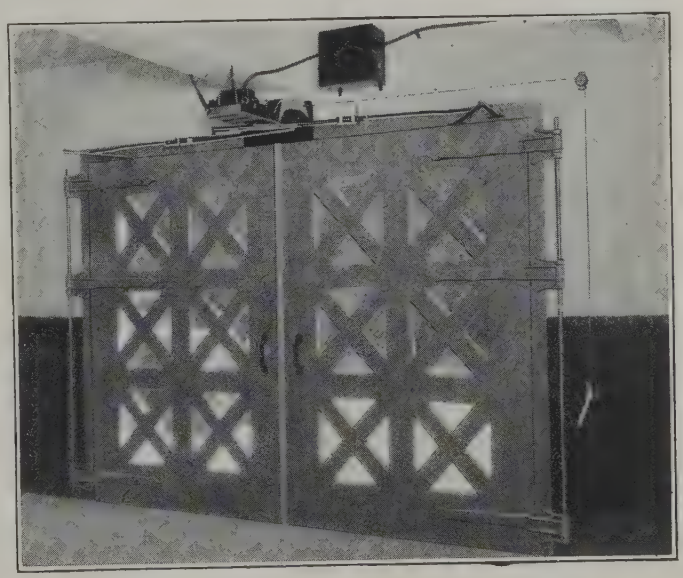
ELECTRIC DOOR OPERATORS
TIME CLOSING DEVICES
FLOOR TRIP SWITCHES
MALLEABLE IRON, BALL BEARING, OFFSET, ADJUSTABLE HARDWARE
METAL and METAL COVERED DOORS
THREE-PLY TWISTPROOF WOOD DOORS
STEEL DOOR FRAMES
WOOD DOOR FRAMES

Services

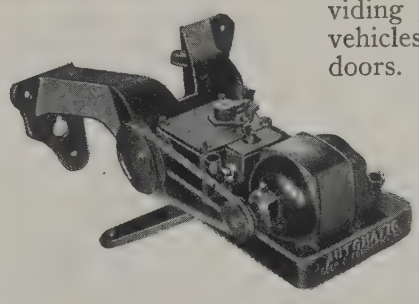
The AUTOMATIC DOOR & EQUIPMENT COMPANY manufactures entrance equipment and, when so contracted, will install entrances complete. Although a complete entrance installation is recommended, any AUTOMATIC DOOR & EQUIPMENT COMPANY product may be purchased and installed independently.

Electric Door Operators

AUTOMATIC DOOR & EQUIPMENT COMPANY electric door operators are manufactured in two styles—one for swinging or folding doors and another for sliding doors. The mechanism of these operators is extremely simple and practical. Doors are opened and closed by a single oscillating arm propelled by a heavy-duty reversible motor. The power reduction is through a sturdy ball-bearing double worm-gear reducer. The gear mechanism is enclosed in a non-leaking housing filled with heavy oil. Due to the circular motion in which the operating arm travels, doors open and close quickly without straining, "whipping" or slamming.



Above
Operator Installed on Double Swing Garage Doors



Right
View of Operator Showing Compact Rugged Construction

Thermostatic Protection

When the action of the doors is checked by any obstruction, a thermostatic cut-out shuts off the power, preventing blowing of fuses and injury to the mechanism.

Releasing Clutch

A conveniently located lever disengages the operating mechanism permitting manual operation of doors. Clutch may be re-engaged with doors in any position.

Remote Control

Positive control of doors is maintained at all times as the "momentary contact" type of switch is employed. Doors may be started, stopped or reversed at any point by a single impulse through conveniently located buttons or pull cords. If the switch is operated while the doors are in motion, action stops immediately. Doors reverse their direction when the switch is operated again.

Automatic floor trip switches, "Key Box" switches and time closing devices may be had when desired.

Hardware

AUTOMATIC DOOR & EQUIPMENT COMPANY entrance hardware for swinging, folding or sliding doors is striking in design and more than adequate in strength. All castings are of highest grade malleable iron. All hinges are of malleable iron and are mounted on thrust ball bearings. Hinges have adjustable side hinge plates and continuous pintels running from top to bottom. Because of the "offset" feature, doors swing completely out of the entrance thus providing greater clearance for vehicles and protecting the doors.

Doors

Wood Doors—These doors are constructed of selected white pine, three-ply, glued. They are shaped for rubber astragals at the meeting edges and are rabbeted at the folds.

Furnished in four-fold, double swing or sliding types.

Metal Covered Doors—All types of metal and metal covered doors can be furnished when specified.

Steel Door Frames

Steel door frames can be supplied in the following types: channels, angles, channel and plate or angle and plate. Equipment is designed to be mounted on the inside flange or leg of frame.

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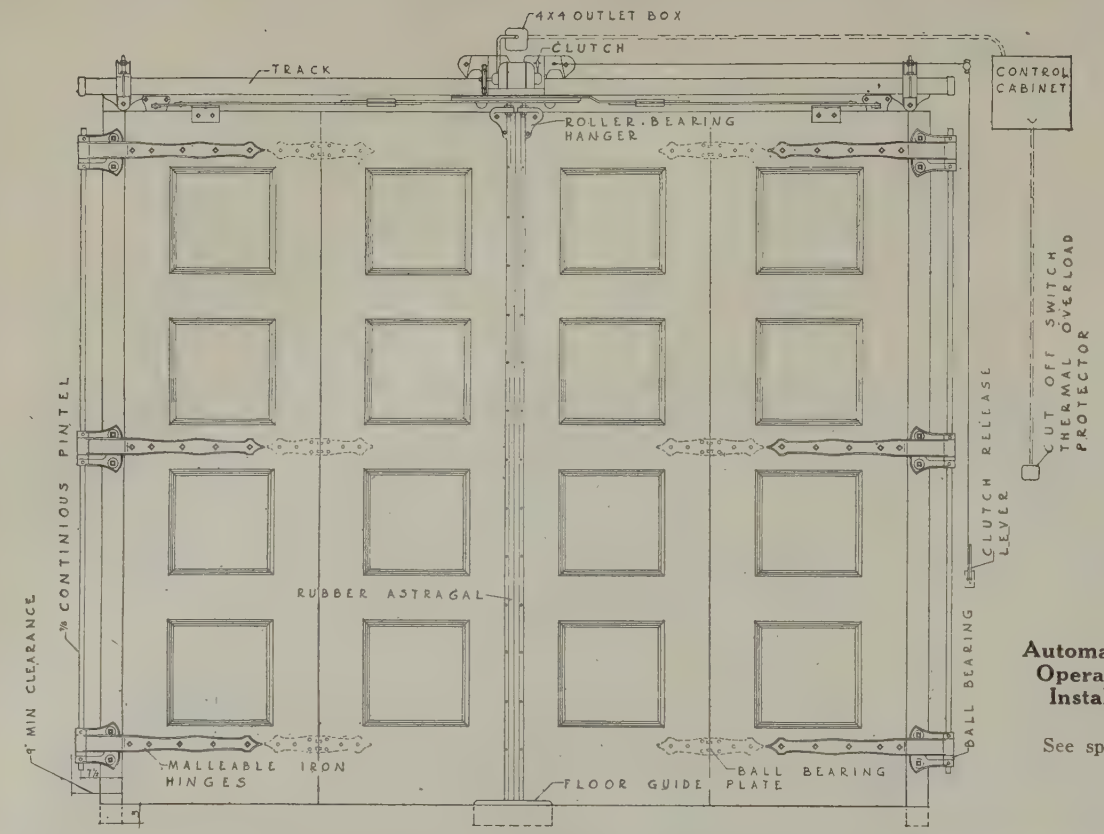
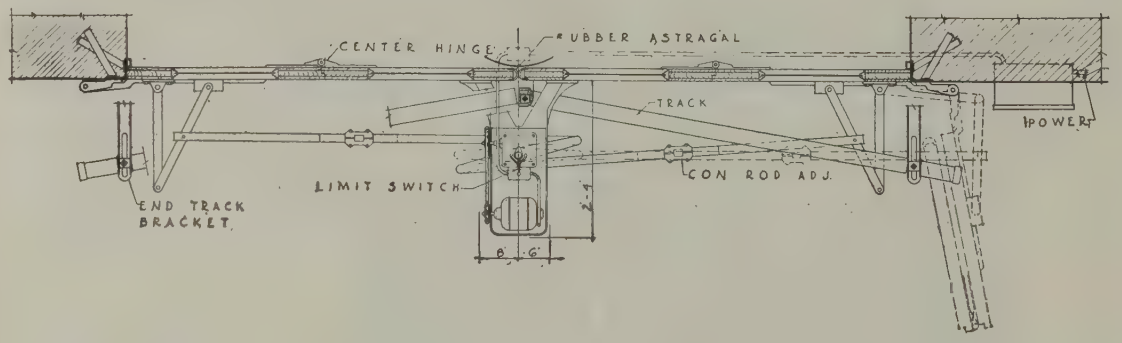
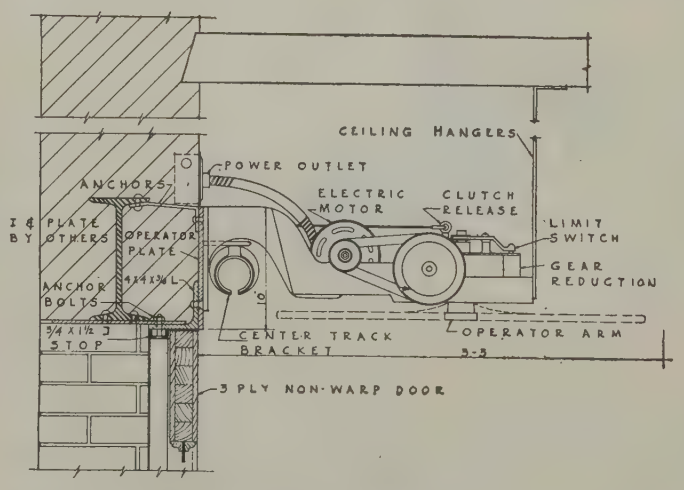


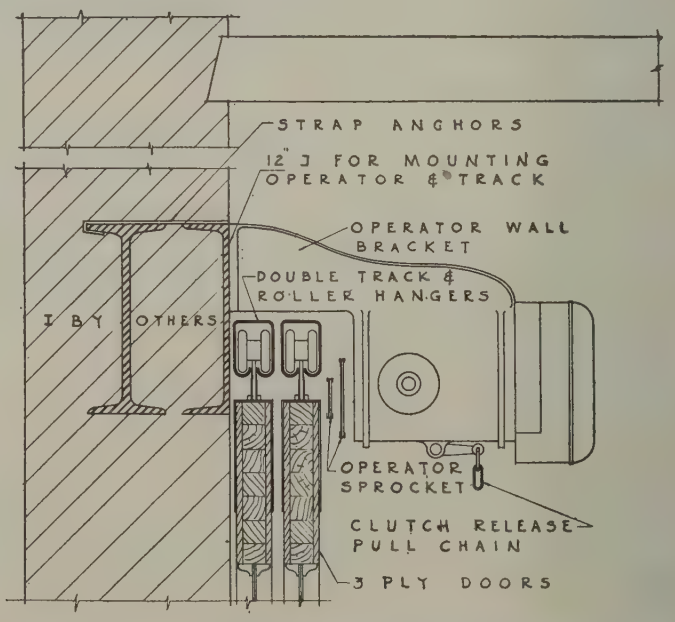
Automatic Electric Door Operator and Hardware Installed on Four-fold Doors

See specifications on following page





Section Through Automatic Electric Door Operator for Swinging and Folding Doors



Section Through Automatic Electric Door Operator for Sliding Door

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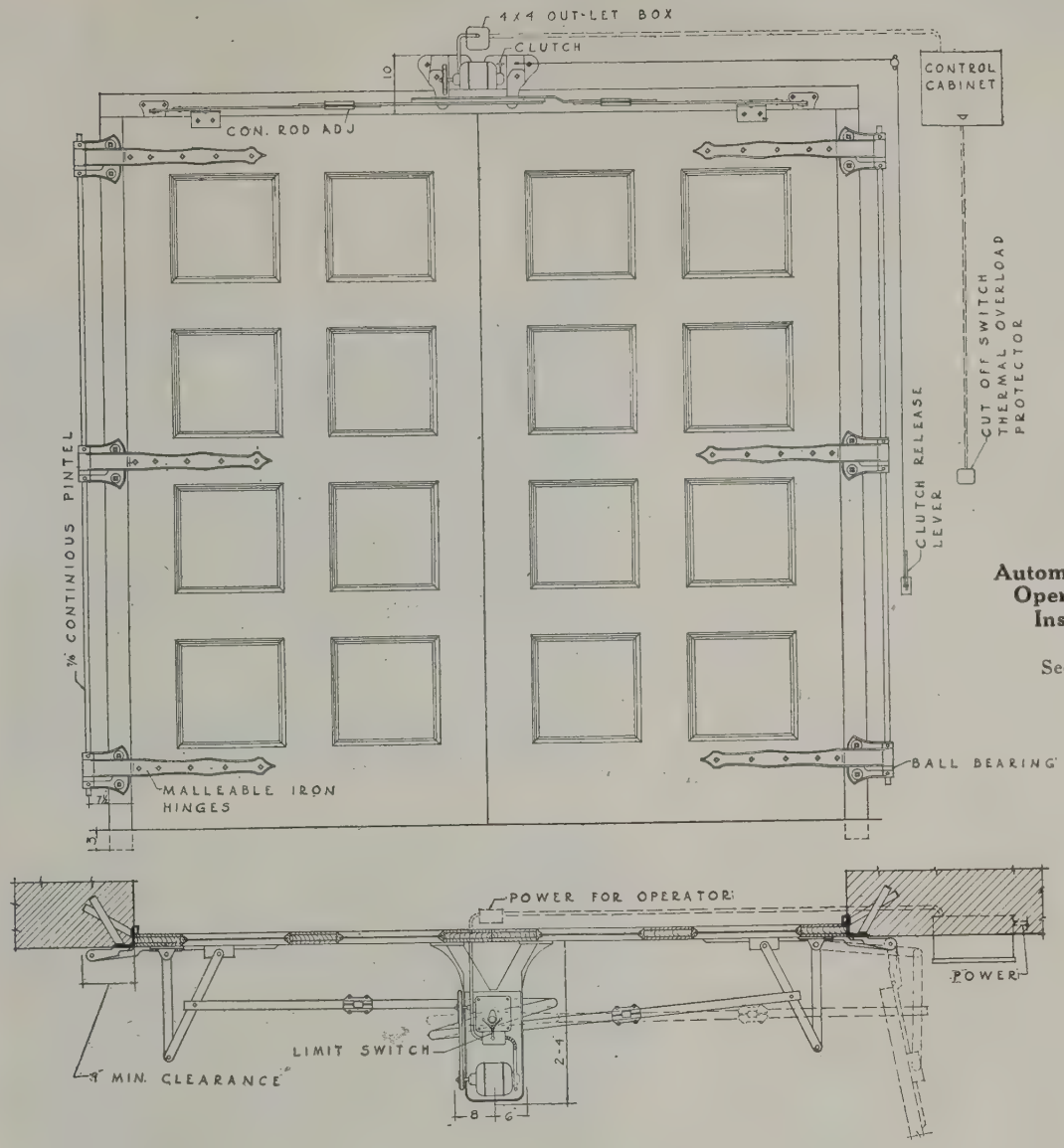


Automatic Electric Door Operator and Hardware Installed on Double-Swing Doors
See specifications below

Specifications

Operator—Furnish and install complete electric door operator with single button, momentary contact, remote controls for starting, stopping and reversing doors. Operator must give smooth, quiet, dependable service. Operator must be equipped with releasing clutch to allow for manual operation of doors; and thermal over-load cut-out for protection of mechanism. Above as manufactured by the Automatic Door & Equipment Company and installed in accordance with drawings furnished by them.

Hardware—***Four-fold***—Furnish and install special approved malleable iron, offset, ball bearing hardware consisting of heavy tubular track enclosing roller bearing hangers; malleable iron, offset standing hinges swung on a continuous ⅞-in. cold rolled shaft fastened to the steel frame by malleable iron brackets designed to allow doors to fold back of jambs when open; rubber astragals with metal binding strips at the meeting edges of doors; floor guide and necessary bolts; two door pulls. Above as manufactured by the Automatic Door & Equipment Company, Chicago, Ill.

Double Swing—Furnish and install special approved malleable iron, offset, ball bearing hinges swung on continuous ⅞-in. cold rolled shaft fastened to the steel frame by malleable iron brackets designed to allow doors to swing back of jambs when open; all necessary bolts; floor stop; door pulls. Above as manufactured by the Automatic Door & Equipment Company, Chicago, Ill.

Doors—Furnish and install three-ply, glued, selected white pine doors fitted and shaped for rubber astragals and rabbetted at the folds; not glazed; approved design. Above as manufactured by the Automatic Door & Equipment Company, Chicago, Ill.

Steel Frames—Furnish and install approved steel door frames manufactured by the Automatic Door & Equipment Company, Chicago, Ill.

Detail drawings are furnished on every job.

Measurements Required for Estimates

Side and head clearances are indicated in accompanying illustrations. Send detail section through walls at head and jambs.

The following measurements are required for estimate:

1. Type of doors.
2. Thickness of doors.
3. Width and height of wall opening.
4. Clearance on each side of jambs.
5. Clearance overhead.
6. Type of ceiling.
7. Type of wall.
8. Thickness of wall.
9. Is inside of wall flush with door?
10. Are hinges offset?
11. Power specifications.
12. Are wheel guards required?

J. EDWARD OGDEN COMPANY, INC.

Doors for Pier Sheds, Freight Warehouses, Industrial Buildings, Garages and Airplane Hangars

TELEPHONE
RECTOR 4655

WORKS: BAYONNE, N. J.

147-149 Cedar Street, NEW YORK, N. Y.

AGENCIES

NEW ORLEANS, LA., OLE K. OLESON, 822 Perdido Street

SAN FRANCISCO, CAL., ROMAN & CO., 55 New Montgomery Street

MONTREAL, QUE., F. BACON & CO., LTD., 131 St. Paul Street W.

Products and Services

Mechanically operated OGDEN SINGLE SECTION TURNOVER DOORS.

Also Ogden Two-section Turnover Doors, Ogden Canopy Doors, Ogden Airplane Hangar Doors, and Ferry Bridge Operating Mechanism.

This company is interested in the Design, Manufacture, and Erection, of all the above named specialties.

Low Cost

You are interested in saving money and maintenance troubles, and at the same time always having doors in working condition, without paying an extra premium, in first cost, to accomplish this. The Ogden Company, therefore, asks you to see its engineers about the new single section turnover door which it has developed to give all of these results.

Use

This new door is for use in warehouses, industrial buildings, railroad freight sheds and public garages. It is comparable in price (and often lower in price) than a rolling steel door.

Advantages

This new door is forever free from rattles, rusting out between slats, trouble with hinges and deflection in high winds. It lends itself to the use of glass in the upper portion and a pass door in the lower portion—two things highly valuable in large warehouses.

This single section door is automatic in locking when closed, thus making it positive in closing, a thing that is seldom accomplished in the so-called jack-knife door. Unlocking is a manual operation.

A Prominent Installation

We have installed 136 of these doors in the large new warehouse of the Seaboard Terminal & Refrigeration Co., at Eleventh and Coles Streets, Jersey City, N. J. Cuts of these doors are shown on this page.

Only Data Necessary

You furnish us with the door opening dimensions. We design, manufacture, and install the doors, guides and mechanisms and erect them completely.

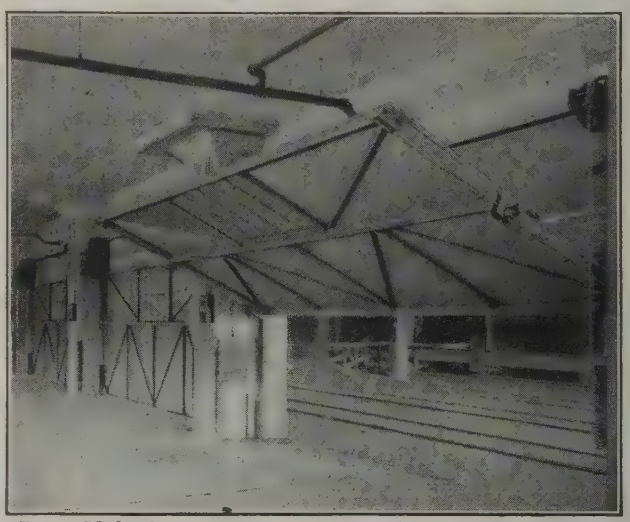
Specifications

Door sections shall be of a skeleton steel construction, covered on outside with No. .... (black or galvanized, flat or crimped) steel. The door shall be of the slotted link bar type and be easily operated by one man.

Door sections shall be supported by links attached near the center of gravity so that a continuous pull on the chains attached to lower corner of door section will raise the bottom edge of door vertically and will swing the top of the door away from the door header, until, in its final open position, the door assumes a horizontal position extending into the building.

Each corner of the door section shall be securely locked when closed. These locks shall be automatic in closing. The top locks shall be manually operated in opening.

Doors Starting to Open, Half Open, and Fully Open



Door Half Open—Doors at Left Side of Illustration Fully Closed

Door Fully Open

THE ATCHISON REVOLVING DOOR CO.

MAIN OFFICE AND FACTORY

INDEPENDENCE, KAN.

AGENCIES IN 60 OF THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA
Consult City or Telephone Directory for Name of Nearest Representative or Write the Main Office

Products

REVOLVING DOORS and ENCLOSURES: wood, metal covered and hollow metal; Wings—"Curved" (exclusive patent) and "Straight"; Types—Safety Exit or Panic-proof (NLD and NLE), Full-folding (PB), Semi-folding (C), Overhead Carriage (K) Contiguous Trim, Doors and Accessories in wood and bronze.

Revolving Door Benefits

Conserve Health—Prevent drafts, control ventilation, eliminate dust.

Convenience—Save floor space, reduce entrance effort by elimination of wind pressure, prevent confusion by automatic traffic division.

Increased Capacity—2000 to 3000 persons per hour each way (greater than is usual with swing doors).

Economy—20% annual return on investment due to fuel saving. A door pays for itself in about 5 years.

Always Open—To traffic.

Always Closed—To outside winds and cold.

General Data—Manufacturer's Recommendations

Adaptability—For office buildings, hotels, banks, department stores and all public and semipublic buildings where periodic or continuous traffic congestion exists.

Capacity Provision—The ideal entrance is one provided with revolving doors of sufficient capacity for normal traffic, flanked by single or pairs of swing doors. (See suggested arrangements or send plan of present entrance for individual recommendations.)

Where not originally included, provision should be made for future installations with the least structural change. Preliminary suggestions will be gladly submitted by our service department.

Sizes—For dimensions see cuts No. 164 and No. 166 (second page following). 4-wing doors *should not be less* than 6 ft. inside diameter. The standard is 6 ft. 6 in. except in hotels where 7 ft., 7 ft. 6 in. or even 8 ft. is needed for the convenient handling of luggage.

3-wing doors may be 4 ft. 6 in. to 5 ft. 6 in. in diameter. They are adapted for use where space is too small for 4-wing door or where less capacity is required.

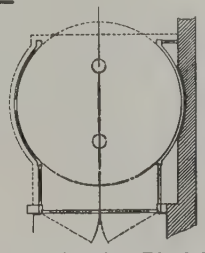
Inside height should be 7 ft. to 8 ft., standard being 7 ft.

Access to Bearing—Space over door *should* (not *must*) be accessible for oiling and adjusting main bearing.

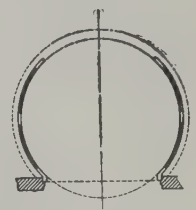
Glass—That the braces may be set sufficiently high to reduce racking strains, 24 in. is recommended as the minimum height from floor to bottom of wing glass.

Avoid other than rectangular glass, to avoid breakage. Beveling is undesirable because of refraction.

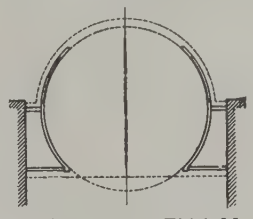
Marble Enclosures—Atchison wings are ideal for use with marble enclosures, as no ceiling slot is needed, and slabs can be supported from bearing channel which lies directly over it. Only a 1¾-in. center hole is needed —no other provision prior to placing of wings, except access to space overhead. Always provide anti-flap bevel or relief at ends of walls.



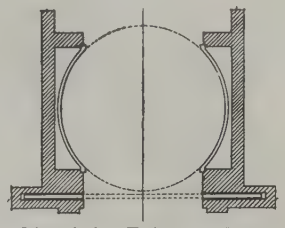
A—One Wall against Blank Building Wall—Screen Doors at Outside



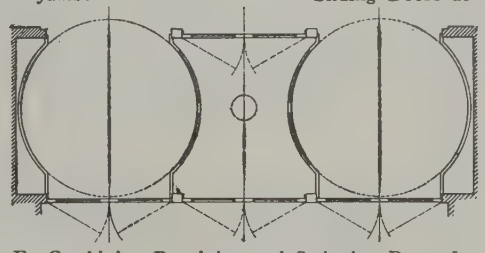
B—Common Layout Taking Place of Pair of Swinging Doors



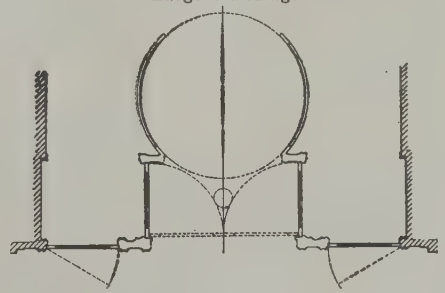
C—To Set Between Thick Masonry Jambs



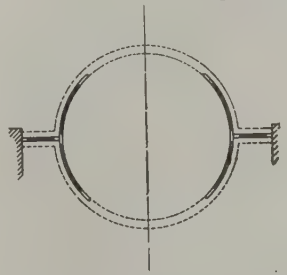
D—Placed in Existing Vestibule, Sliding Doors at Outside



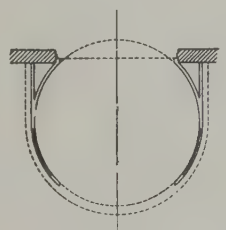
E—Combining Revolving and Swinging Doors for Large Buildings



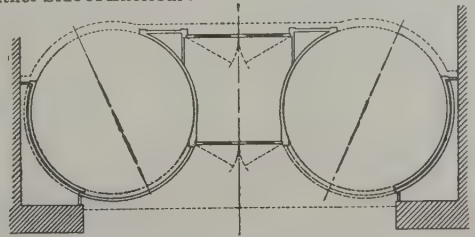
F—Another Combination with One Pair Outer Swing Doors Used as Connecting Jambs



G—Having Swing Doors or Side Lights at Either Side of Enclosure



H—With Enclosure Walls Straight Back to Building Wall



I—Special Layout to Get Two Revolving Doors and Small Swing Doors Into Narrow Opening—Note Curved Sliding Doors at Exterior

Suggested Layouts

Continued on next pag

Types

Type NLD or NLE Safety Exit or Panicproof—For doors that are the *sole* exits for massed crowds (not offices, banks or hotels). Their added expense is not warranted for exits where side swinging doors are present or for average exit conditions. Wings assume full line collapsed position and allow passage at either side without revolving. They *also fold aside* like Type PB. See cut No. 165 (following page).

Type NLD is equipped with push-bar-release, monel cable brace and toggle tightener which will open under panic conditions without knowledge of the mechanism, but which *will not* release under jars, ordinary traffic, or wind pressure. Type NLE is equipped with simple automatic releasing cast bar braces.

Type PB Full-folding—Standard wings fold aside in pairs, on pivots, and lie entirely back of the chord line. They lock or unlock from either inside or outside at both top and bottom in diagonal position. They may be fastened (to ceiling only) in crosswise, quartering or lengthwise position.

Type C Semi-folding—Wings fold into one plane not detached from central pivot and in lengthwise position only (to allow unrestricted passage and passing objects through).

Note: When revolving, they have the same value as other types, and are adapted to use where traffic does not justify investment in the more expensive types.

Type K—Overhead carriage suspension dispenses with side folding pivots, uses a ceiling slot and folds to one side. This type is for those who prefer, at a lower price, a door without the distinctive Atchison features.

Special Features

"Curved Wings"—An exclusive basic improvement in design of outstanding importance surpassing all secondary improvements affecting manner of folding, collapsing and locking. The "curved wings" increase usable space 6 in. in front of the body, permitting a more natural, upright position and easy stride in the line of traffic than is possible with the straight wing.

The "curved wing" is quoted at actual extra cost, under a policy of many years standing.

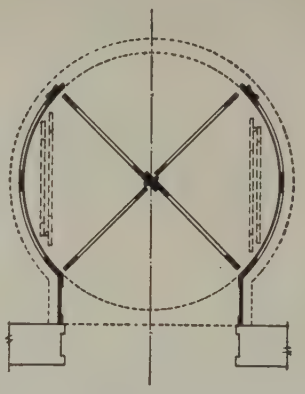
Experience *shows* that breakage of "curved wing" glass is extremely rare. A replacement plate may be carried or can be obtained promptly from stock at cost.

Folding of Wings—When desired, the wings (with exception of Types C and K) fold aside in pairs and *lie entirely back* of the enclosure wall opening or chord line *leaving full unrestricted passage space.* Note the particular advantages in this respect of the "curved wing" design. The main wings (to which the secondary wings are hinged) have top and bottom pivots operated by a powerful lever mechanism in the outer stile. By setting these pivots and releasing the wings from each other and from center pivot and hanger stem, wings swing smoothly back against enclosure walls. The folding operation may be accomplished with ease in 30 seconds.

No Ceiling Slot—Due to the Atchison method of folding, the conspicuous and unsightly ceiling slot with traveling suspension carriage is eliminated, except in Type K.

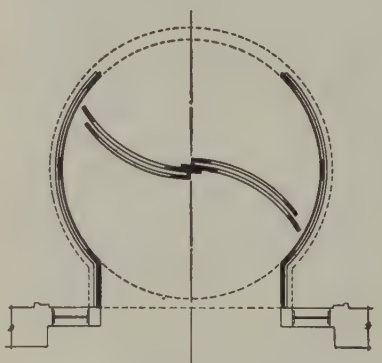
Screen Doors—Light double acting screen or flap doors may be hung with removable hanging strips to enclosure wall ends without interference with wings (an exclusive Atchison feature).

Air Lock Strips—Especially designed and selected to maintain the air lock with just the proper amount of friction. Easily adjusted. Consist of wide flexible rubber strips at bottom; heavy felt strips at top; tapered moulded rubber side strips with piano felt edges.

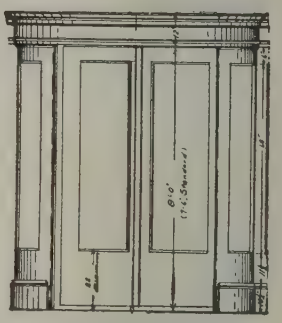


Plan No. 6

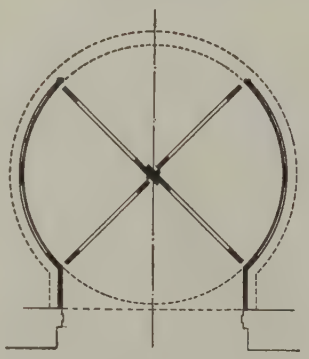
Elevation No. 7



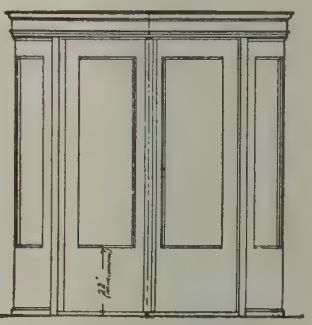
Plan No. 92



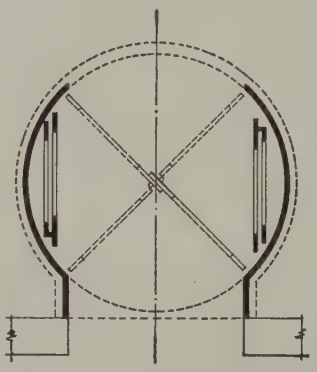
Elevation No. 91



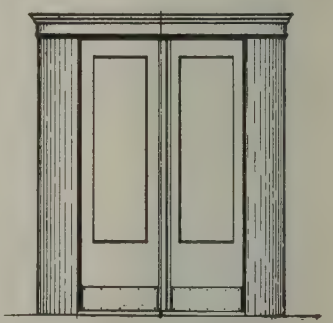
Plan No. 80



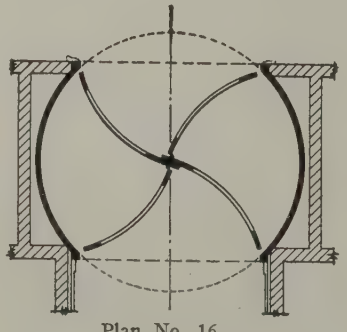
Elevation No. 95



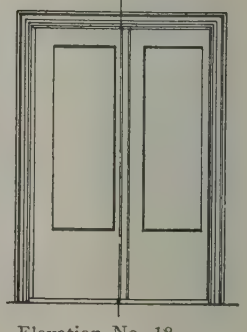
Plan No. 8



Elevation No. 9



Plan No. 16



Elevation No. 18

Standard Design Layouts

Continued on next page

Materials, Construction and Finish

Wood—Wings and enclosures of all cabinet woods veneered over an improved type of laminated core construction. Material, construction and workmanship commensurate with the highest quality of cabinet work.

The highest class of painters finish applied by skilled workmen in any standard or special finish. (Samples of standard finishes furnished on request.)

Metal Covered—Bronze plate overlay construction in No. 16 gauge (recommended) or No. 20 gauge, applied with special metal holding adhesive, under heavy pressure, to hardwood faced, laminated cores, with hair-line reinforced joints.

Note: This construction is particularly recommended for wings over hollow metal construction because of (1) greater stiffness to meet twisting strains (usually absent in swing doors), (2) less weight for the required stiffness (essential to avoid undesirable momentum and inertia effects), (3) lower cost, (4) greater fire resistance.

Connected work in ornamental cast iron and bronze.

Finishes to match adjacent work. Bronze recommended in fine-line medium oxidized or statuary, not lacquered. (Samples of standard finishes furnished on request.)

Hollow Metal—Enclosures furnished in No. 10 and No. 12 gauge, with drawn and extruded moulds. Wings in No. 14 gauge, specially constructed for stiffness.

Hardware—Heavy, plain design, cast bronze in either polished or brushed natural finish.

Cylinder locks (master-keyed if desired) are standard equipment.

Stock Doors and Enclosures

To be had in one design only, as shown, size 6 ft. 6 in. diameter by 7 ft. high. In oak, gum or birch. All types, with or without glass in enclosure walls. Finished to suit.

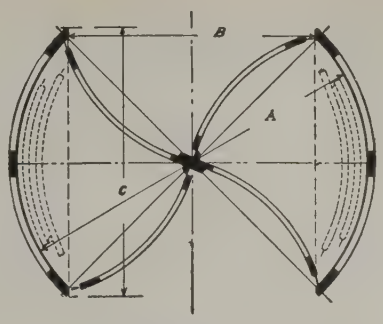
At considerable saving over cost of door especially designed.

Specifications

Furnish and install, where shown on plans and details, revolving doors as made by The Atchison Revolving Door Co., Independence, Kan.

(Here specify optional requirements.)

Design: Special or stock. Type: PB; C; NLD or NLE. Wings: "Curved" or "Straight." Material and finish. Connections. Special equipment, ceiling lights. Master-keyed cylinders, etc. Write for suggested detailed open specification form if desired.

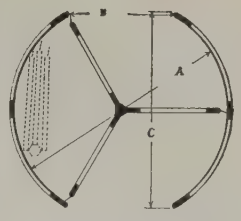


No. 164. "Curved Wing" Door Floor Plan

Note folded position of wings

Dimension Table

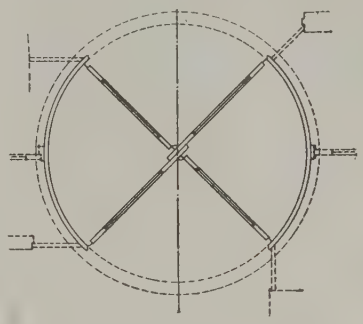
A	B	C
6'0"	4' 2½"	4' 7½"
6'6"	4' 6¾"	4'11¾"
7'0"	4'11 "	5' 4 "
7'6"	5' 3¼"	5' 8¼"
8'0"	5' 7½"	6' 0½"



No. 166. 3-Wing Door Floor Plan

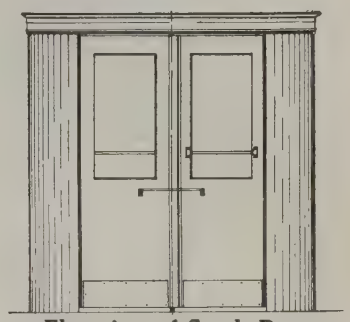
Dimension Table

A	B	C
4'6"	2'2½"	4'2"
5'0"	2'5½"	4'7"
5'6"	2'8½"	4'2"

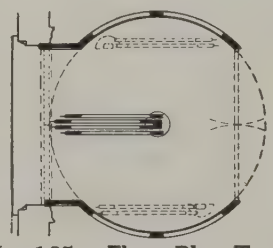


Plan of Stock Door

Dot lines representing various connections which can be applied at job

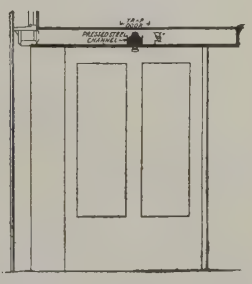


Elevation of Stock Door



No. 165. Floor Plan Type NLD Safety Exit Door

Showing screen doors



No. 169. Section Through Typical Ceiling

Showing connection at transom bar

Facilities

Experience—Atchison Revolving Doors have been made continuously since 1906. An outgrowth of 50 years' millwork experience.

Plant—A modern efficiently planned and lighted one-story plant of 75,000 sq. ft. area, equipped throughout with the most modern motor driven machinery. A woodworking factory accustomed to executing and finishing the highest grade cabinet millwork. A complete metal covered and hollow metal door shop. A complete foundry. Every part (except lock cylinders) from the simplest wood to the most elaborate metal doorway executed under our own roof and under closest supervision.

Location—Favorable manufacturing conditions; uninterrupted, prompt, economical execution and advantageous shipping facilities to any part of the United States.

Patents—The "Curved Wing" and other Atchison exclusive features are protected by patent. This company will guarantee against loss or damage from any infringement suits.

Service—Adequate and capable Engineering and Service Department maintained at plant and Atchison agents accessible in all principal cities of the United States and Canada.

Quotations and Ordering

Agents can generally quote direct on stock designs. Due to numerous variations in material, design, finish and equipment, special design doors must be quoted upon by the factory.

Approximate or comparative estimates from sketch plans and designs promptly furnished.

We urge the placing of orders in the spring and summer to avoid seasonal congestion of fall and winter.

References

A list of notable installations and references furnished on application.

VAN KANNEL REVOLVING DOOR CO.

TELEPHONES
DAYTON 5620, 5621, 5622

716 Whitlock Avenue
NEW YORK, N. Y.

REPRESENTATIVES

ALBANY, N. Y., ROESCH CORP., Syracuse, N. Y.
ATLANTA, GA., 675 Greenwood Ave., N. E.
BALTIMORE, MD., Maryland Ave. and 22nd St.
BILLINGS, MONT., Hedden Bldg.
BIRMINGHAM, ALA., 513 No. 21st St.
BOSTON, MASS., 1042 Little Bldg.
BUFFALO, N. Y., Jackson Bldg.
CANTON, OHIO, P. O. Box 314
CHARLESTON, W. VA., 209 Hale St.
CHATTANOOGA, TENN., 103 E. Sixth St.
CHICAGO, ILL., Tribune Tower
CINCINNATI, OHIO, 534 Main St.
CLEVELAND, OHIO, 1137 Schofield Bldg.
COLUMBIA, S. C., 17 Carolina Bank Bldg.
COLUMBUS, OHIO, 145 No. Front St.
DALLAS, TEX., 616 Slaughter Bldg.
DAYTON, OHIO, 494 Ludlow Arcade
DENVER, COLO., W. 3rd Ave. and Tejon St.
DES MOINES, IOWA, 621 Hubbell Bldg.
DETROIT, MICH., 420 U. S. Mortgage Bldg.
EL PASO, TEX., NEFF-STILES CO.
ERIE, PA., 405 Scott Bldg.
EVANSVILLE, IND., INTERNATIONAL STEEL & IRON CO.
FARGO, N. D., 217 Broadway
FORT WAYNE, IND., 1751 Lindley Ave.
GREENSBORO, N. C., 113 E. Gaston St.
HARRISBURG, PA., 18th and Mulberry Sts.
INDIANAPOLIS, IND., 725 Continental Bank Bldg.
JACKSONVILLE, FLA., Florida National Bank Bldg.
KANSAS CITY, MO., 1215 Midland Office Bldg.
KNOXVILLE, TENN., 712 So. Gay St.
LIMA, OHIO, 417 Opera House Block
LOS ANGELES, CAL., 800 Hibernian Bldg.
LOUISVILLE, KY., 1446-48 Levering St.
MEMPHIS, TENN., 242 Madison Ave.
NASHVILLE, TENN., 57 Arcade Bldg.
NEW ORLEANS, LA., 319 Dryades St.
NORFOLK, VA., 235-37 Monticello Arcade Bldg.
OKLAHOMA CITY, OKLA., 200¼ W. Reno Ave.
OMAHA, NEB., 707 South 27th St.
PHILADELPHIA, PA., 1600 Walnut St.
PHOENIX, ARIZ., P. O. Box 145
PITTSBURGH, PA., 507 Century Bldg.
PORTLAND, ME., 31½ Exchange St.
PORTLAND, ORE., 61-7 Albina Ave.
RALEIGH, N. C., 313 So. Wilmington St.
RICHMOND, VA., 202 Davis Bldg.
ROANOKE, VA., 507 Commerce St.
ROCHESTER, N. Y., Builders Exchange
ST. LOUIS, MO., Century Bldg.
ST. PAUL, MINN., 2694 University Ave.
SALT LAKE CITY, UTAH, 204 Dooly Bldg.
SAN FRANCISCO, CAL., C. J. WATERHOUSE & SONS CO., 55 New Montgomery St.—Telephone, Garfield 6480
SEATTLE, WASH., 216-17 Walker Bldg.
SHREVEPORT, LA., 310 Ricou-Brewster Bldg.
SIOUX FALLS, S. D., 213 Paulton Bldg.
SYRACUSE, N. Y., 423½ So. Salina St.
TERRE HAUTE, IND., 125 So. 7th St.
TULSA, OKLA., 402 Kennedy Bldg.
WASHINGTON, D. C., 1756 M St., N. W.
WILKES-BARRE, PA., Miners Bank Bldg.
WINNIPEG, CAN., 120 Lombard St.

AGENTS FOR JAPAN AND KOREA: UCHIDA TRADING CO., LTD., 291 Broadway, NEW YORK, N. Y.

Products

VAN KANNEL REVOLVING DOORS (3-Wing and 4-Wing styles) in three distinct types:

Automatic Collapsible, Panicproof Type.
Standard "C" Rigid Brace Arm Type.
Standard "N" Rigid Brace Arm Type.

Also manufacturers of Van Kannel Revolving Pantry Windows (Patented).

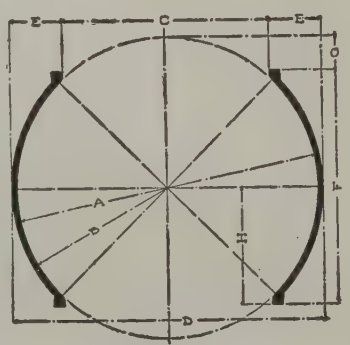
Original Patentee

This company is the pioneer manufacturer and original patentee of revolving doors; its patents cover every practical improvement and substantial feature.

Van Kannel Revolving Doors

Automatic Burglar Lock—Van Kannel Revolving Doors may be furnished with an automatic electrically controlled burglar lock which may be actuated by any number of push buttons located in any part of the building. Closing the circuit insures instantaneous locking of the door.

Materials—Materials used for entire construction are any kind of hardwood, bronze or steel on a metal frame or wood core covered with various gages of metals in either copper, steel or bronze, using the following gages—Nos. 24, 20, 16. Revolving door vestibules may be made of other materials such as marble, tile or cement, as may be needed in order to carry out architectural treatments.



Dimension Diagram

Stock Designs—Several stock designs are carried on hand in plain oak and birch, on which practically immediate delivery can be quoted. See stock series and stock special doors as illustrated.

Automatic Collapsible, Panicproof Type—This type of door has 3 or 4 wings hung independently of each other on a central shaft of metal and wings are held together by flexible cables. This type of door gives a feature of absolute safety at all times and under all conditions. The safety feature lies in the fact that the revolving wings are so arranged that by application of pressure to any part of the revolving door, slightly more than necessary to revolve door, the revolving wings will instantly and automatically collapse and fold outwardly in line of egress, leaving a free, unobstructed passageway.

Rigid Brace Arm Type, Styles "C" and "N"—These two types consist of either 3 or 4 wings, held together in their radial position by rigid braces; wings are collapsed only by means of pressing a spring when it is desired to have doors open in the middle, or pushed to one side for a wide open passageway. These types, although collapsible as to folding of wings, are not automatically so, as in case of automatic collapsible, panicproof type of door previously described.

3-Wing Revolving Door—The 3-wing revolving door is especially adapted for entrances that are too small to accommodate a 4-wing door at least 6 ft. in diameter. It is being used to a great extent in entrances to toilet rooms in schools, institutions and public buildings and the company has installed 34 of these doors for the Prudential building, Newark, N. J. Approximately, 5 ft. diameter.

3-Wing Revolving Door

TABLE OF DIMENSIONS—FT.-IN.

A	B	C	D	E	F	G	H
5-10	2-11	3-11½	6-1	1-0¾	4- 7¼	7⅜	2- 3⅝
6- 0	3- 0	4- 1	6-3	1-1	4- 8½	7¾	2- 4¼
6- 2	3- 1	4- 2½	6-5	1-1¼	4-10	8	2- 5
6- 6	3- 3	4- 5¼	6-9	1-1⅞	5- 0¾	8⅝	2- 6⅜
6-10	3- 5	4- 8	7-1	1-2½	5- 3½	9¼	2- 7¾
7- 0	3- 6	4- 9½	7-3	1-2¾	5- 5	9½	2- 8½
7- 2	3- 7	4-10¾	7-5	1-3⅛	5- 6½	9¾	2- 9¼
7- 6	3- 9	5- 1½	7-9	1-3¾	5- 9¼	10⅜	2-10⅝
7-10	3-11	5- 4¼	8-1	1-4⅜	6- 0	11	3- 0
8- 0	4- 0	5- 5¾	8-3	1-4⅝	6- 1½	11¼	3- 0¾

DESCRIPTIVE DATA

Standard Type Wings—Thickness, 1¼ to 1½ in., wood; 1 to 1¼ in., metal.

Panicproof Type Wings—Thickness, 1¼ in., wood; 1 to 1¼ in., metal.

Door Vestibules—4 ft. 8 in. to 6 ft. diam., 3 wings; 6 ft. to 8 ft. diam., 4 wings; 7 ft. diam., normal.

Standard Size—7 ft. to 7 ft. 6 in. vestibules. Large enough for maximum capacity.

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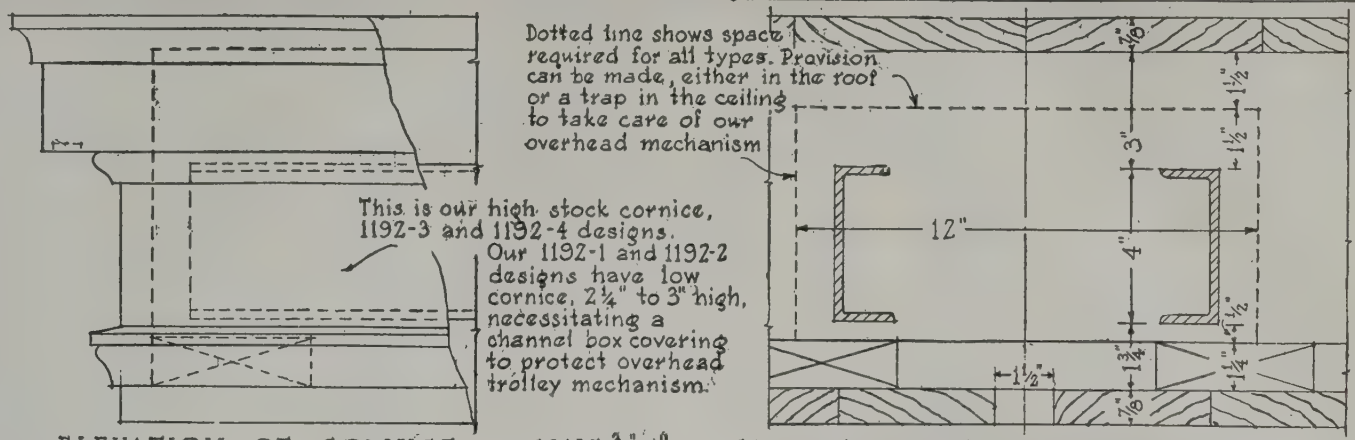
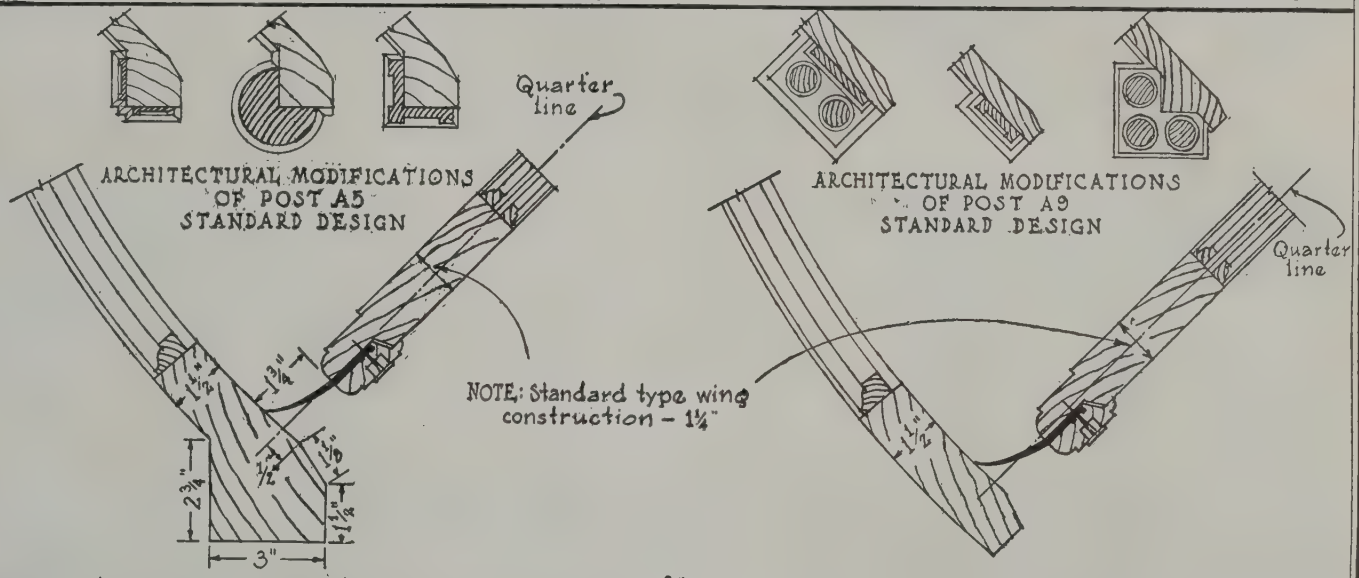
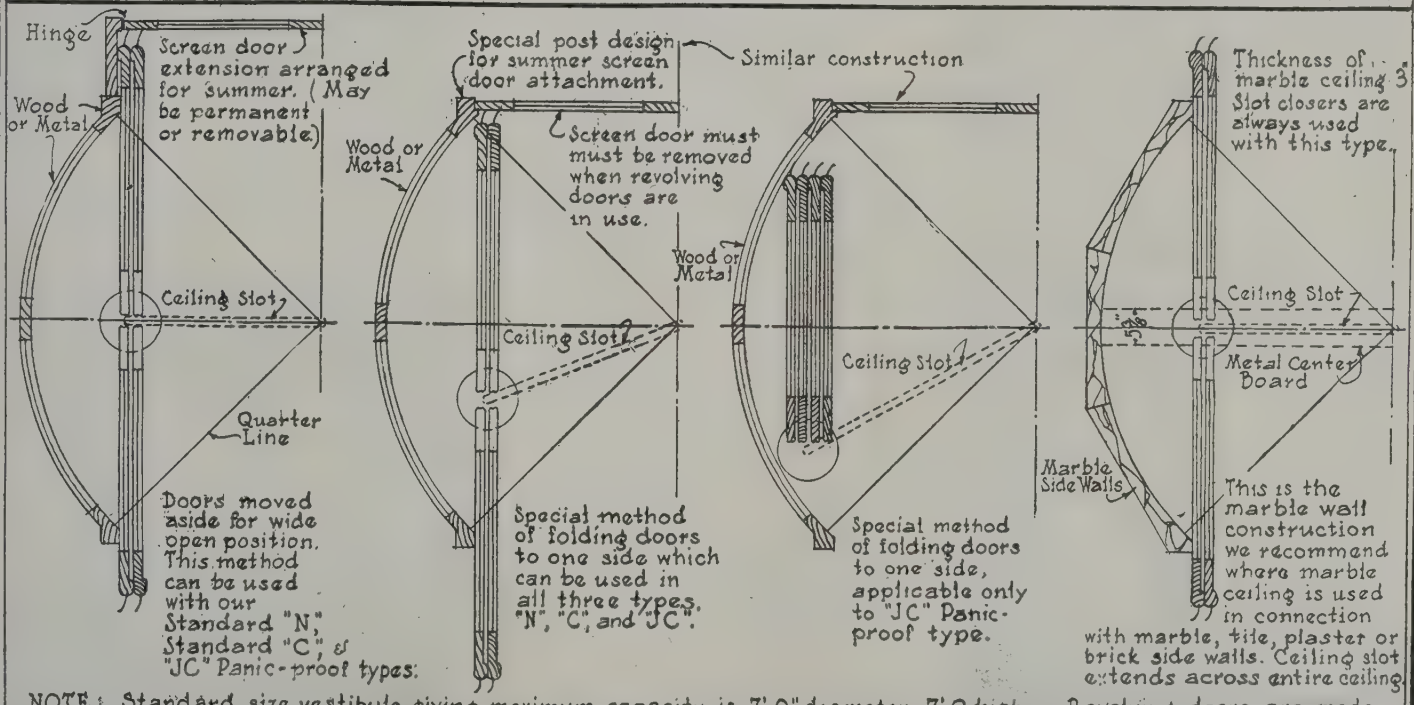


ELEVATION OF CORNICE SCALE 3/16"=1" CHANNEL CONSTRUCTION AND LOCATION



DETAIL OF POST A5 STANDARD DESIGN SCALE 3/16"=1" DETAIL OF POST A9 STANDARD DESIGN



NOTE: Standard size vestibule giving maximum capacity is 7'-0" diameter, 7'-0 high. Revolving doors are made in 3-wing and 4-wing types. The 3-wing type vestibule ranges from 4'-8" to 6'-0" diameter, and the 4-wing type ranges from 6'-0" to 8'-0" diameter. Normal diameter 7'-0". We also make 6-wing type doors, but do not advocate their use.

VARIOUS TYPES OF VESTIBULE CONSTRUCTION TO PERMIT CONVENIENT FOLDING OF WINGS

CONSTRUCTION DETAILS OF THE VAN KANNEL REVOLVING DOOR

Continued on next page

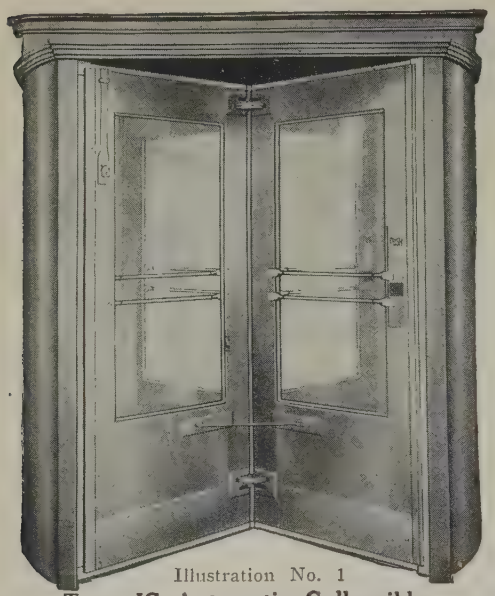


Illustration No. 1
Type JC Automatic Collapsible
Standard Design 1192-1
Material: bronze
Design 1192-1-U: vestibule finished inside only

Illustration No. 3
Type C Rigid Brace Arm (Collapsible)
Standard Design 1192-3
Material: oak

Illustration No. 5
Type Stock JC Automatic Collapsible Hardware
Standard Design 8
Material: birch; size, 6 ft. 6 in. x 6 ft. 11 in.

Specifications for Standard Equipment

The revolving door contract to include the revolving wings, circular walls, ceiling and cornice, together with all necessary mechanism, hardware, push bars, push plates, key locks and kick plates. All glass, either bent or flat, to be best selected American polished plate.

Type JC, Illustrations No. 1 and 2—Furnish and install where shown on plans, revolving doors of the Van Kannel Revolving Door Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Automatic Collapsible. Material: (if wood) the kind selected to match surrounding trim; (if metal) either kalamein plate on wood core construction or hollow metal.

Type C, Illustration No. 3—Furnish and install where shown on plans, revolving doors of the Van Kannel Revolving Door Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Collapsible. Material: (if wood) the kind selected to match surrounding trim: (if metal) either kalamein plate on wood core construction or hollow metal.

Stock "Special" Illustration No. 4—Furnish and install where shown on plans, revolving doors of the Van Kannel Revolving Door Co. make, Design Stock "Special" Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock Standard Design 8, Illustration No. 5—Furnish and install where shown on plans, revolving doors of the Van Kannel Revolving Door Co. make, Standard Design 8, Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock "Series" Illustration No. 6—Furnish and install where shown on plans, revolving doors of the Van Kannel Door Co. make, Design Stock "Series" [No. 1S] [No. 2S] Collapsible. Woodwork to be white pine. Finish to match surrounding trim.

Type "N" Fixtures

This type of fixture may be applied to any 4-wing design of Van Kannel Revolving Door, made of any material. The four wings are held in their revolving position by means of metal brace arms in the form of hooks. When it is desired to fold the wings for any reason it is only necessary to unhook the brace arms and hook them back against the fixed wings, since all the four brace arms are attached to these wings by means of sockets. After the brace hooks are caught back, as above mentioned, the two hinged wings can be folded and the revolving door may assume positions illustrated on following page.

Literature

Send for our 24-page "Manual of Revolving Door Construction and Architectural Design."

Positions Assumed by Wings

Note on following page position assumed by wings of various types here shown.

Illustration No. 2
Type JC Automatic Collapsible
Standard Design 1192-2
Material: bronze

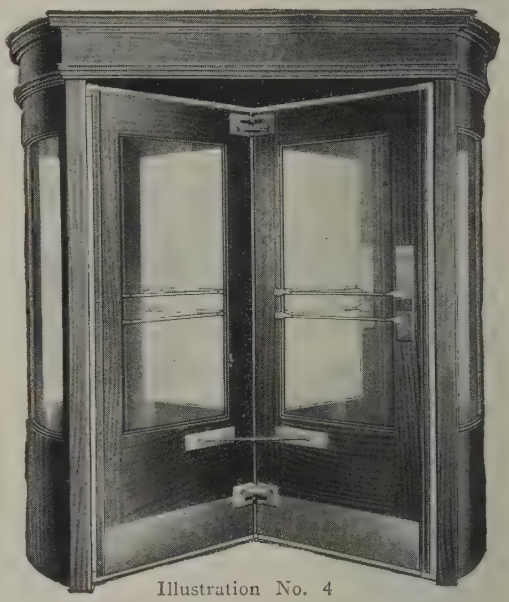


Illustration No. 4
Type Stock JC Automatic Collapsible Hardware
Standard Design 7
Material: birch; size, 7x7 ft.

Illustration No. 6
Type Stock "Series" (Collapsible)
Design 2S
Design 1S: wood panels in sidewalls instead of glass
Material: white pine; size, 6 ft. 6 in. x 6 ft. 10 in.

Continued on next page

Positions Assumed by Wings

Fig. 1
REVOLVING POSITION
Four wings extended, permitting persons to pass in and out, at the same time excluding noise, rain and snow, heat and cold, wind and dust

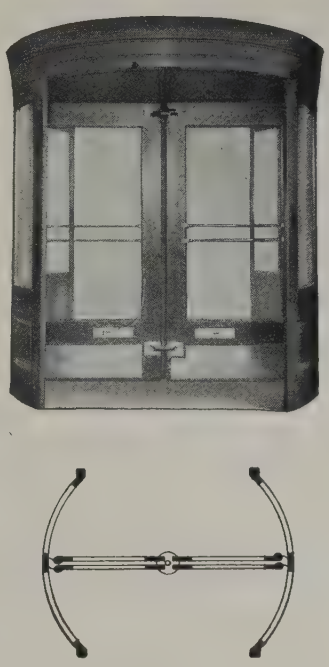


Fig. 2
LOCKED POSITION
Four wings folded in pairs and placed across vestibule, securely locked or bolted. Lock operates from both sides

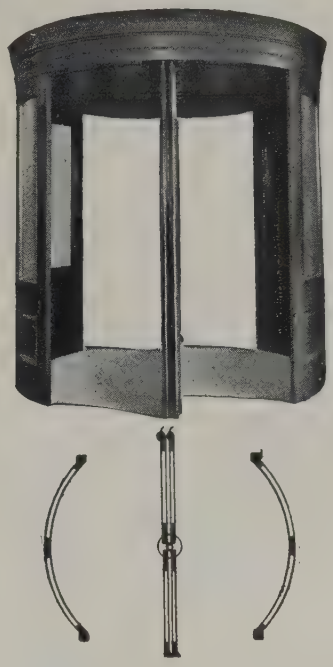


Fig. 3
CENTRAL OPEN POSITION
Wings folded flat in pairs and held in position by folding bars, making two passages separating traffic

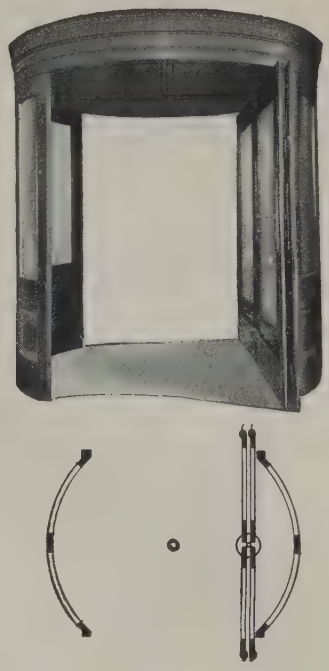


Fig. 4
FULL OPEN POSITION
Wings folded and moved aside, making available full width of entrance

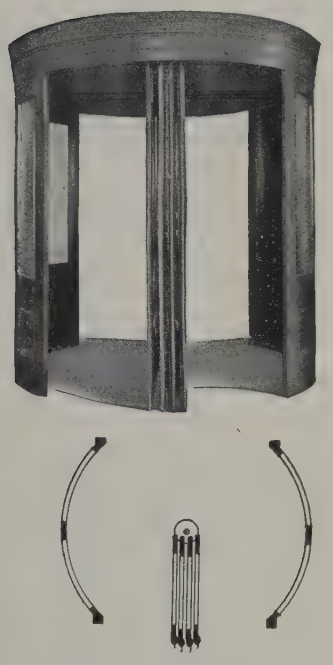


Fig. 5
PANIC COLLAPSED POSITION
Wings folded on each other in outward position, dividing traffic into two streams

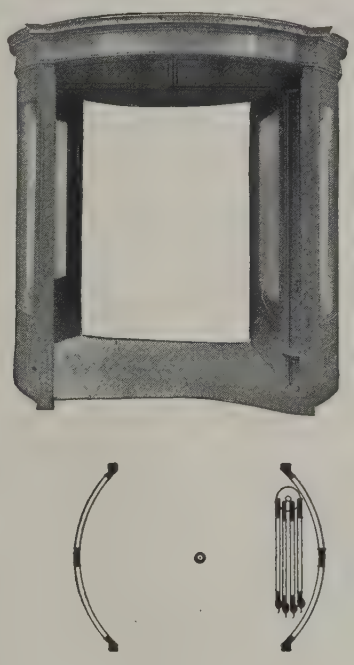


Fig. 6
FULL OPEN POSITION WITH WINGS COLLAPSED
Wings folded on each other and moved to one side making available full width of entrance

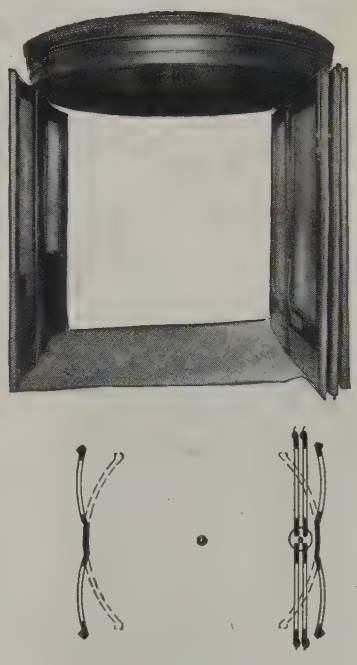


Fig. 7
FULL OPEN POSITION WITH FLEXED WALLS
Wings folded and moved aside with hinged walls flexed for added space

Fig. 8
PANIC COLLAPSED POSITION WITH FLEXED WALLS
Wings folded on each other in outward position with walls flexed for added space

Positions Assumed by Wings—All Types of Doors

Note: One wing may also be folded at a time if desired.

TYPE STOCK "SERIES"—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE STOCK "SPECIAL"—Positions Nos. 1, 2, 3, 4 and 5 assumed by wings.

TYPE C COLLAPSIBLE—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE N COLLAPSIBLE—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE JC AUTOMATIC COLLAPSIBLE—Positions Nos. 1, 2, 3, 4 and 5 assumed by wings.

Note A—Special trolley construction can be furnished which will permit wings to assume position shown in Fig. 6.

Flexed Walls—In order to provide added entrance space where desired, flexed wall construction can be furnished which will permit wings to assume postions shown in Figs. 7 and 8.

REVOLVING DOORS, INC.

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Specialists in all Mechanical Devices as applied to Revolving Doors.

Complete installations contracted for anywhere in the United States and Canada.

This company supplies Fixtures for Revolving Doors to manufacturers of cabinet work, kalamein work, hollow steel and architectural bronze work, together with construction details and, if desired, assembling and erecting labor.

Automatic Panicproof Revolving Door

Wings are suspended from a universal ball bearing located in a dustproof oil chamber mounted on a carriage running on tracks. The wings can be folded centrally and moved to one side in the usual manner.

Each wing is hung to the center post with spring hinges, which hold it under spring control when the braces are detached, preventing slamming of the wings against each other and breaking the glass, which happens in other panicproof revolving doors.

The Slip-bar—The braces which hold the wings in rotating position are the vital feature of a panicproof door. This company uses neither cables nor chains, but manufactures the only slip-bar brace that pushes or pulls out under undue pressure. Brace is positive in action, durable, and conforms to building and fire department regulations.

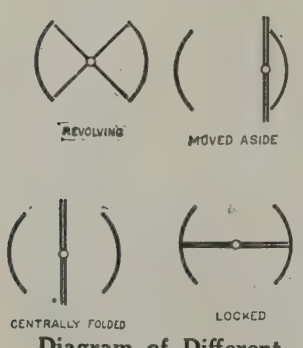


Diagram of Different Positions of Wings

Standard Design No. 106, Panicproof Slip-bar Construction

Adaptable to slight architectural changes. Any material; any wood or hardware finish; kick plates and key locking bolts when desired

Some Recent Installations

The following is a list of some recent installations with the names of the architects and contractors who were connected with the work:

New York, N. Y.

Graybar Building, (6 doors), 420 Lexington Avenue; Sloan & Robertson, architects; Todd, Robertson & Todd Engineering Corp., Contractors

Bank for Savings, Third Avenue and 70th Street; George S. Kingsley, Architect; John Lowry, Inc., Contractors

Uppercu Building, Columbus Avenue and 62nd Street; Charles E. Birge, Architect; Turner Construction Co., Contractors

National City Bank:
- Broadway and Canal Street; Walker & Gillette, Architects; Starrett Bros., Contractors
- 52 Wall Street; McKim, Mead & White, Architects; George A. Fuller Co., Contractors
- Courtlandt Avenue and E. 149th Street; Starrett & Van Vleck, Architects; Cauldwell-Wingate Co., Contractors
- Broadway and 181st Street; Walker & Gillette, Architects
- Varick and Vandam Streets

Chatham & Phenix National Bank, Broadway and 106th Street; Louis S. Weeks, Architect; Miller, Reed Co., Contractors

Union Dime Savings Bank Addition, 40th Street and Sixth Avenue; A. H. Taylor, Architect

Standard Oil Building, (8 doors), 26 Broadway; Carrere & Hastings, Shreve, Lamb & Blake, Architects; Charles T. Wills, Inc., Contractors

New York County Courthouse, (5 doors), Center, Worth, Baxter and Pearl Streets; Guy Lowell, Architect; installed for John Polacheck Bronze & Iron Co.

Brooklyn, N. Y.

Silver's Cafeterias, Adams and Willoughby Streets, and Fulton Street and Hudson Avenue; B. H. Whinston, Architect

Store and Office Building for Jackson Heights Apartment Corp., 25th Street, Jackson Heights; Robert Tappan, Architect

Other Localities

Providence, R. I., Industrial Trust Co.; Walker & Gillette, Architects; Starrett Bros., Contractors; installed for the Gorham Mfg. Co.

Philadelphia, Pa., Guardian Bank & Trust Co., 22nd and Market Streets; Clarence E. Wunder, Architect; Henry P. Schneider, Contractor.

Hudson, N. Y., Farmers National Bank; Shreve & Lamb, Architects; John Lowry, Inc., Contractor

Elizabeth, N. J., Peoples National Bank, 113 Broad Street; Oakley & Son, Architects

Irvington, N. J., Irvington National Bank, Clinton and Springfield Avenues; John H. & Wilson C. Ely, Architects; Robert A. Howie, Jr., Contractor

Union City, N. J., Weehawken Trust & Title Co.; Crow, Lewis & Wick, Architects

Jersey City, N. J., Provident Institution for Savings, Bergen and Harrison Avenues; John T. Rowland, Jr., Architect; installed for Northern Studios, Inc.

West Hazelton, Pa., The Miners Bank; David H. Morgan & Searle H. vonStorch, Architects; Ralph H. Woelfel, Contractors

Yokohama, Japan, Standard Oil Building; Antonin Raymond, Architect; installed by Dahlstrom Metallic Door Co.

KALMAN STEEL COMPANY

Manufacturers of Steel Bucks

CHICAGO, ILL.

For Offices, see page B1698

Products

STEEL BUCK and BEAD; KALMANTRIM.

Also other related products.

For Concrete Reinforcement, see page A149; for Steel Joists, see page A670; for Metal Lath and Lathing Products, see pages B1698-1699.

Kalman Steel Buck and Bead

The new Kalman Steel Buck and Bead replaces wood rough buck, ground, and standing trim in constructing interior or exterior door, plaster jamb, and borrowed light openings.

The Kalman Steel Buck and Bead has been perfected by the KALMAN STEEL COMPANY for use with clay, gypsum tile or solid plaster partitions, or in brick and masonry walls, and it has many definite advantages when used with wood stud walls and metal lath.

(1) It provides a heavy galvanized steel member in place of the usual wood buck.

(2) It eliminates plaster cracks caused by warping of the wood buck.

(3) It provides a steel lintel, eliminating plaster cracks due to shrinkage.

(4) It provides a superior construction at no increase in cost.

(5) It eliminates wood grounds and provides a positive finish and edge for the plaster.

(6) It provides positive anchorge between buck and wall.

(7) It permits of the elimination of standing trim.

(8) It eliminates the necessity for patching and pointing plaster.

(9) It eliminates unsightly split casings.

(10) It increases wall space.

(11) It reduces maintenance cost.

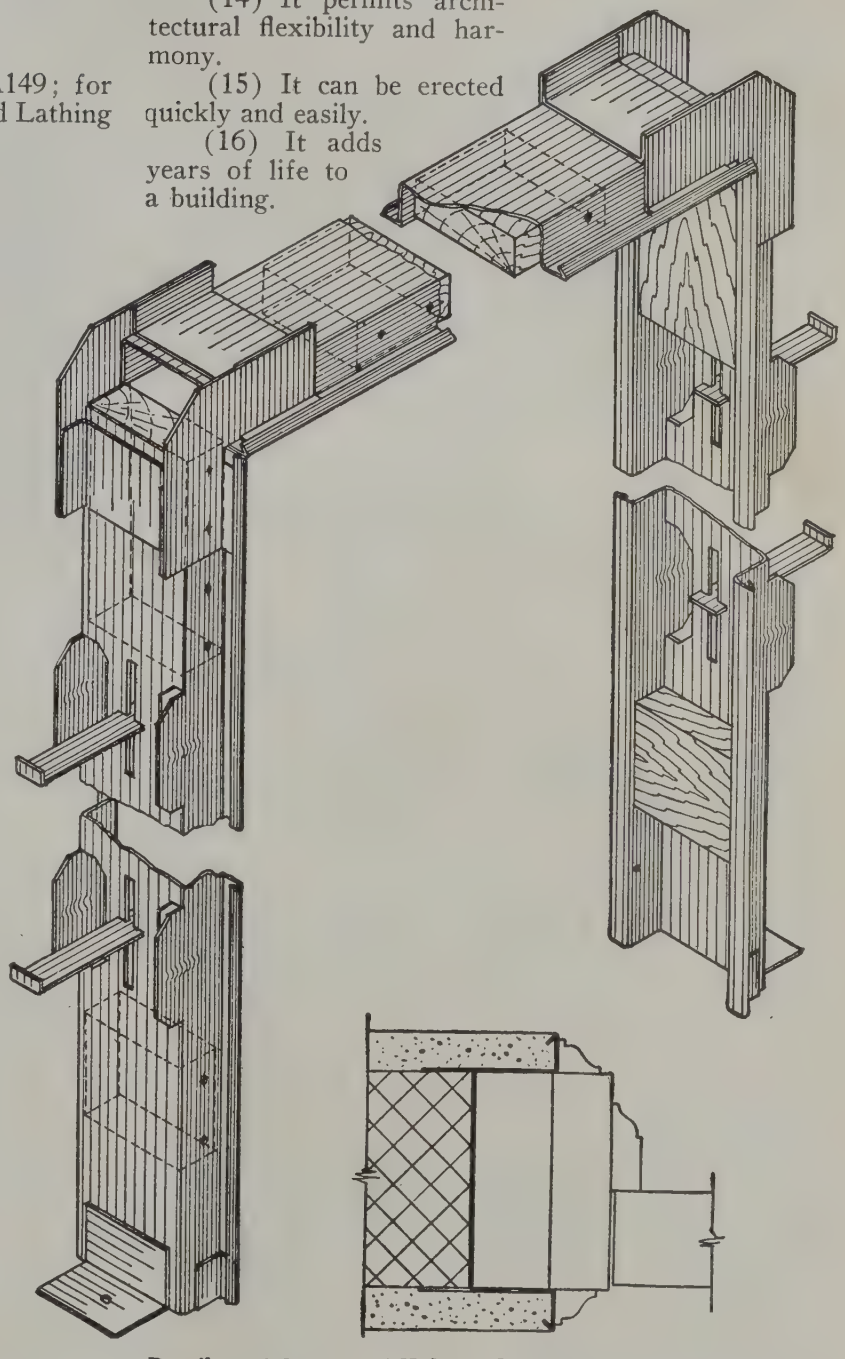
(12) It reduces fire hazard.

(13) It eliminates dust catchers.

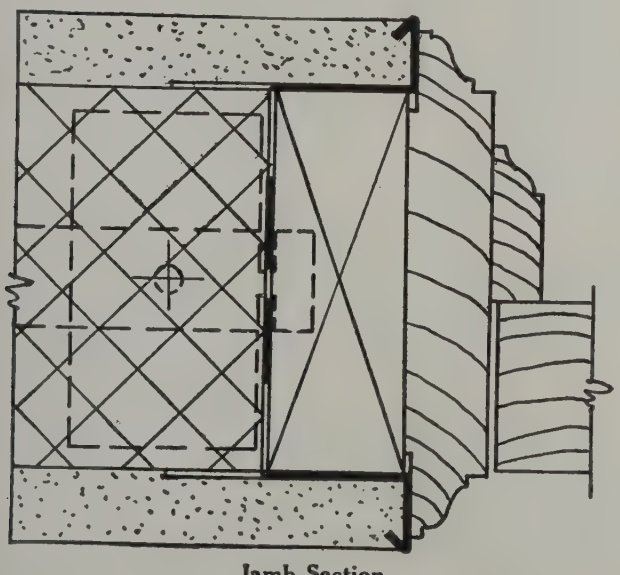
(14) It permits architectural flexibility and harmony.

(15) It can be erected quickly and easily.

(16) It adds years of life to a building.



Details and Section of Kalman Steel Buck and Bead



Jamb Section

Kalmantrim

Kalmantrim makes it possible to finish window openings without standing trim, or a plaster return.

The sash stop made with any desired profile produces perfect harmony between the window and door openings in which the buck and bead is installed.

Kalmantrim can be used to advantage in finishing doorways where wood studs are used and especially when wood lath is the plaster base.

THE LEONARD SHEET METAL WORKS, INC.

Manufacturers of Fireproof Windows and Doors

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"BILTRITE" HOLLOW STEEL UNDERWRITERS' DOORS.
Also Copper Covered Doors and Windows.

Facilities and Service

Our plant is one of the largest in this line and our output runs from 1500 to 2000 steel bucks per week. Output of steel covered doors from 500 to 1000 per week. Everything turned out is a quality job and delivered on date specified.

Steel Bucks

The details shown on the following page are the latest type. The 16 gage rolled steel combination bucks illustrated in Fig. 1 are made for 6, 4 and 3-in. partition walls, to receive 1¾-in. thick doors. The buck for a 3-in. wall can be made for 1⅜-in. doors.

The bucks numbered A, A3, C, and C1 are 16 gage rolled steel type.

Steel Bucks Type B—Pressed steel bucks illustrated are made in 16, 14, 12 and 8 gage to fit any width partition or wall and to any thickness rabbet or width of flange. These bucks can be arranged with applied, clipped or spot-welded trim.

Sanitary Design Buck Type D—Pressed steel buck shown is made in 14, 12 and 10 gage. This type of buck is used in Bell Telephone Co. buildings and various hospitals because of the sanitary design.

Furniture Steel Covered Doors

Leonard Furniture Steel Covered Doors are made of 22 gage furniture steel with various types of paneling and glazing and with 20 gage hollow steel moulding. The moulding is welded into the frames and housed in stiles and rails when doors are put together. The stiles and rails are mortised, tenoned and doweled.

Underwriters' labeled doors can be had in furniture steel at very little extra cost.

Hollow Steel Doors

Made of 18 gage rolled steel. The principal feature of these doors is the rolled edge strip which takes all of the cut-out and reinforcement for hardware. This means that as long as we have the size of the door and type of paneling we can proceed with the manufacturing of the door without waiting for the hardware.

Hollow steel doors come only in a prime finish.

Can also get Underwriters' label service on these doors at small extra cost.

Rolled Steel Windows

Our standard on these windows is 22 gage galvanized steel for frames, 14 gage galvanized steel for sash, 16 gage galvanized steel for sills and 14 gage furniture steel for stools. Frames, sills and stools can be heavier if desired. Windows are labeled by the National Board of Fire Underwriters.

Bronze Covered Doors

Our standard doors can be covered with 20, 18 or 16 gage bronze for rails, stiles and panels. Extruded bronze shapes are used for mouldings and edge pieces. Cast bronze ornaments can be applied to rails, stiles, and panels.

Bronze Store Fronts

Made over white pine cores, in either 20 or 16 gage bronze, to architects' designs.

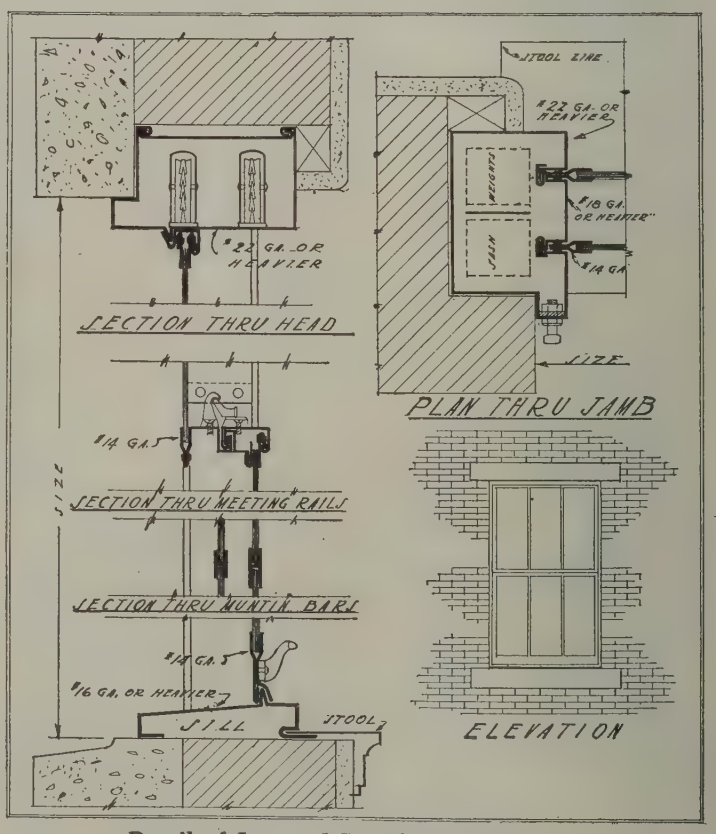
Reference list of installations furnished upon request.

Leonard Bronze Store Front Work

"Biltrite" Hollow Steel Underwriters' Doors

This is a 20 gage steel built-up door which is manufactured under supervision of the National Board of Fire Underwriters. Can be either slide or swing. Used for vertical shafts, party walls, boiler and transformer rooms. Made in two thicknesses, equivalent to 2 and 3-ply tin covered doors.

They pass any classification of the Underwriters.

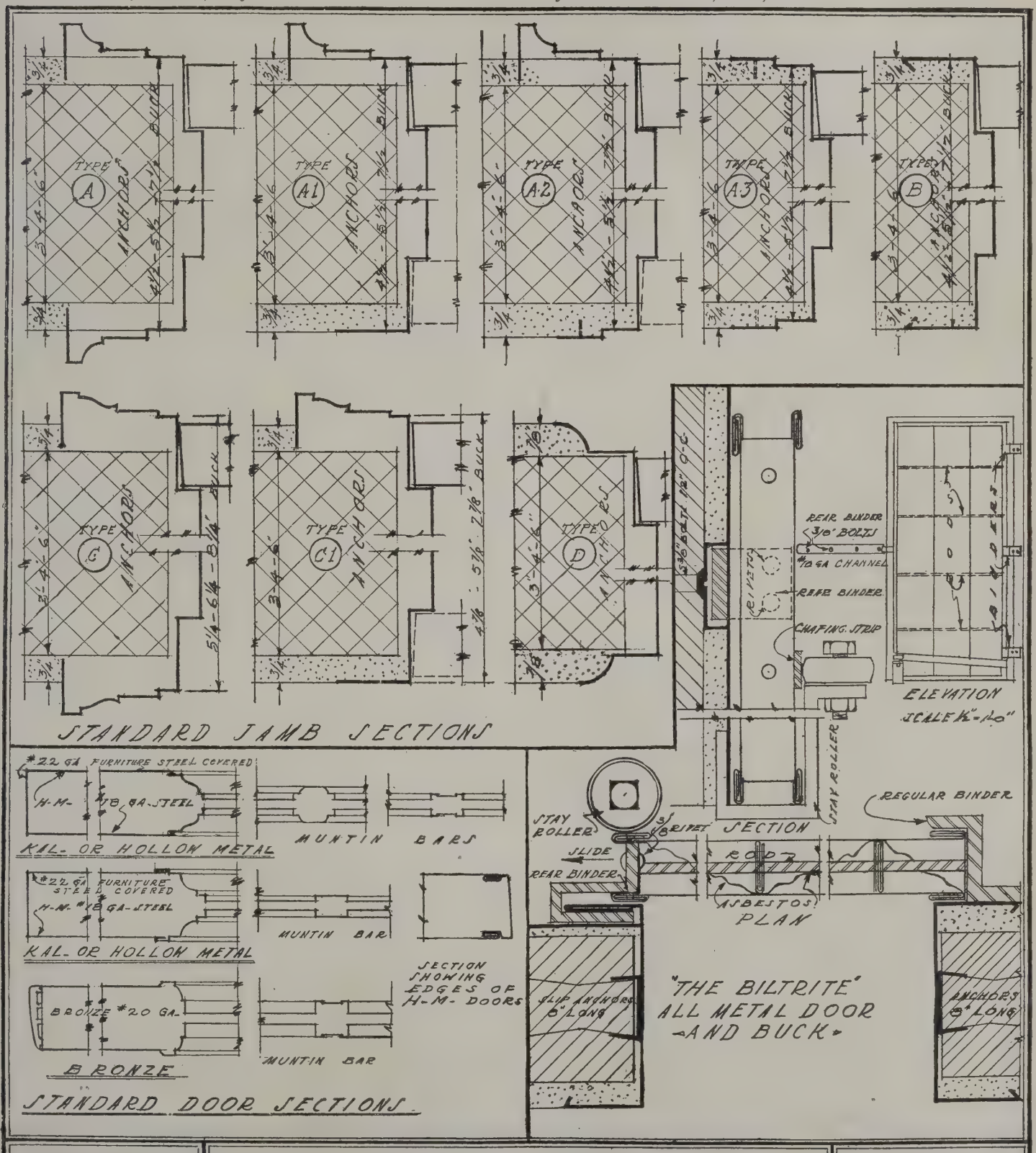


Detail of Leonard Double Hung Window

Continued on next page

Recent Installations

Remington Building, 113 W. 42nd St., New York, N. Y.
119 West 57th St., New York, N. Y.
1385 Broadway, New York, N. Y.
84th St. and Central Park West, New York, N. Y.
1081 Park Ave., New York, N. Y.
810 Fifth Ave., New York, N. Y.
660 Park Ave., New York, N. Y.
37th St. and Eighth Ave., New York, N. Y.
Meyer Bros. Department Store, Paterson, N. J.
Military Park Bldg., Newark, N. J.
Globe Indemnity Bldg., Newark, N. J.
Medical Tower, Newark, N. J.
Gothic Towers, Jersey City, N. J.
26 Court St., Brooklyn, N. Y.
Oppenheim Collins Store, Buffalo, N. Y.
Oppenheim Collins Store, Pittsburgh, Pa.
Federal Reserve Bank, Houston, Tex.
Woodside Security Bldg., Greenville, S. C.
Newburgh Free Academy, Newburgh, N. Y.
St. Mary's Academy, Newburgh, N. Y.
Childs Building, Atlantic City, N. J.
Elleric Tower, 57 Sip Avenue, Jersey City, N. J.
Kitay Building, Paterson, N. J.
Royal Bank of Canada, Lima, Peru



THE LEONARD SHEET METAL WORKS -INCORPORATED- HOBOKEN N.J.

LEONARD STANDARD DOOR & JAMB SECTIONS

SCALE 3" = 1'-0"

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A plant covering more than 6½ acres, designed and built solely for the manufacture of hollow metal products. Equipped throughout with the most modern machinery and equipment.

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A competent engineering staff is at all times available for advisory service.

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We have prepared a comprehensive catalogue giving essential information needed to detail and specify hollow metal doors and trim to meet almost any situation. Elevator door operating hardware, together with fire underwriters' requirements, have also been fully covered. We will be glad to send you a copy.

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Materials

Materials used are the best of their respective kinds. Steel is of the highest grade commercial furniture stock of U. S. standard gauge.

Workmanship

All work is executed by skilled mechanics and is of the finest grade. It is neat in appearance and free from defects.

Hollow Steel Swing Door Units

Doors and Sash (Metal Panel Type)—Panels are constructed of two 18 gauge steel plates separated by heat retarding filler. Panel mouldings, cold drawn to profile, are fitted to panels, mitered and welded at corners, forming a continuous frame around panels.

Stiles and rails are formed of 18 gauge steel and continuously interlocked to panel mouldings. Stiles are fitted to rails, reinforced and welded at joints. Stiffener channels extending full width are welded inside the doors at top and bottom.

Compressed cork is provided in stiles and rails of doors to eliminate metallic sound.

Doors and Sash (Flush Type)—Doors and sash are constructed of two 18 gauge steel plates locked together with special interlocking members welded to plates. Members are spaced not more than 6 in. apart and extend full height of doors and sash.

Continuous reinforcements and stiffener channels are welded inside the doors and sash at top and bottom, and in both sides.

Compressed cork is placed in doors to eliminate metallic sound.

Doors and Sash (Glass Panel Type)—Glass panels are held in place by removable mouldings which are secured to stationary mouldings with oval head machine screws. Mouldings are cold drawn to profile and are made into frames with corners mitered and welded. Stiles and rails are interlocked to stationary mouldings as described under "Metal Panel Type."

When doors are "Flush Type," stationary mouldings are interlocked to plates in a similar manner.

Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel mouldings.

Where mirrors occur, 18 gauge steel plates are provided for backing up.

Stall Doors—Stiles and rails are formed of 20 gauge steel and continuously interlocked to 16 or 18 gauge steel panels. Stiles are fitted to rails and welded at joints.

Astragals—Astragals are of cold drawn interlocking shapes welded to door stiles.

Grilles—Grilles are of 14 gauge perforated steel secured in doors in the same manner as metal or glass panels. When grilles are desired in bottom rails they are usually formed as a part of the rail.

Louvres (Stationary Type)—Louvres, constructed of specially formed 18 gauge steel members, are secured in doors in a substantial manner.

Ventadoors, Panelouvres and Servidors—Doors are prepared to receive these products which are usually furnished under separate contract.

Ventadoors and Panelouvres are ordinarily delivered to our factory completely finished, and installed in the doors by us.

Servidors are usually delivered direct to the building and installed in the doors by Servidor contractor.

Frames (Rough Buck and Cabinet Jamb Type)—Bucks are formed of 12 or 14 gauge steel, welded at corners, provided with anchors for securing to walls and clip angles at bottom for fastening to floor.

When bucks are shipped knocked down, side members are provided with tenons for securing to heads.

Jambs, formed of 16 or 18 gauge steel, are secured to steel bucks by machine screws, and to wood bucks, which are usually furnished and erected under separate contract, by wood screws.

Stationary doors and sash, or glass panels, are retained by removable cold drawn moulding or channel frames, secured to jambs by oval head machine screws.

Frames (Combination Buck and Jamb Type)—Frames are formed of 12, 14 or 16 gauge steel, mitered or coped and welded at corners. Anchors are provided for securing frames to walls and clip angles at bottom for fastening to floor.

Glass panels, or stationary doors and sash, are held in place by removable cold drawn moulding or channel frames, secured to frames by oval head machine screws.

Frames (Combination Buck, Jamb and Trim—Rolled Type)—Frames are cold rolled of 16 gauge steel. The jamb portions of side members are coped and tenoned to heads, while casing portions are mitered and acetylene welded.

Frames are provided with wire anchors for securing to walls and clip angles at bottom for fastening to floor. Special anchoring arrangement is provided for frames in plaster, wood stud or Simplex partitions.

Glass panels are retained by removable cold drawn channels, coped at corners, and secured to frames by oval head machine screws.

Transom Bars and Mullions (Rough Buck and Cabinet Jamb Type)—Bucks are formed of 12 or 14 gauge steel, welded to frames or secured by concealed clip angles and screws as conditions warrant.

Jambs are formed of 16 or 18 gauge steel, secured to steel bucks by machine screws, or to wood bucks, which are usually furnished and erected under separate contract, by wood screws.

Transom Bars and Mullions (Combination Buck and Jamb Type)—Transom bars and mullions are formed of 12, 14, 16 or 18 gauge steel, welded to frames or secured by concealed clip angles and screws as conditions warrant.

Continued on next page

Weatherstrips—Exterior openings are made weathertight at sides and heads by felt, rubber or spring bronze weatherstripping, and at the bottom by bronze interlocking shapes or specially formed steel strips.

Casings—Casings are of 18 gauge cold drawn shapes with corners mitered, welded, and secured to frames by concealed fastenings or oval head machine screws.

Scribe Mouldings—Mouldings are cold drawn of 18 gauge steel, mitered or coped at corners, and secured to frames by oval head machine screws.

Plinths—Plinths are formed of 18 gauge steel, secured to frames by concealed fastenings or oval head machine screws.

Hardware and Reinforcements—Hardware must be to template and is ordinarily supplied under separate contract.

All work is mortised, reinforced, drilled and tapped at the factory to receive hardware, except that frames are usually drilled and tapped for surface hardware at the building by the contractor erecting the doors.

Combination type frames are provided with cover boxes in back of hardware cutouts.

Fire Underwriters' Labels—Our products have been listed by the Fire Underwriters' Laboratories for Class A, B, C, D and E situations.

Hollow Steel Elevator Enclosures

Doors (Metal Panel Type)—Panels are constructed of two 18 gauge steel plates separated by heat-retarding filler. Panel mouldings—cold drawn to profile—are fitted to panels, mitered and welded at corners, forming a continuous frame around panels.

Stiles and rails are cold rolled of 12 gauge steel and continuously interlocked to panel mouldings. Stiles are fitted to rails and welded at joints. Stiffener channels extending full width are welded inside the doors at the bottom.

Continuous rubber bumpers, secured in place by neat cold drawn mouldings, are provided for center-parting doors. For all other types, rubber bumpers are fastened to frames and sills.

Two cast iron guides are attached to the bottom of each sliding door. Flush bolts are used as guides when doors are combination slide and swing.

Doors (Flush Type)—Doors are constructed of two 18 gauge steel plates locked together with special interlocking members welded to plates. These members are spaced not more than 6 in. apart and extend full height of doors. Continuous reinforcements and stiffener channels are welded inside the doors at top and bottom, and in both sides. Compressed cork is placed in doors to eliminate metallic sound.

Continuous rubber bumpers, secured in place by neat cold drawn mouldings, are provided for center-parting doors. For all other types, rubber bumpers are fastened to frames and sills.

Two cast iron guides are attached to the bottom of each sliding door. Flush bolts are used as guides when doors are combination slide and swing.

Doors (Glass Panel Type)—Glass panels are held in place by removable mouldings which are secured to stationary mouldings with oval head machine screws. Mouldings are cold drawn to profile and are made into frames with corners mitered and welded. Stiles and rails are interlocked to stationary mouldings as described under "Metal Panel Type."

When doors are "Flush Type," stationary mouldings are interlocked to plates in a similar manner.

Muntins are constructed of cold drawn interlocking shapes, fitted and welded to panel mouldings.

Where mirrors occur, 18 gauge steel plates are provided for backing up.

Stationary Panels—Panels are constructed as previously described for doors, with the exception that no provisions are made for hardware or guides. Panels are secured to frames at the head and side with machine screws, and held in place at the bottom by channels fastened to sills.

Glass—Glass, which is usually furnished by us, is set in rubber inserts and putty and held in place by removable moulding frames.

Mirrors are set in the same manner, with the exception that they are backed up with felt.

Hanger Housings—Hanger housings are formed of two 12 gauge steel plates spot-welded together and firmly fastened to angle supports at both ends with machine bolts and nuts.

Angle Supports—Hanger housings are supported independent of the walls by two structural steel angles extending from sill to either steel or concrete beam overhead and securely fastened in place. One of these angles is located to act as a closer support when closers or pneumatic operators are used.

Hanger Covers—Hanger covers are formed of 16 or 18 gauge steel and attached to hanger housings by concealed method. Ready access to hangers is permitted without removing covers.

Frames (Combination Buck, Jamb and Trim Type)—Frames are formed of 16 gauge steel mitered and welded at corners. They are securely fastened to hanger housings with machine screws and to the sills with clip angles and cap screws. Where required, a suitable number of rubber bumpers is provided.

Frames (Combination Buck and Jamb Type)—Frames are formed of 12, 14 or 16 gauge steel, either mitered or coped and welded at corners. They are securely fastened to hanger housings with machine screws and to the sills with clip angles and cap screws. Where required, a suitable number of rubber bumpers is provided.

Sills—Sills are either close grain gray iron or bronze castings with non-slip surfaces, securely anchored to either structural steel or concrete. The grooves for door guides are machined. Bumper angles, secured to sills with cap screws, are provided where required.

Facias—Facias are formed of either 14 or 16 gauge steel, substantially reinforced where necessary, and securely fastened in place.

Casings—Casings are cold drawn of 18 gauge steel, mitered and welded at corners, and secured to frames by concealed fastenings or oval head machine screws.

Scribe Mouldings—Mouldings are cold drawn of 18 gauge steel either mitered or coped at corners, and secured to frames by oval head machine screws.

Plinths—Plinths are formed of 18 gauge steel and secured to frames by concealed fastenings or oval head machine screws.

Hardware and Reinforcements—Hardware must be to template and is usually included in our contract.

All work is mortised where required, reinforced, drilled and tapped at the factory to receive hardware, except that drilling and tapping for bar locks, pneumatic operators, door closers, rack and pawl devices, interlocks and striker plates are done at the building.

Frames for combination slide and swing type doors are provided with cover boxes in back of all hardware cutouts.

Finish

Prime Finish (Doors and Sash)—Before assembling, metal panels are painted on the inside. After assembling, all oil, dirt and rust are removed.

Doors and sash are thoroughly coated on the inside and outside with rust resisting paint by a dip process, and then baked. Exposed surfaces are filled where required, each coat baked and sanded. Priming coat of paint is then applied and baked.

Prime Finish (All Other Work)—After assembling, all oil, dirt and rust are removed. Exposed surfaces are filled where required, each coat baked and sanded. Priming coat of paint is then applied to all surfaces, both inside and outside, and baked.

Plain Enamel Finish—Prime coat is thoroughly sanded, after which three coats of enamel of a color as selected are applied to all exposed surfaces. Each coat is baked and rubbed, the final coat being rubbed to an eggshell gloss.

Grained Finish—Prime coat is thoroughly sanded, after which all exposed surfaces are hand grained to match sample selected, and then baked. Two coats of finishing varnish are then applied, each coat baked and rubbed, the final coat being rubbed to an eggshell gloss.

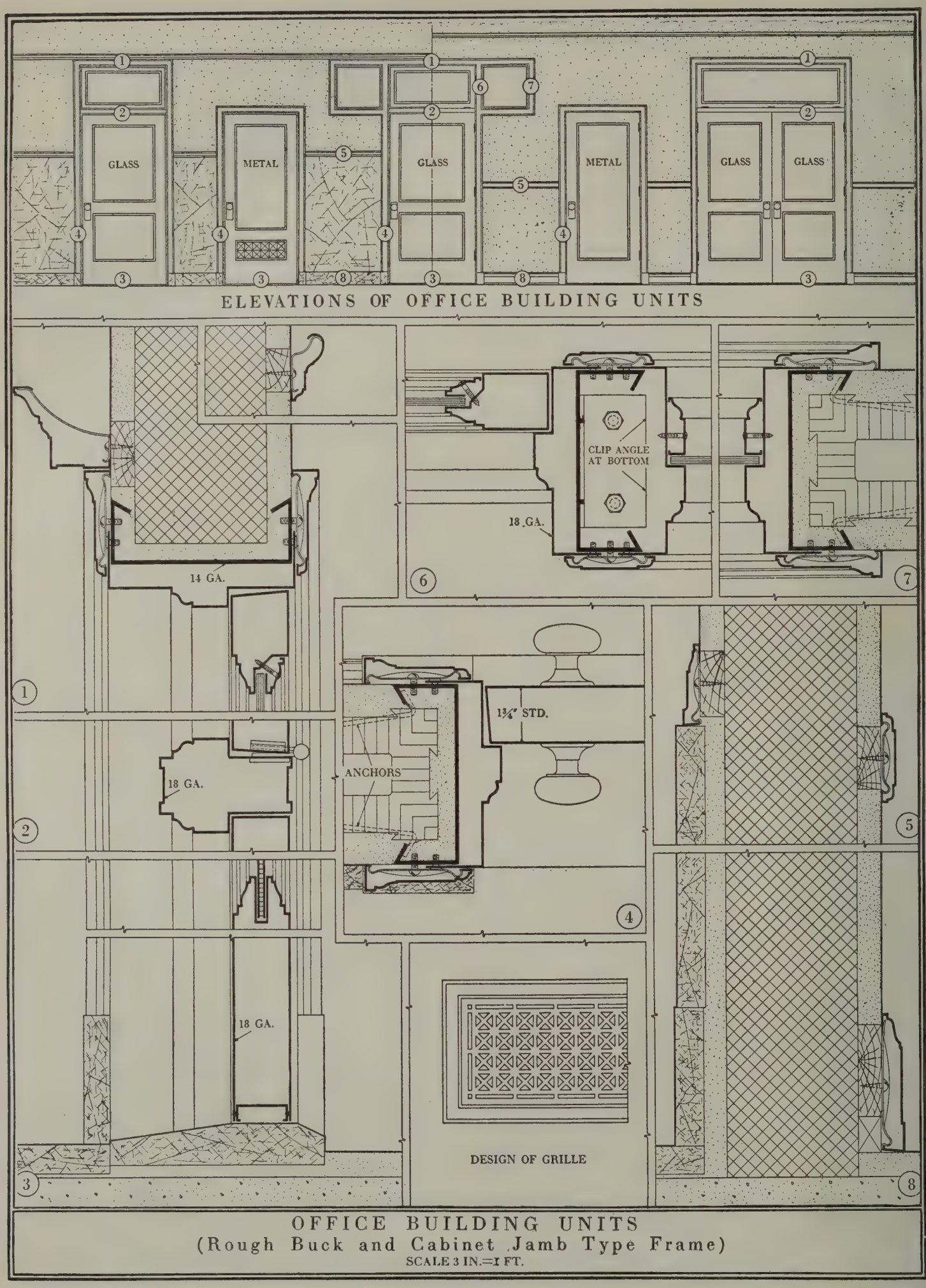
Crating and Erection

Crating—The finished products are substantially crated to guard against damage in transit.

Combination type frames, when finished in baked enamel, are protected by oiled paper, and crated individually. Crating is not removed until after walls have been plastered.

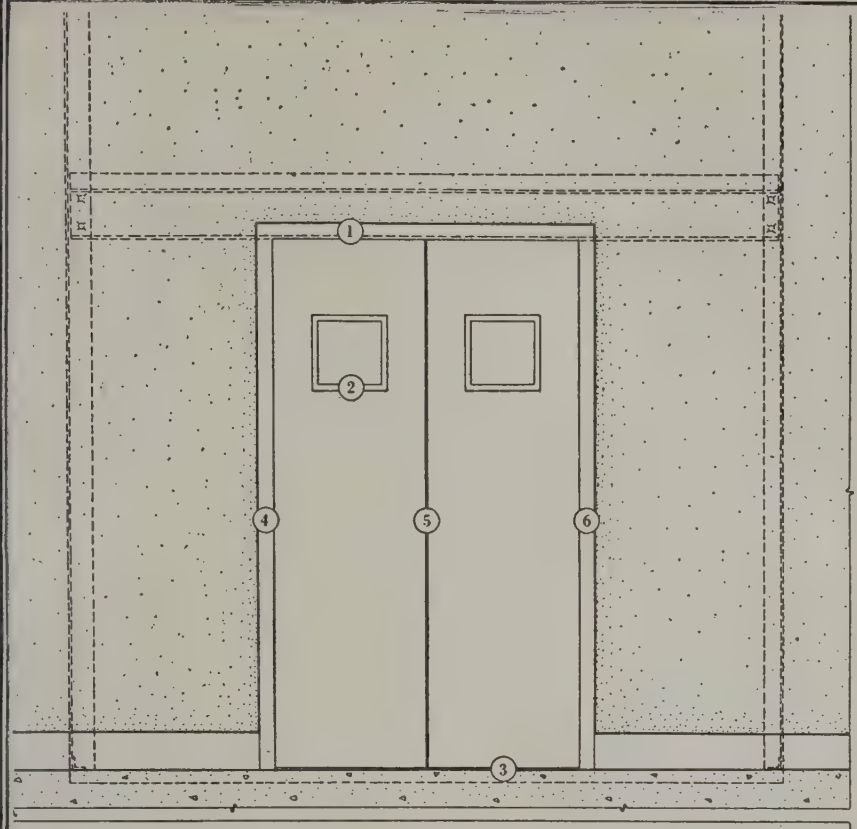
Erection—All work is erected plumb and true by skilled mechanics. Rough bucks, frames, etc., are set and braced in position before partitions are built. The doors, cabinet jambs, casings, etc., are erected after plastering has been completed and the floors are broom clean.

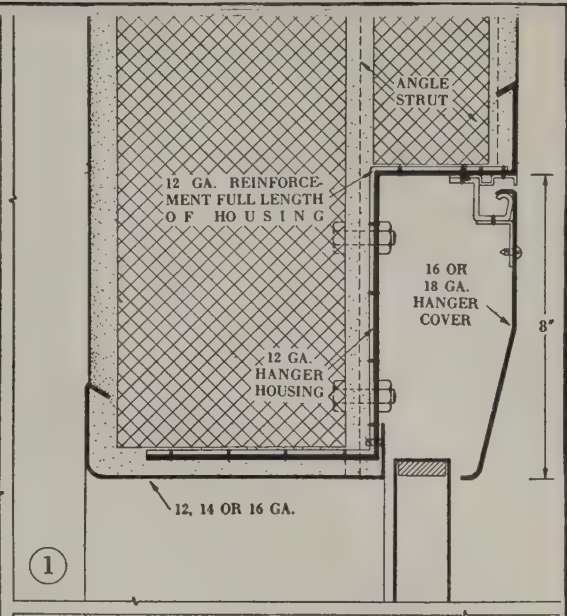
Continued on next page

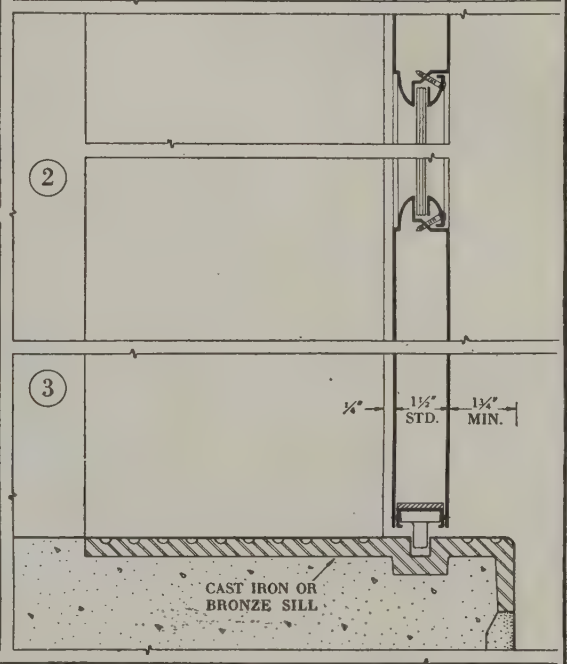


OFFICE BUILDING UNITS
(Rough Buck and Cabinet Jamb Type Frame)
SCALE 3 IN.=1 FT.

Continued on next page



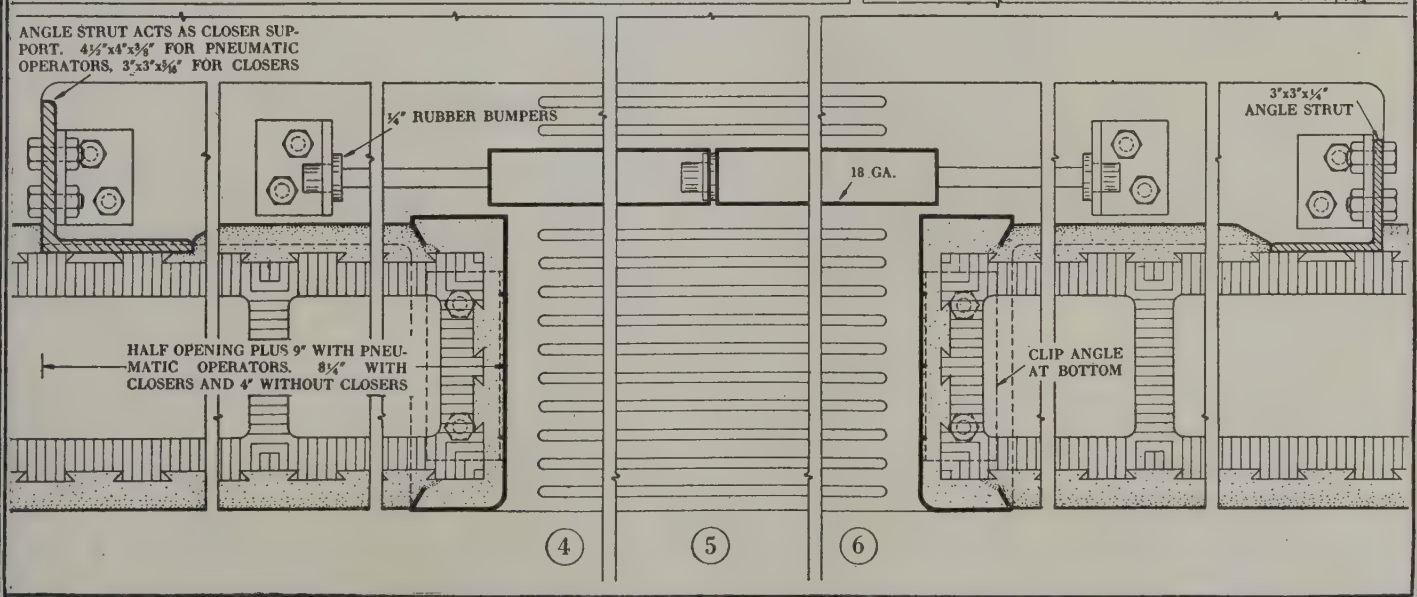




Some makes of pneumatic operators require greater clearance than shown. Heavy duty sheave type hangers require not less than 11" headroom. When bar locks are used, hanger covers must be made straight.

When sufficient space is not available to permit mounting the pneumatic operators or closers in back of doors as here detailed, these devices can be placed between the doors and cab.

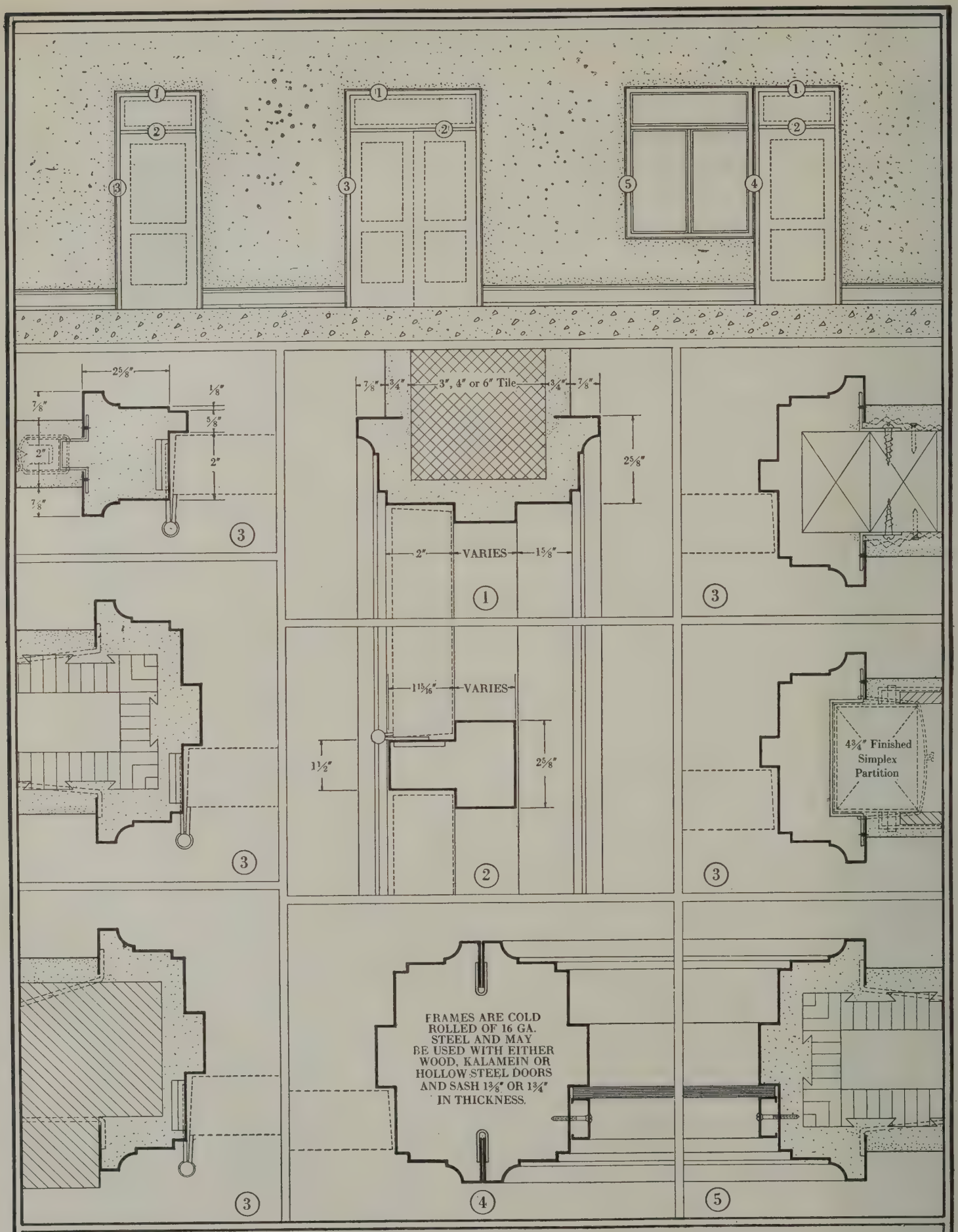
When overhead pneumatic operators are used, write us for detail drawing showing condition at head.



CENTER PARTING UNIT
(Combination Buck and Jamb Type Frame)

SCALE $\frac{3}{16}$ IN. = .1 FT.

Continued on next page



COMBINATION BUCK, JAMB AND TRIM FRAMES
(Rolled Type)
SCALE 3 IN. = 1 FT.

PETERSON AND NEVILLE, INC.

Manufacturers of Pressed Steel Products: "Steelweld" Steel Door Frames, and "Kleen Kitchen" Metal Furniture

365 Dorchester Avenue, BOSTON, MASS.

Product

"Steelweld" Door Frames.

Also Medicine Cabinets, Radiator Furniture, Economy Lockers, Steel Tanks, Conveyor Buckets, Steel Platform Skids, Circuit Breaker Tanks, Steel Tote Boxes and Steel Concrete Forms.

For "Kleen Kitchen" Metal Furniture, see page C3976.

Steel Combination Door Frames

Five types of our steel combination door frames are shown in cuts A, B, C, D and E. These frames are suitable for all interior openings and are complete frames in every detail, embodying the buck, jamb and trim, with provisions made to receive all hardware, such as hinges, striking plates, locks and pads for door checks or any other special hardware.

"Steelweld" door frames are made of steel, are fireproof and free from defects. They will not sag, warp or open up at the joints as do wood frames. All joints are gas welded and ground to a smooth finish.

The economy of "Steelweld" frames becomes apparent when you consider that the erection of a "Steelweld" frame comprises the total cost of erecting a finished door opening. The buck, jamb and trim are all in one piece so there is no further cost of erecting the finished jamb and trim. Our frames can be made to accommodate walls of varying thicknesses, from a 2-inch wall up.

There are several designs of steel anchors that are used with these frames as shown in Types A, B, C, D and E. The selection of the type of anchor is left to the architect, who can select a fixed or a loose anchor as he chooses.

Type A Frame—Made of No. 14 gauge cold rolled steel of simple design and few mouldings, and is very suitable for school work.

Type B Frame—Made of No. 18 gauge auto body steel and is one that we have used extensively for apartment hotels. In lots of 1000 frames or over we can modify these mouldings somewhat to meet the architect's designs.

Type C Frame—Made of No. 16 gauge cold rolled steel with ⅞-in. plaster lock holes placed 2 in. on center as shown in sketch. We have used this type extensively in hotel work. This is a very rugged frame and one that will stand considerable abuse.

Type D Frame—Made of No. 12 gauge cold rolled steel with very simple mouldings suitable for hospital work.

Type E Frame—Made of No. 12 gauge blue annealed steel and shows another treatment to prevent the plaster from cracking where it joins the metal buck. This method is somewhat more expensive than the other types.

Statler Hotel and Office Building, Boston, Mass.

Geo. B. Post, Architect Dwight P. Robinson & Co., Builders

5000 of our "Steelweld" combination door frames used on this project

Other Uses

These same sections can be used in making up the steel door frames for elevator enclosures, also for cased openings, and all interior sash, either fixed or movable.

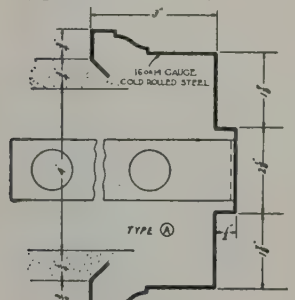
Service and Samples

We will be pleased to study your specific problem in detail if you will send us a set of floor plans and a copy of the specifications.

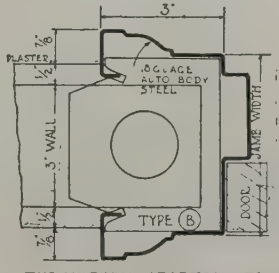
These frames can be shipped economically to any part of the country, especially if there are 400 frames or over. 400 frames fill an average car and can be loaded without the extra expense of individual crating for each frame.

Hardware templates must be furnished us with the order and with the general plans and specifications for the building.

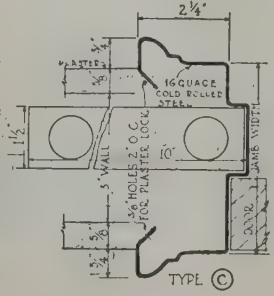
We manufacture many types of special steel door frames and invite you to send us your problems in this line. Send for sample sections.



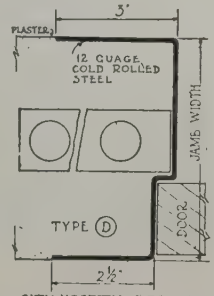
NORTH STATION COLISEUM
BOSTON & MAINE RAILROAD
BOSTON, MASS.
DWIGHT P. ROBINSON CO. ENGINEERS
FUNK & WILCOX · ARCHITECTS



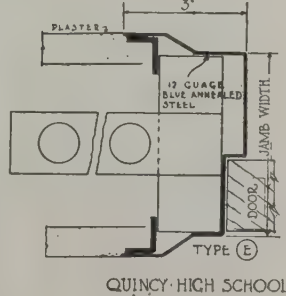
THE WARWICK APARTEMENTS
PELHAM HALL BROOKLINE MASS
MYLES STANDISH BOSTON MASS
ALDEN PARK BROOKLINE MASS
AND PHILADELPHIA PENNSYLVANIA



HOTEL STATLER BOSTON
DWIGHT P ROBINSON CO ENGINEERS
GEO. B POST ARCHITECT NEW YORK



CITY HOSPITAL BOSTON MASS
COOLIDGE AND SHATTUCK
ARCHITECTS BOSTON



QUINCY HIGH SCHOOL
CRAM & FERGUSON
ARCHITECTS

J. G. BRAUN COMPANY, INC.

Casement and Window Sections

541 West 35th Street
NEW YORK, N. Y.

609-621 So. Paulina Street
CHICAGO, ILL.

1088 Howard Street
SAN FRANCISCO, CAL.

Product

CASEMENT and WINDOW SECTIONS.

For Steel Mouldings, Stair Nosings and Perforated Sheets, see pages A856-857.

Catalogue

Our Catalogue No. 25 on steel mouldings contains many other sections useful for window construction.

A copy will be sent the architect, builder or owner upon request.

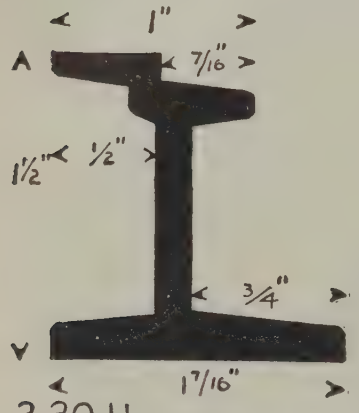
Features

These sections are of the two-point contact type and suitable for all windows; casement type, double hung, austral type, in- or out-opening. The large chamber makes windows constructed with them rigid, airtight and watertight.

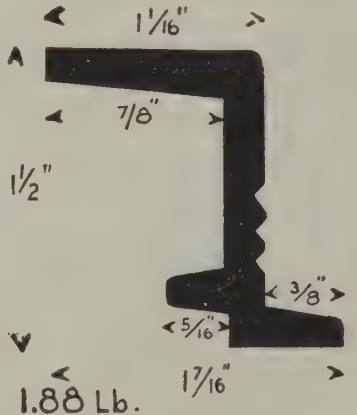
Wide members make for ease of application and tight fit of hardware.

A special feature is the grooves in sections Nos. 1206 and 1207. Adherence of glazing and setting compound makes windows doubly weathertight.

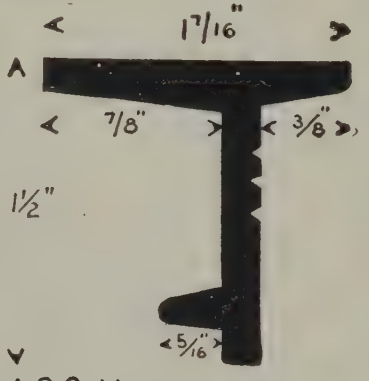
Casement and Window Sections



2.20 Lb.
No. 1205



1.88 Lb.
No. 1206



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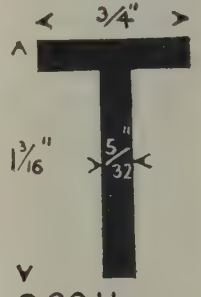
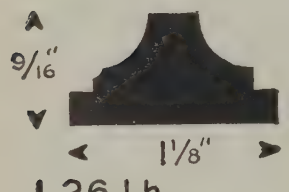
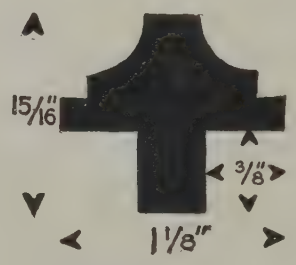


0.96 Lb.
No. 1208

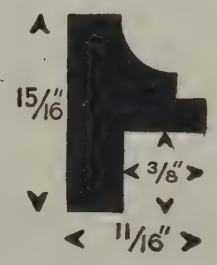
No. 1209
Same type as No. 1208
Measurements,
1 3/8" x 3/4" x 1/8"



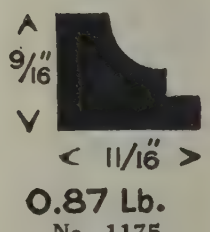
1.26 Lb.
No. 802



1.70 Lb.
No. 1177



1.22 Lb.
No. 1176



0.87 Lb.
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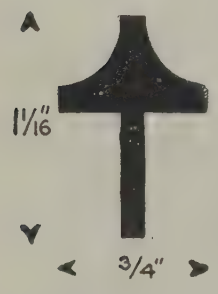

0.90 Lb.
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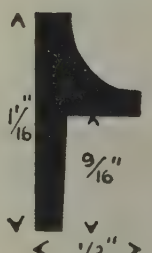
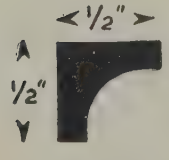
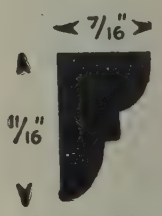


0.68 Lb.
No. 1039



0.42 Lb
No. 215

Detail of Casement Sections
Scale 6 in. = 1 ft.



0.68 Lb.
No. 120

ESTABLISHED 1883

THE ADAMS COMPANY

Manufacturers of Steel Windows and Steel Doors

109 West 6th Street
DUBUQUE, IOWA

Products

ADAMS STEEL WINDOWS: Architectural, Industrial, Basement and Laundry.

ADAMS STEEL DOORS: Architectural, Industrial and Garage.

For Adams Fireplace Dampers, Ash Pit Doors, Ash Dumps and Coal Chutes, see page A713.

Adams Steel Windows

Architectural Casement Type—Windows made according to plans and specifications with inswinging or outswinging casements, square or circle top. Fixed sections also furnished. All windows fully equipped with bronze hardware.

Finished with priming coat of battleship gray paint.

Construction—Sash and frame are constructed of rolled steel, specially formed. All joints electrically welded, which insures rigidity.

Hinges and pins made of steel or bronze.

Heavy pins, easily removed, make the glazing of the sash very simple.

Anchors for sash are furnished upon request.

Screen or wire guard provisions can be made if so desired.

Glazing—Casements are provided with wire clips or steel glazing beads.

Industrial, Basement and Laundry Type—Standard stock sizes. Price sheets upon request.

Adams Steel Doors

Special sizes to order.

Stiles and rails of these doors are made from heavy rolled, special U-shaped channel steel, with all joints electrically welded insuring strength.

Upper panels are divided by steel T-bars, with provisions for either wire glazing clips or steel glazing beads.

Lower panel is provided with steel kick plates.

Strong standard hinges with heavy steel pins.

Carriage track can be furnished.

Special Work

Steel windows and doors made to order.

Our Engineering Department will gladly work out construction details and furnish drawings for approval.

Catalogues

Catalogues, construction and installation details mailed upon request.

Adams Steel Window for Dwelling

Before

After

Bank Building Before and After Installation of Adams Steel Windows

ESTABLISHED 1881

THE WILLIAM BAYLEY CO.

Manufacturers of Steel Windows and Doors

SPRINGFIELD, OHIO

BRANCH OFFICES

NEW YORK, 67 W. 44th Street
Telephone, Vanderbilt 2858

CHICAGO, 310 South Michigan Avenue
Telephone, Harrison 6194

BOSTON, 73 Tremont Street
Telephone, Haymarket 3285

ATLANTA, Bona Allen Building
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SALES AGENTS IN 65 AMERICAN CITIES

Products

PIVOTED VENTILATOR WINDOWS.
PROJECTED WINDOWS, Architectural, Commercial.
CONTINUOUS WINDOWS.
CONTINUOUS WINDOW OPERATORS.
INDUSTRIAL STEEL DOORS for all purposes, including Garages, Roundhouses and Airplane Hangars.
Also Steel and Glass Sidewalls and Partitions, Residence Casements and Basement Windows.

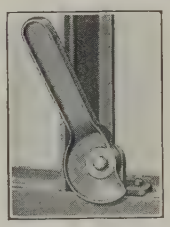
Bayley-Springfield Windows

Bayley-Springfield Windows are backed by 47 years of continuous manufacturing experience and 19 years of solid bar window sash manufacturing experience. Made in a variety of kinds for a variety of purposes. Tell us what you want and permit us to submit the necessary detail matter. The following is only suggestive.

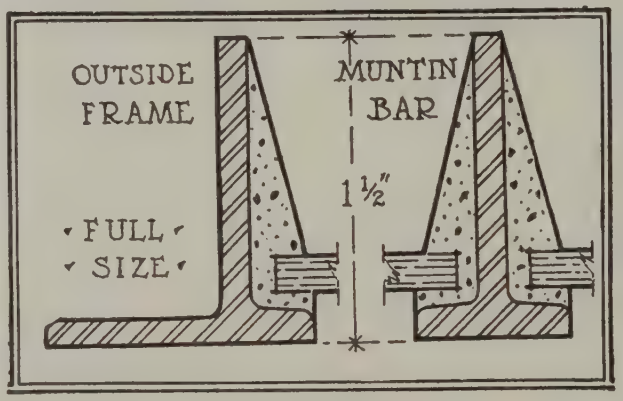
Bayley-Springfield Horizontally Pivoted Windows

Standard Sizes—47 layouts in 14x20 glass size and 47 layouts in 12x18 glass size shown on following page. These units are produced in large quantities and when used singly or in combined unit openings, meet practically all building conditions where center pivoted windows are applicable. Designers should confine requirements to these sizes to get the benefit of low prices and quick deliveries.

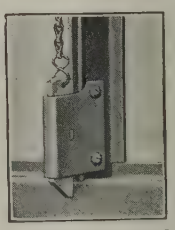
Frame and Muntin Bars—1½ in. deep provide strength and rigidity.



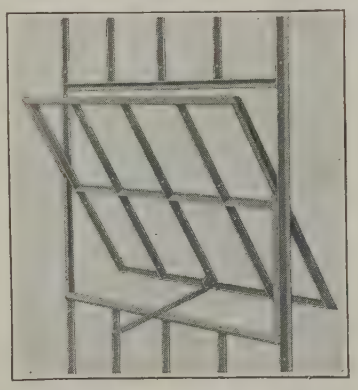
H Cam
Two used with push bars. Alternate for F lock bar at additional cost



Principal Bars
Full size sections

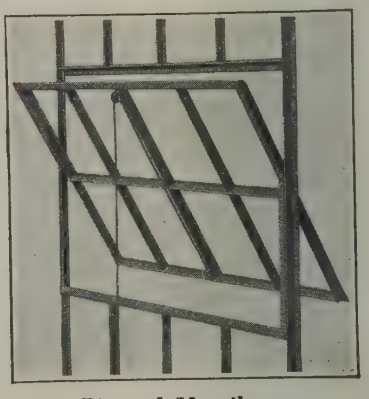


C Chain Catch
Made of steel, sherardized. Used when ventilators are high up

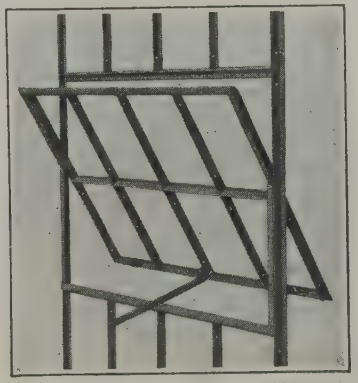


Pivoted Ventilator
F lock bar hardware—the most frequently used kind

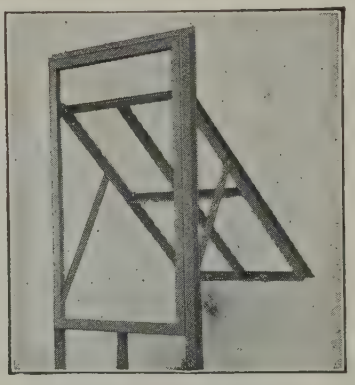
Intersection
Simple, strong, pleasing appearance. Bars not bent or manipulated in assembling, therefore, steel can be and is of strong character. Surfaces get-at-able for easy and complete repainting



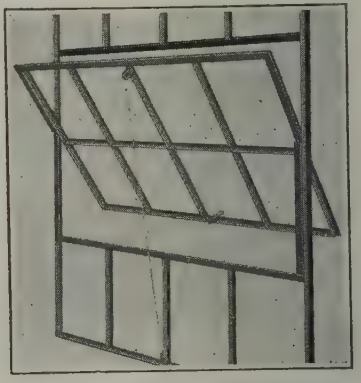
Pivoted Ventilator
Chain catch hardware—for use above reaching distance



Pivoted Ventilator
Push bar and cam hardware



Projected Out (PO) Ventilator
The kind here shown has many merits of other kinds and some individual ones. Users of steel windows may well give it careful consideration



Pivoted Ventilator
H15 cam latch and chain hardware

BAYLEY-SPRINGFIELD STEEL WINDOWS

Continued on next page

Ventilators—Horizontally pivoted. Have double weathering contact 1⅝ in. deep at sides and 1¾ in. deep at top and bottom.

Exceptionally strong and deep at top and bottom. Exceptionally strong and tight.

Paint—One shop coat of Bayley-Springfield standard red.

In Stock for Immediate Shipment—20 sizes in 14x20 glass and 19 sizes in 12x18 glass carried in stock. These are a selection of most popular standard units and are shown in heavy outline on drawings number 189 and 190 below. They are constructed the same as made-to-order windows and are carried in warehouse and by dealers.

Bayley-Springfield Utility Windows—In stock. *Made in one size* 3 ft. 4 in. wide by 3 ft. 7⅝ in. high. Standard Bayley-Springfield construction sections 1½ in. and 1⅝ in. deep, 3 lights wide and 2 lights high—top 3 lights ventilated.

Paint—Bayley-Springfield Utility Window gray. Ideally adapted for small structures such as garages and similar buildings.

F Horizontal Mullions—Usually not furnished by this company. Made of structural materials and permit using one unit above another for power houses, etc.

Bayley-Springfield Economy Inserts (Patented)—Are formed galvanized iron, providing recesses in jambs and heads of openings in which steel windows are to be installed. They are designed for use in buildings constructed of re-inforced concrete.

Economy Inserts simplify and hasten erection which lowers the cost of steel window installation by reducing the number of operations. They improve the quality and increase the durability of the work by forming a perfect bond between the window frame and wall.

Economy Inserts entirely eliminate the necessity of pointing. They permit window sash installation in all kinds of weather. They improve the appearance and make possible easy and economical replacement of windows, when for any reason this is necessary. It is in the economy of the operation that they have their greatest appeal. "Erecting windows" is a quicker operation when Economy Inserts are used. Economy Inserts promote permanent tightness. Pointing required in the old method is done with a mixture which differs from that used in making the walls of a concrete building, and it is applied after the walls have hardened. Economy Inserts save time and materials and promote efficiency in the use of any standard make of steel windows.

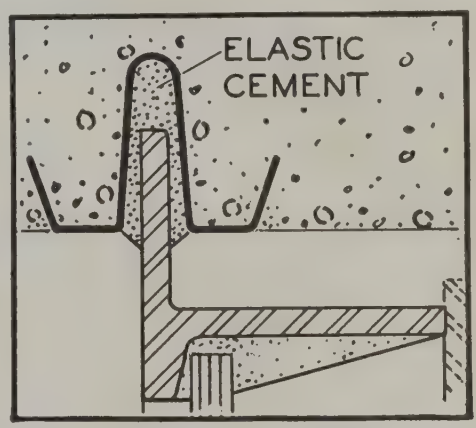
Complete instructions are sent with the shipment, showing how Economy Inserts should be used by the contractor and how the window erection should be done.

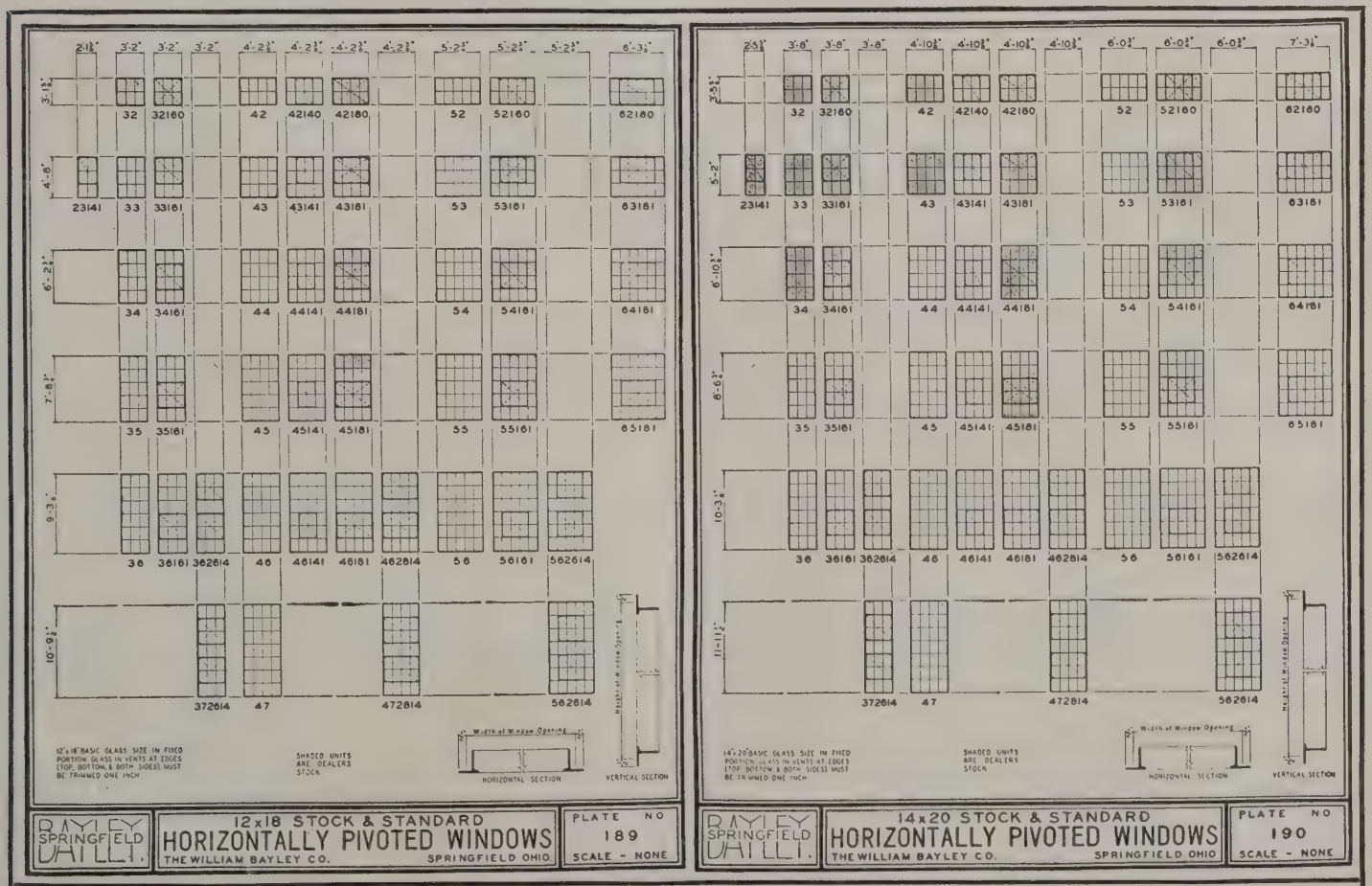
Architect's Specifications—Economy Inserts, made by The William Bayley Co., Springfield, Ohio, are to be provided for both jambs of all openings requiring more than one unit, and for all heads.

Right

Full Size Section Economy Inserts with Sash Installed

This less expensive method eliminates leakage and corrosion where sash frame enters wall. Ventilators operate freely and close tightly





BAYLEY-SPRINGFIELD STEEL WINDOWS

Continued on next page

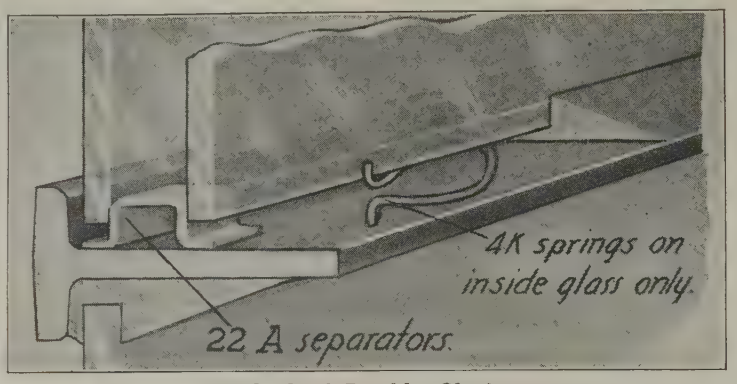
Anchorage—Secured in masonry openings by embedding the outside frame member in cement fill, or by the use of Economy inserts. Windows may be clamped to structural steel by use of clips and bolts which are furnished when specified. Type of head, sill and jamb must be stated.

When Writing for Quotations—Avoid delay by giving complete information as follows:

Type of units; number of units; number and kind of mullions, if any; kind of hardware (lock bar, push bar and 2 cams, chain catch). If chain catch hardware is desired give distance from sill of window to floor. If to be installed in structural steel (anchors consequently required), state where anchors are needed. State when shipment is required.

Quotations — Cover window units complete with or without ventilators as specified. M mullions as required, with necessary clips and bolts, F lock bars (1 to each ventilator), 4K glazing springs (4 to each light), and (only when specified) 3A or 66A clips spaced about 2-ft. centers for attachment to structural steel.

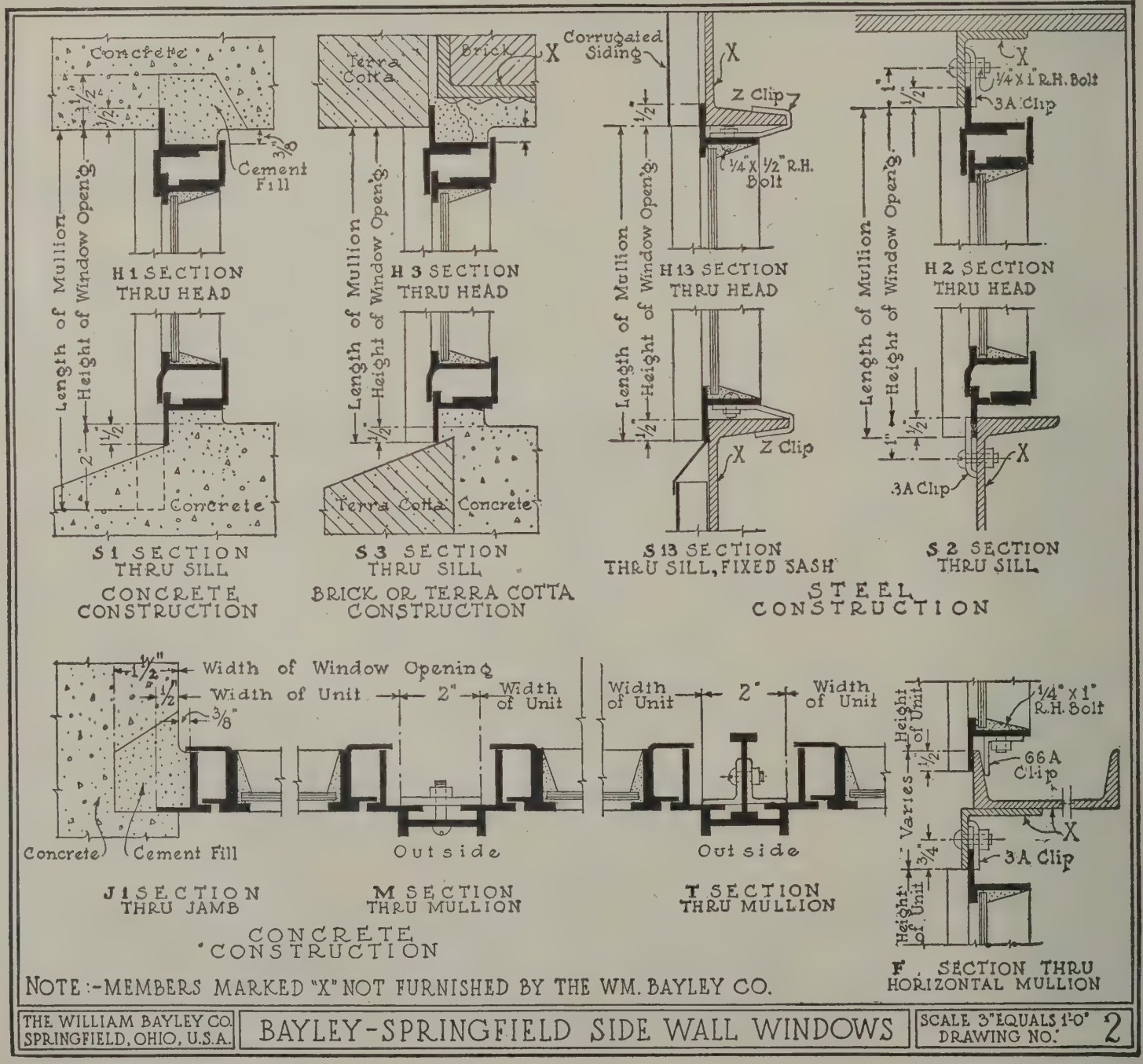
Quotations do not cover (unless specifically stated) structural materials and parts not established and standardized as parts of steel windows and recognized as such in the practices of the trade, glass, putty, erections, glazing or other labor, etc.



Method of Double Glazing

Double Glazing—As a means of promoting comfortable living conditions in summer and conserving heat in winter, is effectively provided for in Bayley-Springfield.

The excessive depth of the bars admits of sufficient dead air space between two panes of glass and entirely eliminates objectionable features.



Continued on next page

Bayley-Springfield Projected Ventilator Windows

Ventilators balance on pivoted arms and simultaneously move down and out, or up and in, sufficient friction being provided to hold them in any desired position. Sliding mechanism parts are of brass.

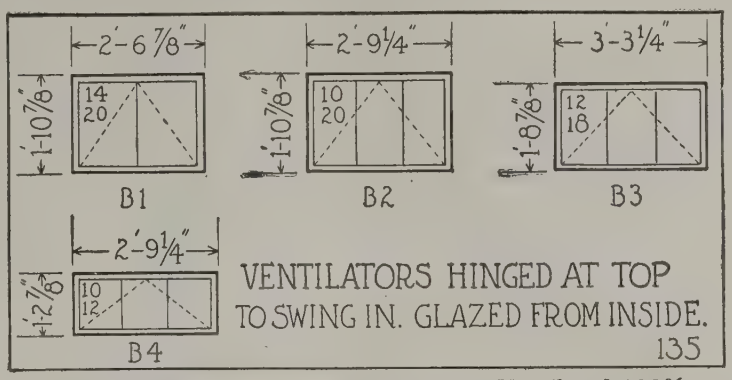
Bayley - Springfield Projected Windows, Commercial — Are a highly standardized manufactured product, the merits of which have produced a demand sufficient to permit quantity production and, with it, high quality and low cost.

For standard layouts see Drawing 170 below.

For sizes use dimensions of corresponding units on second preceding page.

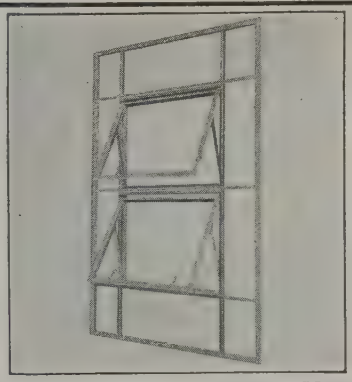
Bayley-Springfield Projected Windows, Architectural—Are an extremely high grade product at a surprisingly moderate cost. They are of layouts shown in drawing 191 and incorporate such structural and quality features as welding of corners of both ventilators and ventilator openings, glazing stops, solid bronze hardware and preparation for attachment of shade brackets.

These windows lend themselves readily to screening and may be prepared for steel screens at but slight additional cost.

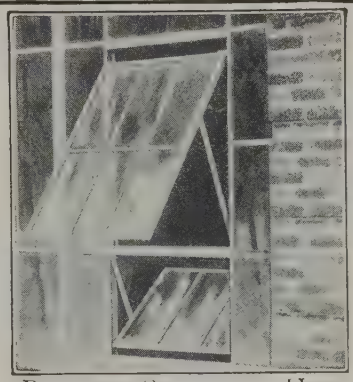


Bayley-Springfield Basement Windows—Ventilated 100%

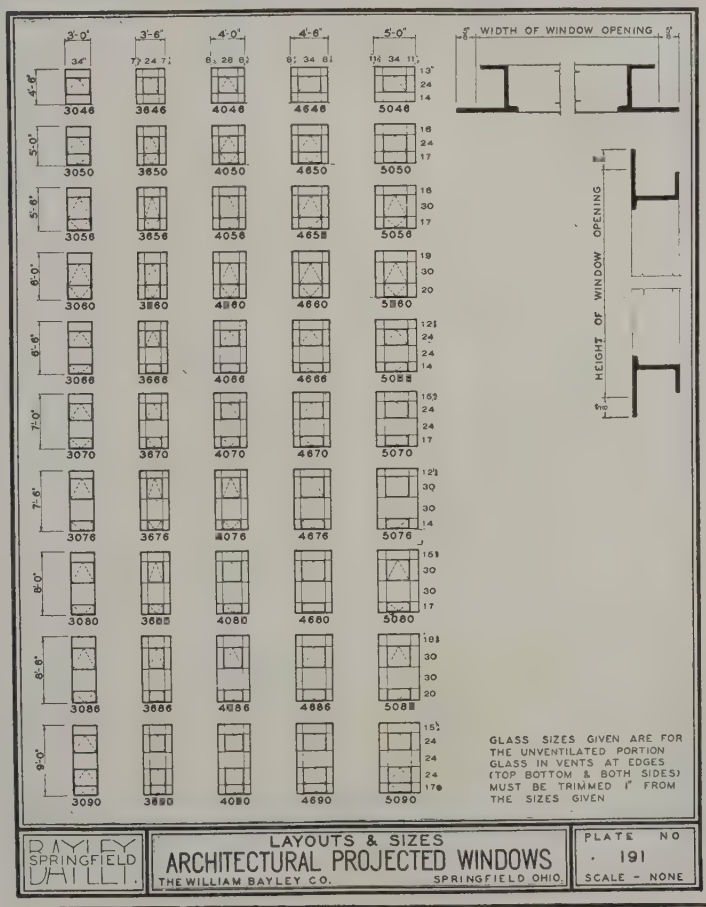
Immediate shipment. Masonry openings and glass sizes, see drawing No. 135. Have a heavy stiff frame. Have a strong ventilator with 1½ in. deep muntins. Easily removable and replaceable. For use in wood, brick, concrete or tile. Inexpensive, cost no more than wood.

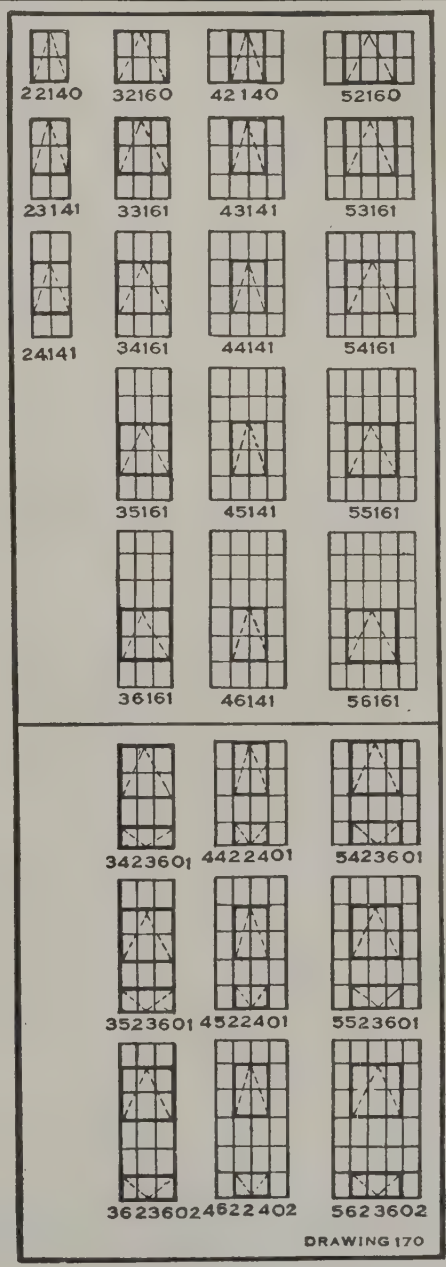


Projected Architectural Unit



Projected Commercial Unit





Projected Commercial Layouts

BAYLEY-SPRINGFIELD PROJECTED WINDOWS

Continued on next page

Bayley-Springfield Continuous Windows and Continuous Window Operators

For Roofs and Sidewalls

Constructed of specially designed solid rolled steel sections welded together for strength and permanency. The sill member is of a new design having no pockets for water or ice in either the open or closed position, at any useful angle. It has an integral flange for operator attachment and a flat-surface contact with the structural steel and its shape is such that a condensation gutter of effective size and form may be used where advisable. Hinges, at 4-ft. centers, placed inside of steel framing for protection, are of heavy steel with ⅜-in. brass pins and have slotted holes for adjustment to steel work. Vertical bars are spaced at 2-ft. centers. Putty-bed on all members is in the same plane which facilitates glazing, requires less putty and reduces glass breakage. Where panels are joined the splice is placed at the center of glass space, and fully develops the strength of horizontal members. Vertical weathering, where hinged portions meet fixed panels, is of formed galvanized steel. Hinged windows have fixed panels 1 ft. wide at extreme ends of lines and 2 ft. wide at intermediate ends. All steel is given one dip coat of standard red oxide paint.

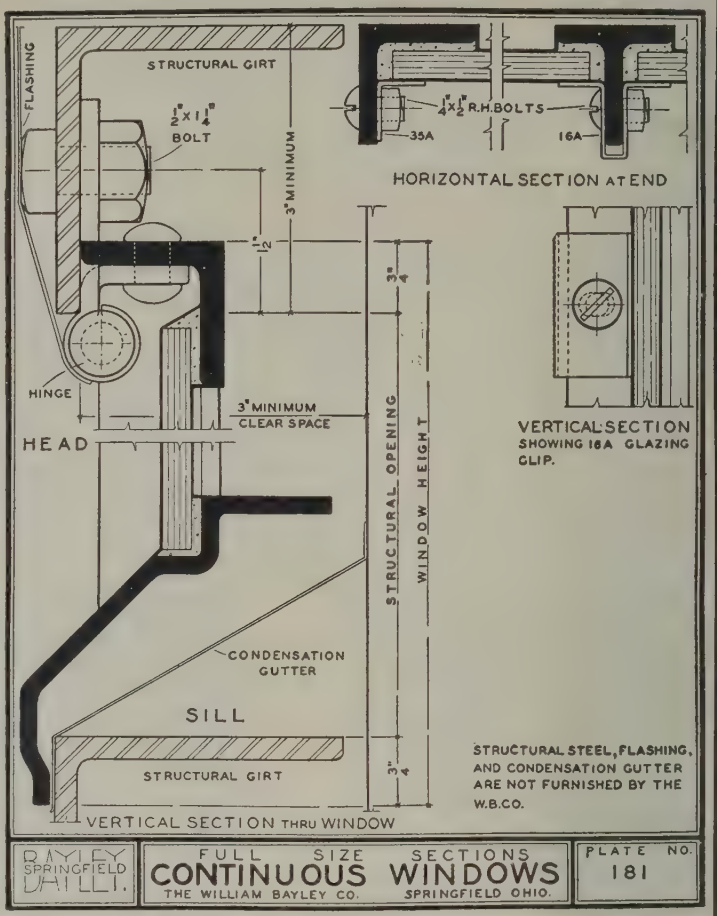
Over-all length of windows should be held to full feet in order to use stock and insure quick shipment. Variations from full feet to be taken up with flashing by others.

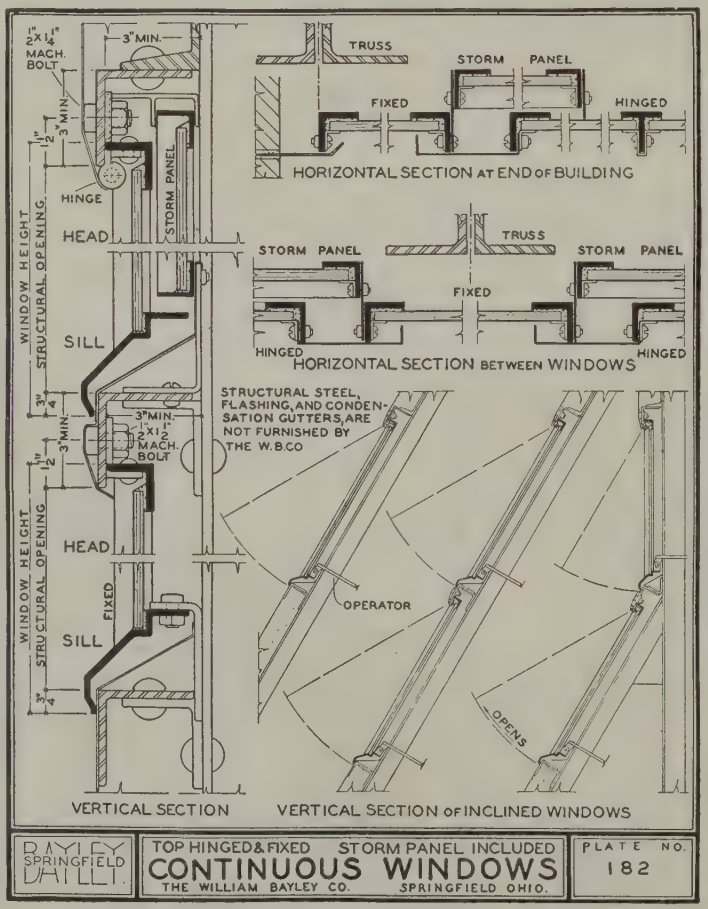
Storm panels are not included but are furnished at extra cost when specially ordered and fit inside the 3-in. clearance space with provision to drain water outside. Glass in storm panels is of same size as glass in main part of line.

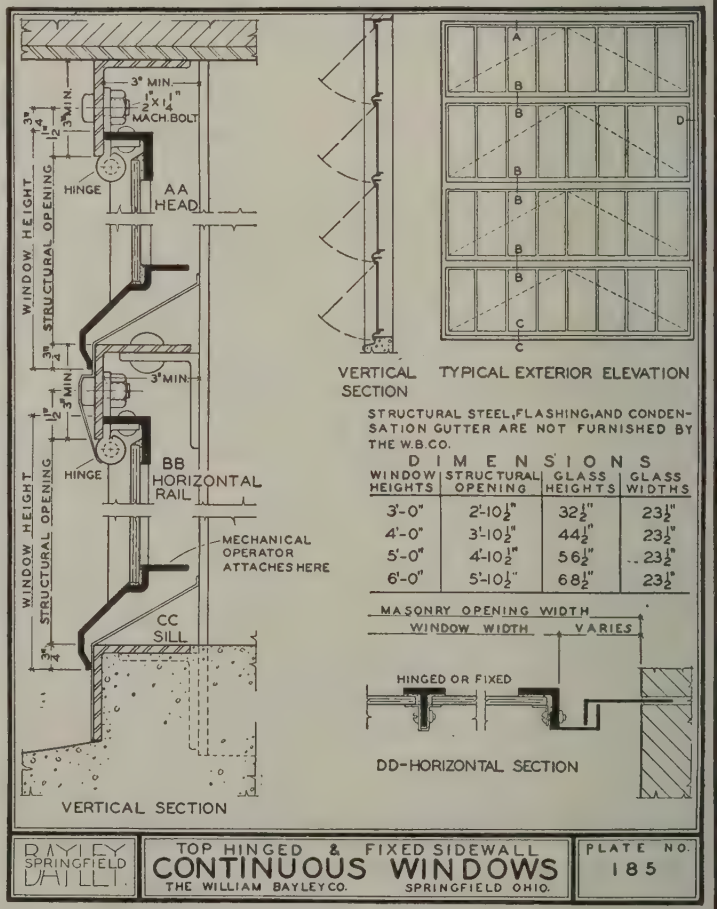
Wire glass ¼ in. thick is recommended and must be 23½ in. wide, except in end panels, set in an even bed of putty struck flush with outside surface of glass and held by galvanized metal clips and bolts. Face putty may be used at extra cost.

Continuous Window Operators—Are of the tension type or rack and pinion type. They may be either manually or electrically controlled. Lengths of lines are determined by conditions of the installation. In general, tension type is used for long lines and rack and pinion type used for short lines. This product is of sturdy construction and good quality. Parts are designed to eliminate friction and include such features as machine-cut racks, pinions, worms and gears; bronze or ball bearings, where necessary; and provision for working parts to run in oil.

Items Not Furnished—The William Bayley Co. does not furnish structural steel, all flashing and condensation gutters, glass, putty, erection, pointing, field painting and glazing, unless specifically mentioned in the contract.







BAYLEY-SPRINGFIELD CONTINUOUS WINDOWS

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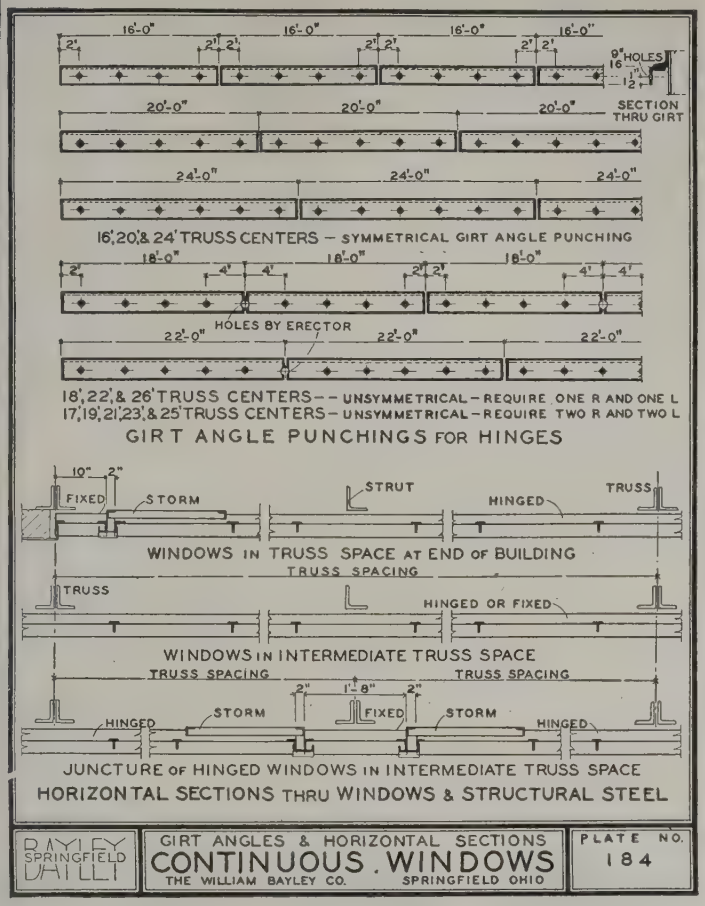
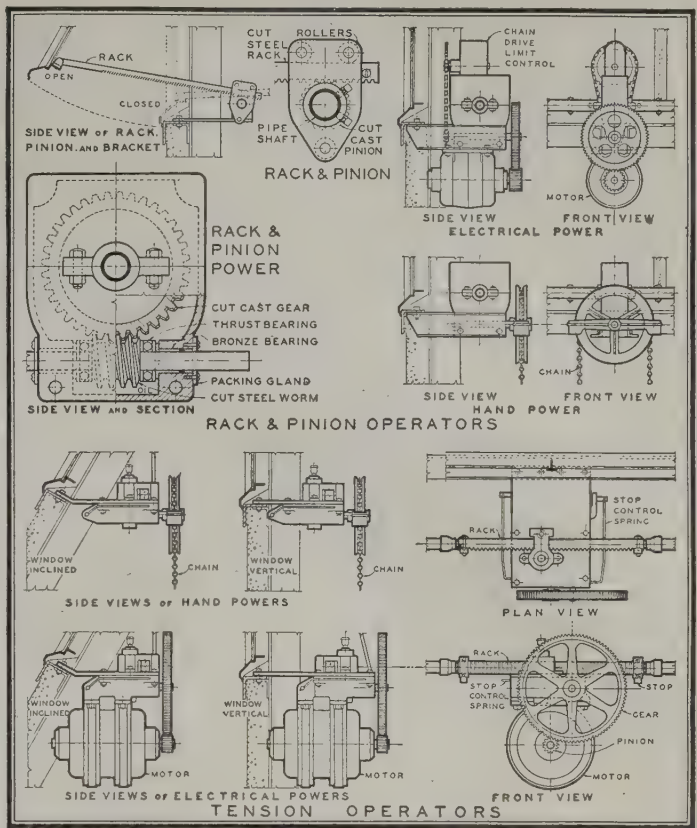


BAYLEY SPRINGFIELD DAYLIGHT

GIRT ANGLES & HORIZONTAL SECTIONS
CONTINUOUS WINDOWS
THE WILLIAM BAYLEY CO. SPRINGFIELD OHIO

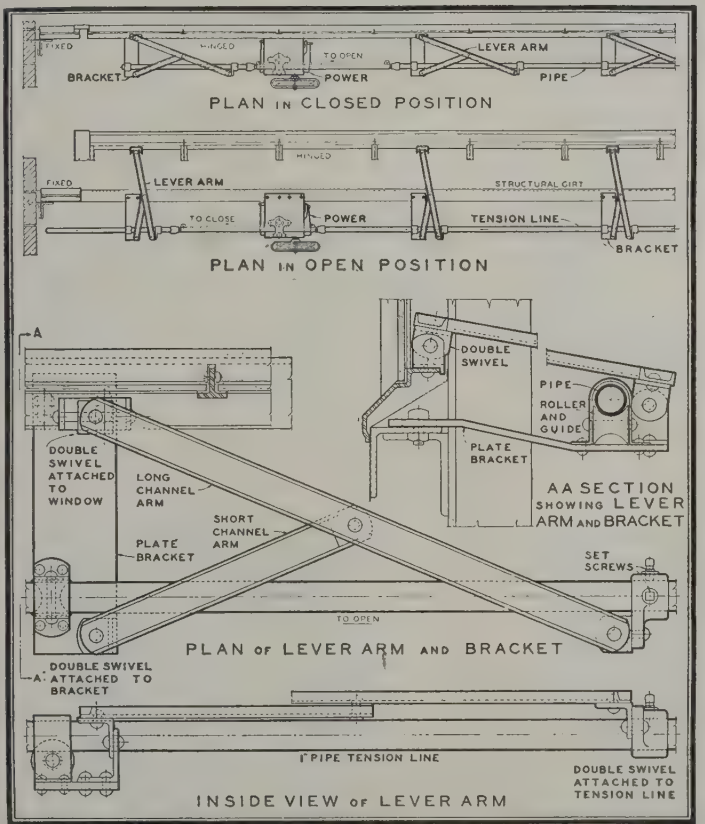
PLATE NO. 184



BAYLEY SPRINGFIELD DAYLIGHT

HAND CONTROL & ELECTRICAL CONTROL
CONTINUOUS WINDOW OPERATORS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

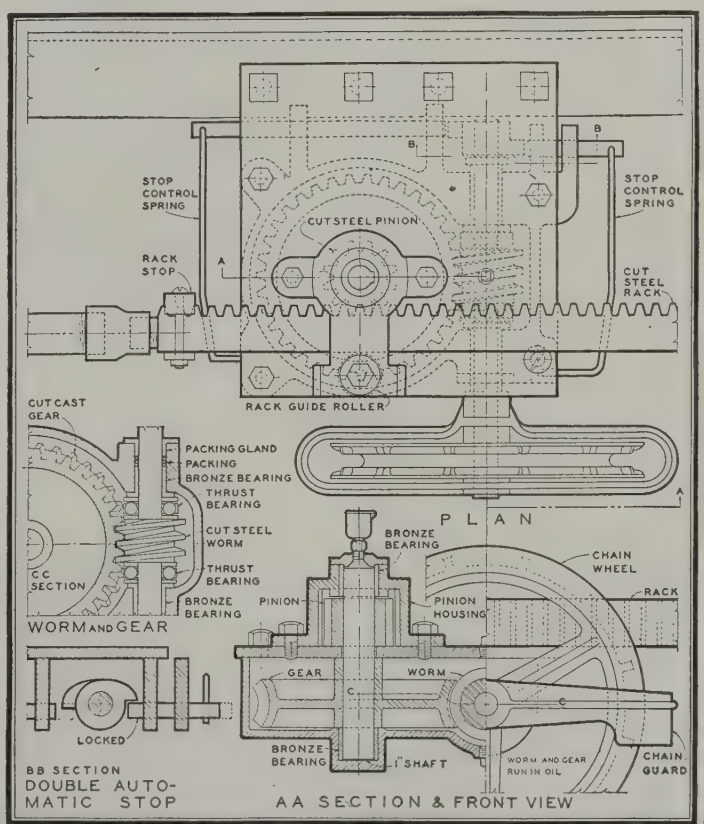
PLATE NO. 187



BAYLEY SPRINGFIELD DAYLIGHT

TENSION LINE & LEVER ARM
CONTINUOUS WINDOW OPERATOR
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 186



BAYLEY SPRINGFIELD DAYLIGHT

TENSION POWER FOR
CONTINUOUS WINDOW OPERATOR
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 188

BAYLEY-SPRINGFIELD CONTINUOUS WINDOWS

Continued on next page

Bayley-Springfield Steel Doors

Primarily for use in industrial buildings. Parts heavy enough and details strong enough to insure continued, satisfactory working under rough and abusive conditions of service. Outer members are thick walled steel tubing. Filling is made of steel window shapes. Usually glazed in the upper portion and provided with a steel plate in the lower. Some are made with steel plates in both portions. Tube corners are reinforced (see BEB below) for strength and along the miter lines to hold the metal heated to fluid condition during the welding process. Plate is flanged on four edges and stretched during riveting so that it is free from buckles and serves as a truss.

Frames for hinged doors are usually channels and contemplate the sills being of concrete. Send sketches of openings for recommendations. Frames for sliding doors usually not required.

Architects' Door Specifications

The standard of quality adopted for the steel doors is that established by The William Bayley Co., Springfield, Ohio, in the manufacture of Bayley-Springfield steel doors, and bidders are required to base their proposals upon the use of this Bayley product.

"Any bidder may submit an alternate on another make of steel doors, but in doing so must give the name and address of the manufacturer, together with evidence that the product is equal to the adopted standard in strength, permanency, design, finish and workmanship."

***STANDARD SIZES OF BAYLEY-SPRINGFIELD STEEL DOORS**

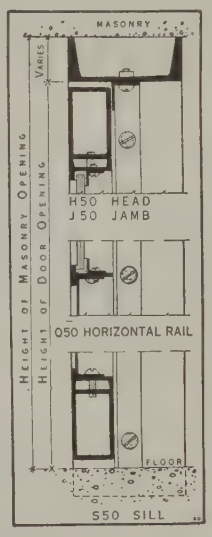
Single		Double	
Width	Height	Width	Height
Type D1—Hinged			
**2′6″	7′0″	5′0″	7′0″
**3′0″	7′0″	6′0″	7′0″
3′6″	7′0″	7′0″	7′0″
3′0″	8′0″	6′0″	8′0″
3′6″	8′0″	7′0″	8′0″
**4′0″	8′0″	8′0″	8′0″
**4′0″	10′0″	8′0″	10′0″
Type D11—Sliding			
**2′3″	6′10½″	4′9″	6′10½″
**2′9″	6′10½″	5′9″	6′10½″
3′3″	6′10½″	6′9″	6′10½″
2′9″	7′10½″	5′9″	7′10½″
3′3″	7′10½″	6′9″	7′10½″
**3′9″	7′10½″	7′9″	7′10½″
**3′9″	9′10½″	7′9″	9′10½″

*Hinged doors: measure between frames for width and from underside of frame at head to sill for height; for clear openings, deduct width of stop angles.
Sliding doors: measure clear opening.
**Indicates stock door.

Catalogue

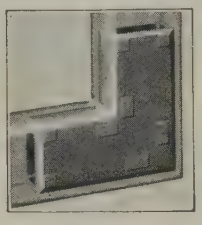
The William Bayley Co. has manufactured metal architectural products, both structural and ornamental, since 1881, and has manufactured Steel Windows since 1909. These years of experience are the test of Bayley-Springfield products today.

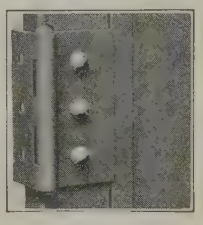
The descriptions of these windows and doors here presented is of necessity brief. A more complete understanding can be had through one of our catalogues. Ask for a copy.

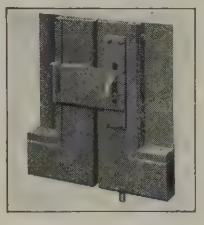


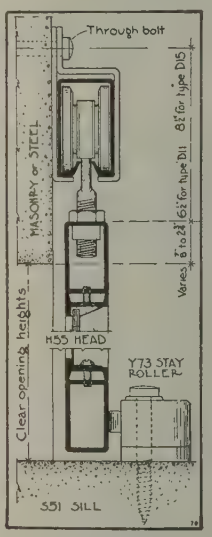
Sectional Detail of Hinged Door

Y70 Extension Bolt for Hinged Double Doors


BEB Corner Reinforcement tubes are welded


24A Hinge


Y72 Hasp Bolt for Double Doors

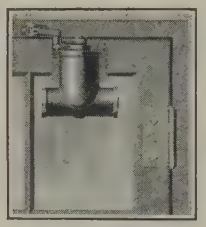


Sectional Detail of Sliding Door

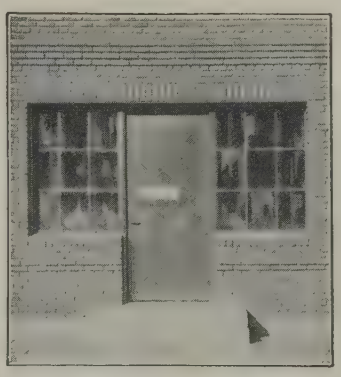
Y1 Cylinder Lock
Heavy solid brass working parts

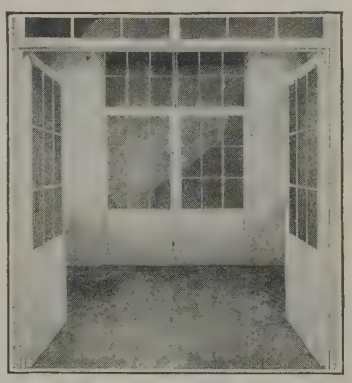
Y5 Panic Release
Heavy solid brass working parts

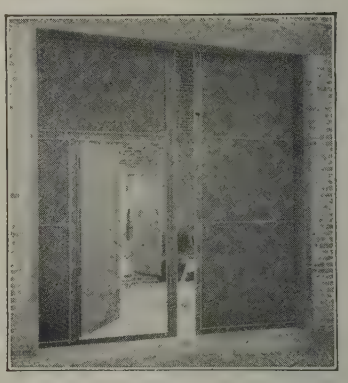
Y55 Panic Release
Outside lock may be omitted


Y61 Door Check for Inswinging or Outswinging Doors

Steel Doors in Detail—Evidence of Strength and Good Appearance


Single Door, Plate Throughout
Most are made with glass


Standard Hinged Double Door


D11 Double Door Filled with Plate
With D1 pass door

BAYLEY-SPRINGFIELD STEEL DOORS

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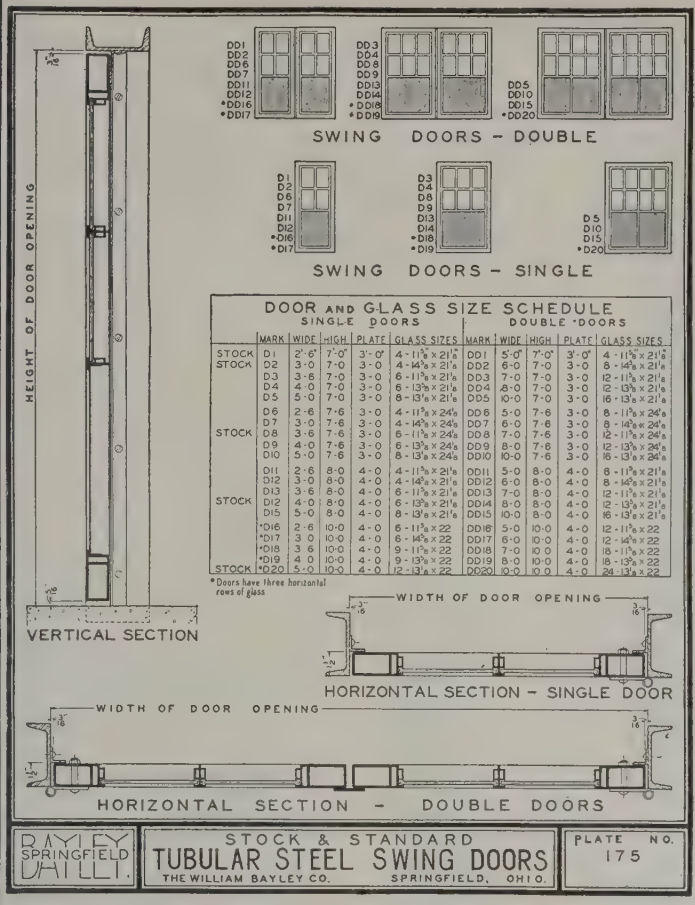


DOOR AND GLASS SIZE SCHEDULE

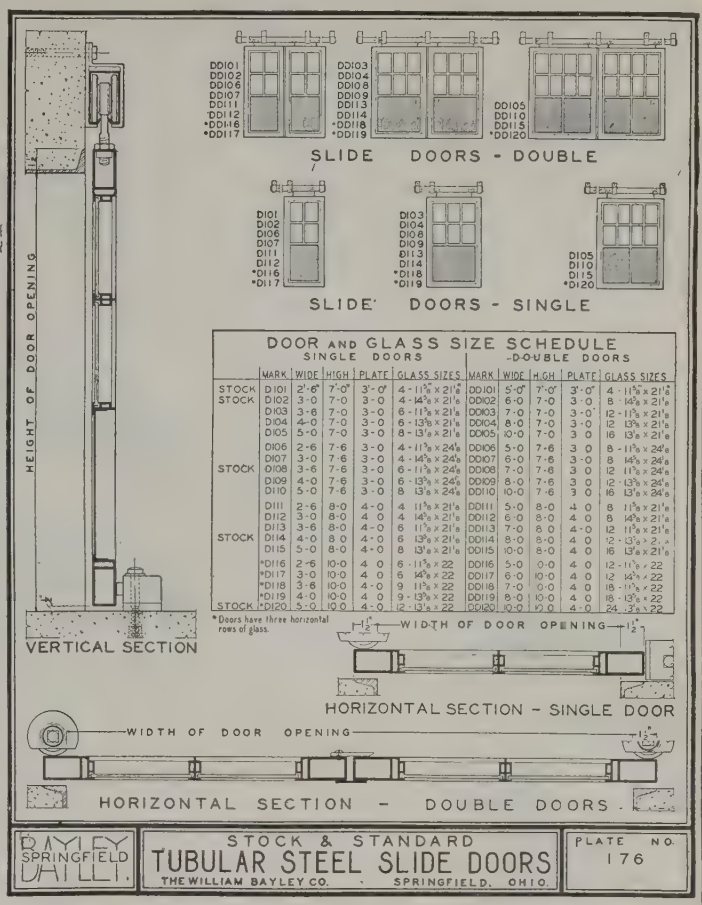
	SINGLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES	DOUBLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES
STOCK	D1	2'-6"	7'-0"	3'-0"	4 - 11⅝ x 21⅛	DD1	5'-0"	7'-0"	3'-0"	4 - 11⅝ x 21⅛
STOCK	D2	3-0	7-0	3-0	4 - 14⅝ x 21⅛	DD2	6-0	7-0	3-0	8 - 14⅝ x 21⅛
	D3	3-6	7-0	3-0	6 - 11⅝ x 21⅛	DD3	7-0	7-0	3-0	12 - 11⅝ x 21⅛
	D4	4-0	7-0	3-0	6 - 13⅜ x 21⅛	DD4	8-0	7-0	3-0	12 - 13⅜ x 21⅛
	D5	5-0	7-0	3-0	8 - 13⅛ x 21⅛	DD5	10-0	7-0	3-0	16 - 13⅛ x 21⅛
	D6	2-6	7-6	3-0	4 - 11⅝ x 24⅛	DD6	5-0	7-6	3-0	8 - 11⅝ x 24⅛
	D7	3-0	7-6	3-0	4 - 14⅝ x 24⅛	DD7	6-0	7-6	3-0	8 - 14⅝ x 24⅛
STOCK	D8	3-6	7-6	3-0	6 - 11⅝ x 24⅛	DD8	7-0	7-6	3-0	12 - 11⅝ x 24⅛
	D9	4-0	7-6	3-0	6 - 13⅜ x 24⅛	DD9	8-0	7-6	3-0	12 - 13⅜ x 24⅛
	D10	5-0	7-6	3-0	8 - 13⅛ x 24⅛	DD10	10-0	7-6	3-0	16 - 13⅛ x 24⅛
	D11	2-6	8-0	4-0	4 - 11⅝ x 21⅛	DD11	5-0	8-0	4-0	8 - 11⅝ x 21⅛
	D12	3-0	8-0	4-0	4 - 14⅝ x 21⅛	DD12	6-0	8-0	4-0	8 - 14⅝ x 21⅛
	D13	3-6	8-0	4-0	6 - 11⅝ x 21⅛	DD13	7-0	8-0	4-0	12 - 11⅝ x 21⅛
STOCK	D14	4-0	8-0	4-0	6 - 13⅜ x 21⅛	DD14	8-0	8-0	4-0	12 - 13⅜ x 21⅛
	D15	5-0	8-0	4-0	8 - 13⅛ x 21⅛	DD15	10-0	8-0	4-0	16 - 13⅛ x 21⅛
	*D16	2-6	10-0	4-0	6 - 11⅝ x 22	DD16	5-0	10-0	4-0	12 - 11⅝ x 22
	*D17	3-0	10-0	4-0	6 - 14⅝ x 22	DD17	6-0	10-0	4-0	12 - 14⅝ x 22
	*D18	3-6	10-0	4-0	9 - 11⅝ x 22	DD18	7-0	10-0	4-0	18 - 11⅝ x 22
	*D19	4-0	10-0	4-0	9 - 13⅜ x 22	DD19	8-0	10-0	4-0	18 - 13⅜ x 22
STOCK	*D20	5-0	10-0	4-0	12 - 13⅛ x 22	DD20	10-0	10-0	4-0	24 - 13⅛ x 22

*Doors have three horizontal rows of glass

BAYLEY SPRINGFIELD DAILEY

STOCK & STANDARD
TUBULAR STEEL SWING DOORS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 175



DOOR AND GLASS SIZE SCHEDULE

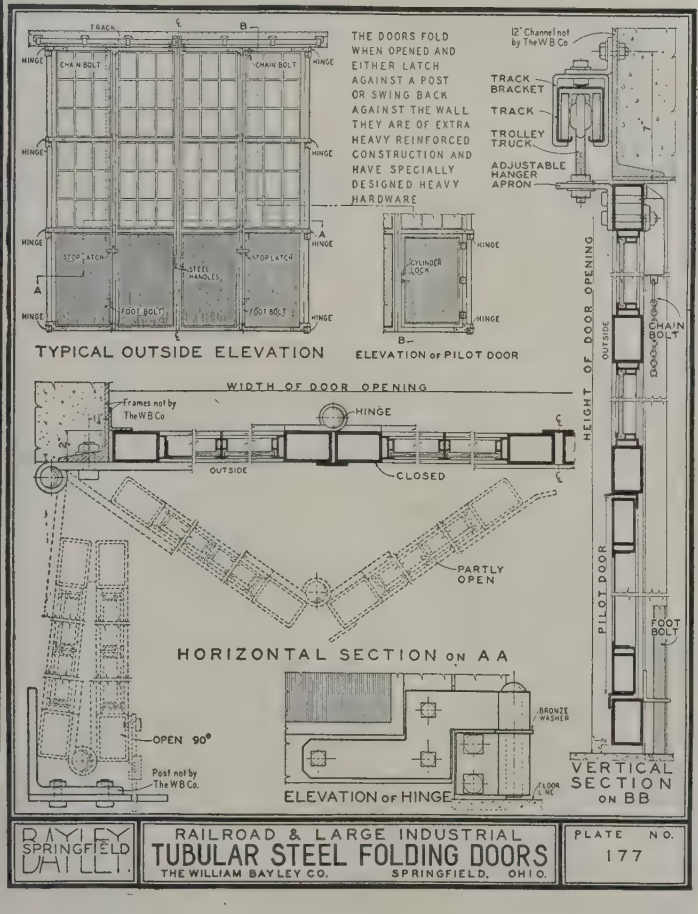
	SINGLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES	DOUBLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES
STOCK	DI01	2'-6"	7'-0"	3'-0"	4 - 11⅝ x 21⅛	DDI01	5'-0"	7'-0"	3'-0"	4 - 11⅝ x 21⅛
STOCK	DI02	3-0	7-0	3-0	4 - 14⅝ x 21⅛	DDI02	6-0	7-0	3-0	8 - 14⅝ x 21⅛
	DI03	3-6	7-0	3-0	6 - 11⅝ x 21⅛	DDI03	7-0	7-0	3-0	12 - 11⅝ x 21⅛
	DI04	4-0	7-0	3-0	6 - 13⅜ x 21⅛	DDI04	8-0	7-0	3-0	12 - 13⅜ x 21⅛
	DI05	5-0	7-0	3-0	8 - 13⅛ x 21⅛	DDI05	10-0	7-0	3-0	16 - 13⅛ x 21⅛
	DI06	2-6	7-6	3-0	4 - 11⅝ x 24⅛	DDI06	5-0	7-6	3-0	8 - 11⅝ x 24⅛
	DI07	3-0	7-6	3-0	4 - 14⅝ x 24⅛	DDI07	6-0	7-6	3-0	8 - 14⅝ x 24⅛
STOCK	DI08	3-6	7-6	3-0	6 - 11⅝ x 24⅛	DDI08	7-0	7-6	3-0	12 - 11⅝ x 24⅛
	DI09	4-0	7-6	3-0	6 - 13⅜ x 24⅛	DDI09	8-0	7-6	3-0	12 - 13⅜ x 24⅛
	DI10	5-0	7-6	3-0	8 - 13⅛ x 24⅛	DDI10	10-0	7-6	3-0	16 - 13⅛ x 24⅛
	DI11	2-6	8-0	4-0	4 - 11⅝ x 21⅛	DDI11	5-0	8-0	4-0	8 - 11⅝ x 21⅛
	DI12	3-0	8-0	4-0	4 - 14⅝ x 21⅛	DDI12	6-0	8-0	4-0	8 - 14⅝ x 21⅛
	DI13	3-6	8-0	4-0	6 - 11⅝ x 21⅛	DDI13	7-0	8-0	4-0	12 - 11⅝ x 21⅛
STOCK	DI14	4-0	8-0	4-0	6 - 13⅜ x 21⅛	DDI14	8-0	8-0	4-0	12 - 13⅜ x 21⅛
	DI15	5-0	8-0	4-0	8 - 13⅛ x 21⅛	DDI15	10-0	8-0	4-0	16 - 13⅛ x 21⅛
	*DI16	2-6	10-0	4-0	6 - 11⅝ x 22	DDI16	5-0	10-0	4-0	12 - 11⅝ x 22
	*DI17	3-0	10-0	4-0	6 - 14⅝ x 22	DDI17	6-0	10-0	4-0	12 - 14⅝ x 22
	*DI18	3-6	10-0	4-0	9 - 11⅝ x 22	DDI18	7-0	10-0	4-0	18 - 11⅝ x 22
	*DI19	4-0	10-0	4-0	9 - 13⅜ x 22	DDI19	8-0	10-0	4-0	18 - 13⅜ x 22
STOCK	*DI20	5-0	10-0	4-0	12 - 13⅛ x 22	DDI20	10-0	10-0	4-0	24 - 13⅛ x 22

*Doors have three horizontal rows of glass.

BAYLEY SPRINGFIELD DAILEY

STOCK & STANDARD
TUBULAR STEEL SLIDE DOORS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 176



BAYLEY SPRINGFIELD DAILEY

RAILROAD & LARGE INDUSTRIAL
TUBULAR STEEL FOLDING DOORS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 177

FOLDING DOORS FOR GARAGES

BAYLEY-SPRINGFIELD STEEL DOORS

THE BOGERT & CARLOUGH CO.

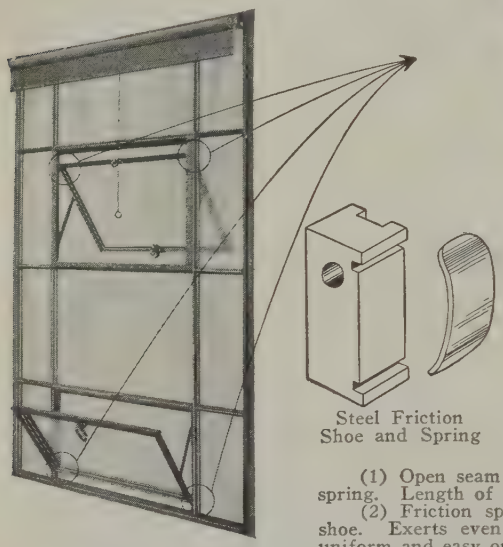
PATERSON, N. J.
TELEPHONE SHERWOOD 7850
NEW YORK, N. Y., 441 Lexington Ave.—Telephone, Vanderbilt 1627 CHICAGO, ILL., 163 W. Washington St.—Telephone, State 8016
AGENCIES IN PRINCIPAL CITIES

Products

STEEL PROJECTED WINDOWS WITH BRONZE GUIDE—Architectural and Commercial; STEEL PIVOTED WINDOWS; UNDERWRITERS' WINDOWS; CONTINUOUS MONITOR BOCA SOLID STEEL SASH TRADE-MARK WINDOWS; MECHANICAL OPERATORS; STEEL PARTITIONS; STEEL BASEMENT WINDOWS; STEEL CASEMENTS; TUBULAR STEEL DOORS; ALL-STEEL DOORS.

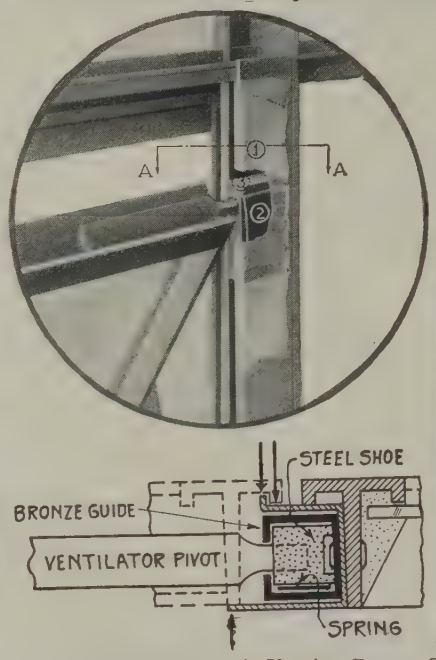
Boca Architectural TS Projected Windows

THE BOGERT & CARLOUGH CO. have done much to popularize the projected window by the introduction of the patented Boca Bronze Ventilator Guide—an exclusive feature. This guide contains a steel friction shoe and spring which gives free and uniform operation of the ventilator at all times and holds it open at any desired angle. This device requires neither paint nor adjustment and always functions with ease.

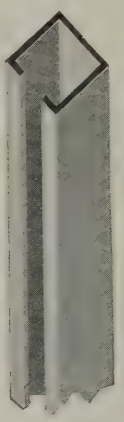


Boca Architectural TS Projected Window with Open-out and Open-in Ventilators

Steel Friction Shoe and Spring



Section Through A—A Showing Bronze Guide and Three-point Weathering



Bronze Guide

Boca Bronze Guide

(1) Open seam rectangular bronze guide. Contains steel friction shoe and spring. Length of guide about two-thirds height of ventilator.

(2) Friction spring. Specially tempered. Designed as part of the steel shoe. Exerts even pressure against inside of bronze guide (1) and insures uniform and easy operation of ventilator.

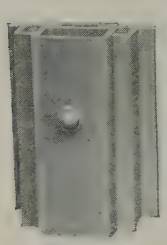
(3) Steel friction shoe. Slides within bronze guide (1) with action of the ventilator and holds it open at any angle by friction. Ventilator pivots on steel pins, at either side, riveted in position and extending into the friction shoe.

(A—A) Three-point weathering member. Continuous contact at sides of ventilator is obtained by special formed channel engaging jamb member of ventilator when closed

It overcomes the ordinary difficulty with projected windows caused by paint and by the slides binding and sticking.

Another exclusive feature is the three-point continuous weathering contact at sides of ventilator. It is obtained by use of special steel weathering channel shown in section A-A.

Specifications—Architectural Projected Windows shall be Boca (type TS) as manufactured by THE BOGERT & CARLOUGH CO., Paterson, N. J.



TS Vertical Mullion

Window bars shall be made of solid rolled steel members and where interior muntin bars cross, they shall be joined by a rigid interlocking joint, giving a flat exterior surface. Outside frame member of windows shall be an unequal leg channel section.

Ventilators—All ventilators shall be of projected open-out or open-in type. They shall be equipped at sides with the special Boca open seam rectangular bronze guides, riveted to frame, within which slide vertically a steel shoe and friction spring to assure smooth and uniform operation of ventilator.

The ventilators shall be supported on arms of spring steel riveted to sides and to brackets attached to window frame. All corners of frames and ventilators shall be riveted and welded and exposed surfaces ground smooth.

Hardware—All hardware shall be of bronze of window manufacturer's standard design. Ventilators within reach shall be provided with cam handle and where pole operated they shall have spring catch and pole ring.

Where two or more windows occur in the same opening mullions of tubular steel shall be furnished to join them.

Glazing angles held in place with brass barrel bolts shall be furnished for all lights.

Painting—All windows shall be given one dip coat of gray paint by manufacturer before shipment.

TS Vertical Tubular Mullion—

Consists of an exterior 2 in. steel flat and an interior 2x1½x$\frac{5}{16}$-in. tubular member.

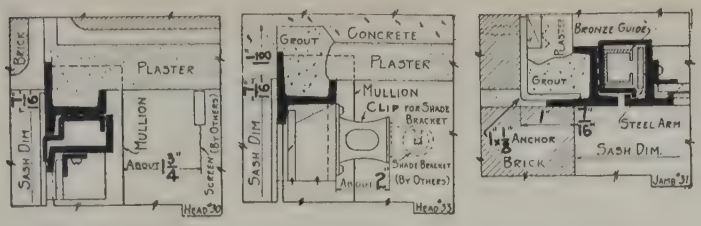
This mullion produces an attractive vertical paneled interior effect and its heavy construction gives rigidity and durability. Double surface contact is had with the frame members of Architectural TS projected windows by a single line of bolts with bronze cap nuts.

	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"		3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
TYPE / 4'-6"	3046	3646	4046	4646	5046	TYPE / 7'-0"	3070	3670	4070	4670	5070
TYPE / 5'-0"	3050	3650	4050	4650	5050	TYPE / 7'-6"	3076	3676	4076	4676	5076
TYPE / 5'-6"	3056	3656	4056	4656	5056	TYPE / 8'-0"	3080	3680	4080	4680	5080
TYPE / 6'-0"	3060	3660	4060	4660	5060	TYPE / 8'-6"	3086	3686	4086	4686	5086
TYPE / 6'-6"	3066	3666	4066	4666	5066	TYPE / 9'-0"	3090	3690	4090	4690	5090

Types and Sizes of Boca Architectural TS Projected Windows

Widths and heights given above are wall opening dimensions.
Allow 2 in. for width of each TS vertical tubular mullion joining TS windows

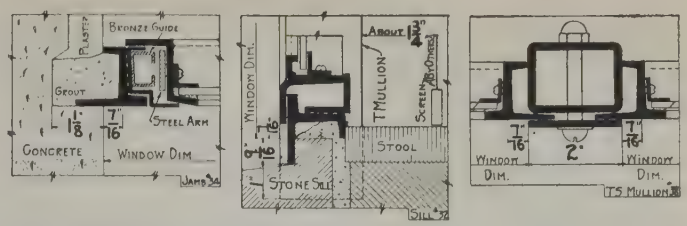
Continued on next page



Head No. 30—Standard for brick construction with steel lintel where plaster ceilings occur. Position of window screen indicated.

Head No. 33—Standard for concrete construction with plaster ceiling. Shade bracket clip shown and position of shade indicated.

Jamb No. 31—Standard for brick openings with interior plastered wall. Section indicates position of bronze guide for open-out ventilators.



Jamb No. 34—Standard for concrete walls with interior plaster. Section shows position of bronze guide for open-in ventilator.

Sill No. 32—Standard for stone sill. Sills must be cut to receive vertical mullions where they occur. Sills of concrete, terra cotta or brick are similar in detail. Position of screen indicated.

No. 38—TS vertical tubular mullion.

Installation Details of Boca Architectural TS Projected Windows

TS horizontal tubular mullions of the same design are furnished (only when specified) where two or more TS windows are placed one above the other in the same opening.

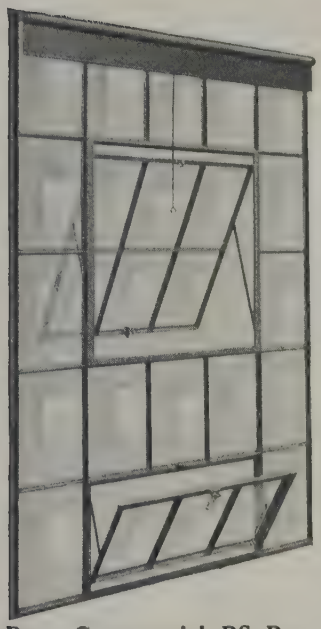
Screens—These are not furnished by window manufacturer.

For open-out ventilators of either Architectural TS or Commercial RS Projected Windows screens should be either metal side or top hinged or vertical sliding and provision made to clear window hardware.

For open-in ventilators metal outside screens either removable or fixed may be used.

Shade Bracket Clips or Supports—These are supplied at slight additional cost when specified, for Architectural TS Projected Windows. These clips are slotted to accommodate any standard shade bracket.

Boca Commercial RS Projected Windows



Boca Commercial RS Projected Window with Open-out and Open-in Ventilators

These windows are similar to the Boca Architectural TS Windows except that the outside frame member, hardware, types and sizes are different and the glazing angles are omitted. They also are equipped with the patented Boca Bronze Guide at sides of ventilators. These windows take 12x18 and 14x20 glass sizes. Ventilators may be open-in or open-out as specified, but no ventilators shall be more than three lights wide. The standard hardware is iron, but bronze may be substituted when specified. Tee bar mullions are used to join windows when two or more occur in an opening. Shade bracket clips will be supplied when specified.

Specifications — Commercial Projected Windows shall be Boca (type RS) as manufactured by The Bogert & Carlough Co., Paterson, N. J.

Bars shall be made of solid rolled steel members and where interior muntin bars cross they shall be joined by a rigid interlocking joint, giving a flat exterior surface. Outside frame member of windows shall be a special rolled steel T bar with 1 in. outstanding leg.

All ventilators shall be of projected open-out or open-in type. They shall be equipped at sides with the special Boca open seam rectangular bronze guides, riveted to frame, within which slide vertically a steel shoe and friction spring to assure smooth and uniform operation of ventilator.

The ventilators shall be supported on arms of spring steel riveted to sides and to brackets attached to window frame. All corners of ventilators shall be tenoned and riveted.

All hardware shall be of iron of window manufacturer's standard design (of similar design in bronze if specified). Ventilators within reach shall be provided with cam handle and where pole operated, with a spring catch and pole ring.

Where two or more windows occur in the same opening tubular steel mullions shall be furnished to join them. (If specified, Boca standard T bar mullions No. 37 shown at bottom of next page will be supplied instead.)

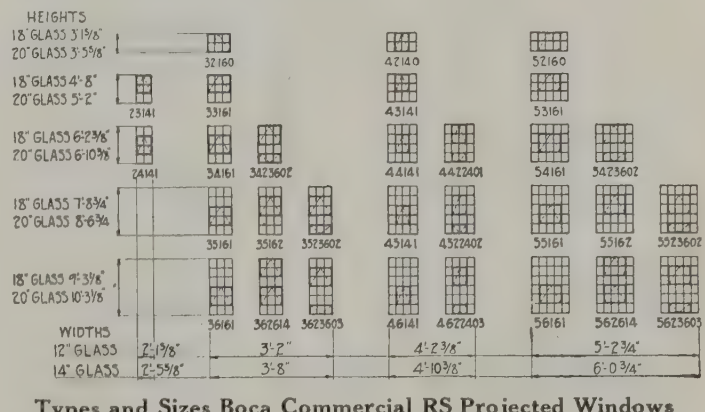
Glass shall be held in place by coppered steel glazing clips.

All windows shall be given one dip coat of gray paint by manufacturer before shipment.

COMBINED WIDTHS

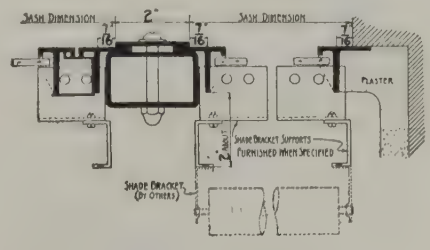
12" x 18" Glass	14" x 20" Glass	Windows wide	Lights wide	Number windows and lights wide
2′ 1⅝"	2′ 5⅝"	1	2	2
3′ 2"	3′ 8"	1	3	3
4′ 2⅜"	4′ 10⅜"	1	4	4
4′ 5¼"	5′ 1¼"	2	4	2, 2
5′ 2¾"	6′ 0¾"	1	5	5
6′ 6"	7′ 6"	2	6	3, 3
8′ 6¾"	9′ 10¾"	2	8	4, 4
9′ 10"	11′ 4"	3	9	3, 3, 3
10′ 7½"	12′ 3½"	2	10	5, 5
10′ 10⅜"	12′ 6⅜"	3	10	3, 4, 3
11′ 10¾"	13′ 8¾"	3	11	3, 5, 3
12′ 11⅛"	14′ 11⅛"	3	12	4, 4, 4
13′ 11½"	16′ 1½"	3	13	4, 5, 4
13′ 11½"	16′ 1½"	3	13	5, 3, 5
14′ 11⅞"	17′ 3⅞"	3	14	5, 4, 5
15′ 2¾"	17′ 6¾"	4	14	3, 4, 4, 3
16′ 0¼"	18′ 6¼"	3	15	5, 5, 5
17′ 3½"	19′ 11½"	4	16	4, 4, 4, 4
19′ 4¼"	22′ 4¼"	4	18	4, 5, 5, 4
20′ 7½"	23′ 9½"	5	19	5, 3, 3, 3, 5
21′ 5"	24′ 9"	4	20	5, 5, 5, 5

Standard width of 2 in. for each mullion used in table above.



Types and Sizes Boca Commercial RS Projected Windows

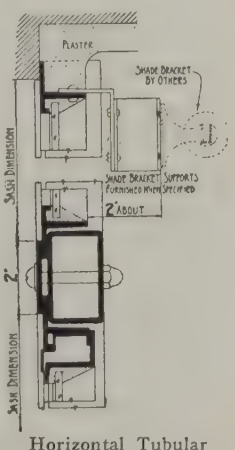
Open-out projected ventilators are indicated above by lines, thus ∧. Open-in thus ∨. Open-in ventilators will be furnished in place of open-out ventilators shown or vice-versa, when so specified, at slight additional cost.



Vertical Tubular Mullion

The vertical mullion is used where mullion width is 2 in. Consists of an exterior 2-in. steel flat and an interior 2½x1½x$\frac{3}{16}$-in. tubular member. Interchangeable with Boca standard tee mullion No. 37 shown on next page but costs slightly more.

The horizontal tubular mullion shown at the right is of the same construction as the vertical tubular mullion, and is used in conjunction therewith. Horizontal mullions furnished only when specified.

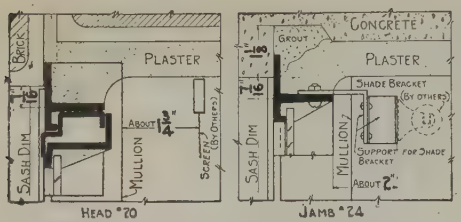


Horizontal Tubular Mullion

Boca Mullions for Commercial RS Projected Windows

These mullions have the same advantages as the mullions shown on preceding page. Note shade bracket support or clip (furnished only when specified) which consists of a small angle bracket and a channel extension.

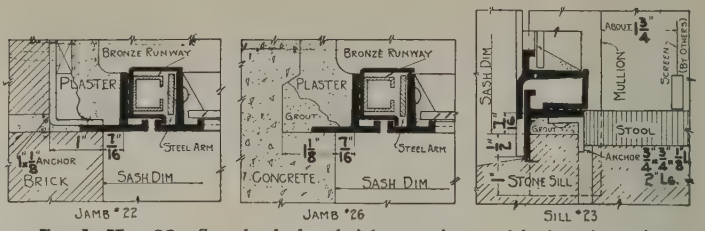
Continued on next page



Head No. 20—Standard for brick construction. Window held in position by anchors, if specified. Position of screen indicated.

Head No. 24—Standard for concrete construction. Location of shade and shade bracket support indicated.

Jamb No. 21—Standard for brick openings without interior plaster. Section shows bronze guide or runway for open-out ventilator.



Jamb No. 22—Standard for brick openings with interior plaster. Section shows bronze guide for open-out ventilator.

Jamb No. 26—Standard for concrete walls with interior plaster. Section shows bronze guide for open-out ventilator.

Sill No. 23—Standard for stone sill. Sills of concrete or brick are similar in detail. Position of screen indicated.

Installation Details of Commercial RS Projected Windows

Boca Horizontally Pivoted Windows

Specifications—Horizontally Pivoted Windows shall be Boca as manufactured by The Bogert & Carlough Co., Paterson, N. J.

All windows shall be made of solid rolled steel members and where interior horizontal and vertical muntin bars cross, they shall be joined by a rigid interlocking joint with flat exterior surface.

All ventilators shall be horizontally pivoted on external hinges and shall have double weathering contact at head and at sill and three-point continuous weathering contact at the sides.

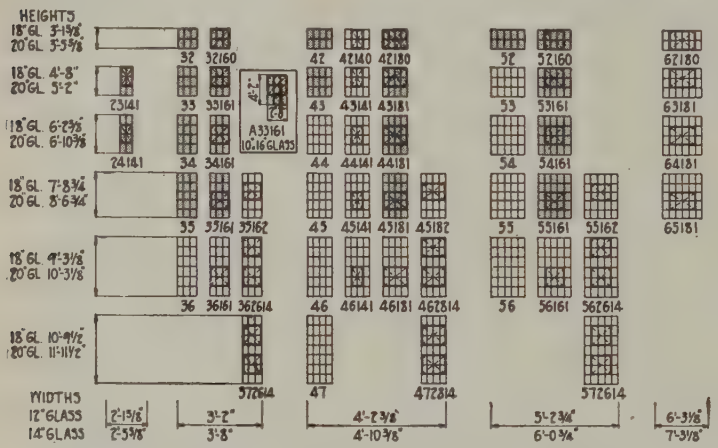
Interior View Boca Lock Joint

All ventilators shall be provided with steel stay bar with locking attachment (or—All ventilators shall be equipped with spring catch, roller bracket and chain except where mechanical operators are specified).

Where two or more windows are used in the same opening they shall be joined by vertical mullions of solid steel T bars.

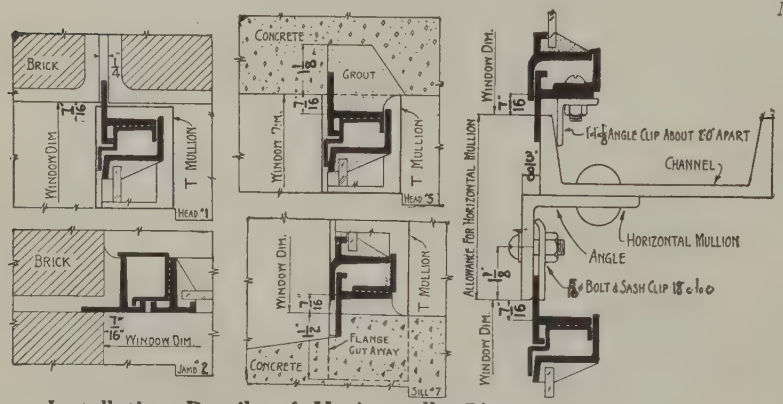
Glazing clips of coppered spring steel wire and necessary clips and bolts required for installation of windows shall be supplied.

All windows shall be given one dip coat of gray paint by manufacturer before shipment.



Standard Sizes and Types of Boca Pivoted Windows

Types shaded are warehouse sizes carried in stock



Installation Details of Horizontally Pivoted Windows

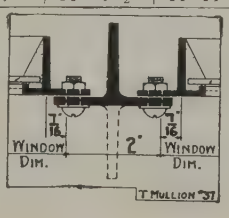
STANDARD WIDTHS

Widths listed below are furnished in heights given at right.

Number of lights in width of opening	Number of lights in width of unit	12"x18" glass	14"x20" glass
		Width of window	
2	2	2′ 1⅝″	2′ 5⅝″
3	3	3′ 2″	3′ 8″
4	4	4′ 2⅜″	4′ 10⅜″
5	5	5′ 2¾″	6′ 0¾″
6	3, 3	6′ 6″	7′ 6″
8	4, 4	8′ 6¾″	9′ 10¾″
9	3, 3, 3	9′ 10″	11′ 4″
10	5, 5	10′ 7½″	12′ 3½″
10	3, 4, 3	10′ 10⅜″	12′ 6⅜″
11	3, 5, 3	11′ 10¾″	13′ 8¾″
11	4, 3, 4	11′ 10¾″	13′ 8¾″
12	4, 4, 4	12′ 11⅛″	14′ 11⅛″
13	4, 5, 4	13′ 11½″	16′ 1½″
13	5, 3, 5	13′ 11⅝″	16′ 1⅝″
14	5, 4, 5	14′ 11⅞″	17′ 3⅞″

STANDARD HEIGHTS

Number of lights high	12"x18" glass	14"x20" glass
	Height of window	
1	1′ 7¼″	1′ 9¼″
2	3′ 1⅝″	3′ 5⅝″
3	4′ 8″	5′ 2″
4	6′ 2⅜″	6′ 10¾″
5	7′ 8¾″	8′ 6¾″
6	9′ 3⅛″	10′ 3½″
7	10′ 9½″	11′ 11½″



Underwriters' Windows

Underwriters' windows are limited to 7x12 ft. either dimension being taken as height or width.

Multiple of sizes within the required dimensions may be used to fill any opening by using Boca T bar mullions bolted to windows and secured to lintel and sill.

Wire glass ¼ in. thick must be used, not over 14 in. in width and not over 48 in. in height. Total exposed glass area for any light must not exceed 350 sq. in.

Boca windows as listed below can be furnished with Underwriters' label at additional cost.

Standard sizes (see sizes and types on this page) and special sizes of *horizontal pivoted windows,* ventilators pivoted above center.

Standard sizes (see sizes and types on second preceding page) and special sizes of *Architectural TS Projected Windows* except those having one or more open-in ventilators. Additional muntin bars must be supplied in large lights necessary to meet glass limitations.

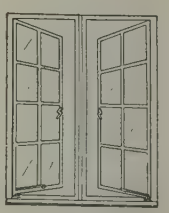
Standard sizes (see sizes and types, preceding page) and special sizes of *Commercial RS Projected Windows* except those having one or more open-in ventilators.

Note: Curved or splayed head windows will not be labeled.

Boca Steel Partitions

Constructed of regular Boca steel window units joined by mullions, with sheet steel panels in the lower sections. Built to meet the requirements of any building condition.

Boca Steel Casements



Made from Boca solid steel rolled sections; welded at corners.

Have 2-point weathering contact at all sides, and equipped with bronze hardware.

Easily installed in any type of wall construction — brick, stone, concrete, stucco or wood.

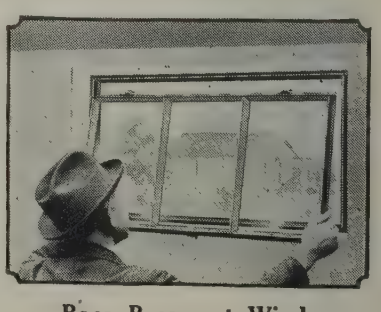
Offset hinges to permit cleaning from inside are standard construction.

Boca Steel Basement Windows

An exclusive Boca development. No hinges, no pins. Window easily removed from frame (from inside only) for cleaning or replacing glass.

Screw holes provided in frame for attaching screens. A special latch automatically locks window when closed. Made in the standard sizes.

Type	Wall openings Width	Wall openings Height	Lights glass
W1	2′ 9½″	1′ 3″	3–10″x12″
W2	3′ 3½″	1′ 9″	3–12″x18″
W3	2′ 9½″	1′ 11″	3–10″x20″
W4	2′ 7¼″	1′ 11″	2–14″x20″



Boca Basement Window

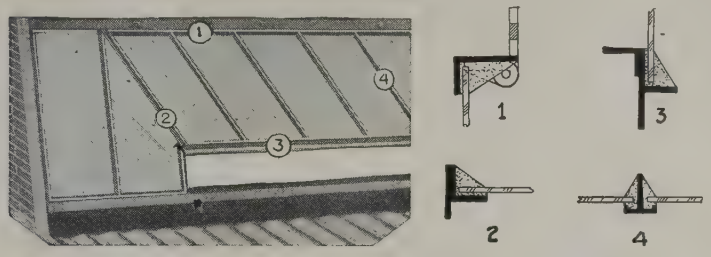
Continued on next page

Boca Continuous Windows

Top hung and fixed for monitor, sawtooth, A-frame, foundry and other types of roof, also sidewalls. May be placed either vertically or sloping.

Top hung operated with mechanical operators by arms attached to bottom rail.

Made of rolled steel members with all joints acetylene welded. Standard panels are 20 ft. long and 3, 4 and 5 ft. high. Special lengths of 10 to 18 ft. can be supplied. Clips are supplied for holding glass in place.



Weathering Features of Boca Continuous Windows

(1) *Top rail and hinge.* These weather back of girt angle at head of opening. (2) *End bar of panel.* Weathering flat used only at end of run. (3) *Bottom rail of window.* Closes against girt angle at sill forming weathering. (4) *Interior muntin bar.* Tenoned to top and bottom rails

Boca All-steel Doors and Frames for Economy

Offer decided advantages over wood doors, including simplified fireproof construction and worthwhile economies in installation and maintenance.

Made of special Boca section with corners welded, and with copper alloy sheet riveted in lower portion.

Finished in one coat of gray paint. No glass or putty included.

Double Doors—Complete with 4-in. steel channel frame at jambs, head and sill. Shipped in four pieces: 1 head channel, 1 sill channel and 2 doors with jamb channel and hinges attached.

Hardware consists of foot bolt, chain bolt, automatic door holders, Yale rim lock and handles.

Two styles, swing and slide.

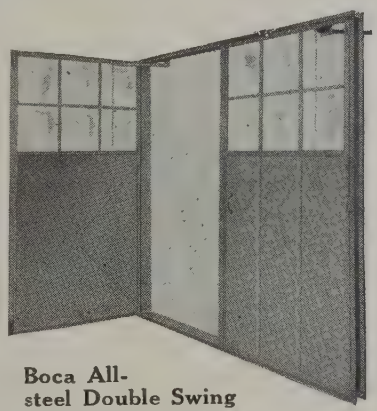
Swing doors are made in three sizes to fit wall openings 8 ft. wide, 7 ft. 6 in. high; 8 ft. wide, 8 ft. high; and 9 ft. wide, 9 ft. 6 in. high.

Net price $50.00 for the first two sizes and $78.00 for the largest size.

Slide doors are made in one size, without frame, to fit wall opening 9 ft. 9 in. wide, 9 ft. 10½ in. high, and are complete with overhead track, hangers, hasp and staple, foot bolt, handles and bottom guides.

Net price $98.00.

Boca All-steel Double Doors are recommended for commercial buildings and for battery garage construction. The 4-in. steel jamb channels bolted together serve as posts to support roof and eliminate brick or concrete piers.



Boca All-steel Double Swing Doors and Frame

Single Doors and Frame—Similar construction to double doors.

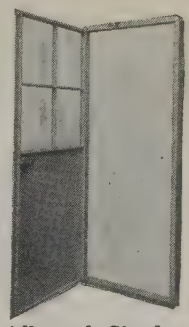
Shipped in one complete unit, consisting of door, 3-in. steel channel frame, cylinder rim lock and handles.

Appropriate for use wherever fireproof door construction is required.

Made for two sizes of wall openings, 2 ft. 8 in. wide, 6 ft. 8 in. high; and 3 ft. wide, 7 ft. high.

Net price $33.00 and $38.00, respectively.

All above prices f. o. b. Paterson, N. J.



All-steel Single Swing Door and Frame

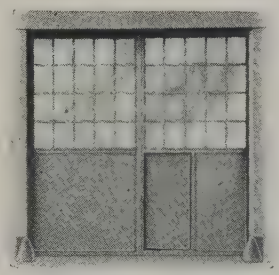
Single Swing Door

Boca Tubular Steel Doors

For commercial and industrial buildings or wherever steel doors with glass panels are required.

Hinged doors are complete with standard handle, knob and bronze lock; sliding doors with standard bow handle, foot and chain bolt, hasp and staple and overhead track and hangers.

Standard sizes of single swinging doors given are inside dimensions of steel channel door frames. For single sliding and double sliding doors, the standard sizes given are 2 in. wider and 1½ in. higher than the actual door opening to provide for overlap at head and jambs.



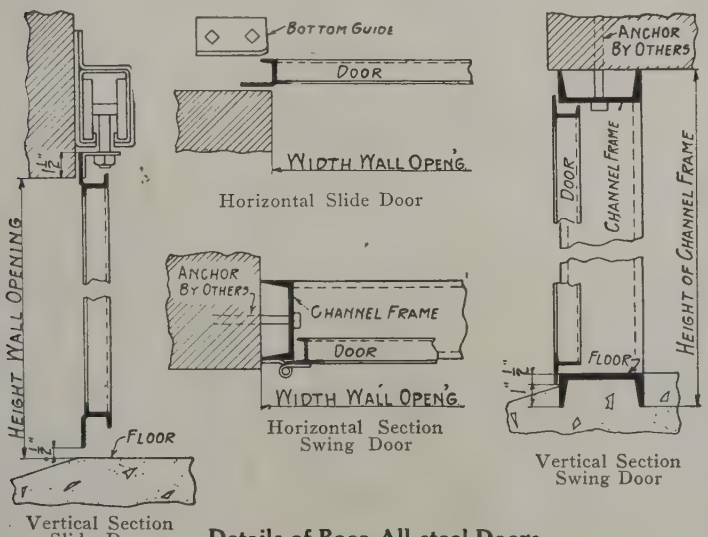
Double Slide Door

DOOR SIZES

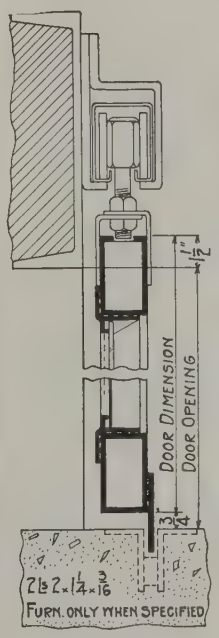
Single swing and slide		Double swing and slide	
Width	Height	Width	Height
2′ 6″	7′ 0″	5′ 0″	7′ 0″
3′ 0″	7′ 0″	6′ 0″	7′ 0″
3′ 0″	7′ 6″	7′ 0″	7′ 6″
3′ 6″	7′ 6″	8′ 0″	8′ 0″
4′ 0″	8′ 0″	10′ 0″	10′ 0″
5′ 0″	10′ 0″	12′ 0″	12′ 0″

Boca Steel Railroad Doors and Frames

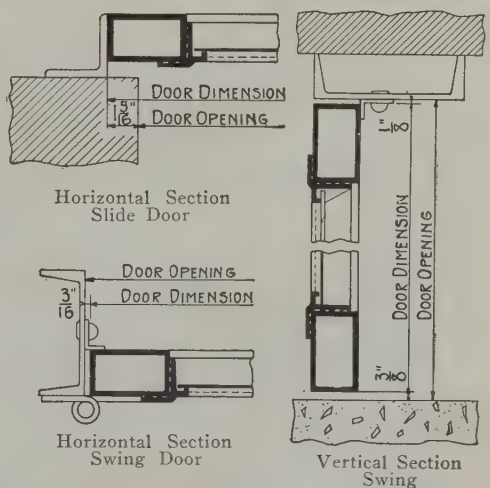
Similar in construction to Boca tubular steel doors except heavier construction throughout. Furnished in sizes to admit the largest type locomotive or car or built to meet special requirements. Sliding, swinging or double folding types. Equipped with especially designed hardware.



Details of Boca All-steel Doors



Vertical Section Slide



Meeting Rail

Details of Boca Tubular Steel Doors

CAMPBELL METAL WINDOW CORPORATION

Pershing Square Building, NEW YORK, N. Y.

BALTIMORE, MD., Bush and Hamburg Streets

Campbell Solid Metal Windows

Model No. 26-W Double Hung—All parts of the sash and frame, as indicated on detail drawings, are formed of No. 12 gage blue annealed steel, the balance of No. 16 gage. Sash weights are single-unit castings. Chains are of steel, hot galvanized, with galvanized connectors to sash and weights. Rubbing strips are on each jamb at ends of meeting rails. Screws are of steel with standard 10-24 machine thread and heads as detailed. Cast iron sills and stools furnished for this model, if desired.

Model No. 25-W Double Hung—Materials entering into the construction of Model No. 25-W are essentially the same as described for Model No. 26-W with the exception that the sash members are made of No. 14 gage steel and parts of the frame (as indicated on detail drawing) are formed of No. 20 gage blue annealed steel; staff bead of No. 12 gage steel. Sills are of No. 12 gage drawn steel.

Assembly—Sash frames have mitered and welded corners. Glazing stops are mounted with screws on interior. Members forming jambs and head boxes are welded together. The frames are shipped with sash, pulleys and chains installed.

Weathering—Sill, meeting rails and head are fitted with metallic flexible weather stops. Vertical guides and sash members are fitted with metallic flexible interlocking weather stops within the boxes.

Guarantee—The amount of infiltration of air through standard double hung windows is guaranteed not to be more than ½ cu. ft. of air per foot of sash perimeter per minute when subjected to a static air pressure equivalent to the pressure exerted by a wind of 25 miles per hour.

Adjustment—Sash have concealed adjusters to prevent sash members from rubbing on exposed face of jambs and scraping paint.

Finish and Hardware—All steel in windows, except inside glass stops and inside cover plates, is galvanized after fabrication.

All finish hardware is solid bronze, polished and unlacquered.

Labels—Where required, windows are made in accordance with the regulations of the National Board of Fire Underwriters and bear their label.

Bronze Windows

All types are made in bronze if desired.

A Few of the Recent Prominent Buildings Equipped with Campbell Windows

Building and Location	Architect	Builder	Windows
Columbia-Presbyterian Medical Center, New York, N. Y.	James Gamble Rogers	Marc Eidlitz & Son, Inc.	6434
New Yorker Hotel, New York, N. Y.	Sugarman & Berger	New York Hotel Corp.	5190
Twenty North Wacker Drive, Chicago, Ill.	Graham, Anderson, Probst & White	John Griffiths & Son, Inc.	4450
Graybar Building, New York, N. Y.	Sloan & Robertson	Todd, Robertson, Todd Eng. Corp.	3784
Manger Hotel, New York, N. Y.	H. Craig Severance	Bing & Bing	3201
New York Central Building, New York, N. Y.	Warren & Wetmore	James Stewart & Co., Inc.	2967
Hotel Statler, Boston, Mass.	Geo. B. Post & Sons	Dwight P. Robinson & Co., Inc.	2628
Wassaic State School, Amenia, N. Y.	N. Y. State Architect	Seglin-Harrison Const. Co., Inc.	2276
Salmon Tower, New York, N. Y.	York & Sawyer	C. T. Wills, Inc.	2177
Savoy-Plaza Hotel, New York, N. Y.	McKim, Mead & White	George A. Fuller Co.	1996
Barclay-Vesey Telephone Building, New York, N. Y.	Voorhees, Gmelin & Walker	Marc Eidlitz & Son, Inc.	1933
Governor Clinton Hotel, New York, N. Y.	Murgatroyd & Ogden	Thompson-Starrett Co.	1920
Palm Olive Building, Chicago, Ill.	Holabird & Root	Lundoff-Bicknell Co.	1704
American Women's Club, New York, N. Y.	Benjamin W. Morris	Marc Eidlitz & Son, Inc.	1660
Chicago Daily News, Chicago, Ill.	Holabird & Root	Hegeman-Harris Co.	1584
Foreman Bank, Chicago, Ill.	Graham, Anderson, Probst & White	Paschen Brothers	1566
Jewelers Building, Chicago, Ill.	Giaver & Dinkelberg	Starrett-Dilks Co.	1557
Industrial Trust, Providence, R. I.	Walker & Gillette	Starrett Brothers	1462
Paramount Theatre Building, New York, N. Y.	Rapp & Rapp	Thompson-Starrett Co.	1414
Lefcourt National Building, New York, N. Y.	Shreve & Lamb	521 Fifth Avenue, Inc.	1400
State Office Building, New York, N. Y.	N. Y. State Architect	Cauldwell-Wingate Co.	1377
Wall and Hanover Street, New York, N. Y.	Delano & Aldrich	Starrett Brothers	1373
Consolidated Gas Company, New York, N. Y.	Thomas E. Murray, Inc.	Kenn-Well Construction Co.	1346
Sherry-Netherlands Hotel, New York, N. Y.	Schultze & Weaver	Shroder & Koppel, Inc.	1306
Arnold-Constable Building, New York, N. Y.	Ludlow & Peabody	G. Richard Davis Co., Inc.	1265
Harriman Building, New York, N. Y.	Cross & Cross	George A. Fuller Co.	1257
Detroit Telephone Building, Detroit, Mich.	Smith, Hinchman & Grylls	R. G. Christman & Co.	1205
Empire Trust Building, New York, N. Y.	Warren & Wetmore	Max J. Kramer Co.	1200
Lord Baltimore Hotel, Baltimore, Md.	W. L. Stoddart	Consolidated Engineering Co.	1059
Williamsburgh Savings Bank, Brooklyn, N. Y.	Halsey, McCormack & Helmar	Wm. Kennedy Construction Co.	1055
Norwood Building, Austin, Tex.	Geisike & Harris	Frank R. Barron	1035
International Telephone Building, New York, N. Y.	Buchman & Kahn	A. E. Lefcourt Realty Holdings	1000
Carbide & Carbon Building, Chicago, Ill.	D. H. Burnham & Co.	Paschen Brothers	966
Reynolds Building, Winston-Salem, N. C.	Shreve & Lamb	James Baird & Co.	945
Union Central Life Annex, Cincinnati, Ohio	Garber & Woodward	Ferro Concrete Construction Co.	943
Evening Post Building, New York, N. Y.	Horace Trumbauer	Thompson-Starrett Co.	918
Jackson-Franklin Building, Chicago, Ill.	A. S. Alschuler	Jackson-Franklin Building Co.	903
Cincinnati Enquirer Building, Cincinnati, Ohio	Lockwood-Greene Co.	George A. Fuller Co.	875
Pennsylvania Power & Light Co., Allentown, Pa.	Helmle & Corbett	Hegeman-Harris Co., Inc.	788
Integrity Trust, Philadelphia, Pa.	Samuel M. Green & Co.	George A. Fuller Co.	738
North Office Building, Harrisburg, Pa.	Gehron & Ross	James Baird Co.	706
Home Savings Bank, Albany, N. Y.	Dennison & Hirons	John Dyer, Jr.	672
State National Bank, Albany, N. Y.	Henry Ives Cobb	The Foundation Co.	616
Mistui Main Building, Tokyo, Japan	Trowbridge & Livingston	James Stewart & Co., Inc.	561

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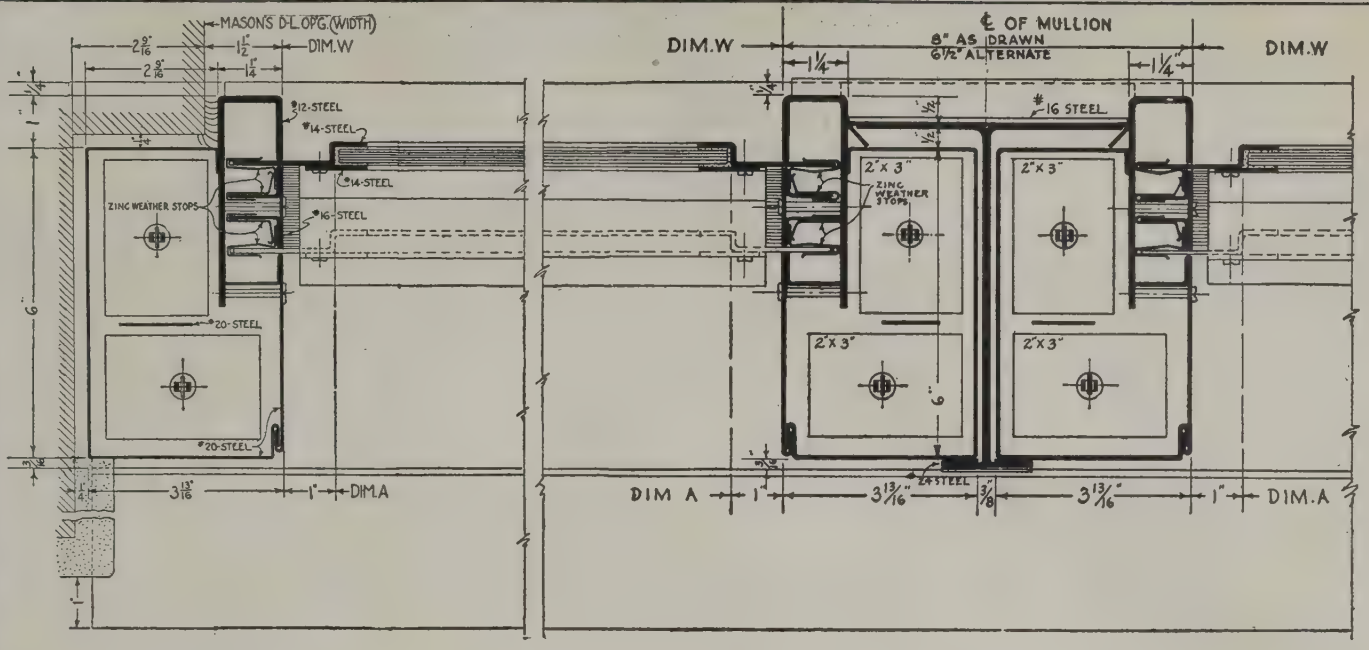
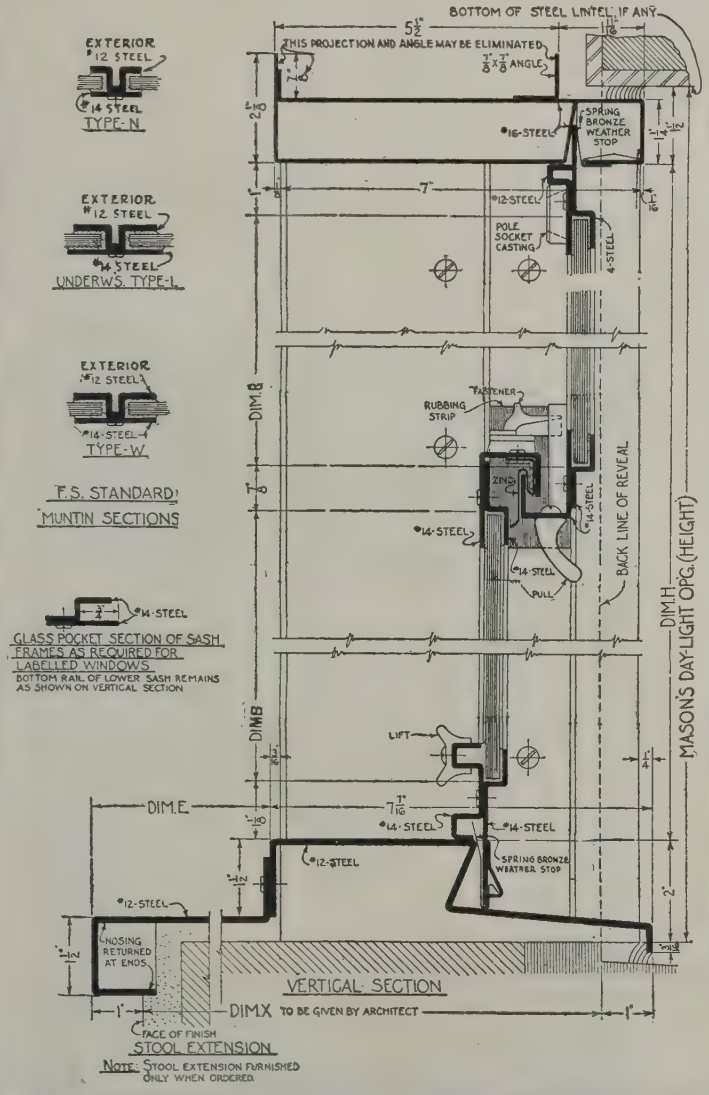
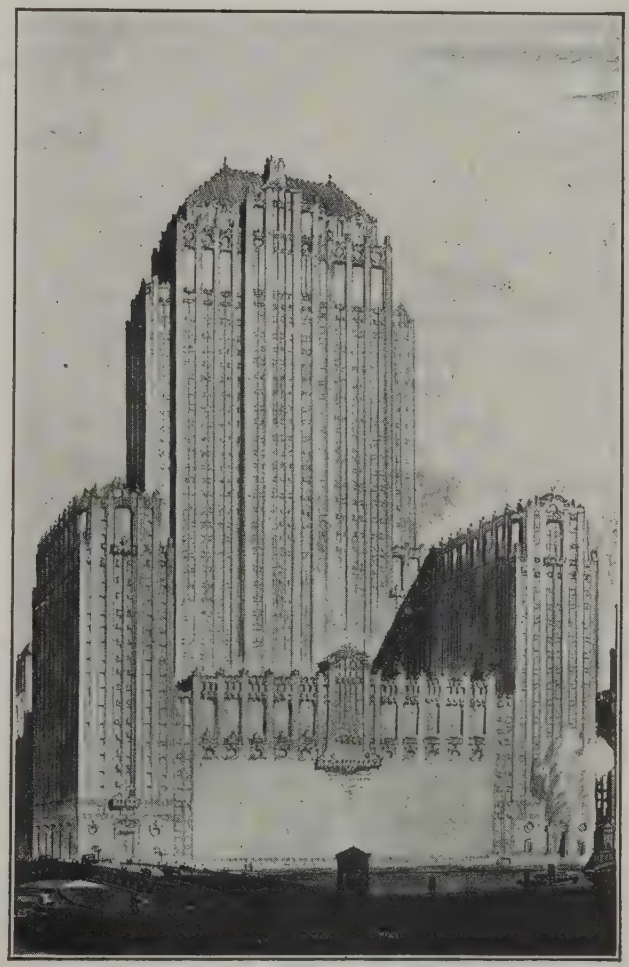


PLAN THRU BOX

PLAN THRU 6½" AND 8" MULLION





Twenty North Wacker Drive, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects
JOHN GRIFFITHS & SON, INC., Builders
4450 Campbell Metal Windows

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD DETAILS OF CAMPBELL SOLID METAL WINDOW DOUBLE HUNG MODEL Nº 25 W	SCALE 3 IN. EQUALS 1'-0 DATE AUG. '28	DRWG. 1

CRESCENT STEEL COMPANY

Manufacturers of Steel Windows
120 East Loughborough Avenue
ST. LOUIS, MO.
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

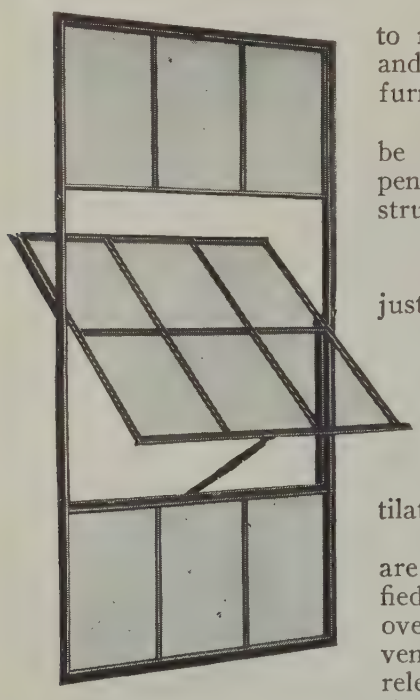
HORIZONTALLY PIVOTED WINDOWS.
COMMERCIAL PROJECTED WINDOWS.
ARCHITECTURAL PROJECTED WINDOWS.
CASEMENT WINDOWS.
BASEMENT WINDOWS.
CONTINUOUS STEEL WINDOWS.
STEEL DOORS.
MECHANICAL OPERATORS.
Complete catalogue mailed free on request.

Crescent Pivoted Windows

Constructed of moulded 1⅜-in. deep sections, with interwoven muntin bars and all cross joints welded, making a rigid, strong and neat appearing window.

T-Bar Mullion—

Two or more units of Crescent Pivoted Windows may be combined in the same opening by joining them with a T-Bar mullion.



All units are punched to receive these mullions and bolts and nuts are furnished.

Stem of mullion may be turned out or in, depending upon the construction of the building.

Hardware—

Push bar sash adjuster is supplied as standard. When closed, this bar acts as a lock, holding the ventilator tight, and when open the bar is notched to hold ventilator at various positions.

Cam latch and chain are supplied when specified. The chain extends over a pulley at the top of ventilator. A slight pull releases cam lock and at the same time pulls ventilator open. A clip is furnished for holding the sash open.

Ventilators are pivoted 2 in. above center by means of heavy $\frac{3}{16}$-in. steel butts, with special pivot bolt for ventilator movement.

Each half of butt is solidly riveted to sash and ventilator member, these rivets passing through weathering sections. When closed, the weathering section of ventilator overlaps weathering section of the frame, insuring continuous double contact. Special head bar adds rigidity to the ventilator.

Glazing Clips—

Crescent Windows are glazed on the inside. First the frame is bed-puttied, then the glass is set in place and the glazing clips are placed, one at top and bottom of each side. These hold the glass securely while the putty is applied and provide a constant anchor for the glass. The clips are covered by the putty.

Crescent Projected Windows

Both the Commercial and Architectural types have ventilators that slide in channel and project out or in and are used where something better than the horizontally pivoted type windows are desired.

This type of window has become very popular for offices of factory buildings, and is also used in offices, schools and various other buildings.

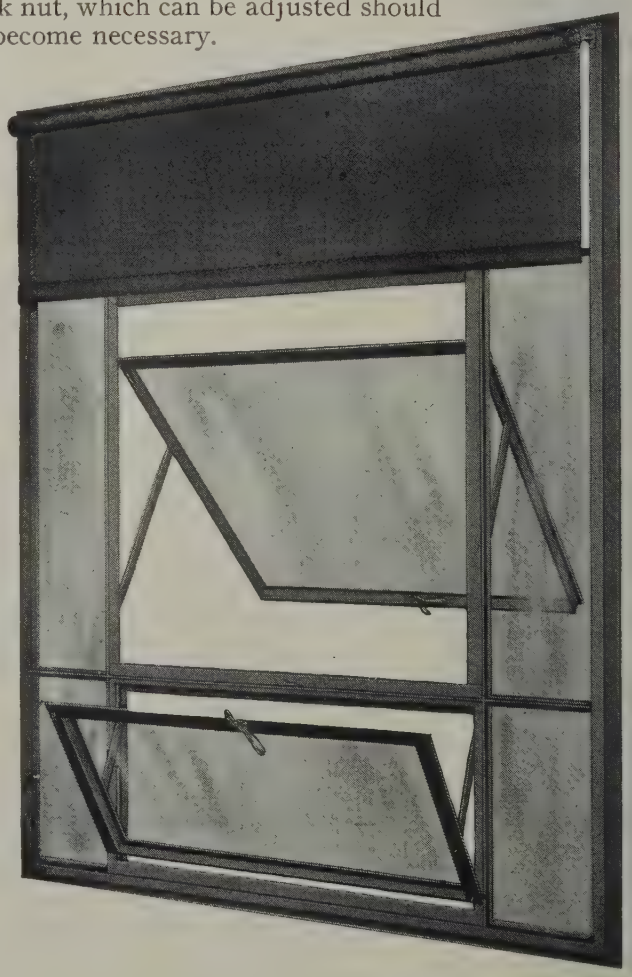
The ventilator is pivoted at top and swings out from the bottom, with no part of the ventilator extending into the interior of the building. The ventilator may be reversed making it easy for washing.

The ventilator may be opened a few inches at the bottom, without any movement from the top, and this is especially desirable for ventilation on rainy days.

The sections used in Commercial Projected Windows are the same as used in the construction of pivoted windows, and erection details are the same as for horizontally pivoted sash.

The ventilator is fastened at the top to sliding brass shoes. When the ventilator is pushed out from the bottom, these shoes slide down in the channel, the upper portion of the ventilator remaining in the same plane as the sash, while the lower portion of ventilator swings out and then upward after it has reached a horizontal position.

Adjustment in operation of the sash can easily be made, as the ventilator is attached to shoe by bolt and lock nut, which can be adjusted should it become necessary.



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Side arms support the ventilators when open, and when the ventilator is closed these are out of sight, as they are covered by the channel and ventilator section.

Screens and shades may be easily attached, as the ventilator does not project on the inside.

Architectural Projected Windows have a special heavy channel frame section, with all corners of frame and ventilators welded. Glass is held in place by means of glazing angles. Bronze hardware is furnished as standard on this type window. Complete specifications shown in our catalogue.

Underwriters' Labeled Steel Windows

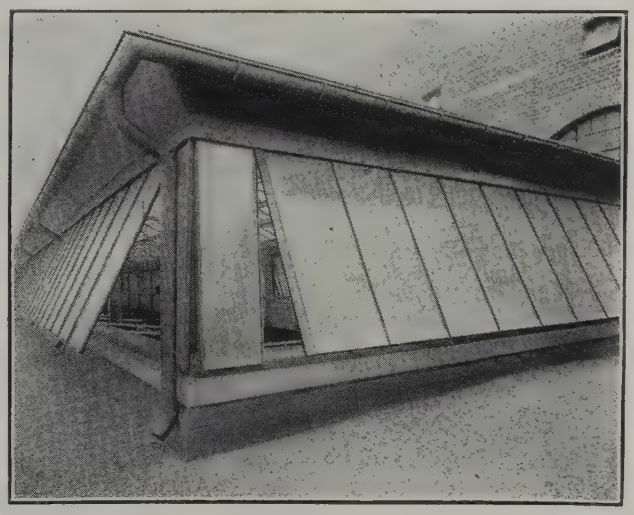
Can be furnished in horizontally pivoted, projected swing out and basement types. These types can only be furnished in sizes and within limits as designated by Underwriters' Laboratories, Inc.

Continuous glazing angles, eliminating bolts and nuts in horizontal members of Crescent Labeled Windows reduces the time and cost of glazing our windows. Corners of glazing angles are mitered giving a neat appearance. Complete data on sizes, limits, and where labeled windows should be used, shown in our complete catalogue.

Crescent Continuous Steel Windows

Furnished in top hung, center pivoted and fixed types. This type of window is commonly used in monitors and moveable types must be operated with mechanical operators. They serve a definite purpose in ventilating foundries, etc.

These windows are usually made in 3, 4, 5 and 6-ft. heights and any length made up to 20-ft. panels, joined together with expandable mullions. Storm panels, when required, are furnished at end of runs. See catalogue for details.



Steel Doors

Fabricated of tubular stiles and rails, with corners solidly welded and reinforced at all necessary points. Can be furnished in swinging, sliding or folding types in standard sizes.

Lower portion of door is a plate while upper section is a steel window with glazing angles for holding glass in place. Suitable hardware is furnished with each door.

Mechanical Operators

For operation of various types of windows in torsion, tension and rack and pinion types.

Torsion and rack and pinion types are used on horizontally pivoted windows. Tension type is used on continuous windows. Complete catalogue on operators

Crescent Casement Windows

Crescent Casements have been designed to fill the demand for a low priced yet satisfactory steel window for the home. The design and bars used have been proven to be the best for the purpose where weathertightness, architectural beauty and general utility are considered. The many thousands of homes now being equipped with steel casement windows, the general satisfaction obtained by the users, and their favorable cost, have built up a market of large proportions. Corners of frame and ventilators are riveted and then welded, making practically one-piece units. Welds are ground smooth.

Ventilators are hinged on either the right side or left side. A right-hand casement is such that when the window is viewed from the outside, has its hinges on the right-hand side. A left-hand casement, when viewed from the outside, has its hinges on the left-hand side. Please be sure to specify on which side the casements are to be hinged.

Hinges, such that windows can be easily cleaned from the inside, are standard equipment on Crescent Windows. Solid brass pins are used to eliminate any danger of corrosion and binding.

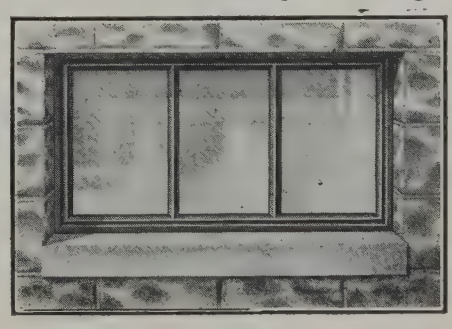
Malleable cam locks are furnished as standard. Bronze cam locks are furnished at a slight extra cost. All ventilated units are equipped with our No. 61 automatic casement stay. Standard punching will accommodate thumb screw adjuster, as well as underscreen hardware.

Spring wire glazing clips, for holding the glass in place, are furnished at no extra cost as well as anchor clips for anchoring the windows in the masonry.

Vertical and horizontal mullions are $1\frac{1}{2}$x$1\frac{1}{2}$x$\frac{1}{4}$ in. T-Bars securely fastened to units by bolts passing through frame sections and mullions.

Crescent Basement Windows

Made in four standard glass sizes, with extra heavy channel frame and ventilator bars. No formed-up weathering is used on our basement windows. Ventilators are double weathered. Screw holes are provided for attaching screens. Removable brass hinge pins eliminate corrosion and binding at wearing points. Clip lock and glazing clips furnished with each unit.



DE PETT CASEMENT CORP.

FORMERLY THE STEEL CASEMENT CO., INC.

Manufacturers of Steel and Bronze Windows and Doors

245 Fifth Avenue, NEW YORK, N. Y.

SALES REPRESENTATIVES IN PRINCIPAL CITIES

Products

STANDARD STEEL CASEMENTS, MEDIUM and HEAVY SECTION CASEMENTS and DOORS, DOUBLE GLAZED CASEMENTS, PROJECTED STEEL WINDOWS.

Also Factory Steel Sash.

Experience

Since the foundation of the factory, *over 50 years ago,* the constant aim has been to utilize that long experience to produce a window that cannot be surpassed.

Literature

Literature and full size details of all products sent upon request.

De Pett Standard Casements—100 Series

Furnished with muntins or for leaded glass.

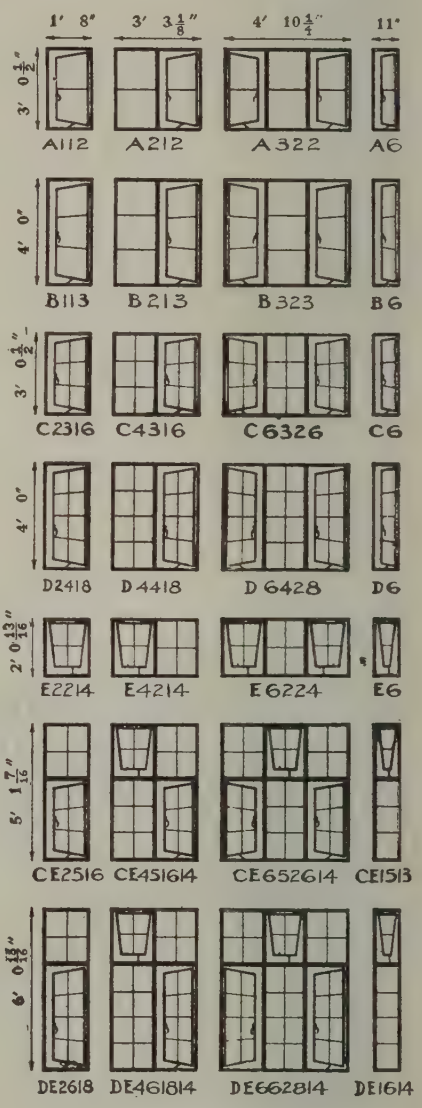
De Pett Casements are arranged for coupling together by means of our heavy mullion and transom bars specially designed to afford double weathering and rigidity, neither of which is secured when T-bars are used for this purpose. This feature enables the use of these windows in large openings, even when exceptional wind pressure must be provided against.

Sections—Solid steel, rolled from new billets of rust resisting quality, hydraulically straightened and especially designed to meet the requirements of rigid construction.

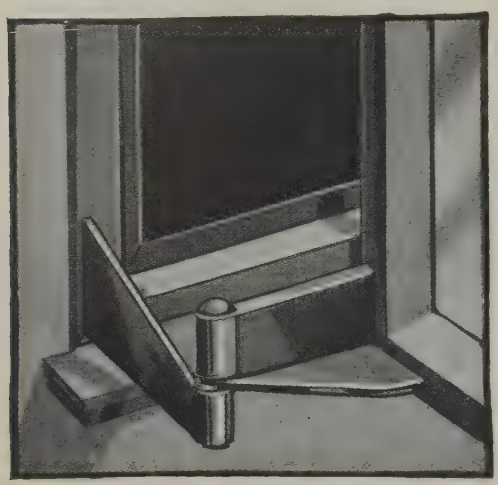
Construction — Two-point weathering contact. Cross joints of glazing bars are locked to avoid cutting away the strength of the bar at the joint and to give a distinctive appearance to the window. All corners are tenoned by specially designed tools, machine riveted, and then welded solid. All contacts polished smooth. De Pett precision in fabrication results in perfect contact at every point, insuring weatherproof casements.

Hardware—3-point solid bronze handle. Bronze sliding adjusting stay. Extension hinges, permitting cleaning the window from the inside.

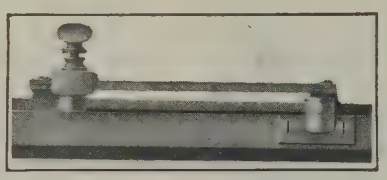
Carried in Stock—De Pett Standard Casements are carried in stock for immediate delivery.



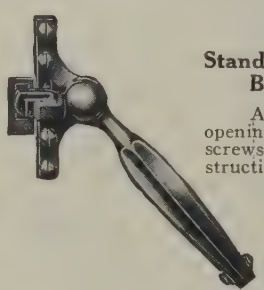
Type and Sizes of Casements—100 Series



Standard Extension Hinge



Standard Bronze Sliding Stay



Standard 3-Point Solid Bronze Handle

Attached directly to the opening leaf with four screws, the most rigid construction possible

Typical Cross Section of De Pett Casement—100 Series Showing Section Through Mullion

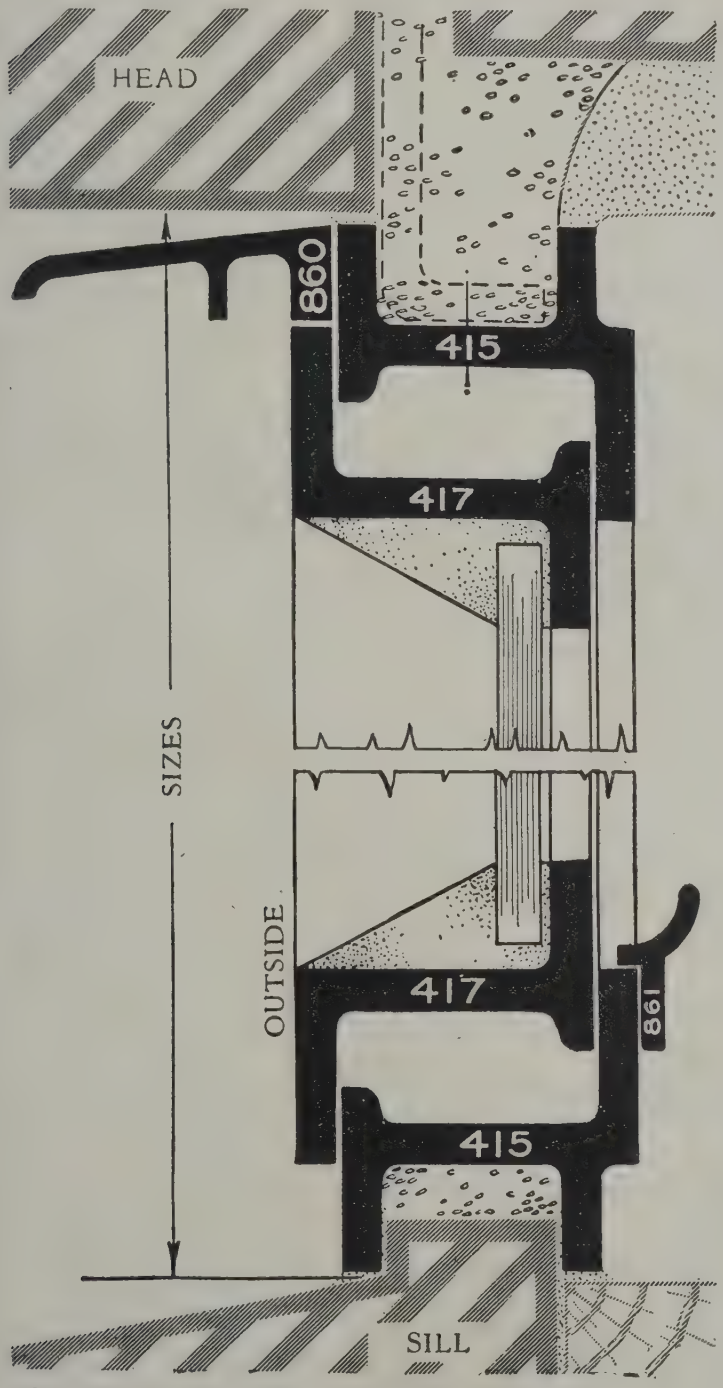
Continued on next page

De Pett Casements—400 Series

This series embraces side hung or pivoted casement windows for better class residences, banks, clubs, public buildings, churches, etc., projected windows for hospitals and schools, double glazed windows (either side hung or pivoted) and casement doors.

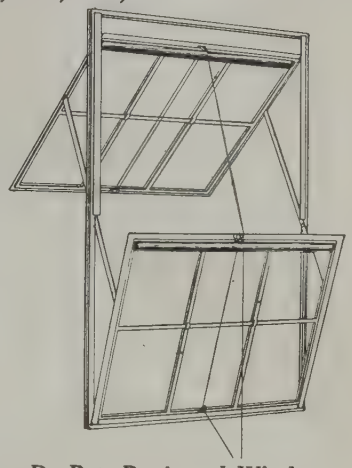
De Pett Casement Windows in the 400 Series afford an architectural effect not possible with lighter weight sections. The appearance of both fast and opening positions is identical throughout. Whether opening or fixed, the sight lines of all windows are exactly similar and the glass is in the same plane. Hinges are of solid bronze, of unusually substantial design.

De Pett Pivoted Casements are hung on our special solid brass, machine turned pivots of large diameter. They are formed with two ribs on the outside of each part designed to prevent any thrust on the screws that hold them in position, and at the same time these ribs both afford weather protection to the joints and avoid interruption of the architectural lines of the window. The bars to which the pivots are fixed are machined from solid, continuous sections, instead of being formed by reversing and welding two bars together. The weathering is solid with the frames and not obtained by the use of welded or screwed beads or strips.



Cross Section Side and Top Hung De Pett Casement—400 Series

De Pett Projected Window (Manufactured under U. S. Patent No. 1,643,042)



De Pett Projected Window

The ideal window for hospitals and schools. All sections are specially designed for this type of window. Ventilation is regulated by friction arms through sections sufficiently wide to guarantee rigid construction of all working parts without impairing the weathering. Fittings are entirely interchangeable and have bronze working parts throughout. Lower sashes are fitted with one pair of handles for opening and lever pattern handle and bridge for closing.

De Pett Double Glazed Casements (Patent Applied For)

For church work or any purpose where double glazing is required for protection or architectural effect as, for instance, where wire glass is required by fire laws yet it is desired to conceal same. Full details gladly furnished on request.

De Pett Casement Doors

All De Pett Casement Doors are made in 400 Series sections as we are unable to recommend a lighter weight section for doors. Standard doors are 6 ft. 10 in. high, 3 ft. 4¼ in. wide and are fitted with lock or cremone bolts. Bronze threshold furnished when specified. Carried in stock in New York.

Windows and Doors of Special Design

We specialize in steel and bronze windows and doors of unusual design, being equipped and prepared to execute quickly special orders of any design whatsoever.

Just a Few Recent Installations by De Pett

Jackson Trust Co., Jersey City, N. J.
Clifton National Bank, Clifton, N. J.
Port Washington National Bank, Port Washington, N. Y.
Masonic Temple, Plainfield, N. J.
State Police Barracks, Mt. Pleasant, N. Y.
Science and Technology Building, Pratt Institute, Brooklyn, N. Y.
Georgetown Preparatory School, Washington, D. C.
Chatsworth Apartment, Larchmont, N. Y.
60 Gramercy Park Apartment, New York, N. Y.
Doric Apartment, Larchmont, N. Y.
St. Michael's Church, Paterson, N. J.
St. Stephen's Church, Brooklyn, N. Y.

BLISS STEEL PRODUCTS CORPORATION

Manufacturers of Solid Steel Windows

EAST SYRACUSE, N. Y.

Bliss Steel Windows (Patented and Patents Pending)

Bliss steel windows are made of solid sections rolled from low carbon steel.

Joints are interlocking and designed for maximum strength. Corners of outside sections are acetylene-welded to develop full strength of the section.

Specifications for Bliss Pivoted Windows—

Sash shall be made of solid rolled low carbon steel sections; joints shall be interlocking; hinges shall have ¼-in. bearing surface on a $\frac{5}{16}$-in. diameter pin.

Ventilator shall have double contact weathering all around; no materials shall be less than ⅛ in. in thickness; ventilators within reach of floor shall be operated with cam and stay bar, all other ventilators shall be operated with spring catch and chain. Corners of frame and ventilators shall be welded.

Glass shall be held in place with four glazing springs for each light.

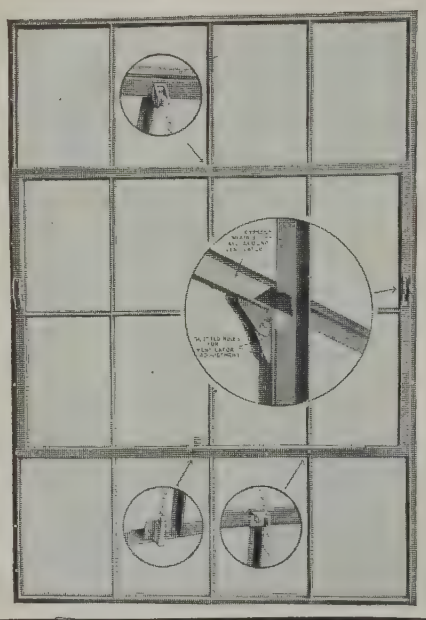
Specifications for Bliss Protected Type Windows—

Sash shall be made of solid rolled low carbon steel sections; joints shall be interlocking. Ventilators shall have double contact weathering and shall be operated with cam latch; pole rings shall be used only where bottom of ventilator is more than 6 ft. from floor. Friction shoes and pins shall be of bronze. Corners of frame and ventilators shall be welded; no material shall be less than ⅛ in. thick. Glass shall be held in place with four glazing springs for each light.

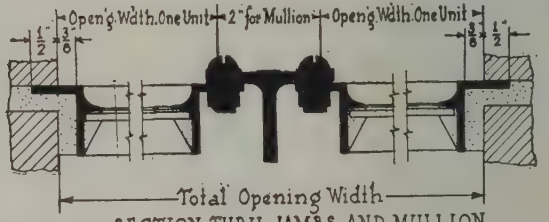
Specifications for Bliss Basement Windows—

Basement Windows shall fit opening 32 in. wide and of proper height to fit building materials as called for on plans. Ventilator shall be top hinged to swing in and shall be removable from frame without tools; no material shall be less than ⅛-in. thick. Glass shall be held in place with four glazing springs for each light.

Where weathertightness is important, specify Bliss steel windows—they will reduce fuel bills.

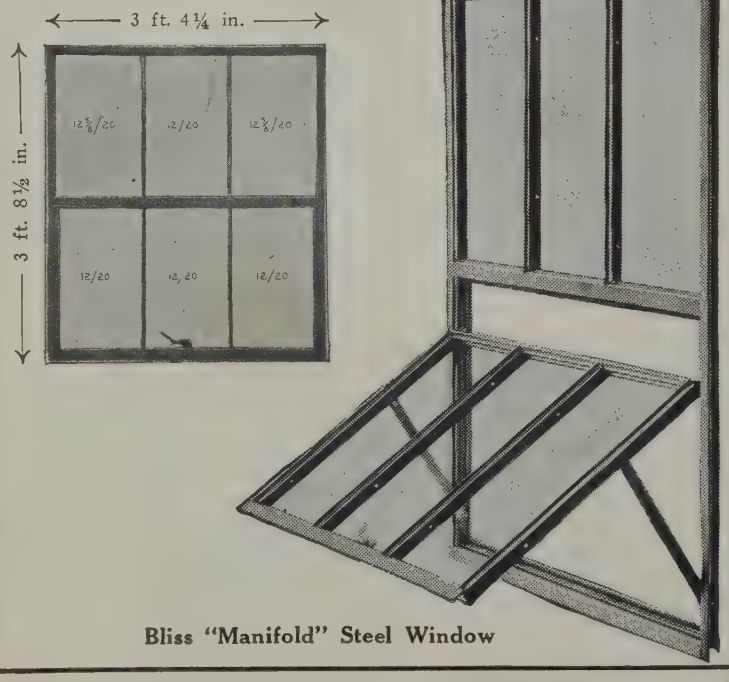


SMALL PART OF
30,000 FT. INSTALLATION
Bliss Pivoted Window

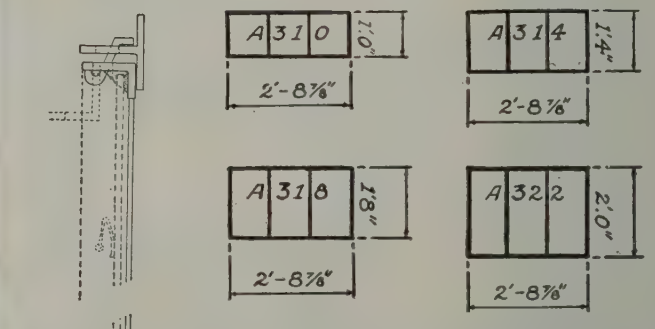


SECTION THRU JAMBS AND MULLION

2 Light Width	3 Light Width	4 Light Width	5 Light Width	6 Light Width
12"x18" Lts. 2'-1 5/8"	12x18 Lts. 3-2	12x18 Lts 4-2⅜	12x18 Lts 5-2¾	12x18 Lts. 6-3⅛
14"x20" Lts. 2'-5⅝"	14x20 Lts 3-8	14x20 Lts 4-10⅜	14x20 Lts 6-0¾	14x20 Lts 7-3⅛
2 Light Height 12x18 Lts 3-1⅝ 14x20 Lts 3-5⅜	22-1-4-0	32-1-6-0	42-1-8-0	52-1-6-0	62-1-8-0
3 Light Height 12x18 Lts 4-8 14x20 Lts 5-2		33-1-6-1	43-1-8-1	53-1-6-1	63-1-8-1
4 Light Height 12x18 Lts 6-2⅜ 14x20 Lts 6-10⅜		34-1-6-1	44-1-8-1	54-1-6-1	64-1-8-1
5 Light Height 12x18 Lts 7-8¾ 14x20 Lts 8-6¾		35-1-6-1	45-1-8-1	55-1-6-1	65-1-8-1



Bliss "Manifold" Steel Window



No. of lts.	Size of lts., in.	Over-all dimensions, in. Width	Over-all dimensions, in. Height	Wall opening required, in. Width	Wall opening required, in. Height	Wt., lb.
3	10x10	32⅞	12	.....	.....	15
3	10x14	32⅞	16	.....	.....	16
3	10x18	32⅞	20	.....	.....	18
3	10x22	32⅞	24	.....	.....	19

Bliss "Mostlite" Basement Window

Details of Bliss Solid Steel Windows

Fenestra

The Blue Book
of
Steel Windows

Local Representative

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan
1929

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DETROIT STEEL PRODUCTS COMPANY

Manufacturers of Fenestra Steel Windows

2250 East Grand Boulevard, DETROIT, MICH.

(1) Experience and Facilities

Fenestra, the Latin word for "window," is also the registered trademark of the first steel window made in America. Since 1907, the DETROIT STEEL PRODUCTS COMPANY has manufactured these windows under exclusive patents covering the Fenestra joint, a process of interlocking steel bars in such a manner that strength increases at the point of intersection. The company has always enjoyed an exceptional reputation for financial soundness and is recognized as one of Michigan's strongest industrial concerns. Its product has been used on many of the largest structures in the United States. Besides the main plant covering 14½ acres in Detroit, branch plants are maintained at Oakland, California, and Toronto, Canada. The product is sold through 14 branch offices, direct agents in principal cities, dealers in towns of every size, and a world-wide export organization. Canadian sales are handled through the Canadian Metal Window and Steel Products Company, Ltd., of Toronto.

(2) Scope of This Catalogue

While the DETROIT STEEL PRODUCTS COMPANY is fully equipped to manufacture solid steel windows, doors, partitions and operators of every type and character, it is manifestly impossible to show in any catalogue the hundreds of special designs which this company can supply. This catalogue, therefore, covers only such designs as have been accepted throughout the steel window industry and approved by the Department of the Interior as the stock and standard products normally used in building.

On individual operations where windows of special design are absolutely required, layouts and detail drawings are supplied without added cost. To secure the most practical and economical window designs, we strongly recommend consultation with our branch offices and agents *at the time the building is designed.*

(3) Designing Service

To assist in the proper designing of steel windows for architectural structures, we maintain an Architectural Service Department composed of architects with special training in the correct use of Fenestra in all types of monumental buildings. A word to your local Fenestra representative will place this department at your disposal without charge or obligation, with either direct personal service in your own drafting room or through intelligent co-operation from headquarters in Detroit.

(4) Casement Installation Service

Since the Fenestra Casement Window is for the most part installed by the carpenters and brick-masons on residential and apartment house projects, the DETROIT STEEL PRODUCTS COMPANY maintains a service organization for the purpose of advising and instructing the builder and where necessary or desirable, inspecting and servicing the installation at the time the windows are installed. This is a free service. It involves no charge and entails no obligation.

(5) Erection Service

The FENESTRA CONSTRUCTION COMPANY, a subsidiary of the DETROIT STEEL PRODUCTS COMPANY, offers builders the service of an organization especially equipped and trained for the erection and field painting of Fenestra windows.

Under separate contract, this company will assume complete responsibility for the delivery, handling, erection and painting of Fenestra products and will guarantee satisfaction from the time the material leaves the factory until it is installed in the building. Twelve erection supervisors and twenty-seven experienced field superintendents are constantly employed in this work all over the United States.

GENERAL INFORMATION—READ CAREFULLY

(6) Nomenclature

Numbers designating various types of Fenestra Windows are translated as follows: first digit—number of lights in width; second digit—number of lights in height; third digit—number of ventilators or swing leaves; fourth digit—number of lights in each ventilator or leaf; fifth digit—number of lights between ventilator or swing leaf and the sill of the window. Thus a casement type 4528 indicates a unit 4 lights wide, five lights high with two 8-light swing leaves at the sill. A Horizontally Pivoted type 35161 indicates a unit 3 lights wide, 5 lights high with one 6-light ventilator 1 light above the sill.

(7) Dimensions

In all Fenestra except casements and basements, the window dimension is always equal to the clear opening. In other words, that part of the window frame which is embedded in the wall is not considered in the window dimensions. On casement windows the window opening dimension is ¼ in. larger than the window dimensions, for clearance. On basement windows dimensions are overall. See details.

(8) Stock Types

Stock types of Fenestra Windows—those types which are made up and carried in warehouses—are indicated in this book by solid outline drawings, *shaded.* Standard types—those types which are not made up but for which bars are already cut and in stock at Detroit—are shown in solid outline, *not shaded.* Listed Special Windows are shown in *broken* outline. Stock types are always preferable from the standpoint of economy and quick shipment. Standard types are next best.

(9) Installation

All window openings should be so designed that steel windows may be installed after the walls are up. This is the most economical, as well as the most practical method of erection and obviates many difficulties frequently

Continued on next page

encountered when an attempt is made to set the windows as the building progresses. Rebates, clearances and angles as shown have been accepted as the best building practice and such details should be followed closely.

Steel windows are not structural members and under no circumstances should any portion of the building structure be allowed to rest on the windows.

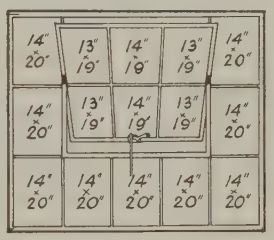
(10) Glazing

Standard glass dimensions for horizontally pivoted units are: 12x18 in. and 14x20 in.; but glass in ventilators which abut on the top, sides or bottom of the ventilator must be trimmed 1 in. along the abutting edge. See accompanying diagram. It is desirable to cut glass full to the specified dimension.

Bed Puttying

Inserting Glazing Clips

Casement and Architectural Projected glass sizes are indicated on the plates showing types and sizes of standard units.



Ordinarily, the DETROIT STEEL PRODUCTS COMPANY does not do glazing but any Fenestra representative can refer you to reputable concerns who make a specialty of glazing steel windows.

A sufficient quantity of spring glazing clips accompanies every order of Fenestra windows, without added cost.

After the windows have been bed puttied and glass inserted, the clips are used together with face putty to hold glass in place. On casement windows use two clips for each light. On horizontally pivoted windows use four clips for each fixed light, and six clips for each ventilator light.

Plate glass is desirable for casements though double strength clear glass may be used. The standard method of glazing architectural projected windows is with ¼ in. glass or double strength glass, held by glazing angles or glazing bead. On horizontally pivoted windows ¼ in. factory ribbed or wire glass or ⅛ in. ribbed, or double strength glass may be used.

(11) Putty

Wood sash putty never should be used with steel windows. Steel casement putty or any other high grade of steel window putty should be used, and is obtainable locally. Putty may be ordered from Fenestra dealers or from company warehouses in 25, 50 and 100 pound drums. Use ½ pound per square foot of glass area.

(12) Basement Windows

Fenestra Basement windows are sold exclusively through dealers. Thousands of dealers in all parts of the country carry them in stock for immediate delivery. Any responsible dealer can secure them by writing to the home office at Detroit.

(13) Lists and Schedules

We recommend that all steel windows, doors, partitions or operators be accurately listed and located either in schedules on plans or in specifications. If more than one type of the same product be desired, each type should be listed and located separately.

In the case of mechanical operators, it should be clearly indicated whether the ventilators are to be operated from one or more stations and whether in single or in multiple runs. These details assure greater accuracy in estimates.

(14) Fillets to Increase Strength

Most of the bars used in the manufacture of Fenestra steel windows, doors and partitions, are of solid, open hearth steel, hot rolled to special Fenestra designs. All such bars are rolled with heavy fillets in all re-entrant angles. These fillets increase the strength and rigidity of the bars, making them much stronger than similar sections of pressed metal

(15) Protection of Hardware

We strongly recommend that hardware be stored carefully in the original packages and that it be attached *only* after the windows, doors or partitions have been erected, glazed and painted.

(16) Galvanizing

Where specified at the time the order is taken, Fenestra Architectural and Industrial Windows can be supplied, hot galvanized. (Certain parts, such as glazing angles and side arms, electro-galvanized.) Mechanical operators may also be secured, galvanized, under the same conditions with the exception of powers which are painted with aluminum paint.

DEPARTMENT OF ENGINEERING RESEARCH

Due to the importance of adequate light and ventilation in the modern industrial building, increased attention is being given to the fenestration or window layout.

The daylighting characteristics of a building under various conditions can be predetermined by methods of proved accuracy and the amount and distribution of the natural illumination can be adjusted to a remarkable degree. Dirt accumulation, reflecting surfaces on sides and roofs of adjoining buildings, size and location of monitors as well as the shape, all have their influence and are subject to rules that can be applied in making a comparative analysis.

Likewise, the airation (natural ventilation) of a building or group of buildings can be predetermined and controlled; the orien-

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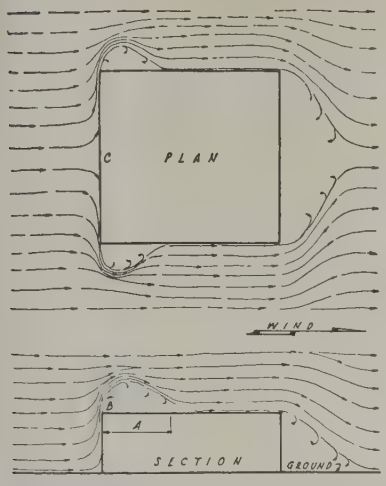


Diagram Showing How Wind-jump Is Formed and Its Location

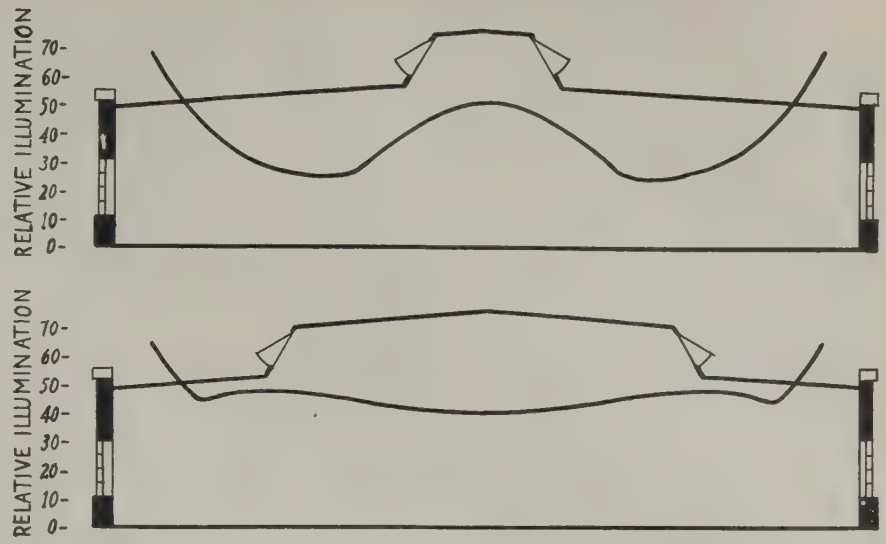
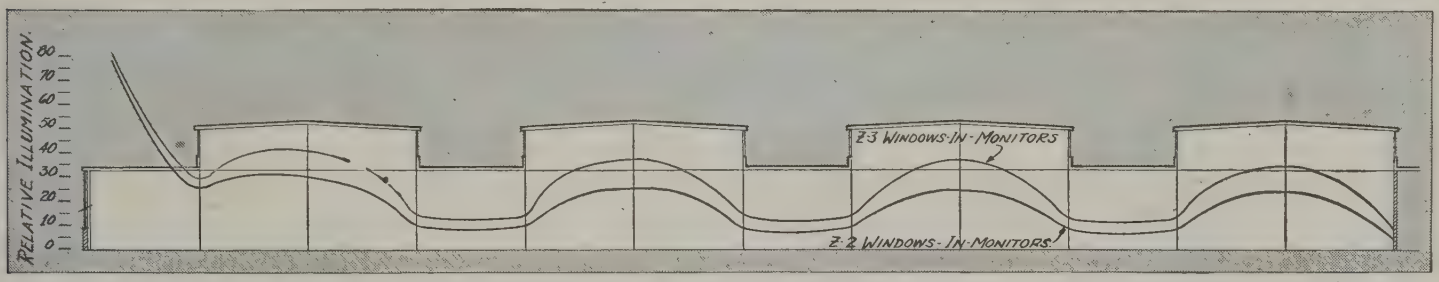


Diagram Showing Relocation of Windows by Means of a Wider Monitor and Its Effect on Distribution of Natural Light

tation of the building in relation to prevailing winds, the size and location of the openings, the motive head formed by the temperature difference, and the suction or vacuum created by the wind jump are important factors to be considered if effective airation is to be obtained.

Frequently it is possible to make suggestions in the design of the fenestration to provide better distribution of the daylighting or more effective airation without changing the window areas. Sometimes the results desired can be obtained with even more economical construction than is called for on the original design.

Any architect or engineer engaged in a major operation can obtain through the nearest office of the Detroit Steel Products Company, a thorough analysis of the daylighting and airation possibilities of any proposed building design without cost or obligation.



Curves Show How Addition of One Pane to Height of Monitor Windows Affects Relative Intensity and Distribution

(A) STEEL CASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(A-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(A-2) General

Steel Casement Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

(A-3) Material

(A-3a) Casement Sections—All sections shall be specially designed, hot rolled, solid steel casement bars with heavy fillets in all re-entrant angles.

All frame members and the stiles and rails of each swing leaf shall be rolled with a ⅛" baffle.

Muntins shall be T bars.

(A-3b) Mullions—All mullions shall be hot rolled, solid steel T bars.

Note: Use when two or more Casements are placed side by side or one above another in the same opening.

Note: Pressed metal or built up sections should not be used for either vertical or horizontal mullions.

(A-4) Construction

(A-4a) Frames and Swing Leaves—Frames and the stiles and rails of swing leaves shall be baffled Z bars mitered at all corners and electrically butt welded. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two-point, flat contact weathering between swing leaves and frame.

(A-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at intersections. Joints at frames, stiles and rails shall be mortise and tenon, air hammer riveted.

Note: Intersections of casement window muntins are made substantially as described on Fenestra Page 40.

Note: Muntins may be omitted to permit glazing in single lights or leaded glass. If desired so specify. We do not supply leaded glass.

(A-4c) Vertical Mullions—Vertical mullions shall be 1⅝" deep. Provide bolts for frame attachment.

(Continued on Fenestra Page 4)

(A-4d) Horizontal Mullions—Horizontal mullions shall not be less than 2¼" deep with tip of protruding web bent downward to form a drip. They shall be continuous from jamb to jamb. Provide bolts for frame attachment.

(A-4e) Copper Head-Drip—Wherever swing leaves extend to head of frame, provide a continuous 20-gauge, cold rolled, copper drip.

Note: Copper drip is shipped unattached. See details Fenestra Page 5.

(A-4f) Jamb and Head Fins—

Note: We recommend that for all masonry construction jamb and head fins be specified to provide added anchorage and form wind stop. Where used, Casements must be built into the masonry work (not installed in prepared openings). See note (A-8). (See detail Fenestra Page 5.) Their added cost is warranted. If desired so specify. If not included specify that jamb and head anchor clips shall be furnished.

(A-4g) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(A-5) Attached Hardware

Note: Attached at factory.

(A-5a) Side Hinges—All side hung swing leaves shall be hung on two (2) heavy, extension (cleaning) hinges of special, solid rolled, steel with heavy re-entrant angle fillets. Hinge pins (non-removable) shall be of solid bronze accurately fitted into flanged, bronze bushings.

Note: Bronze pins and bushings provide 100% bronze bearing at all moving points.

(A-5b) Top Hinges—Top hung swing leaves in transoms shall be hung on heavy steel hinges with bronze pins.

(A-5c) Locking Handle Brackets—Ornamental locking handle brackets shall be cut from special, solid rolled, steel sections and both riveted and welded to the swing leaf stiles.

(A-5d) Operator Provisions—Bottom rails of all side hung swing leaves shall be provided with tapped holes, standardized as to size and location to take any of the six types of casement operators.

Note: See (A-6c).

(A-5e) Strikes (for Side Hung Swing Leaves)—Provide bronze strike plates attached to frames.

(A-6) Detached Hardware

Note: See Fenestra Page 7.

(A-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(A-6b) Locking Handles (for Side Hung Swing Leaves)—Ornamental locking handles, so designed as to produce a cam action, shall be:

(1) Handle 198 (malleable iron with dull black, rust-resisting finish) (dark oxidized bronze).

(2) Handle 699 (dark oxidized bronze).

Note: Select as to design and material. No. 699 at slight added cost over No. 198. Bronze at added cost over iron.

Handles shall be attached to handle brackets with bronze hexagonal headed bolts tap-screwed into steel, spring, friction clevices.

Note: Clevice assures constant and even tension which prevents handle from becoming loose.

All handles at latch shall be provided with notched heads to permit restricted ventilation.

(A-6c) Operators (for Side Hung Swing Leaves)—

Note: Select as required.

Note: All casements are furnished with the "Standard" operator. Where desired, any of the types listed "Optional" may be substituted at a reasonable added cost.

(1) *Standard:* Sliding Stay (malleable iron with dull black rust-resisting finish).

(2) *Standard:* Peg and Stay (bronze peg, malleable iron stay with dull black rust-resisting finish, stay plate and stay bracket).

Note: In oxidized bronze for both 1 and 2 Standards at slightly added cost.

(3) *Optional:* Thumb Screw Stay (dull black rust-resisting finish, oxidized bronze friction plate, guide and thumb screw).

(4) *Optional:* Gear Type Underscreen (malleable iron with black rust-resisting finish or oxidized bronze).

(5) *Optional:* Surface Type Underscreen (malleable iron with dull black rust-resisting finish).

Note: In oxidized bronze at slightly added cost.

(6) *Optional:* Flush Type Underscreen (oxidized bronze).

(A-6d) Operator (for Top Hung Transom Sash)—

(1) *Standard:* Peg and Stay (malleable iron with dull black rust-resisting finish).

SYMMETRICAL COMBINED WIDTHS

Standard widths	Units wide	Panes wide	Panes wide per unit	Vert. mull.
1 ft. 7⅜ in.....	1	2	2	0
3 ft. 1½ in.....	1	4	4	0
3 ft. 2⅞ in.....	2	4	2, 2	1
4 ft. 7½ in.....	1	6	6	0
4 ft. 10⅜ in.....	3	6	2, 2, 2	2
6 ft. 3⅛ in.....	2	8	4, 4	1
6 ft. 4½ in.....	3	8	2, 4, 2	2
6 ft. 5⅞ in.....	4	8	2, 2, 2, 2	3
7 ft. 10½ in.....	3	10	2, 6, 2	2
7 ft. 10⅝ in.....	3	10	4, 2, 4	2
8 ft. 1⅜ in.....	5	10	2, 2, 2, 2, 2	4

Use these widths with any heights.

(A-7) Mastic

The Casement Manufacturer shall furnish a sufficient quantity (one pound to ten lineal feet) of mastic to form a weather-tight frame bed, at head, jambs and sill (and mullions).

(A-8) Erection

Note: In brick masonry construction wherever casements are built into the brickwork (not in prepared openings) without wood bucks, include in the masonry specification a clause that the mason shall use every precaution against springing or racking the casements out of shape.

Note: Where desired, the Fenestra Construction Co., *under a separate contract will erect Casements windows in prepared openings. (See Paragraph 5, Fenestra Page 1.) If required so specify.*

(A-8a) All casement windows shall be set plumb and true, properly aligned and securely anchored before glazing.

(A-8b) All mullions shall be rigidly bolted to frames.

(A-8c) Set all frames in mastic neatly applied in a narrow beading where they come in contact with the building construction (or steel mullions). Use one pound of mastic to 10 lineal feet.

(A-8d) Apply all hardware in accordance with the manufacturer's directions.

Note: Give second coat of paint and glaze before applying finish hardware.

(A-9) Painting

All casement windows shall be given one dip-coat of grey lead and oil paint by the manufacturer before shipment.

Note: The following should be provided for in the painting specifications:

Note: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(A-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(A-10a) Glass—Glass shall be (¼" thick plate) (double strength).

Note: Single strength glass is not recommended.

(A-10b) Putty—Putty shall be Fenestra Steel Casement Putty.

Note: This is a special, high-grade, steel window putty which assures quick setting. Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(A-10c) Glazing—All casement windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Casement Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See Paragraph (A-9).

(A-11) Provisions for Screens

Note: Fenestra Page 12 gives suggestions for screening provisions. Include in the Carpentry Specifications, the necessary clauses covering stops and wood trim. Space between screen and casement frame must not be less than 2⅛".

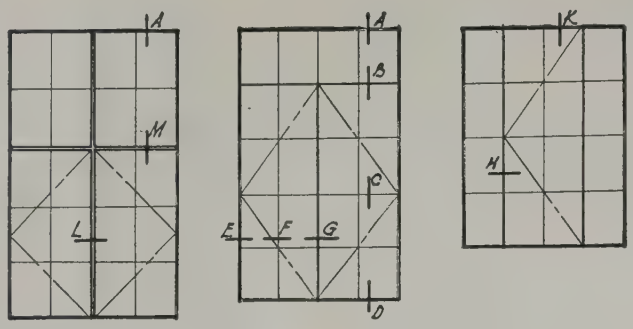
(A-12) Screens

Note: Metal or wood screens, sliding, hinged or rolling may be used as desired. Screens are not included by the Casement Manufacturer and should, therefore, be provided for under another division of the specification.

(A-13) Shade and Drapery Brackets

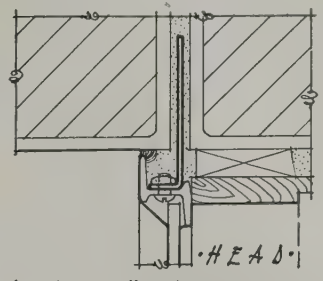
Note: Shade and drapery brackets are not attached to the steel casement frame and are, therefore, not provided by the Casement Manufacturer. Suggestive provisions are made in Fenestra Page 12.

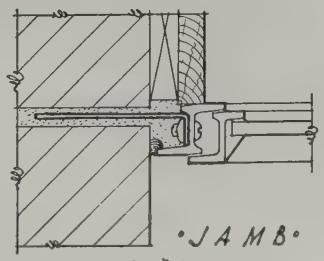
Continued on next page

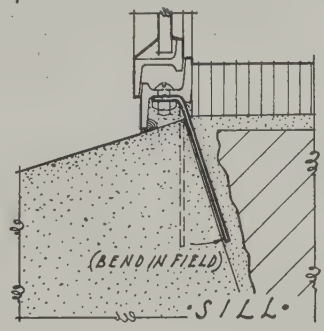


·TYPICAL·ELEVATIONS·

·ANCHOR·CLIPS·

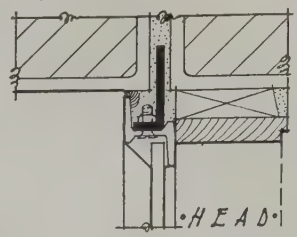


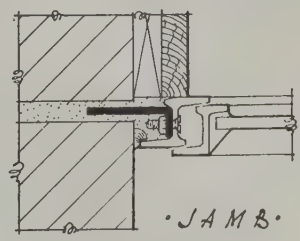




·HEAD, JAMB AND SILL ANCHOR CLIPS OF FLAT STEEL ARE FURNISHED WITOUT ADDED COST WHEN CONTINUOUS STEEL FIN IS NOT SPECIFIED

·CONTINUOUS·FIN·





CONTINUOUS FIN OF SOLID ROLLED STEEL, BOLTED TO HEAD AND JAMBS IN MASONRY OPENINGS. SUPPLIED AT SLIGHT ADDED COST.

·OVERALL·DIMENSION·

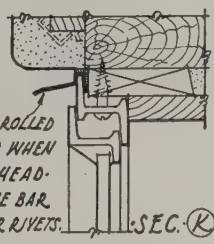
·SECTION-Ⓐ·

·SECTION-Ⓑ·

·SECTION-Ⓒ·

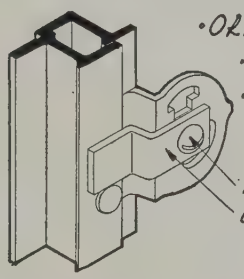
·SECTION-Ⓓ·

·COPPER·DRIP·

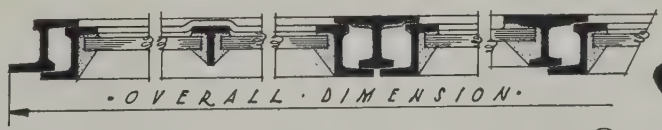


#20 GAUGE COLD ROLLED COPPER DRIP USED WHEN VENT COMES TO HEAD. SNAPS OVER FRAME BAR WITHOUT BOLTS OR RIVETS.

·ORNAMENTAL·HANDLE·BRACKET·

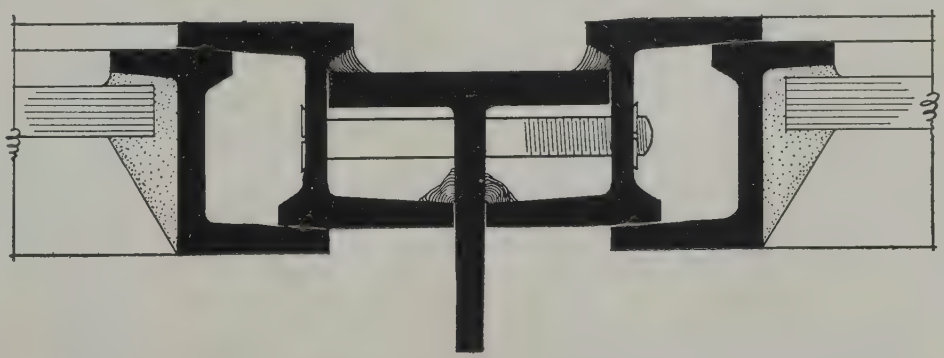


STEEL CLIP LOCKING VENTS SHUT DURING SHIPPING. SHOULD BE KEPT TIGHT UNTIL HARDWARE IS ATTACHED TO PREVENT DAMAGE TO VENT OR ENTRANCE TO BLDG.

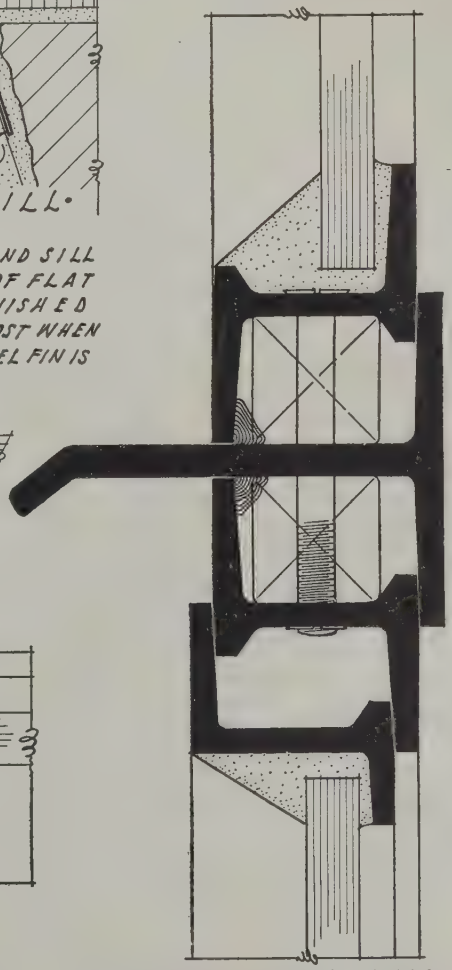


·SEC.-Ⓔ· ·SEC.-Ⓕ· ·SEC.-Ⓖ· ·SEC-Ⓗ·

·SCALE: 3"=1'-0"·



·FULL·SIZE·VERTICAL·MULLION·SECTION-Ⓛ·



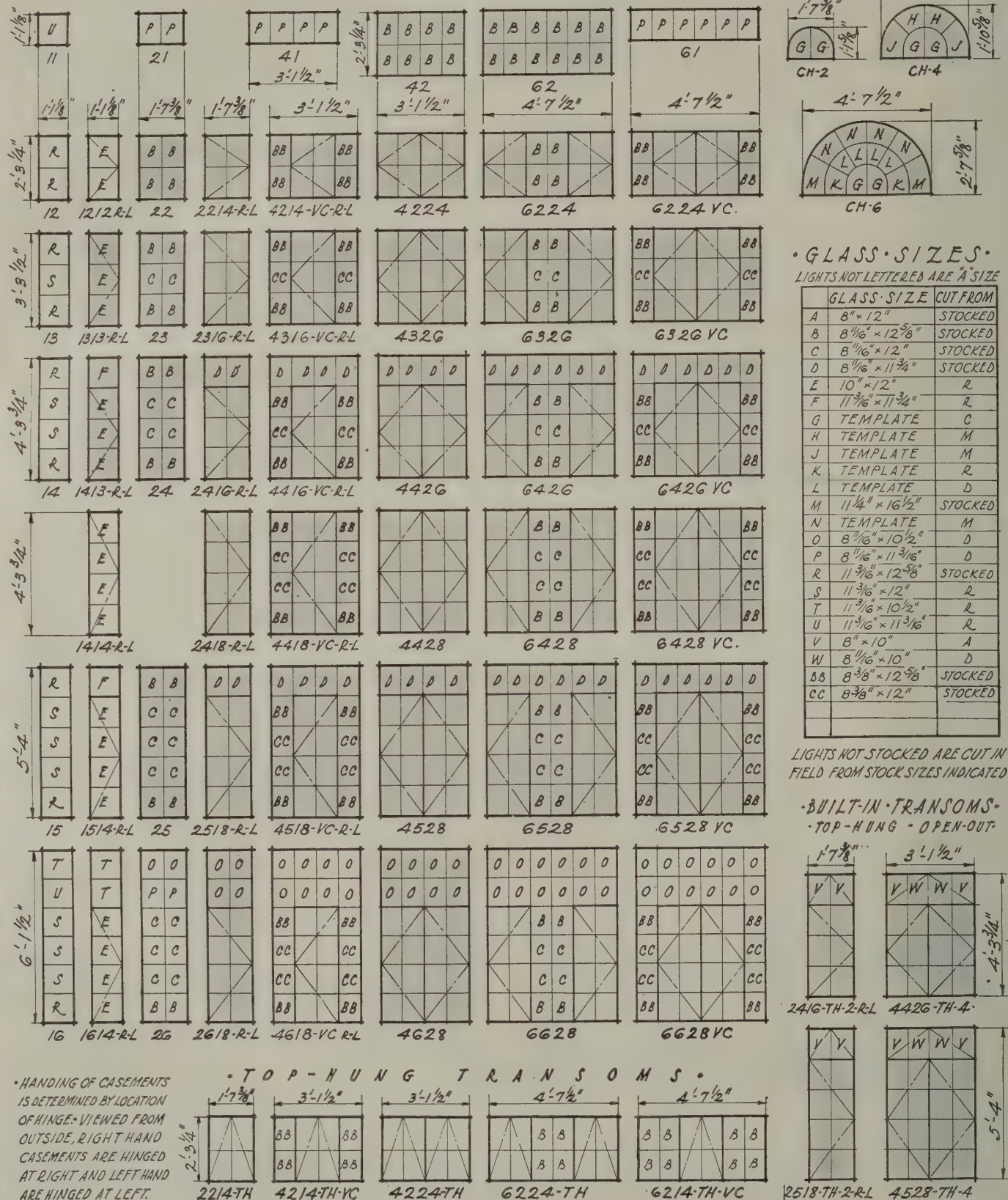
·FULL·SIZE·HORIZONTAL·MULLION·SECTION-Ⓜ·

Fenestra, August 1928	Steel Casement Windows Typical Cross Sections—Drip—Fins—Anchors	Plate No A-101

Continued on next page

• S T A N D A R D • A N D • S T O C K • T Y P E S •

• S T O C K • T Y P E S • S H O W N • W I T H • S H A D E D • B A C K G R O U N D •



• G L A S S • S I Z E S •

LIGHTS NOT LETTERED ARE "A" SIZE

	GLASS SIZE	CUT FROM
A	8" × 12"	STOCKED
B	8 1/16" × 12 5/8"	STOCKED
C	8 1/16" × 12"	STOCKED
D	8 1/16" × 11 3/4"	STOCKED
E	10" × 12"	R
F	11 3/16" × 11 3/4"	R
G	TEMPLATE	C
H	TEMPLATE	M
J	TEMPLATE	M
K	TEMPLATE	R
L	TEMPLATE	D
M	11 1/4" × 16 1/2"	STOCKED
N	TEMPLATE	M
O	8 1/16" × 10 1/2"	D
P	8 1/16" × 11 3/16"	D
R	11 3/16" × 12 5/8"	STOCKED
S	11 3/16" × 12"	R
T	11 3/16" × 10 1/2"	R
U	11 3/16" × 11 3/16"	R
V	8" × 10"	A
W	8 1/16" × 10"	D
BB	8 3/8" × 12 5/8"	STOCKED
CC	8 3/8" × 12"	STOCKED

LIGHTS NOT STOCKED ARE CUT IN FIELD FROM STOCK SIZES INDICATED

• B U I L T - I N • T R A N S O M S •

• T O P - H U N G • O P E N - O U T •

• T O P - H U N G T R A N S O M S •

• HANDING OF CASEMENTS IS DETERMINED BY LOCATION OF HINGE. VIEWED FROM OUTSIDE, RIGHT HAND CASEMENTS ARE HINGED AT RIGHT AND LEFT HAND ARE HINGED AT LEFT.

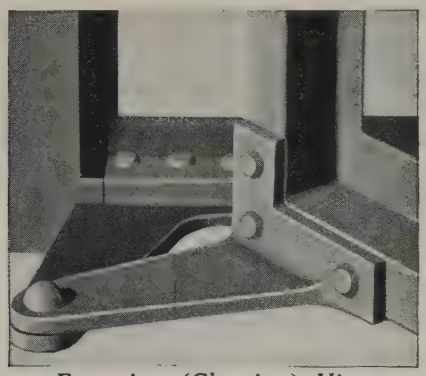
Fenestra August 1928

Steel Casement Windows
Types and Sizes

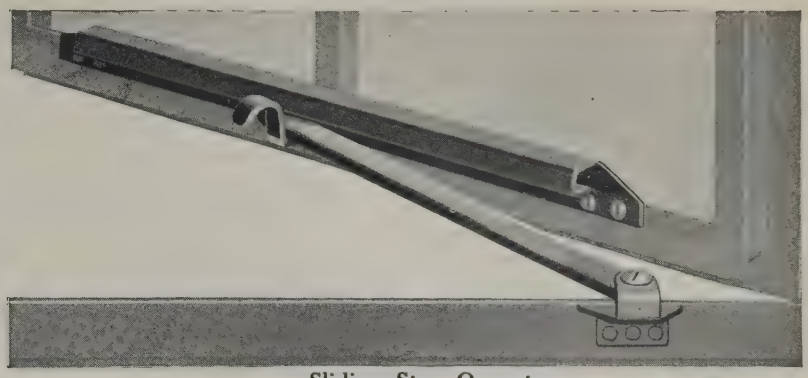
Plate No A-102

Continued on next page

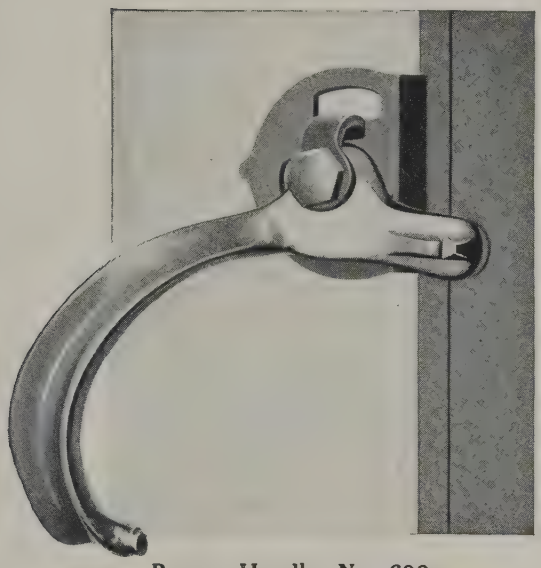
CASEMENT FITTINGS AND HARDWARE



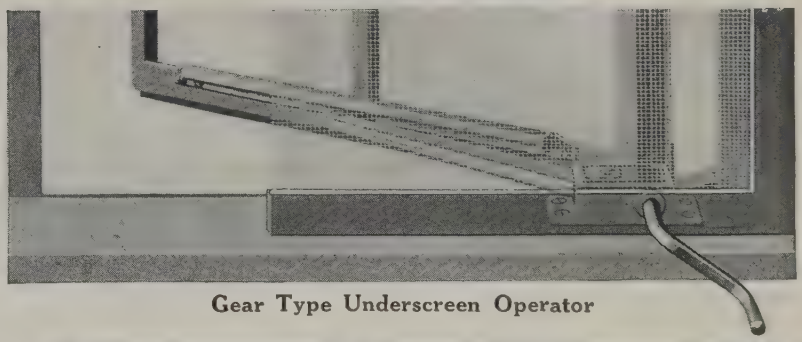
Extension (Cleaning) Hinge



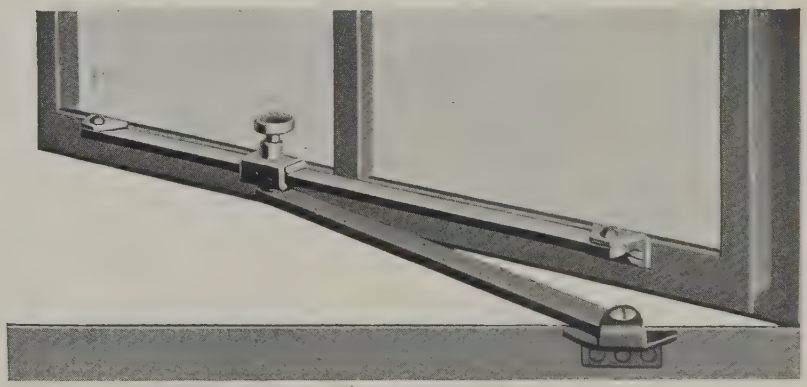
Sliding Stay Operator



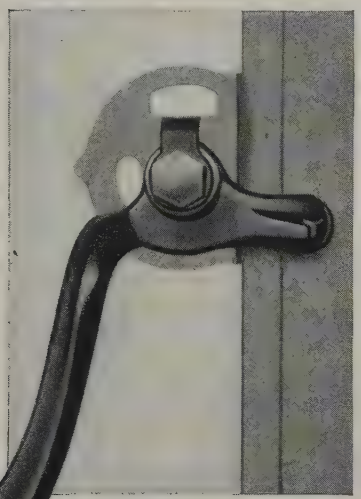
Bronze Handle, No. 699



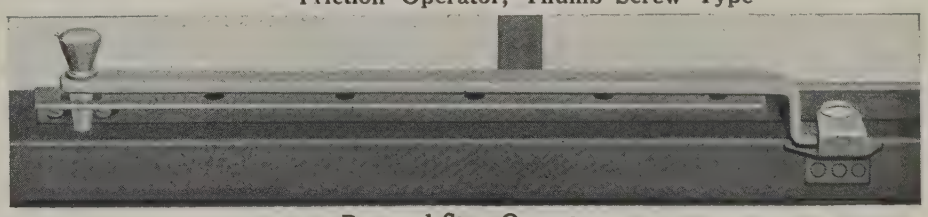
Gear Type Underscreen Operator



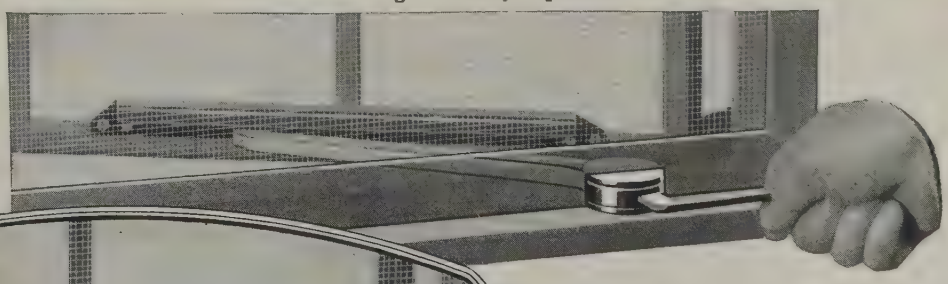
Friction Operator, Thumb Screw Type



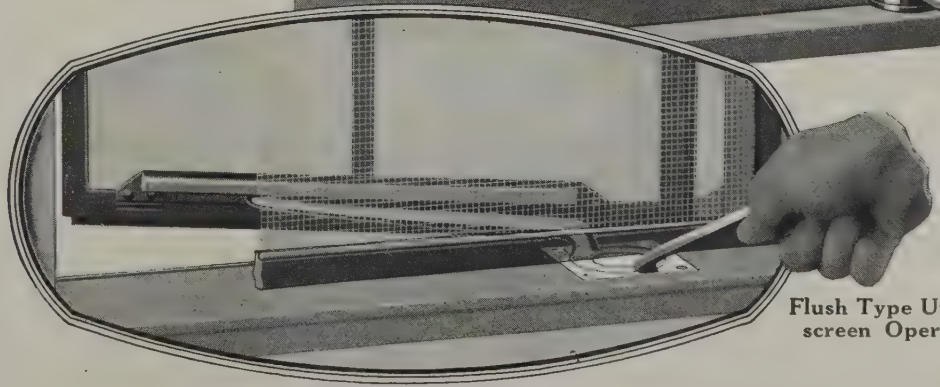
Malleable Iron Handle, No. 198



Peg and Stay Operator



Surface Type Underscreen Operator



Flush Type Underscreen Operator

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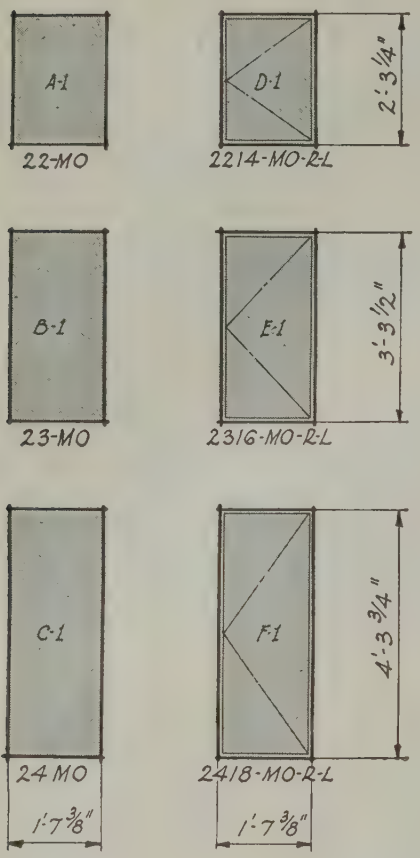
·SINGLE·LIGHT·UNITS·
·STOCK·TYPES·



STOCK TYPES OF CASEMENTS AND LEADED GLASS PANELS REQUIRED FOR EACH

Insert the letters MO (Muntins Omitted) after each casement type specified for leaded glass

Casement type	No. panels	Type of panels
1313 R/L	1	13 V
1413 R/L	2	13 V 11 T
22	1	22 F
2214 R/L	1	22 V
2214 TH	1	22 V
23	1	23 F
2316 R/L	1	23 V
24	1	24 F
2416 R/L	2	23 V 21 T
2416 TH-2-R/L	2	23 V 21 V
2418 R/L	1	24 V
25	1	25 F
2518 R/L	2	24 V 21 T
2518 TH-2-R/L	2	24 V 21 V
2618 R/L	2	24 V 22 T
42	1	42 F
4214 R/L	2	22 V 22 F
4214 TH R/L	2	22 F 22 V
4224	2	22 V 22 V
4224 TH	2	22 V 22 V
4316 R/L	2	23 F 23 V
4326	2	23 V 23 V
4416 R/L	3	23 F 23 V 41 T
4418 R/L	2	24 F 24 V
4426	3	23 V 23 V 41 T
4426 TH-4	3	23 V 23 V 41 V
4428	2	24 V 24 V
4518 R/L	3	24 F 24 V 41 T
4528	3	24 V 24 V 41 T
4528 TH-4	3	24 V 24 V 41 V
4628	3	24 V 24 V 42 T
62	1	62 F
6214 TH	3	22 F 22 V 22 F
6224	3	22 V 22 F 22 V
6224 TH	3	22 V 22 F 22 V
6326	3	23 V 23 F 23 V
6426	4	23 V 23 F 23 V 61 T
6428	3	24 V 24 F 24 V
6528	4	24 V 24 F 24 V 61 T

SINGLE LIGHT UNITS—STOCK TYPES

To accommodate large lights of plate glass or panels of leaded glass, the six Single Light Units shown at the left on this page have been placed in stock and are now ready for immediate delivery, as are the other stock types shown on Plate A-102.

These casements correspond in every respect to the same sized units (fixed and ventilated) on Plate A-102 except that no provision is made for interior muntin bars. The units shown on this page have, therefore, a clean perimeter free from the punching necessary when muntin bars are optional.

Glass sizes are shown opposite the letters in the table below.

When ordering any stock, casement units designed for single lights of plate glass or leaded glass panels, specify "M.O." (Muntins Omitted). Ventilated units are Right or Left handed as desired.

GLASS SIZES

Units	Sizes, in.	Units	Sizes, in.
A-1	17⅜x25⅜	D-1	16¼x24¼
B-1	17⅜x37⅝	E-1	16¼x36½
C-1	17⅜x49⅞	F-1	16¼x48¾

SUGGESTIONS FOR LEADED GLASS PANELS

The following page (Plate A-103) shows suggested designs and dimensions for standard Leaded Glass Panels of a size and character to fit stock types of Fenestra Casements including the Single Light Units shown above. (No panels are shown suitable for semi-circular heads.)

We do not make leaded glass. The accompanying suggestions are offered for the benefit of architects and builders, so that leaded panels may be purchased locally with assurance of correct dimensions and with a minimum of detail labor and expense.

In designing both the Rectangular Leaded and the Diamond Leaded panels, we have kept constantly in mind the proportions used in the fine examples of Tudor architecture. The glass dimensions, 5½ by 8 in., which were so frequently utilized by the masters of that period, have been retained as nearly as possible and standardized as far as compatible with stock types and sizes.

Eighteen different panels are shown in Rectangular leaded and in Diamond Leaded types. Six of these panels are dimensioned to fit ventilated units or the ventilated portion of combination units and are so indicated by the prefixed letter "V." Six panels are dimensioned to fit fixed units or the fixed portions of combination units and are so indicated by the prefixed letter "F." Six panels are dimensioned to fit fixed transoms in single or combined units and are so indicated by the letter "T." The numbers "22," "24," "62" and so on *do not refer* to the number of panes in the width and height of the Leaded Glass panels, but *do refer* to the number of standard panes in the width and height of the stock casements into which the panels are designed to fit. The letters "RL" and "DL" indicate "Rectangular Leaded" and "Diamond Leaded" panels, respectively.

Thus the stock casement Type 22 (Plate A-102) with muntins omitted, can be fitted with either RL-22-F or DL-22F. The dimensions of the casement will be 1 ft. 7⅜ in. by 2 ft. 3¼ in. while the dimensions of either leaded panel will be 17⅜ in x 25⅜ in.

A table of our stock types of casements and the leaded glass panels required for each is given at the right.

All leaded glass designs have been carefully arranged so that when several panels are used in combination units, the various panels form a harmonious whole with cames in proper relation to one another.

All lights should be double strength clear glass. Framing cames should be ⅞ in. offset flat lead on Fixed and Transom Panels and ⅝ in. flat lead on Ventilating Panels. All interior cames should be ½ in. flat lead.

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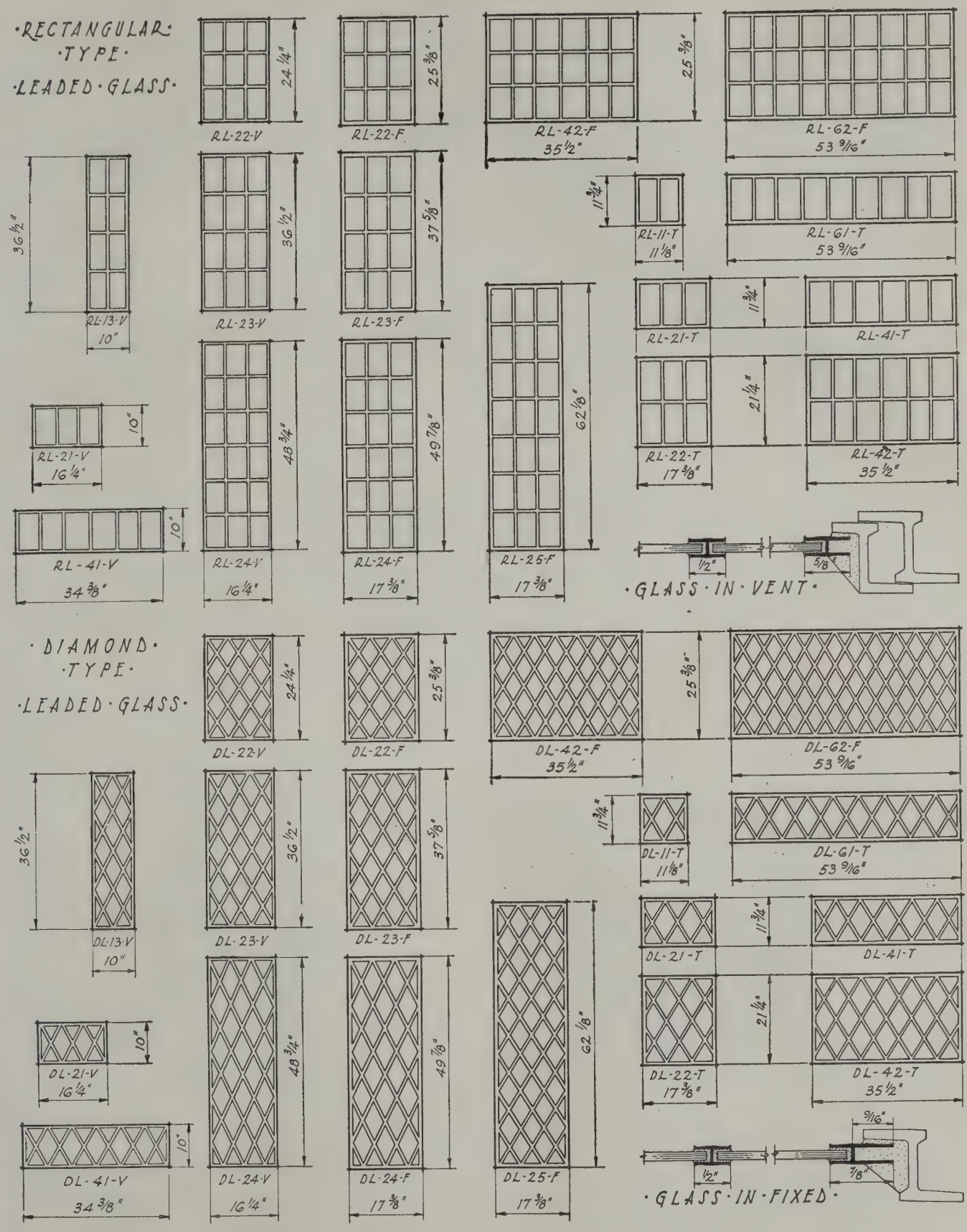
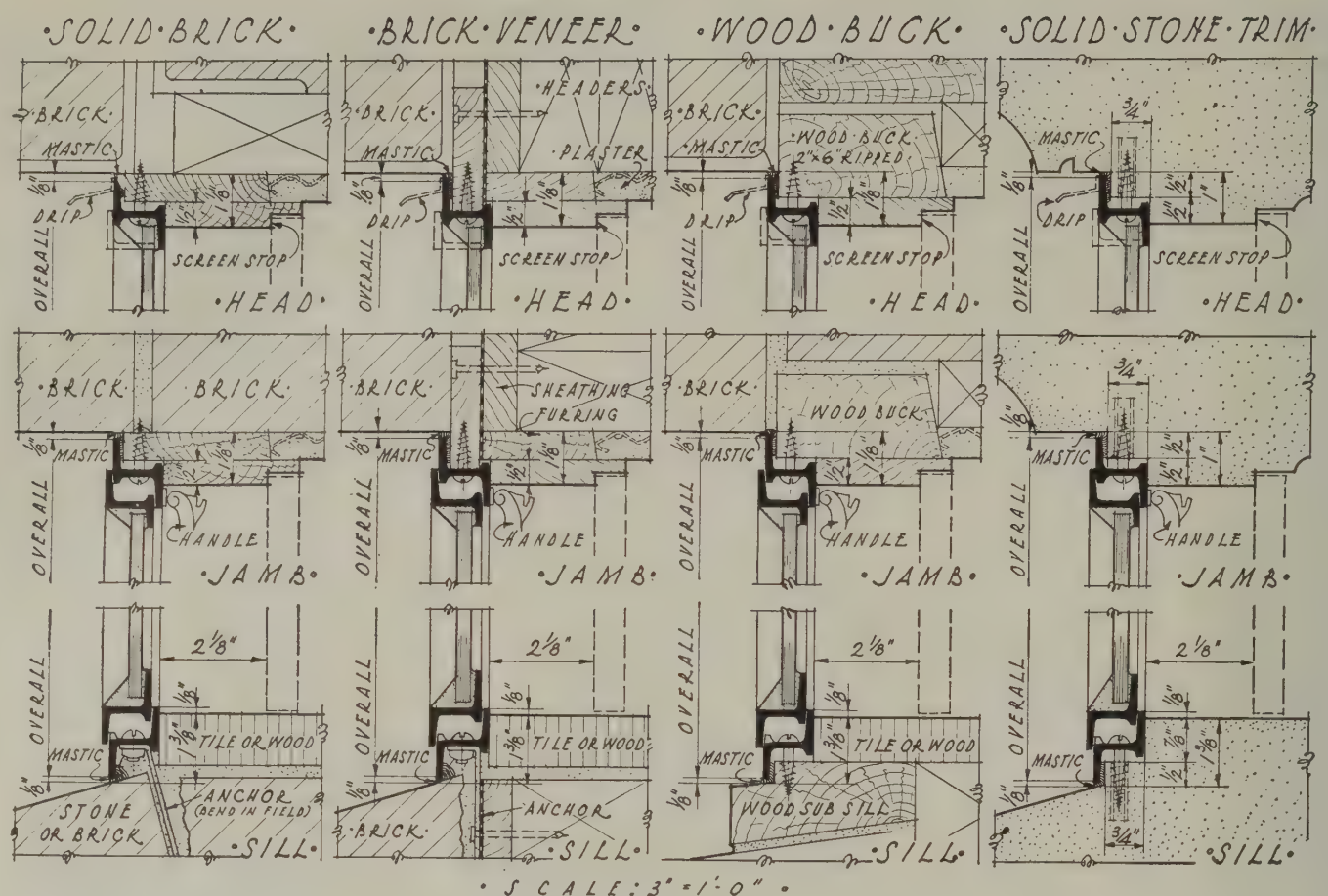


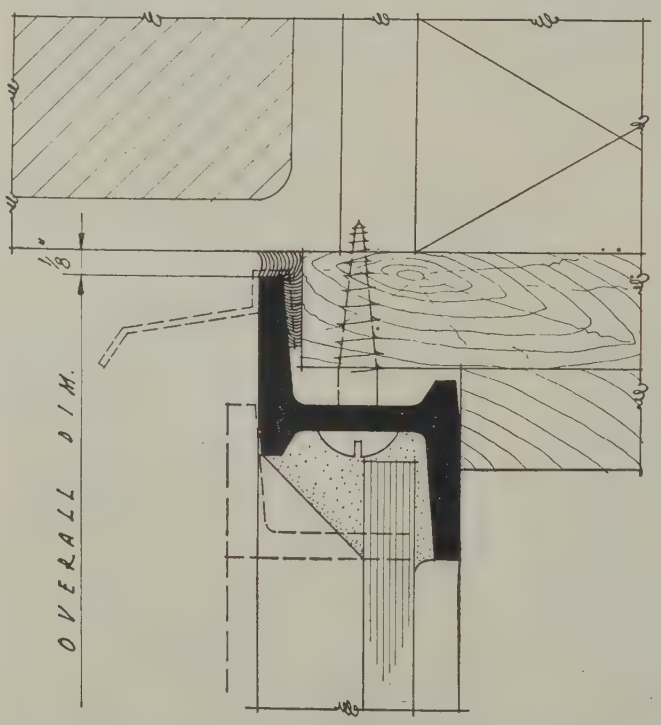
Fenestra
August 1928

Steel Casement Windows
Suggestions for Leaded Glass

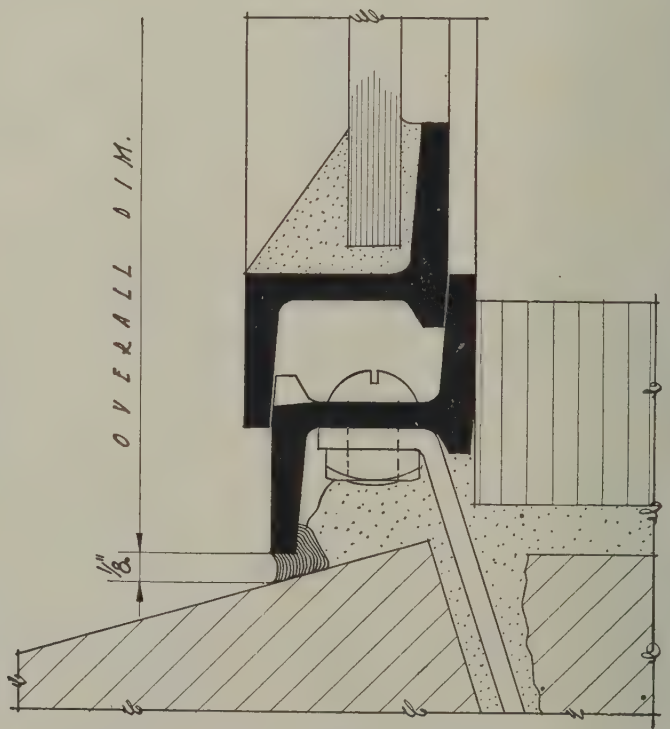
Plate No
A-103

Continued on next page





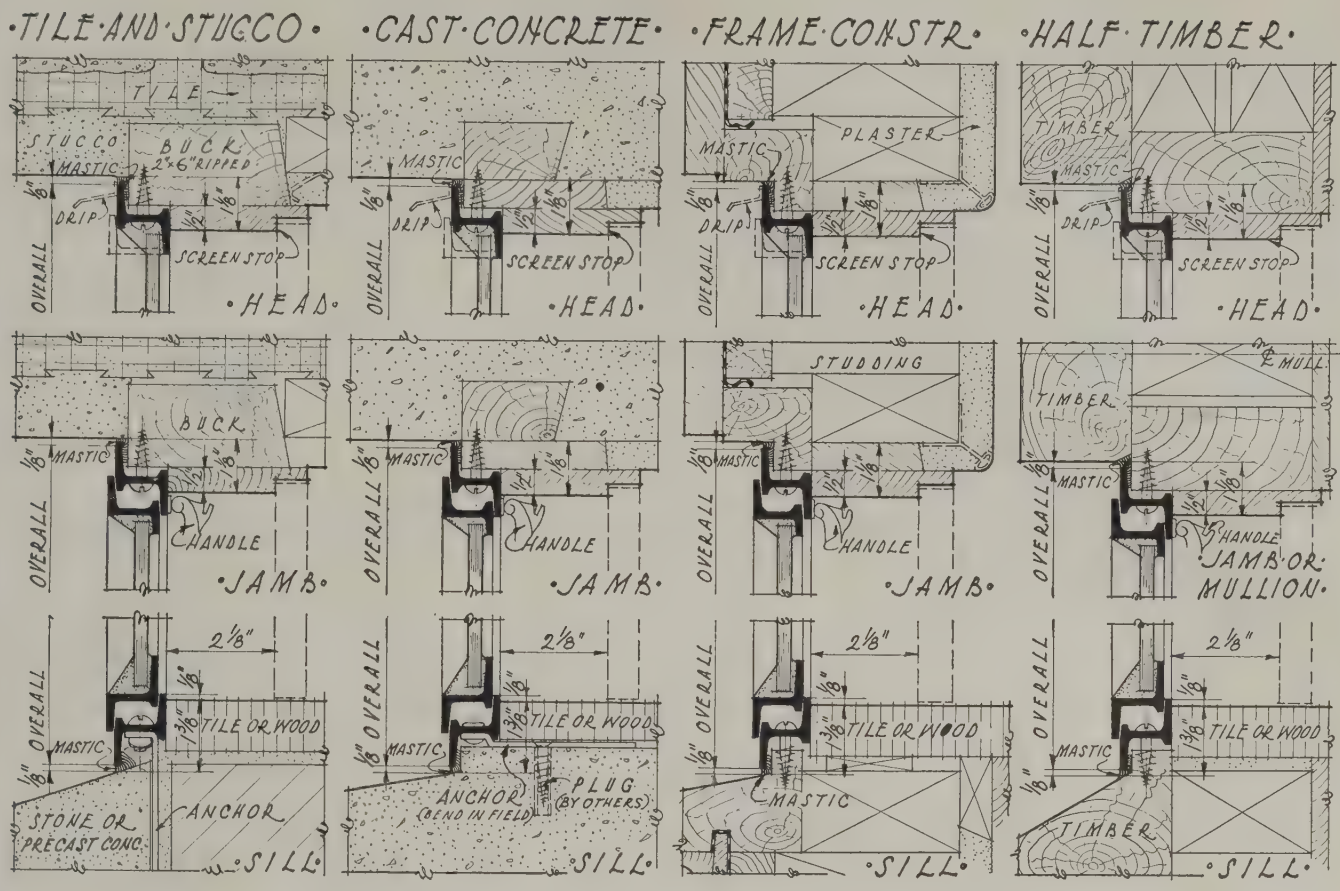
·FULL·SIZE·HEAD·DETAIL·



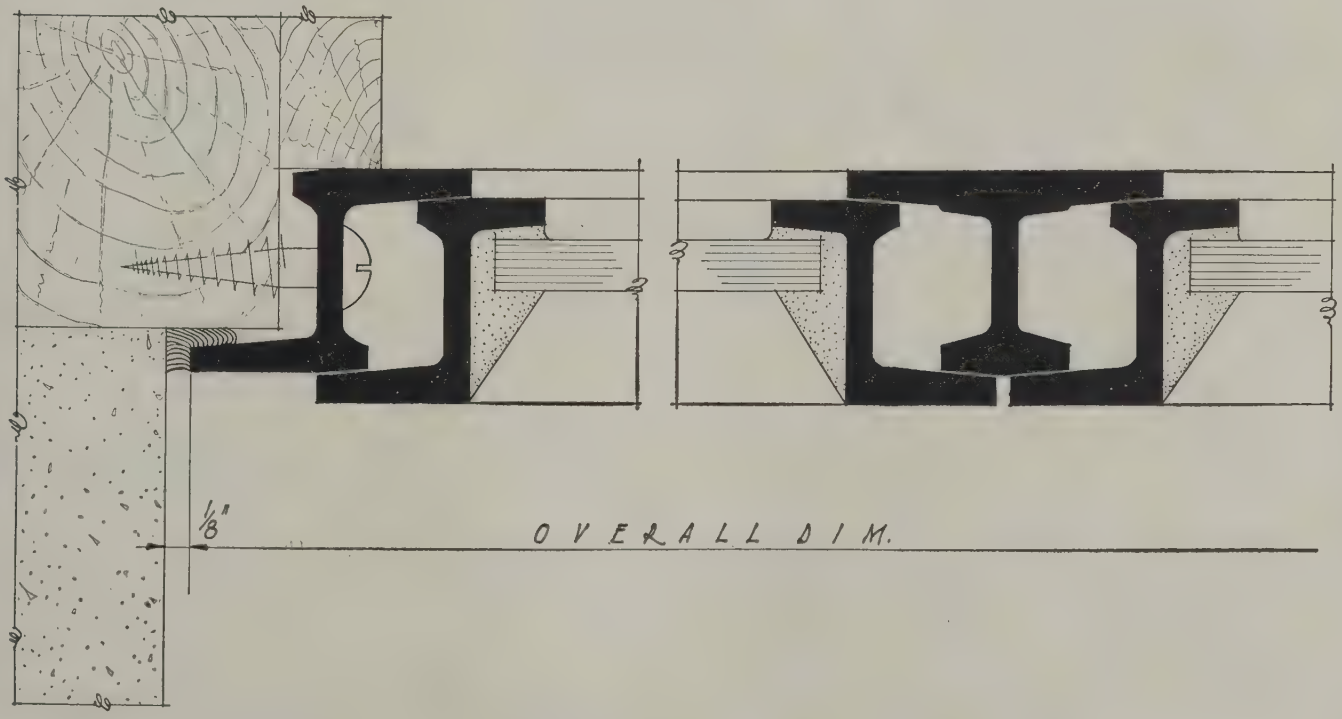
·FULL·SIZE·SILL·DETAIL·

Fenestra August 1928	Steel Casement Windows Installation Details	Plate No A-104

Continued on next page



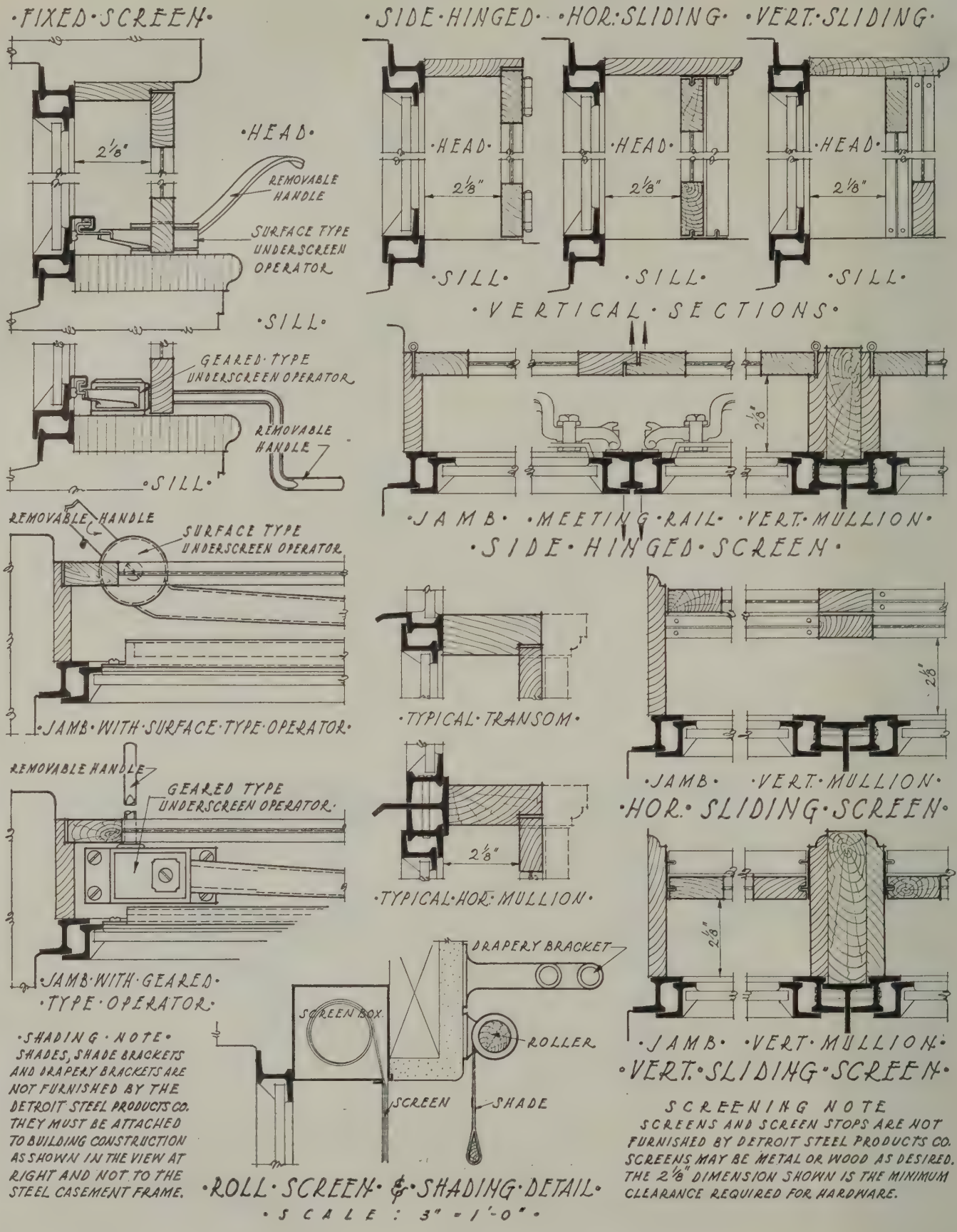
·SCALE: 3"=1'-0"·



·FULL·SIZE·JAMB·DETAIL· ·FULL·SIZE·MEETING·RAIL·

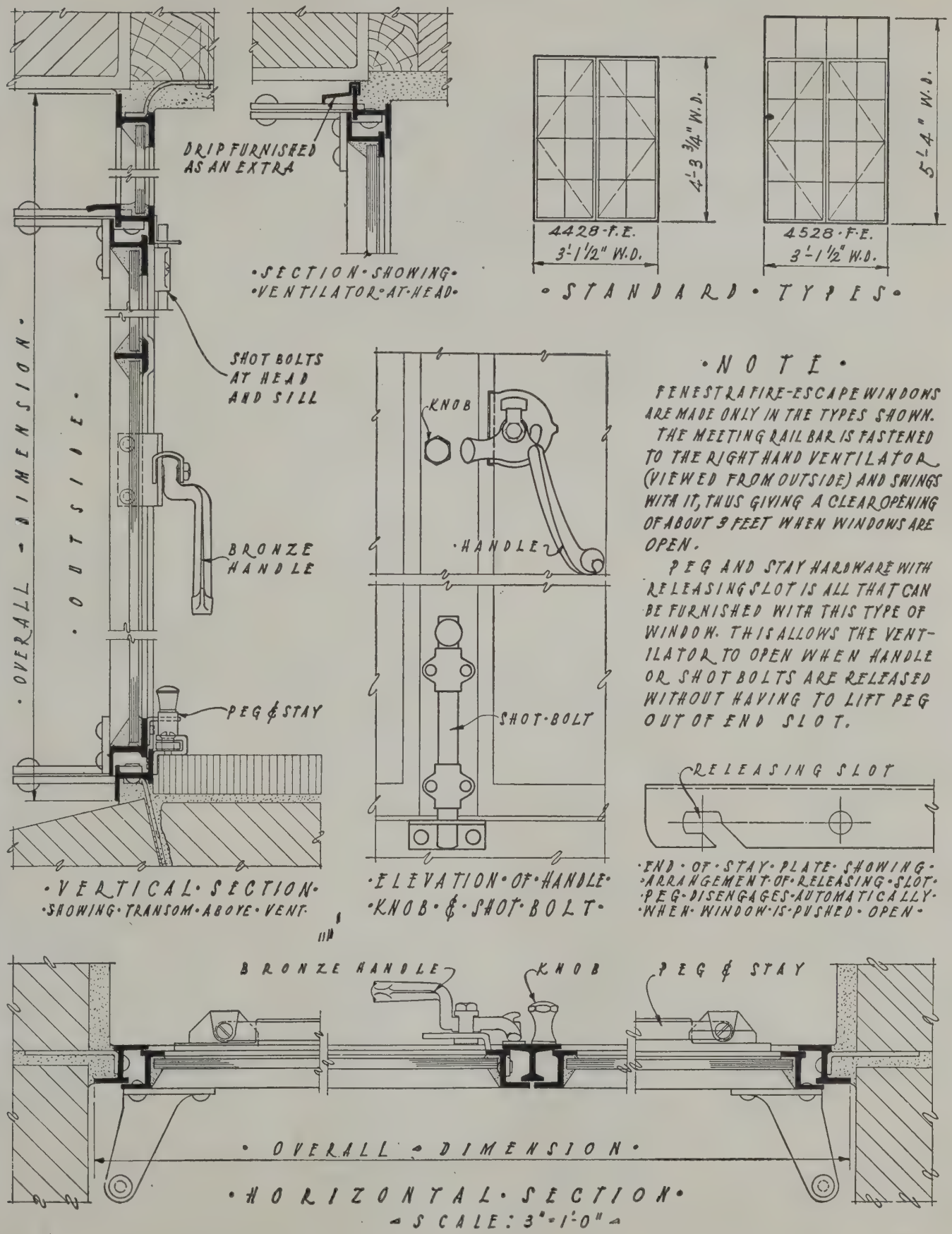
Fenestra *August 1928*	*Steel Casement Windows* *Installation Details*	***Plate No*** *A-105*

Continued on next page



Fenestra, August 1928	Steel Casement Windows Screening and Shading Details	Plate No A-106

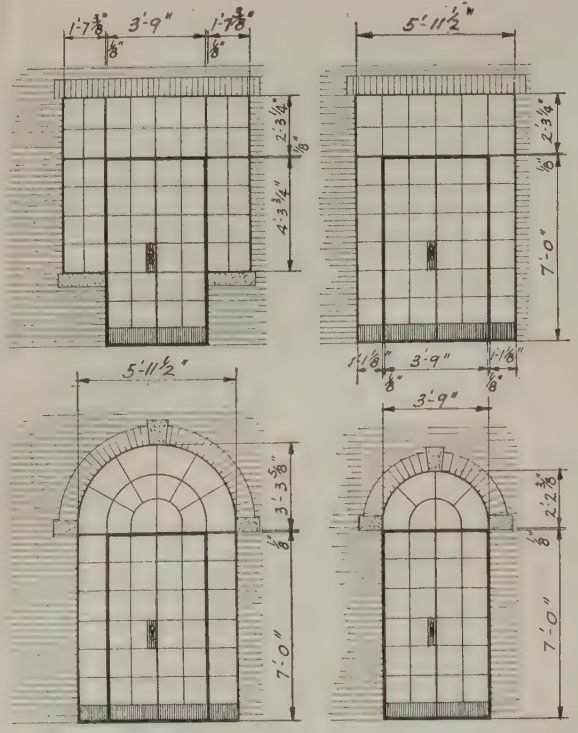
Continued on next page



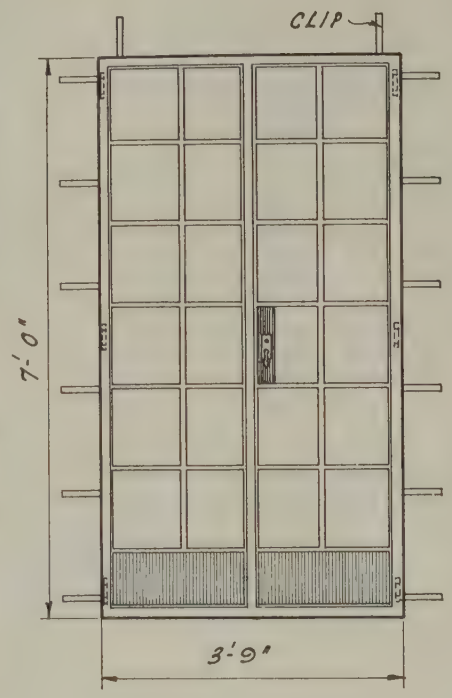
Fenestra August 1928	Steel Casement Windows Fire Escape Details	Plate No A-107

Continued on next page

COMBINATIONS AND SIZES

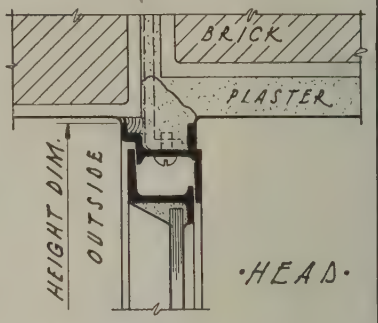


TYPICAL OPENINGS
OUTSIDE ELEVATIONS

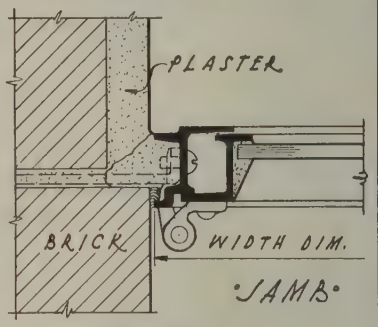


INSIDE ELEVATION

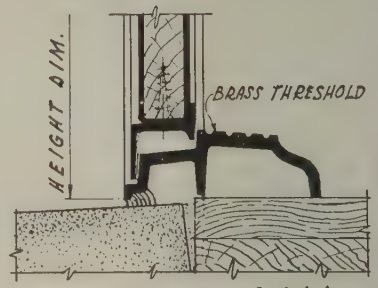
INSTALLATION DETAILS



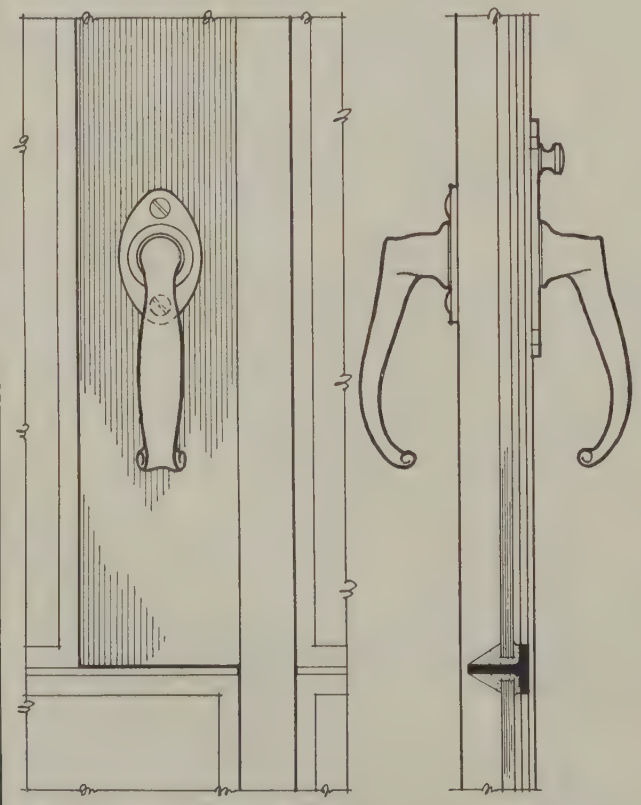
HEAD



JAMB

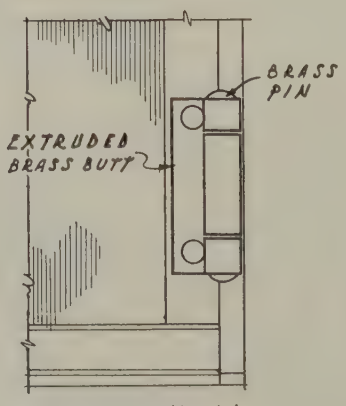


SILL

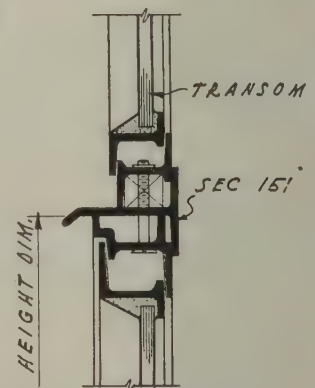


OUTSIDE ELEVATION — SECTION
CREMONE BOLT HANDLE DETAIL

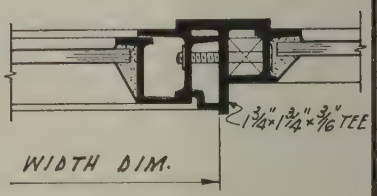
NOTE
HEAVY ANCHOR CLIPS OF ½" × 3/16" FLAT STEEL ARE SUPPLIED FOR ANCHORING DOOR WHEN INSTALLED INTO MASONRY OPENINGS. SEE INSTALLATION DETAILS.
BRONZE HANDLES FOR CREMONE BOLT ARE FURNISHED WITH AN OXIDIZED BRONZE FINISH.



OUTSIDE VIEW AT CORNER SHOWING BUTT



HORIZONTAL MULLION



VERTICAL MULLION

DETAILS SCALE: 3" = 1'-0"

Fenestra August 1928	Steel Casement Doors Elevations and Details	Plate No B-101

Continued on next page

(D) STEEL BASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: *These windows are sold exclusively through dealers. See Paragraph 12 Fenestra Page 2.*

(D-1) Work Included

Note: *List and locate. (See Paragraph 13 Fenestra Page 2.)*

(D-2) General

Basement Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(D-3) Materials

All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles. All frame and sash members shall be rolled with ⅛" baffles. Sash bottom rails shall be rolled with special projecting drip. Provide steel fins for jamb anchorage and weathering. Muntins shall be T bars. Provide two holes in each frame jamb for screen attachment.

Note: *Sections (except sash bottom rails) are similar to Casement Window Sections (see Fenestra Pages 5, 10 and 11) arranged for inside glazing.*

(D-4) Construction

Sills and jambs of frame shall be continuous of one piece mitered and turned at corners. Joints at head of frame and all joints of sash shall be mortise and tenon, air hammer riveted. Fins shall be spot welded to frame jambs. Provide continuous, two-point, flat contact weathering between sash and frame.

(D-5) Hardware

All hardware shall be of steel and shall be attached at the factory. Hinges shall be of "pinless" hook design riveted to the frame, so constructed, in conjunction with formed slots in the sash top rail, that the sash may be removed for glazing. Locks shall be self-centering and shall consist of a bevel lipped, slotted angle, riveted to sill and a wedge pin attached by ring and heavy chain to the bottom rail of sash to act as the support for the sash when open.

(D-6) Erection

Basement windows shall be set plumb and true securely anchored to the building construction. Adjust all sash to properly operate.

(D-7) Painting

All Basement Windows shall be given one dip-coat of grey, lead and oil paint by the Manufacturer before shipment.

Note: *The following should be provided for in the painting specifications:*

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(D-8) Glass and Glazing

Note: *The following should be included in the Glazing Specifications:*

Note: *See Paragraph 10 Fenestra Page 2.*

(D-8a) **Glass**—Glass shall be double strength.

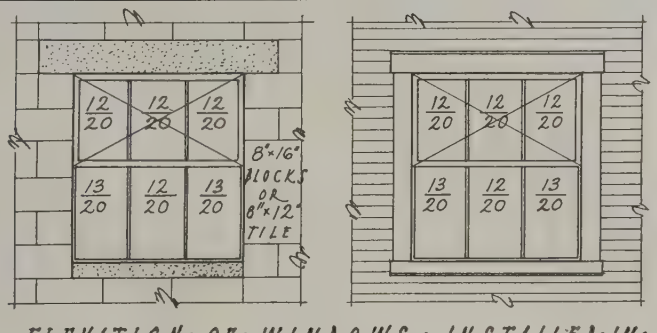
Note: *Single strength glass is not recommended.*

(D-8b) **Putty**—Putty shall be a high grade Steel Window Putty.

Note: *Ordinary wood sash putty must not be used. See Paragraph 11 Fenestra Page 2.*

(D-8c) **Glazing**—All windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Window Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: *Do not paint until putty has thoroughly hardened. See Paragraph (D-7).*



ELEVATION OF WINDOWS INSTALLED IN CONCRETE BLOCK AND FRAME CONSTRUCTION

NOTE

THE FENESTRA UTILITY WINDOW IS DESIGNED FOR SMALL BUILDINGS SUCH AS GARAGES FILLING-STATIONS, SHOPS, STORES AND BASEMENTS HIGH ABOVE THE GRADE LINE.

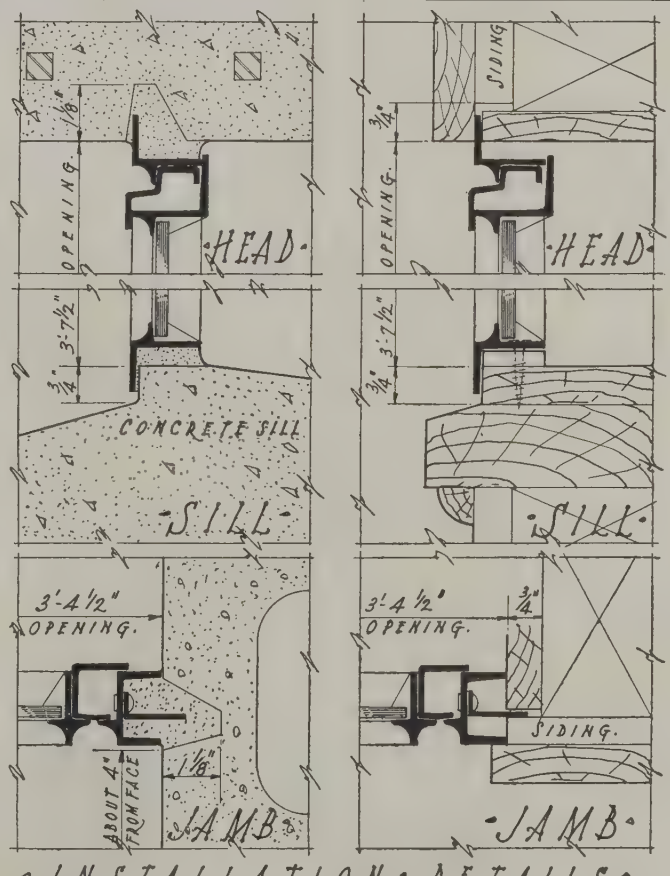
IT IS ALSO DESIRABLE IN AREA-WAYS WHERE MORE LIGHT IS NEEDED THAN IS SUPPLIED THRU FENESTRA BASEMENT WINDOWS, AS IN LAUNDRY ROOMS.

IT IS MADE IN ONE SIZE, ONLY, 3'-4½" × 3'-7½".

VENTILATOR IS ONE LIGHT HIGH, PIVOTED 2" ABOVE CENTER TO PREVENT UNDUE PROJECTION EITHER INSIDE OR OUTSIDE.

SECTIONS AND FITTINGS ARE THE SAME AS FOR HORIZONTALLY PIVOTED WINDOWS.

OPERATING HARDWARE CONSISTS OF IRON CAM HANDLE AND NOTCHED STAY-BAR AS IN HORIZONTALLY PIVOTED WINDOWS.

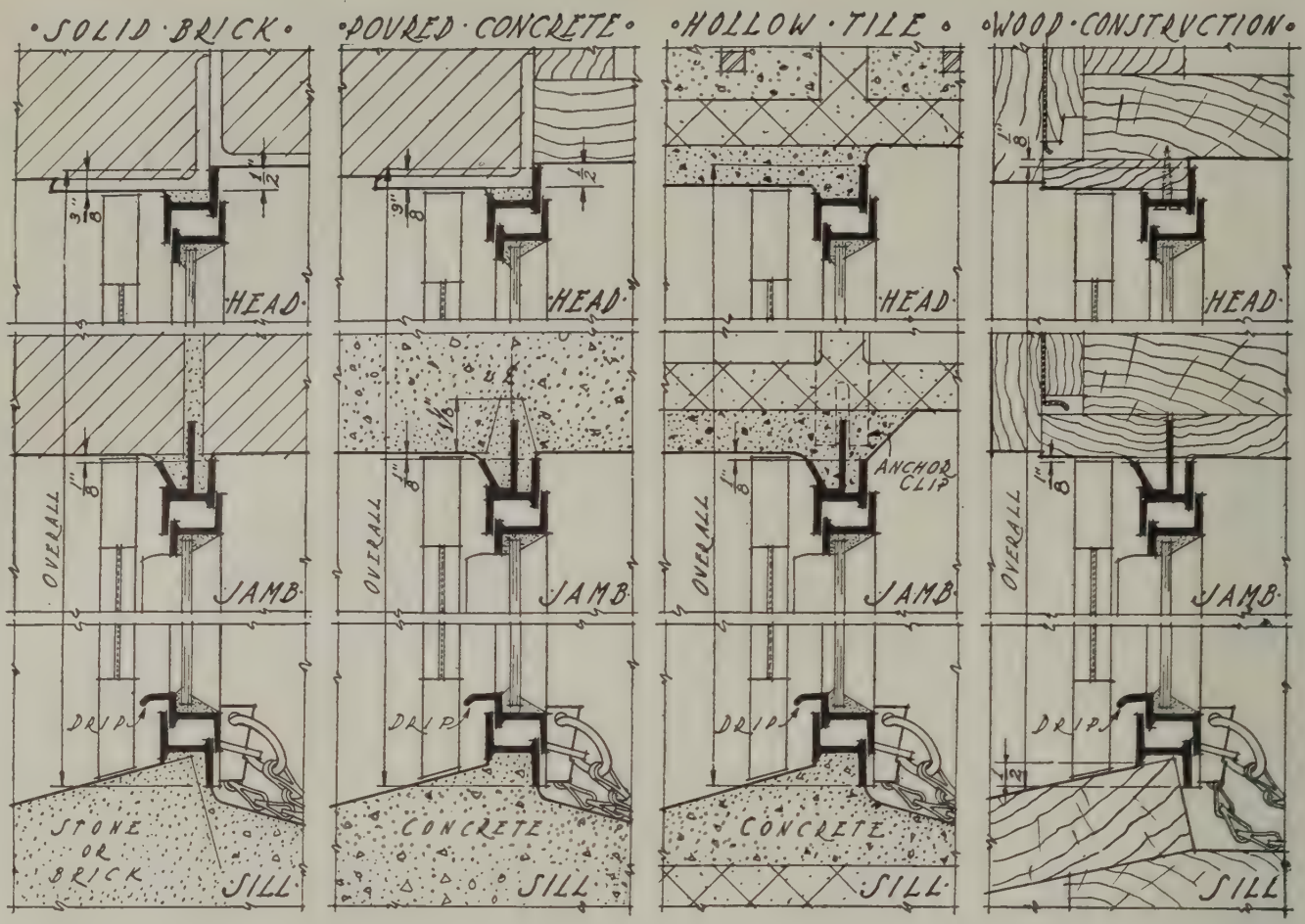


INSTALLATION DETAILS

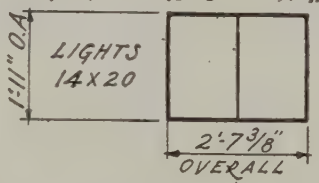
SCALE: 3" = 1'-0"

Fenestra August 1928	Steel Utility Windows Types, Sizes and Details	Plate No C-101

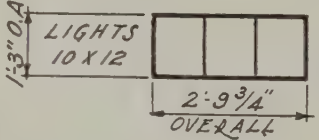
Continued on next page



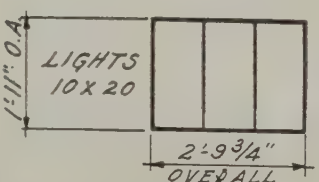
TYPES AND SIZES



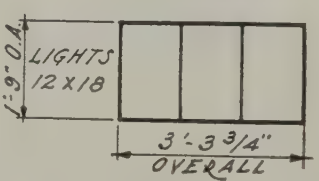
IN CONCRETE BLOCK CONSTRUCTION. FITS OPENING TWO BLOCKS WIDE BY THREE BLOCKS HIGH WITH A TROWELED SILL.



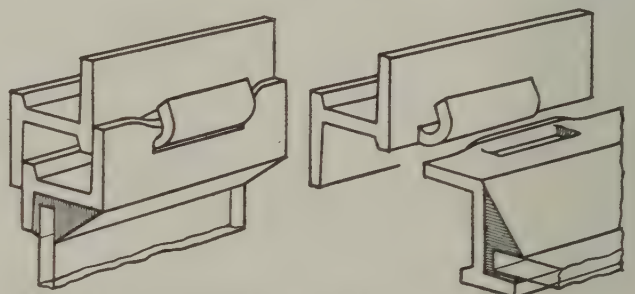
FOR HOUSES WITH LOW GRADE LINES — WORKS OUT EXCEPTIONALLY WELL IN BRICK CONSTRUCTION.



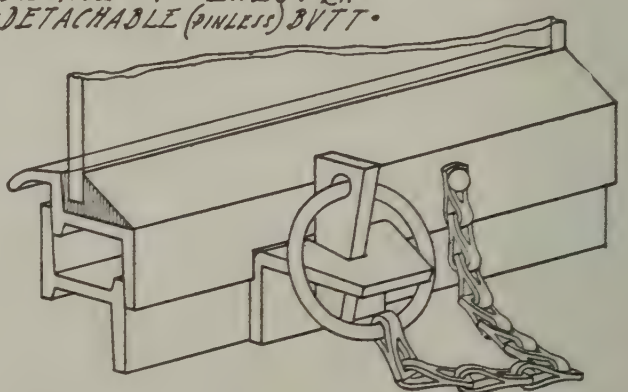
FOR HOUSES WITH A HIGHER GRADE LINE. WORKS OUT WELL IN BRICK OR CONCRETE BLOCKS



WORKS OUT WELL WITH EITHER BRICK OR CONCRETE BLOCK; AND IS THE WINDOW MOST USED IN THE AVERAGE TYPE OF CONSTRUCTION.



DETAIL OF FENESTRA DETACHABLE (PINLESS) BUTT



DETAIL OF SELF-CENTERING KEEPER

SCALE: 3" = 1'-0"

Fenestra August 1928	Steel Basement Windows Types, Sizes and Details	Plate No D-101

Continued on next page

(GA) FENESTRA OFFICE WINDOWS—Specifications

Notes are explanatory only and need not be included in specifications

(GA-1) Work Included

Note: List and locate.

(GA-2) General

All windows shall be Fenestra Office Windows as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(GA-3) General

(GA-3a) Window Sections—All sections shall be special designed, hot rolled, solid steel bars with heavy fillets in re-entrant angles, designed for exterior glazing.

(GA-3b) Frame Members—Jamb and head members shall be 1½" unequal leg, sections (outside leg 1⅜", inside leg ¾") designed for ⅝" anchorage. Sills and horizontal intermediate bars shall be Z's with offset baffles.

(GA-3c) Ventilator Members—Ventilator stiles and rails shall be 1¼x1⅜" Z or T bars, with baffles.

(GA-3b) Jamb Weathering—Weathering at jambs shall be 1⅜" offset unequal leg channels forming beveled interior sliding shoe grooves.

(GA-3e) Muntins—Muntins shall be 1¼x⅞" T's.

(GA-3f) Vertical Mullions—Vertical Mullions shall be interior and exterior plates secured with bolts and nuts.

Note: Other designs of mullions may be used. If desired, provision for them should be made in the ornamental iron or structural steel specifications.

(GA-3g) Horizontal Mullions—Horizontal Mullions shall be standard Fenestra (Type 1—Z and angle) (Type 2—angle and channel with interior pressed steel mullion cover).

Note: Other designs of mullions may be used. If desired, provisions for them should be made in the ornamental iron or structural steel specifications.

(GA-4) Construction

(GA-4a) Frames—Frames, including intermediate bars, shall be mortise and tenon, and electrically welded at corners. All exposed faces at welds shall be ground to a smooth finish.

(GA-4b) Ventilators—All stiles and rails of ventilators shall be mitered at corners and electrically butt welded with all exposed faces at welds ground smooth.

(GA-4c) Muntins—Joints at frame and ventilator members shall be closely fitted mortise and tenon, air hammer riveted.

(GA-4d) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions.

(GA-4e) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frames where required.

(GA-5) Attached Hardware

Note: Attached at factory.

(GA-5a) Ventilator Operating Hardware—Ventilators shall (swing-out from the bottom while sliding down from the top) (or) (swing-in from the top while sliding up from the bottom) as indicated. The ventilators shall be so constructed that by tilting they may be conveniently washed from inside the building.

Note: Specify swing-out, swing-in or both as required.

Each ventilator shall be balanced on two supporting arms of solid spring steel. Connections between supporting arms and window frame and between supporting arms and ventilators shall be made by malleable iron brackets rigidly supported and double riveted to the vertical members, with arms attached to brackets by bronze shoulder pivots. Each ventilator shall be equipped with two brass friction shoes sliding vertically in the weathering channels.

(GA-5b) Alignment Springs—Each open-out ventilator shall be equipped with two shouldered, alignment-control bronze springs riveted to the channel jambs.

Note: The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic.

Note: Include if ventilators are more than 20 in. high.

(GA-5c) Cam Handle Brackets—On open-out ventilators provide special design solid brackets, rolled Z-bar, rigidly riveted to ventilator bottom rails for attachment of cam handles.

(GA-6) Detached Hardware

(GA-6a) Operating Hardware for Fenestra Office Windows shall be of bronze, light coinage finish, and packed separately.

(GA-6b) Locking and Operating Hardware—

Note: Select as required.

(1) ***For Open-out Ventilators***—Bronze pole ring, Part 151 at head of ventilator. Bronze, cam-action handle, Part 733, attached to bracket on bottom rail by bronze bolt and friction clevis (all handle shall be provided with notched heads to permit restricted ventilation), iron strike plate, Part 737, with brass rubbing rivet.

(2) ***For Open-in Ventilators***—Bronze spring latch with ornamental handle, Part 734; riveter, iron, lipped strike, Part 735.
(3) Where open-in ventilator is located immediately below an open-out ventilator, use combination riveted iron strike, Part 736.

(GA-7) Mastic

Note: Include in the Masonry Specifications that all windows shall be calked at head, jambs and sill with mastic or other calking compound, neatly applied after erection, wherever the frames meet the building construction.

(GA-8) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed.

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.
Note: Where window frames come in contact with Fenestra Mullions or Transom Bars, calking is to be supplied and applied by the erectors.

(GA-8a) All Fenestra Office Windows shall be erected in prepared openings by the *Fenestra Construction Company*, under a separate contract.

(GA-8b) All windows shall be set plumb and true, properly aligned and securely anchored and all ventilators properly adjusted before glazing.
Standard Fenestra sill anchors shall be used under the following conditions:
(1) In all cases where a ventilator comes at the sill of the window.
(2) In all multiple unit openings where mullions are not anchored into the sills.
Standard Fenestra Jamb Anchor Clips, No. 822, to be used as necessary.

(GA-8c) Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting have been completed.

(GA-9) Painting

All windows shall be given one dip-coat of gray, lead and oil paint by the manufacturer before shipment.

Note: The following should be provided for in the painting specifications: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

Continued on next page

(GA-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications.

(GA-10a) Glass—Glass shall be (¼" thick plate) (¼" wire of type desired) (double strength).

Note: ¼-in. thick glass is recommended.

(GA-10b) Putty—Putty shall be a high grade steel window putty.

Note: Ordinary wood sash putty must not be used.

(GA-10c) Glazing—All Fenestra Office Windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated steel, spring glazing clips, furnished by the window manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Use four to twelve glazing clips per pane depending on the size of the pane and whether it is in a fixed or movable portion of the window.
Note: Do not paint until putty has thoroughly hardened. See Paragraph (GA-9).

(GA-11) Shading

Note: All shades must be located at least 2 in. from the inside face of the window for hardware clearance.

Note: Shade bracket clips designed to attach by drilling and tapping the top of each jamb section, are supplied at slight added cost. These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. If shade bracket clips are required, so specify.

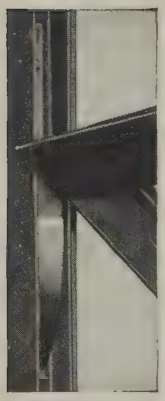
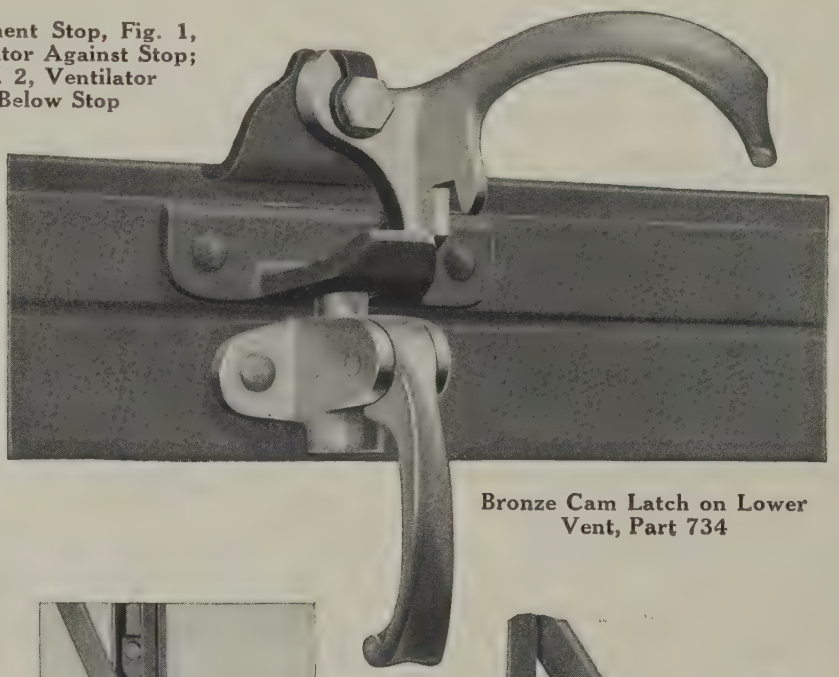


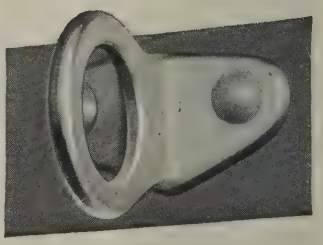
Fig. 1

Alignment Stop, Fig. 1, Ventilator Against Stop; Fig. 2, Ventilator Below Stop



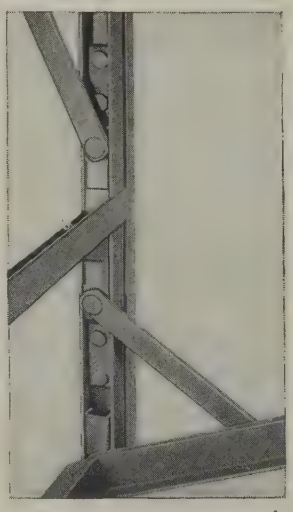
Bronze Cam Handle on Upper Vent, Part 733

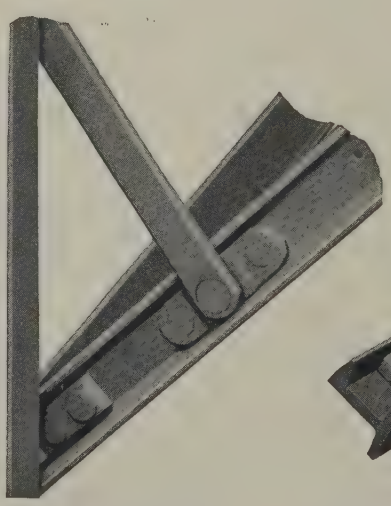
Bronze Cam Latch on Lower Vent, Part 734



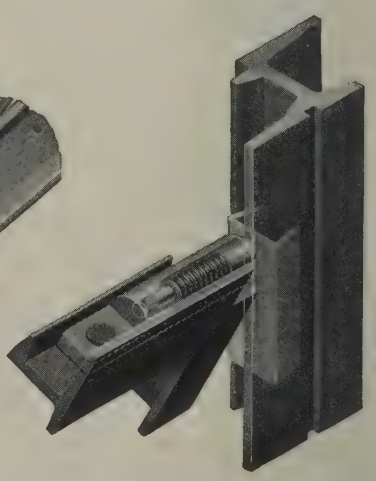
Bronze Pole Ring, Part 151

Fig. 2





Arm Attachment (left) to Frame, and (right) to Ventilator. Bronze Shoulder Pivots and Double Riveted Malleable Iron Brackets

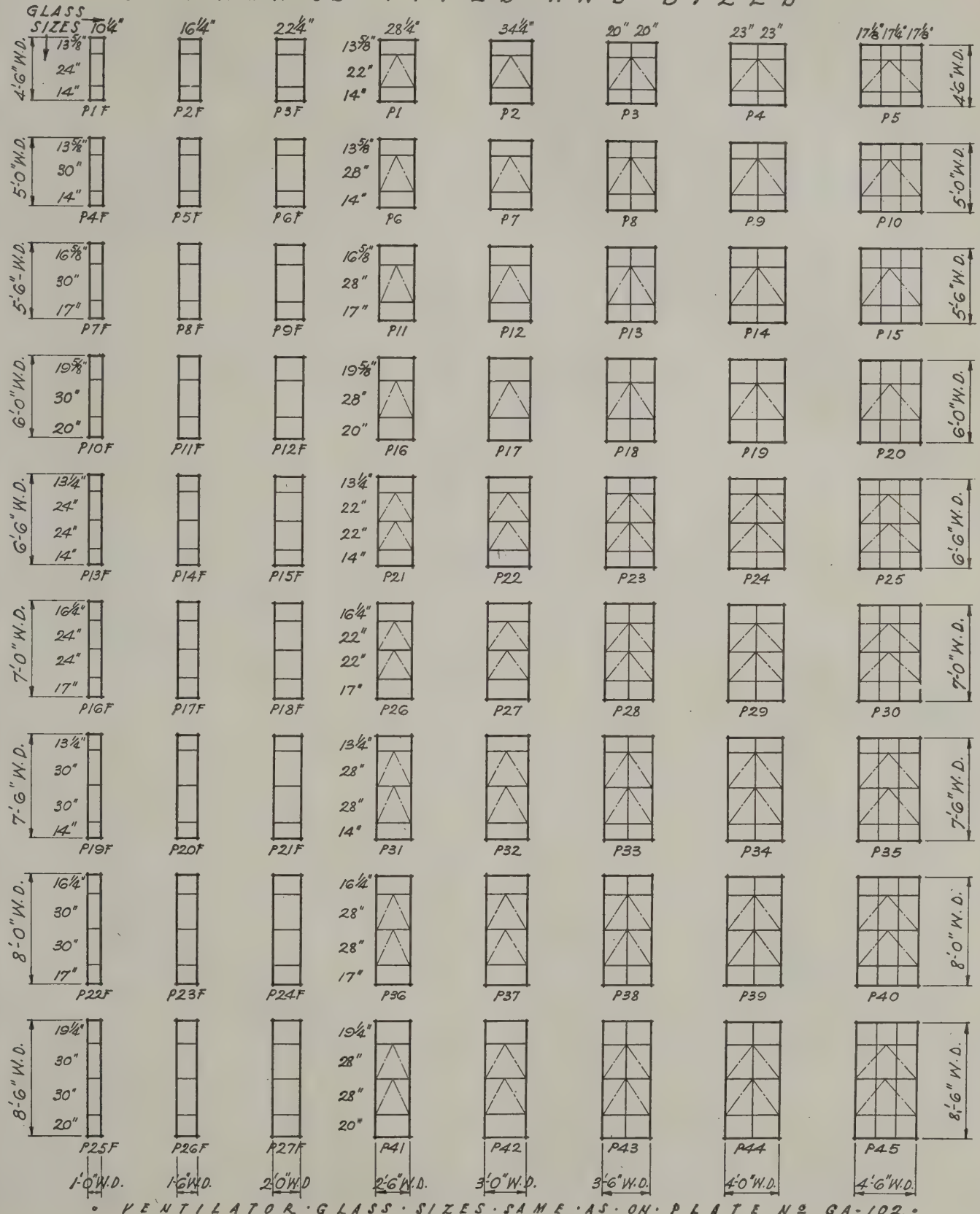


Phantom View of Brass Sliding Friction Shoe

FENESTRA PAGE 18 (SEE PLATES ON PAGES 19, 20, 21, 22)

Continued on next page

· STANDARD · TYPES · AND · SIZES ·

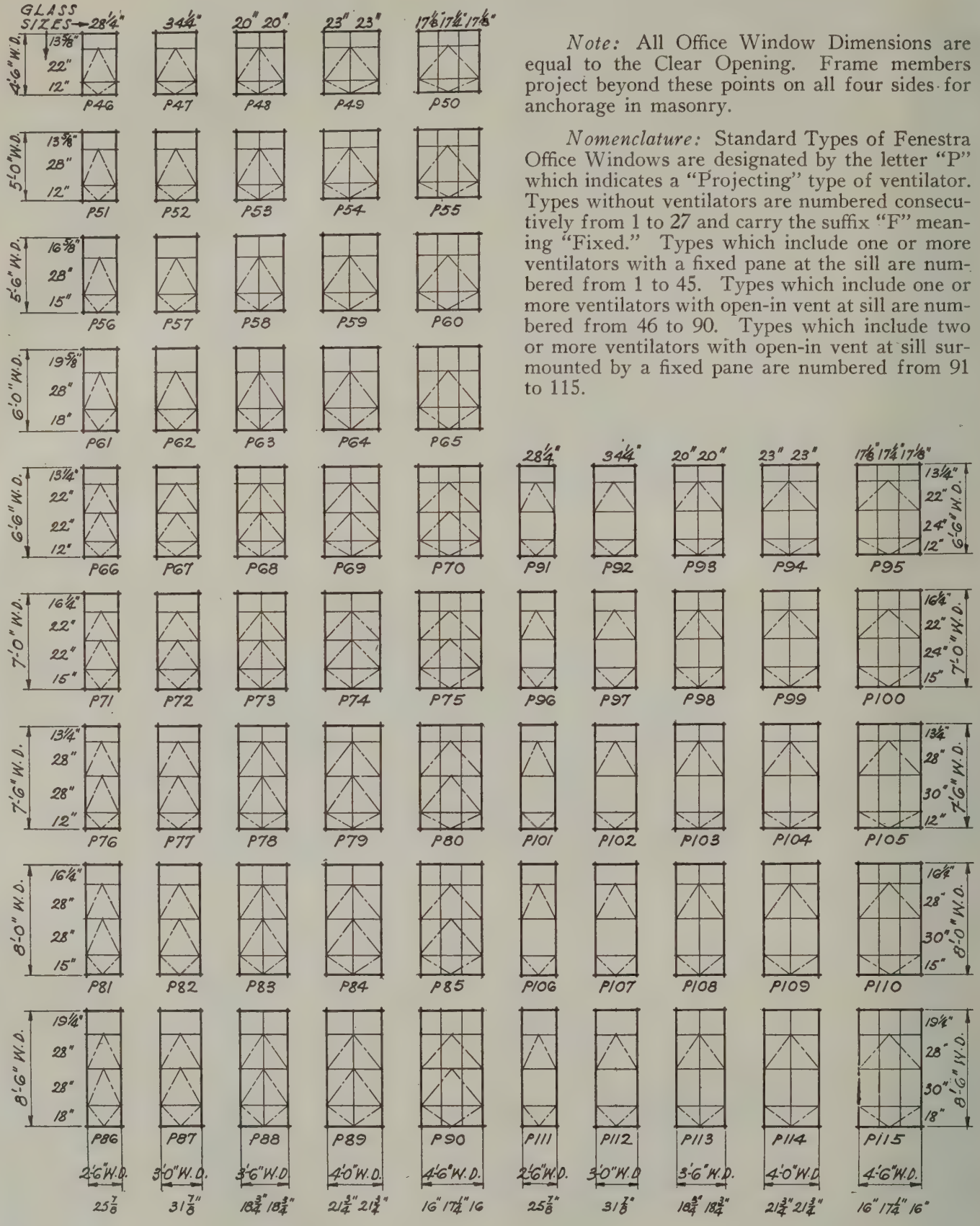


· VENTILATOR · GLASS · SIZES · SAME · AS · ON · PLATE № GA-102 ·

Fenestra August 1928	Steel Office Windows Types and Sizes	Plate № GA-101

Continued on next page

· STANDARD · TYPES · AND · SIZES ·

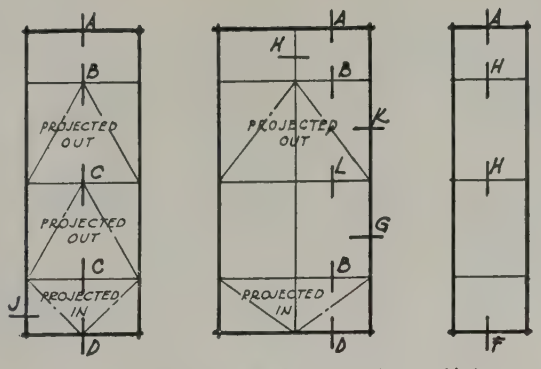


Note: All Office Window Dimensions are equal to the Clear Opening. Frame members project beyond these points on all four sides for anchorage in masonry.

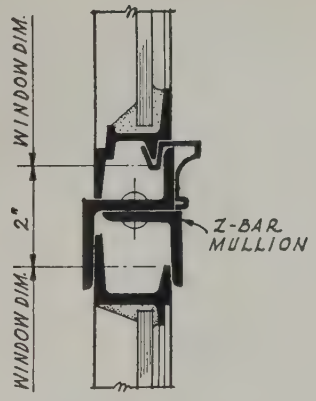
Nomenclature: Standard Types of Fenestra Office Windows are designated by the letter "P" which indicates a "Projecting" type of ventilator. Types without ventilators are numbered consecutively from 1 to 27 and carry the suffix "F" meaning "Fixed." Types which include one or more ventilators with a fixed pane at the sill are numbered from 1 to 45. Types which include one or more ventilators with open-in vent at sill are numbered from 46 to 90. Types which include two or more ventilators with open-in vent at sill surmounted by a fixed pane are numbered from 91 to 115.

Fenestra, August 1928	Steel Office Windows Types and Sizes	Plate No. GA-102

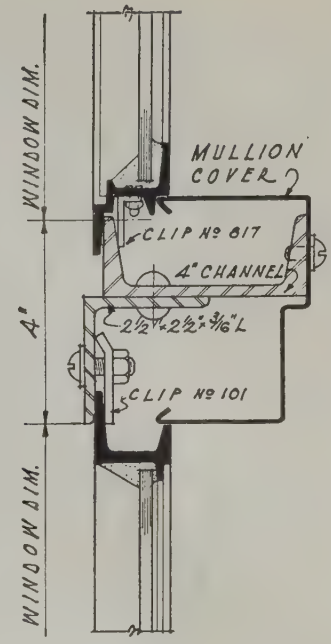
Continued on next page



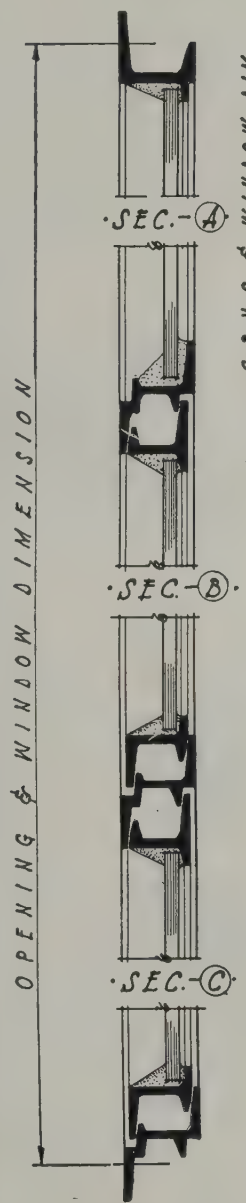
·TYPICAL·ELEVATIONS·



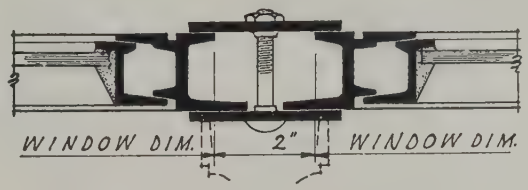
·HORIZONTAL·MULLION·
·TYPE·NO.-1·



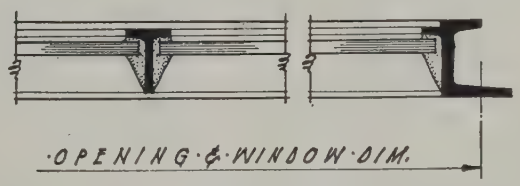
·HOR·MULLION·
·TYPE·NO.-2·



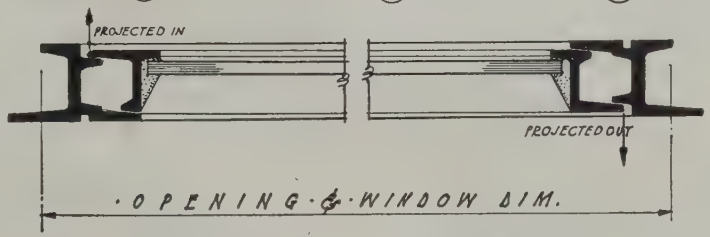
·SEC.-(A)·
·SEC.-(L)·
·SEC.-(B)·
·SEC.-(C)·
·SEC.-(D)·



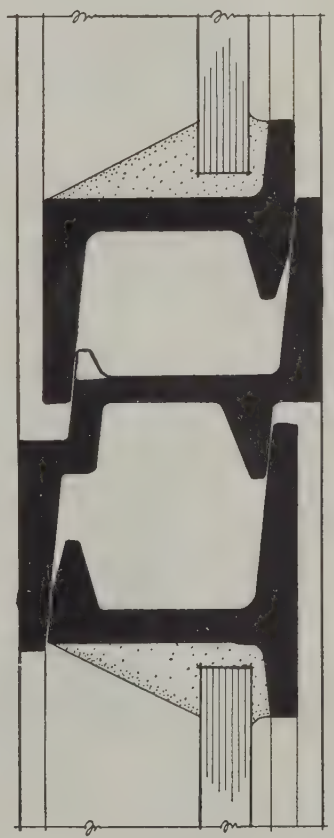
·VERTICAL·MULLION·



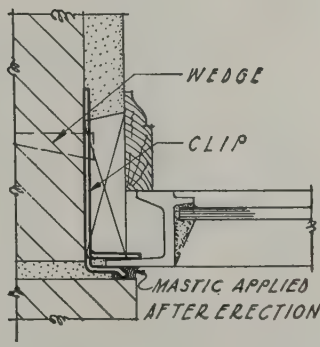
·SEC.-(F)· ·SEC.-(H)· ·SEC.-(G)·

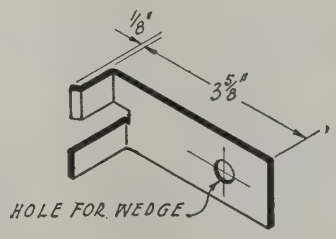


·SEC.-(J)· ·SEC.-(K)·



·FULL·SIZE·DETAIL·
·OF·MEETING·RAIL·



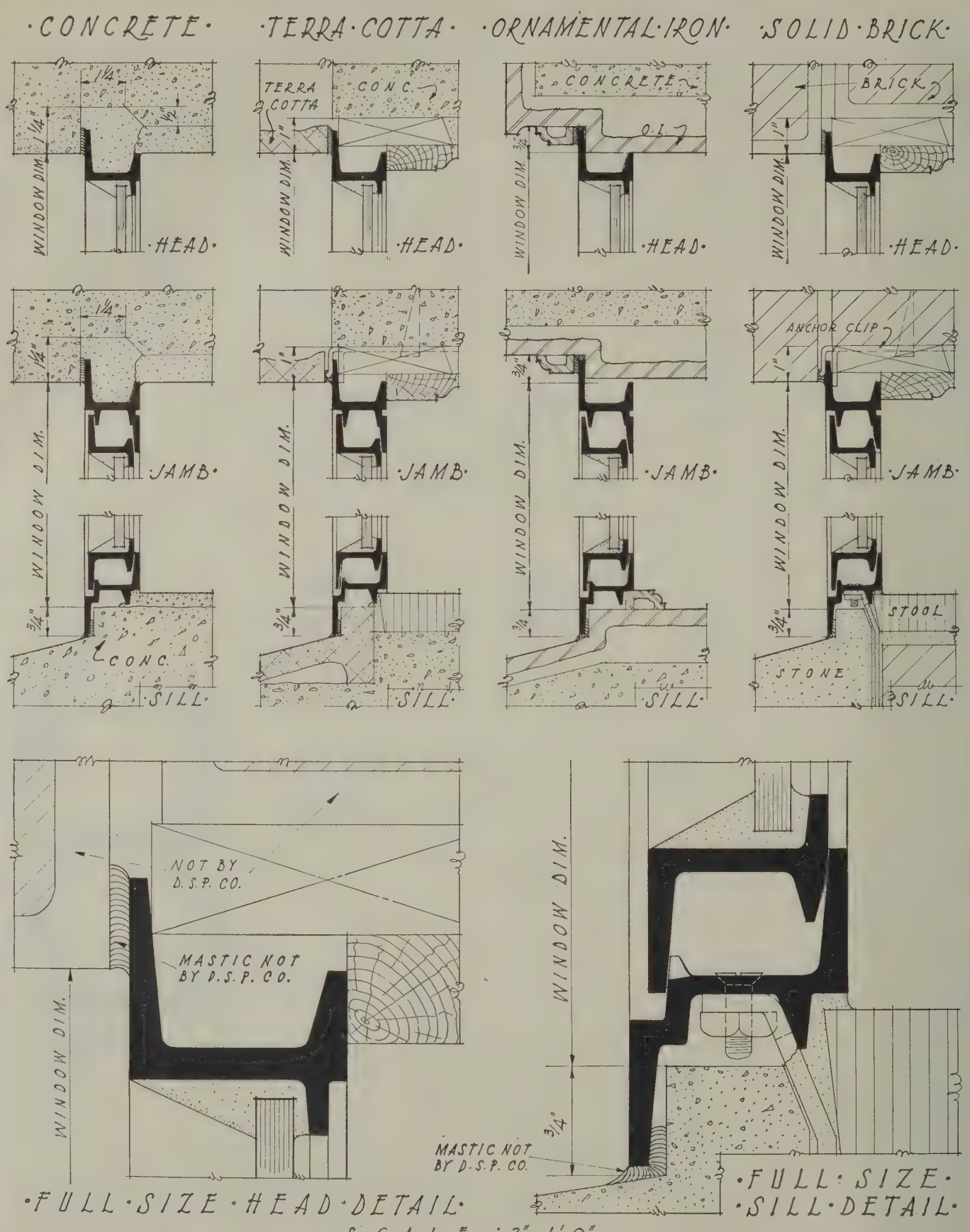


·ISOMETRIC VIEW·
·OF ANCHOR CLIP·

·DETAILS·OF·JAMB·ANCHOR·CLIP·
·SCALE 3"-1 0"·

Fenestra August 1928	Steel Office Windows Construction Details	Plate No GA-103

Continued on next page



Fenestra *August 1928*

Steel Office Windows
Installation Details

Plate No *GA-104*

Continued on next page

(GB) ARCHITECTURAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(GB-1) Work Included

Note: List and locate. (See Paragraph 13 Fenestra Page 2).

(GB-2) General

Architectural Projected Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

(GB-3) Materials

(GB-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in re-entrant angles.

(GB-3b) Frame Members—All frame members shall be unequal leg channel sections, outside leg 1⅝", inside leg ⅞".

(GB-3c) Muntins—Muntins shall be 1⅜" deep.

(GB-3d) Vertical Mullions—Vertical Mullions shall be standard Fenestra, hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(GB-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled, solid steel Z bars and angles) (structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GB-3f) Mullion Covers—(Vertical) (Horizontal) Mullion covers shall be of pressed steel designed to neatly cover mullion recesses.

(GB-4) Construction

(GB-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous two point, flat-contact weathering between ventilators and frames.

(GB-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at the intersections. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 40. An exclusive Fenestra feature.

(GB-4c) Glazing Angles—All glass shall be secured with glazing angles neatly mitered at corners. Angles shall be secured to head, jamb and sill frame and ventilator members with brass tap screws and to muntins with brass barrel screws.

(GB-4d) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(GB-4e) Horizontal Mullions—Where two or more windows are placed one above another in the same opening, provide horizontal mullions with bolts for frame attachment.

(GB-4f) Mullion Covers—Provide (vertical) (horizontal) steel mullion covers with the necessary clips and bolts for attachment.

(GB-4g) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(GB-5) Attached Hardware

Note: Attached at Factory.

(GB-5a) Ventilator Operating Hardware—Ventilators shall (swing-out from the bottom while sliding down from the top) (or) (swing-in from the top while sliding up from the bottom) as indicated. The *open-out* ventilators shall be so constructed that by tilting them slightly beyond the horizontal they may be conveniently washed from inside the building. (The *open-in* ventilators shall tilt to 90°.)

Note: Specify swing-out, swing-in or both as required.

Each ventilator shall be accurately balanced on two supporting arms of solid spring steel attached to the ventilator with bronze shoulder pivots, equipped with bronze washers. Connections between supporting arms and window frame shall be made by malleable iron brackets rigidly supported on the horizontal frame members or muntins and double riveted to the vertical frame members or muntins with arms attached by bronze shoulder pivots.

Each ventilator shall be equipped with two bronze friction shoes sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Friction shoes shall be channel shaped (to insure ease of operation) and mounted on bronze shouldered studs, so constructed that through galvanized compression springs (covered by weather protecting bronze tubes) uniform tension is secured. Shoes shall be accurately gauged and located and solidly riveted in place to assure proper, constant pressure at the jambs.

(GB-5b) Alignment Springs—Each *open-out* ventilator shall be equipped with two shouldered, alignment-control bronze springs riveted to the channel jambs.

Note: The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle or reverse for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic. See Fenestra Page 24.

Note: Include if open-out ventilators are used.

(GB-5c) Alignment Stops—Each *open-in* ventilator shall be equipped with a solid steel stop which prevents its opening farther than 90°.

Note: Include if open-in ventilators are used.

(GB-5d) Cam Handle Brackets—Where required, provide special design malleable iron brackets, triple riveted to ventilators, for attachment of cam handles.

(GB-6) Detached Hardware

Note: See Fenestra Page 24.

(GB-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(GB-6b) All hardware for Architectural Projected Windows shall be of bronze, oxidized bronze finish.

(GB-6c) Locking and Operating Devices

Note: Select as required.

Note: Where ventilators are screened, special flat-type bronze handles may be secured which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Bronze cam handle, Part 114, attached to malleable iron bracket by bronze screw-head bolt through steel spring friction clevis. Bronze strike plate carrying a 6" bronze hook stay, Part 122, riveted to window at ventilator sill.

(2) *For open-out ventilators beyond reach from floor*—Riveted bronze pole ring, Part 151, at head of ventilator. Bronze cam handle, Part 150, with hole for pole hook, attached to malleable iron brackets by bronze, screw-head, steel, spring, friction clevis. Riveted bronze strike plate.

(3) *For open-in ventilators within reach from floor*—Riveted bronze spring latch with ornamental handle, Part 212, at head of ventilator. Riveted bronze lipped strike.

(4) *For open-in ventilators beyond reach from floor*—(Riveted bronze spring latch with pole hook ring handle, Part 147, at head of ventilator; riveted steel strike). (Riveted bronze spring latch with endless chain, Part 146, at head of ventilator. Riveted steel strike. Riveted bronze chain guide, Part 149, at sill).

Note: Select type desired.

(GB-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. (See Paragraph 9, Fenestra Page 1.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GB-7a) All Architectural Projected Windows shall be erected in prepared openings by the Fenestra Construction Company, under a separate contract.

Note: See paragraph 5 Fenestra Page 1.

(GB-7b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing.

Standard Fenestra sill anchors shall be used under the following conditions:

(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.

(2) In all cases where the window is over 5′ 0″ wide, regardless of the location of the ventilators.

(3) In all multiple unit openings where mullions are not anchored into the sills.

All ventilators shall be properly adjusted before glazing.

(Continued on Fenestra Page 24)

Continued on next page

(GB-7c) Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting has been completed.

(GB-8) Painting

All Windows shall be given one dip-coat of red mineral paint by the Manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:
One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.
Note: Where desired, the Fenestra Construction Company *(see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.*

(GB-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:
Note: See Paragraph 10 Fenestra Page 2.

(GB-9a) Glass—Glass shall be (¼" thick plate) (¼" wire of type desired) (double strength).

Note: ¼" thick glass is recommended. Single strength glass is not recommended.

(GB-9b) Putty—Putty shall be a high grade steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(GB-9c) Glazing—All Architectural Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured with glazing angles set against face putty neatly and smoothly applied.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (GB-8).

(GB-10) Provision for Screens

Note: Fenestra Page 28 gives suggestions for screening provisions. Include in the Carpentry Specifications the necessary clauses covering wood trim required in conjunction with screens. Space between inside screen and window must be not less than 2" to clear standard hardware. If special "Flat Type" handles are specified. (See note, paragraph [GB-6c] 1" clearance only is required.) On account of the roller, rolling screens require a 2½" clearance.

(GB-11) Screens

Note: On open-out ventilators, metal side hinged or vertical sliding screens may be used as desired. Rolling screens up to 6' 0" wide may be used where entire window is covered. On open-in ventilators, metal, removable, fixed, outside screens may be used. Screens are not included by the Window Manufacturer and should, therefore, be provided for under another division of the specification.

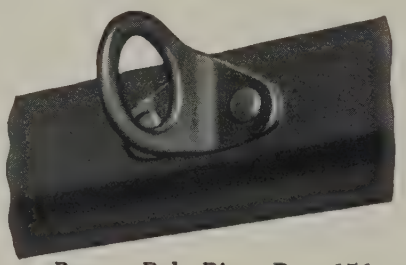
(GB-12) Shading

Note: All shades must be located at least 2" from the inside face of the window for hardware clearance. Clearance for screens depends upon the type selected.
Note: Shade bracket clips designed to attach by drilling and tapping two small holes at the top of each jamb section are supplied at slight added cost (see Fenestra Page 28). These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. Shade clips cannot be used satisfactorily with rolling screens but shade brackets may be attached to the underside of screen box. Brackets of various projections may be used to clear any type of screening except where whole opening is screened. If shade bracket clips are required, so specify.

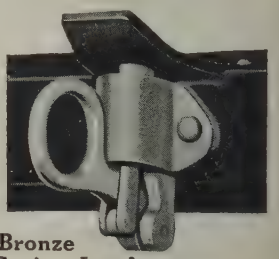
Fig. 1

Bronze Spring Latch with Chain, Part 146

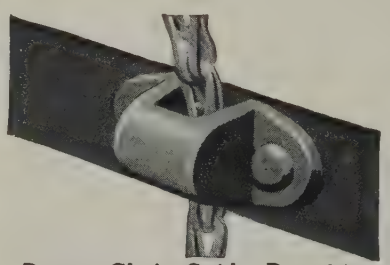
Figs. 1 and 2 show views of the alignment stop. Fig. 1, ventilator against the stop. Fig. 2, ventilator below the stop.



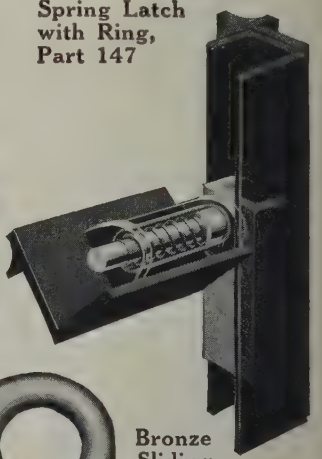
Bronze Pole Ring, Part 151



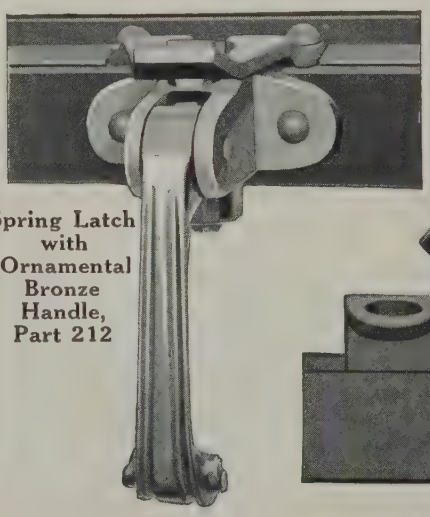
Bronze Spring Latch with Ring, Part 147



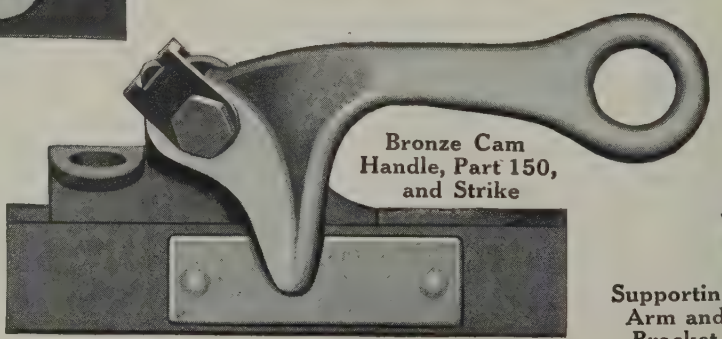
Bronze Chain Guide, Part 149



Bronze Sliding Friction Shoe

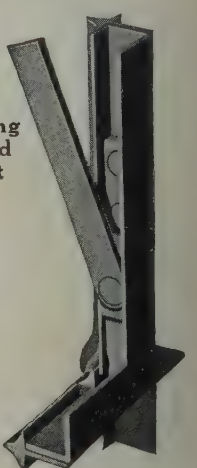


Spring Latch with Ornamental Bronze Handle, Part 212

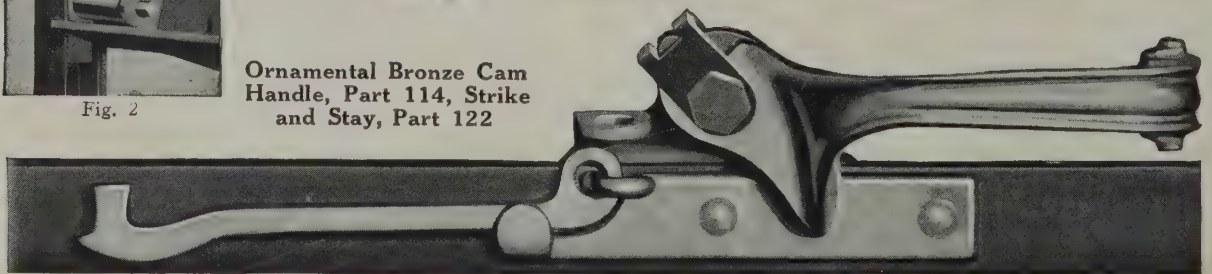


Bronze Cam Handle, Part 150, and Strike

Fig. 2



Supporting Arm and Bracket



Ornamental Bronze Cam Handle, Part 114, Strike and Stay, Part 122

Architectural Projected Window Hardware

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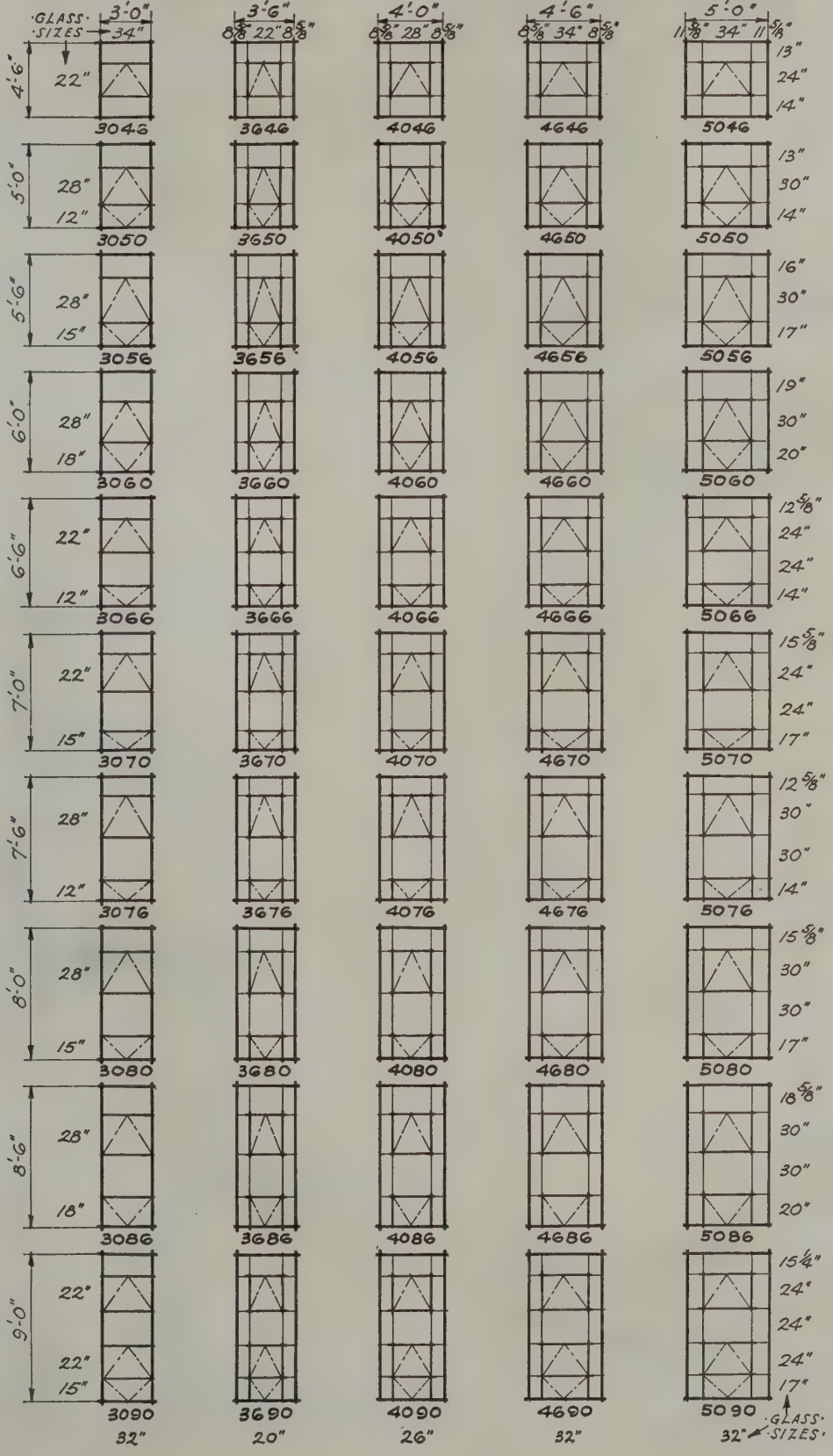
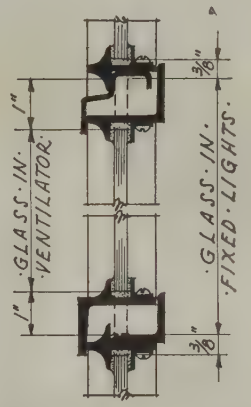
• STANDARD • TYPES • AND • SIZES •

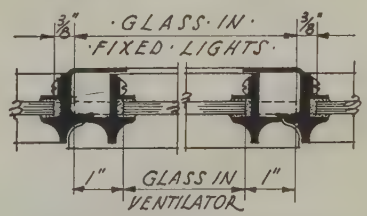


DIMENSIONS SHOWN FOR TYPES ARE OPENING SIZES. SEE INSTALLATION DETAILS PLATE GB-203. FOR SYMETRICAL COMBINED WIDTHS SEE PLATE GB-202.

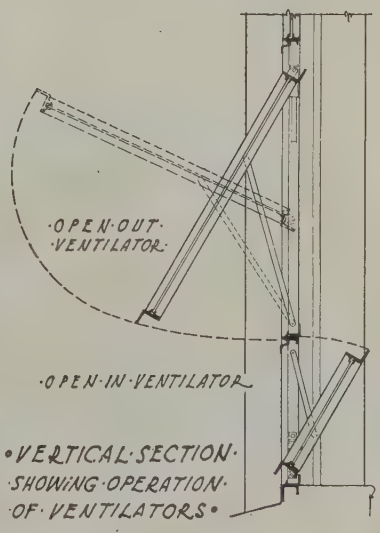
GLASS SIZES SHOWN ABOVE AND TO THE RIGHT OF TYPES ARE FOR FIXED LIGHTS. THOSE SHOWN BELOW AND TO THE LEFT OF TYPES ARE FOR VENTILATORS ONLY. SECTIONS BELOW SHOW RELATION OF GLASS IN FIXED AND VENTILATOR LIGHTS.



• VERTICAL SECTION •



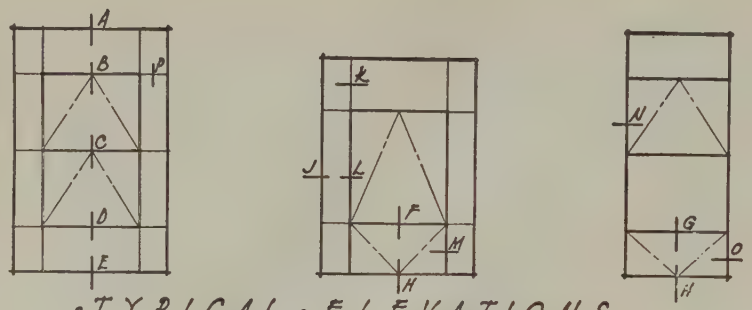
• HORIZONTAL SECTION •



• VERTICAL SECTION SHOWING OPERATION OF VENTILATORS •

Fenestra, August 1928	Architectural Projected Windows — Types and Sizes	Plate No. GB-201

Continued on next page

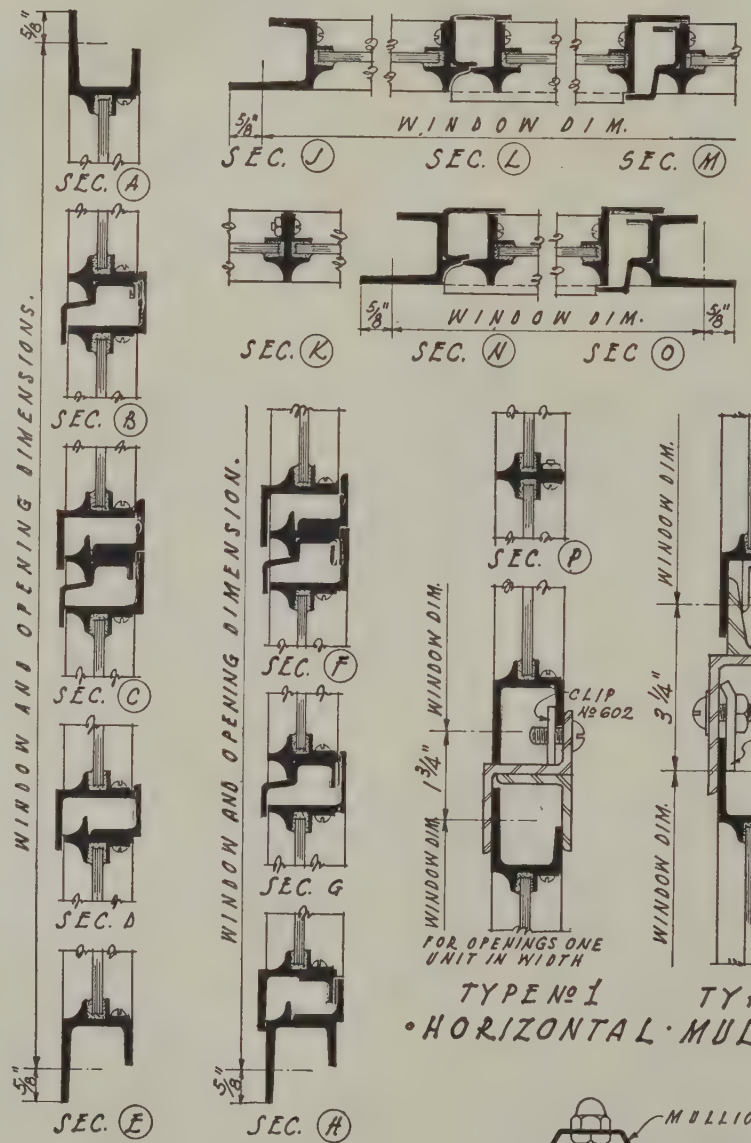


•TYPICAL·ELEVATIONS•

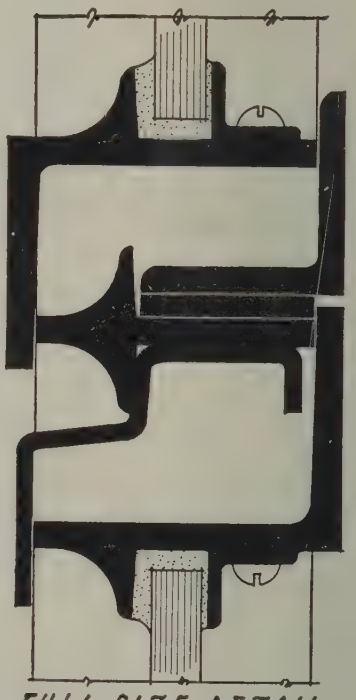
SYMMETRICAL COMBINED UNITS

Width of opening, ft. in.	Units wide	Lights wide	Arrangement of units in opening (letter "M" indicates mullion) ft. in.
6 2¼	2	2	3 0—M—3 0
7 2¼	2	6	3 6—M—3 6
8 2¼	2	6	4 0—M—4 0
9 2¼	2	6	4 6—M—4 6
9 4½	3	3	3 0—M—3 0—M—3 0
9 10½	3	5	3 0—M—3 6—M—3 0
10 2¼	2	6	5 0—M—5 0
10 4½	3	5	3 0—M—4 0—M—3 0
10 4½	3	7	3 6—M—3 0—M—3 6
10 10½	3	5	3 0—M—4 6—M—3 0
10 10½	3	9	3 6—M—3 6—M—3 6
11 4½	3	5	3 0—M—5 0—M—3 0
11 4½	3	7	4 0—M—3 0—M—4 0
11 4½	3	9	3 6—M—4 0—M—3 6
11 10½	3	9	3 6—M—4 6—M—3 6
11 10½	3	9	4 0—M—3 6—M—4 0
12 4½	3	7	4 6—M—3 0—M—4 6
12 4½	3	9	4 0—M—4 0—M—4 0
12 4½	3	9	3 6—M—5 0—M—3 6

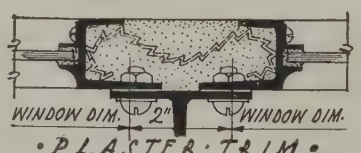
Use these width dimensions with any height dimension.



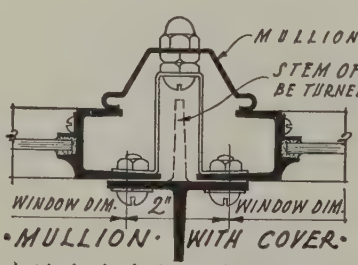
TYPE Nº 1 TYPE Nº 2
•HORIZONTAL·MULLIONS•



•FULL·SIZE·DETAIL·
·OF·MEETING·RAIL·



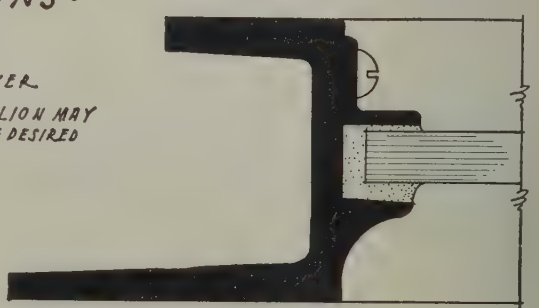
•PLASTER·TRIM•



•MULLION·WITH COVER·

•VERTICAL·MULLIONS•

•SCALE: 3"=1'-0"•



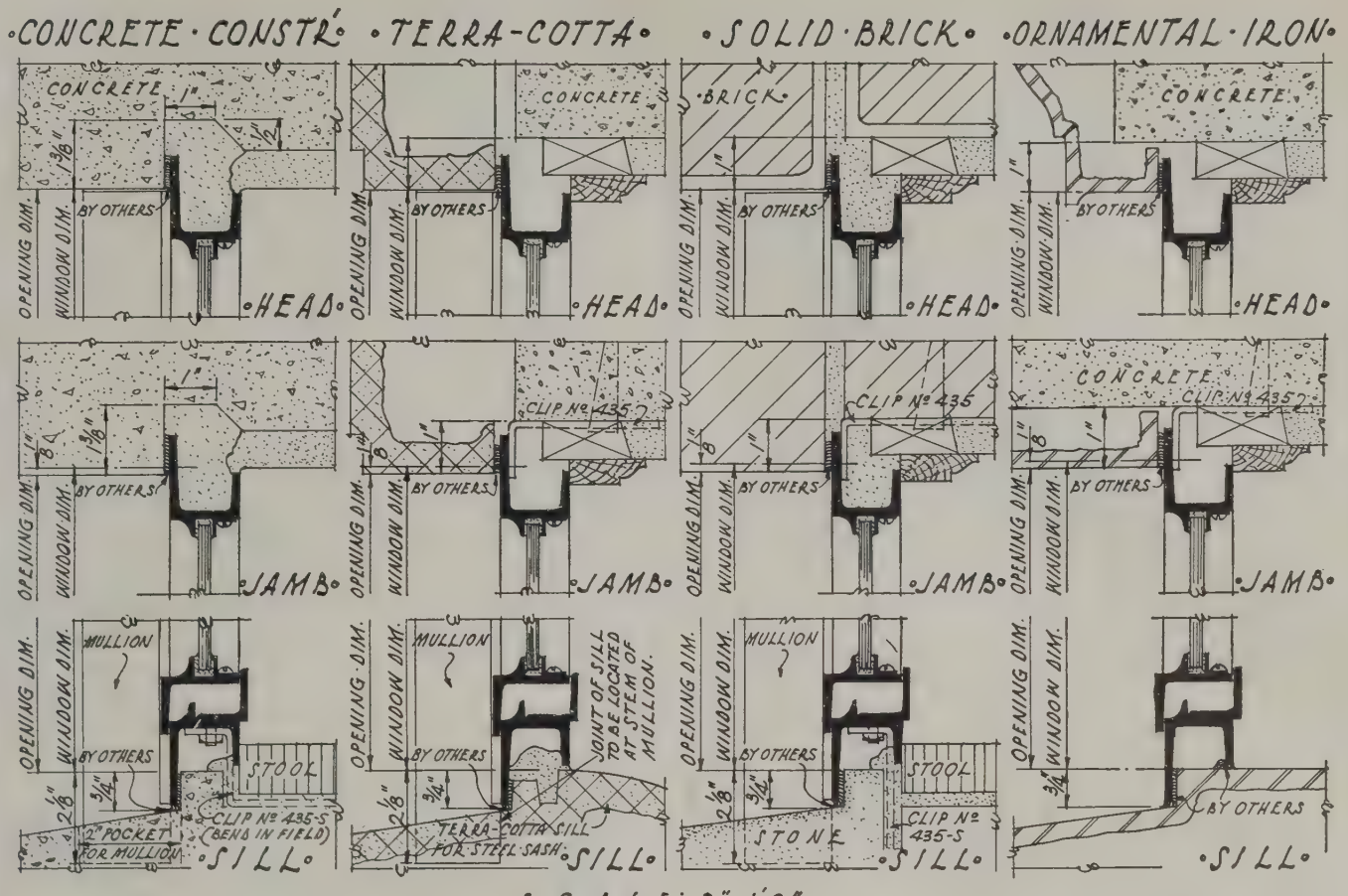
•FULL·SIZE·JAMB·DETAIL•

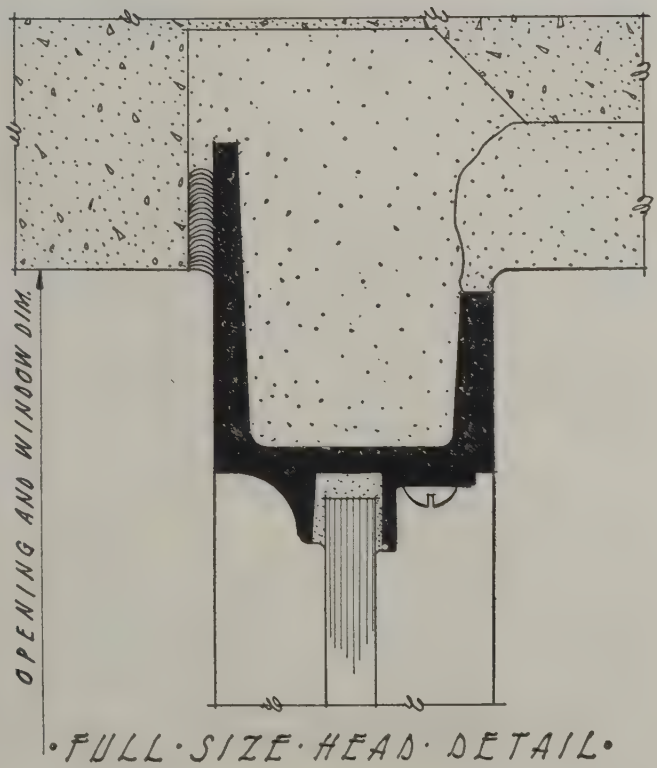
Fenestra August 1928

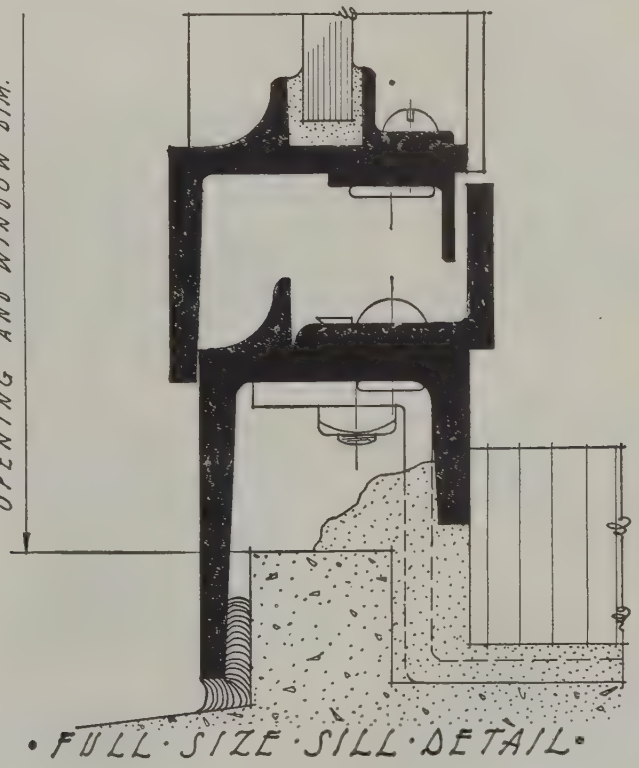
Architectural Projected Windows
Details and Combinations

Plate Nº GB-202

Continued on next page

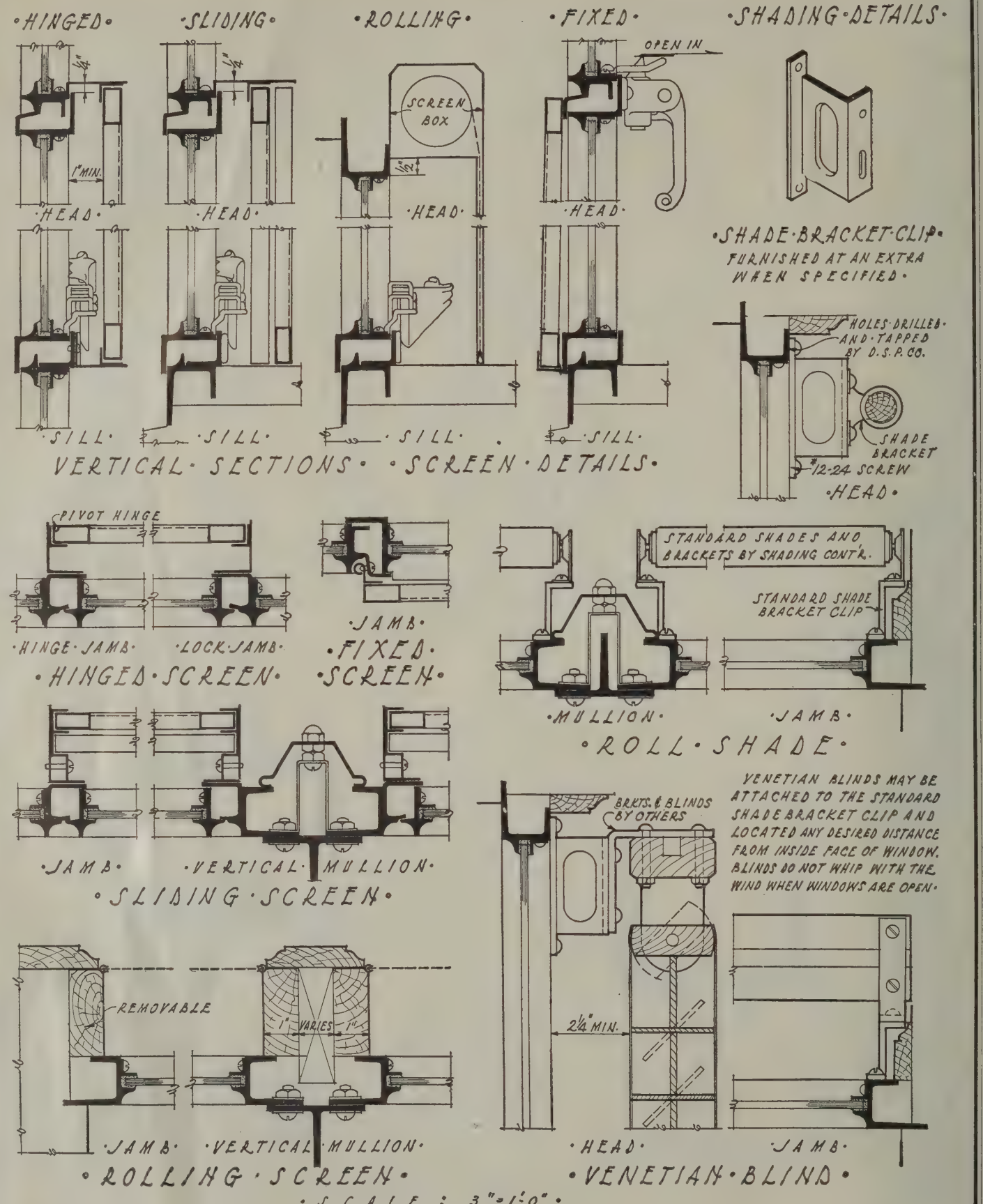






Fenestra, August 1928	Architectural Projected Windows Installation Details	Plate Nº GB-203

Continued on next page



Fenestra August 1928	Architectural Projected Windows Screening and Shading Details	Plate No GB-204

Continued on next page

(GC) COMMERCIAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: Commercial Projected Windows are in general design and operation similar to Architectural Projected Windows. They are made to meet the demand for a less expensive window of this type. The chief differences between the two are (1) the section of the frame member; (2) the addition of muntins dividing the window into small panes; (3) inside putty instead of glazing angles; (4) use of malleable iron instead of bronze hardware.

Note: Commercial Projected Windows with "open-in" ventilators are particularly adapted to Food Products Plants since these windows may be screened economically. See Paragraphs (GC-10) and (GC-11).

Note: To avoid repetition where the specification is the same as that for the Architectural Projected Windows, this is so noted. Where not identical, use the clauses here given. For Specification for Architectural Projected Window referred to, see Fenestra Page 23.

(GC-1) Work Included

Same as (GB-1).

(GC-2) General

Commercial Projected Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

(GC-3) Materials

(GC-3a) Window Sections—Same as (GB-3a).

(GC-3b) Frame Members—All frame members shall be (special angle sections with protruding leg 1" deep) (special unequal leg channel sections).

Note: Select as required unequal leg channel at added cost over angle section.

(GC-3c) Muntins—Same as (GB-3c).

(GC-3d) Vertical Mullions—Same as (GB-3d).

(GC-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled solid steel T bars) (Structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GC-3f) Mullion Covers—Same as (GB-3f).

(GC-4) Construction

(GC-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted at all corners. Ventilators shall, in addition to riveting, be electrically welded at corners, with exposed faces ground to a smooth finish.

(GC-4b) Muntins—Same as (GB-4b).

(GC-4c) Vertical Mullions—Same as (GB-4d).

(GC-4d) Horizontal Mullions—Same as (GB-4e).

(GC-4e) Mullion Covers—Same as (GB-4f).

(GC-4f) Sill and Jamb Anchor Clips—Same as (GB-4g).

(GC-5) Attached Hardware

Note: Attached at factory.

(GC-5a) Ventilator Operating Hardware—Same as (GB-5b) (GB-5c).

(GC-5d) Cam Handle Brackets—Where required, provide solid rolled steel Z bar brackets, triple riveted to the ventilators, for the attachment of cam handles.

(GC-6) Detached Hardware

(GC-6a) Same as (GB-6a).

(GC-6b) All hardware for Commercial Projected Windows shall be (malleable iron with one coat of red mineral paint) (bronze, oxidized bronze finish).

Note: Select as required. Bronze at added cost over iron.

(GC-6d) Locking and Operating Devices—

Note: Select as required.

Note: Where ventilators are screened, special flat type handles may be secured at added cost which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Malleable iron cam handle attached to Z bar bracket by bolt and nut, Part 150.

(2) *For open-out ventilators beyond reach from floor*—Riveted malleable iron pole hook ring at head of ventilator, Part 151, malleable iron cam handle, Part 150, with hole for pole hook, attached to Z bar bracket by bolt and nut.

(3) *For open-in ventilators within reach from floor*—Riveted malleable iron spring latch with finger ring handle at head of ventilator, Part 147.

(4) *For open-in ventilators beyond reach from floor*—(Riveted malleable iron spring latch with endless chain, Part 146, at head of ventilator. Riveted iron chain guide, Part 149, at sill) (or) (Riveted malleable iron spring latch with pole hook ring handle, Part 147, at head).

(GC-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. See Paragraph 9, Fenestra Page 1.

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GC-7a) All Commercial Projected Windows shall be erected in prepared openings by the Fenestra Construction Company, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(GC-7b) Same as (GB-7b).

(GC-7c) Same as (GB-7c).

(GC-8) Painting

Same as (GB-8).

(GC-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(GC-9a) Glass—Same as (GB-9a).

(GC-9b) Putty—Same as (GB-9b).

(GC-9c) Glazing—All Commercial Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring, glazing clips furnished by the window manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Glazing angles are obtainable at slight added cost.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (GB-8).

(GC-10) Provision for Screens

(GC-10a) For Open-out Ventilators—Same as (GB-10).

(GC-10b) For Open-in Ventilators—For open-in ventilators provide permanent brackets for removable screen support.

Note: See Fenestra Page 31.

(GC-11) Screens

Same as (GB-11).

Note: Where desired for open-in ventilators, the Window Manufacturer will furnish, at reasonable added cost, removable, tubular, steel frame, rewirable screens (baked enameled finish) with No. 16 mesh bronze screen cloth. These screens are well constructed and furnished completely adapted to and fitting the ventilator opening. (See Fenestra Page 33.) If required so specify.

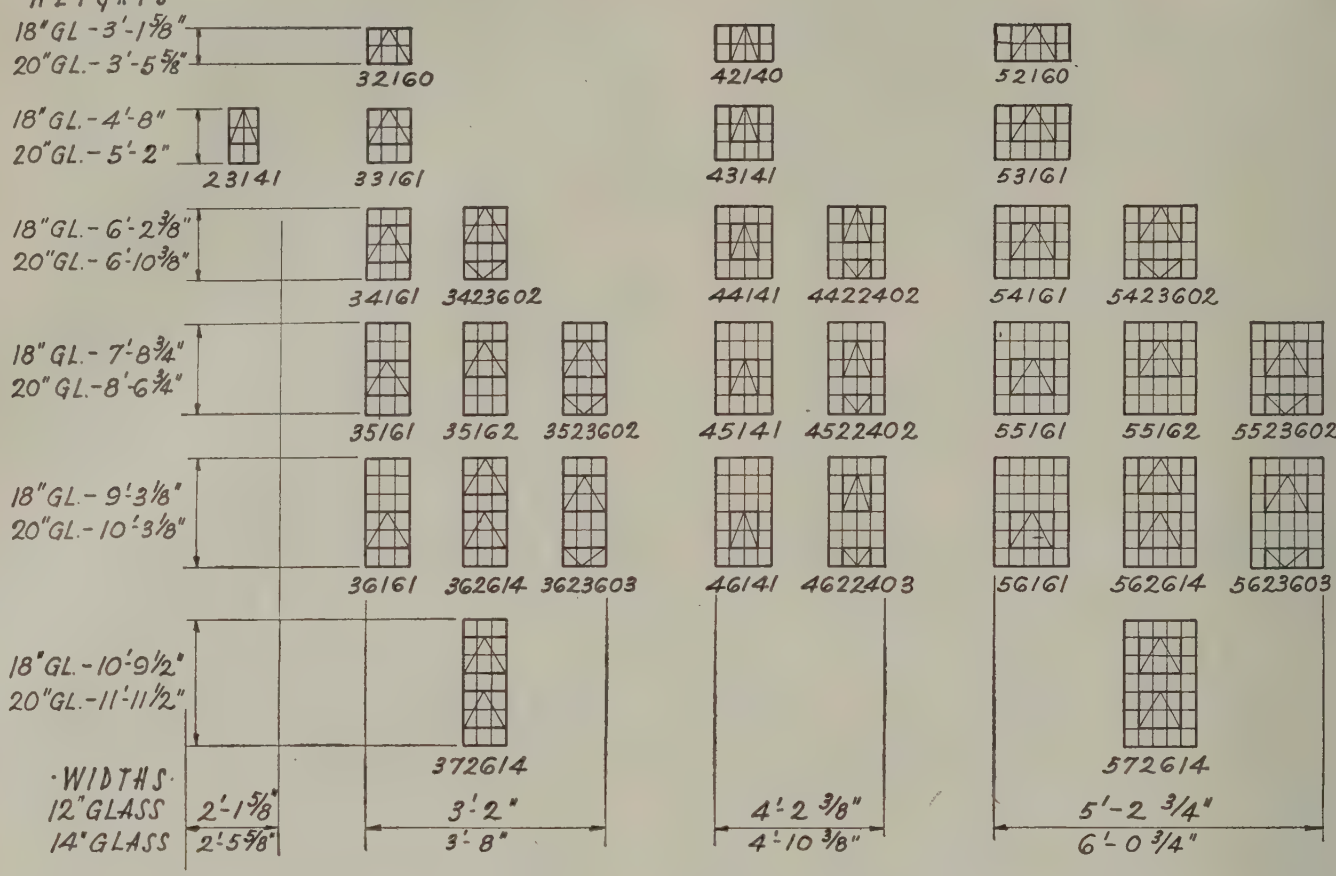
(GC-12) Shading

Note: Where ventilators are "open out" shade bracket clips, slotted to accommodate standard shade brackets, may be attached by drilling and tapping two small holes at the top of each jamb section of the frame. Clips are supplied at slight added cost. If required so specify.

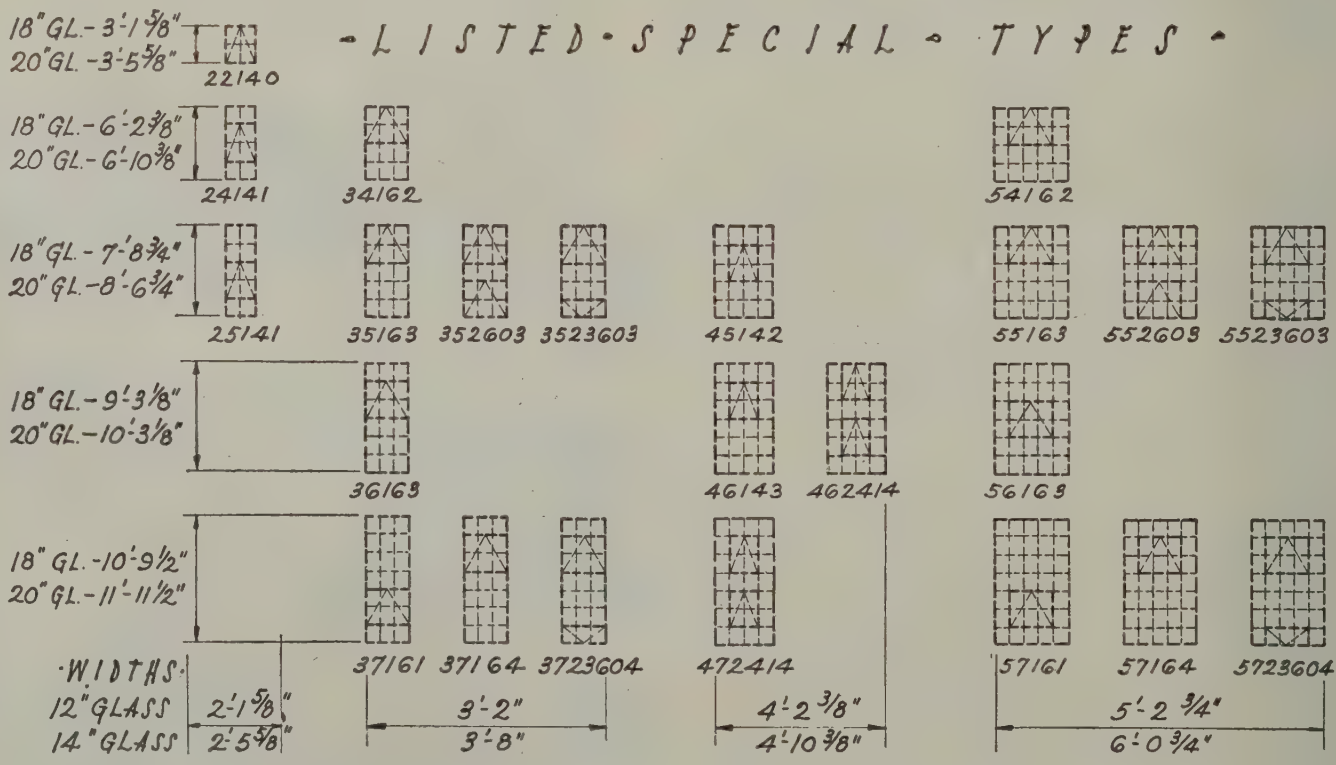
Commercial Projected Window Hardware

Continued on next page

STANDARD TYPES



LISTED SPECIAL TYPES



Fenestra, August 1928	Commercial Projected Windows Types and Sizes	Plate No. GC-301

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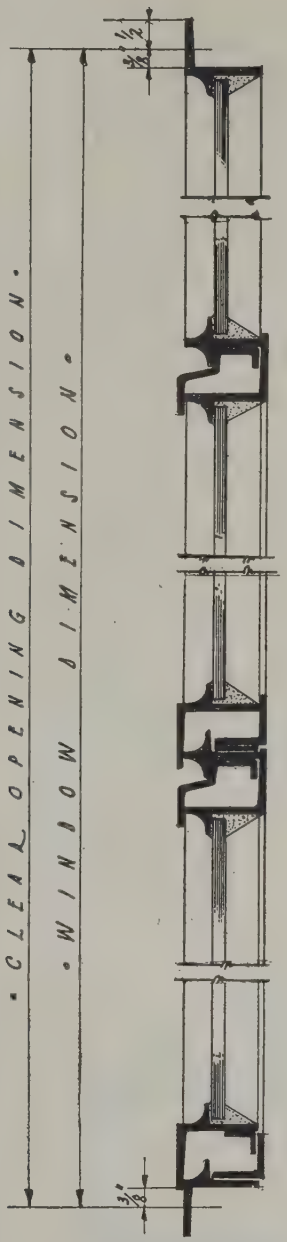
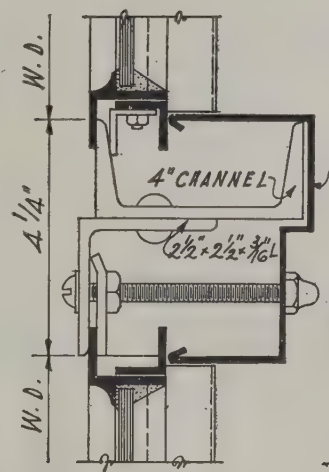


VERTICAL SECTION

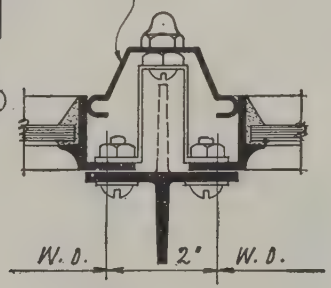
Symmetrical Combined Widths

12" x 18" Glass	14" x 20" Glass	Units Wide	Lights Wide	No. of Units and Lights Per Unit
2' 1⅝"	2' 5⅝"	1	2	2
3' 2"	3' 8"	1	3	3
4' 2⅜"	4' 10⅜"	1	4	4
4' 5¼"	5' 1¼"	2	4	2, 2
5' 2¾"	6' 0¾"	1	5	5
6' 6"	7' 6"	2	6	3, 3
8' 6¾"	9' 10¾"	2	8	4, 4
9' 10"	11' 4"	3	9	3, 3, 3
10' 7½"	12' 3½"	2	10	5,5
10' 10⅜"	12' 6⅜"	3	10	3, 4, 3
11' 10¾"	13' 8¾"	3	11	3, 5, 3
12' 11⅛"	14' 11⅛"	3	12	4, 4, 4
13' 11½"	16' 1½"	3	13	4, 5, 4
13' 11½"	16' 1½"	3	13	5, 3, 5
14' 11⅞"	17' 3⅞"	3	14	5, 4, 5
15' 2¾"	17' 6¾"	4	14	3, 4, 4, 3
16' 0¼"	18' 6¼"	3	15	5, 5, 5
17' 3½"	19' 11½"	4	16	4, 4, 4, 4
19' 4¼"	22' 4¼"	4	18	4, 5, 5, 4
20' 7½"	23' 9½"	5	19	5, 3, 3, 3, 5
21' 5"	24' 9"	4	20	5, 5, 5, 5

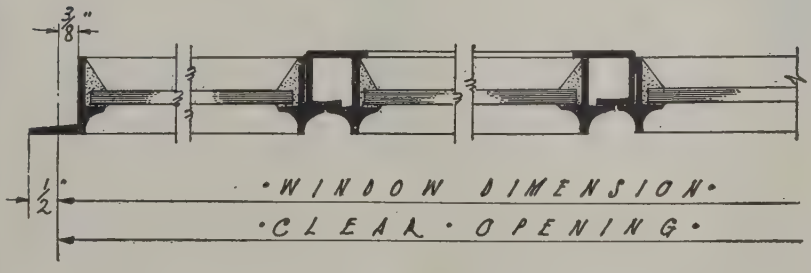
COMBINE WIDTH DIMENSIONS IN COL. 1 WITH 12"×18" GLASS HEIGHTS ONLY.
COMBINE WIDTH DIMENSIONS IN COL. 2 WITH 14"×20" GLASS HEIGHTS ONLY.



HORIZONTAL MULLION



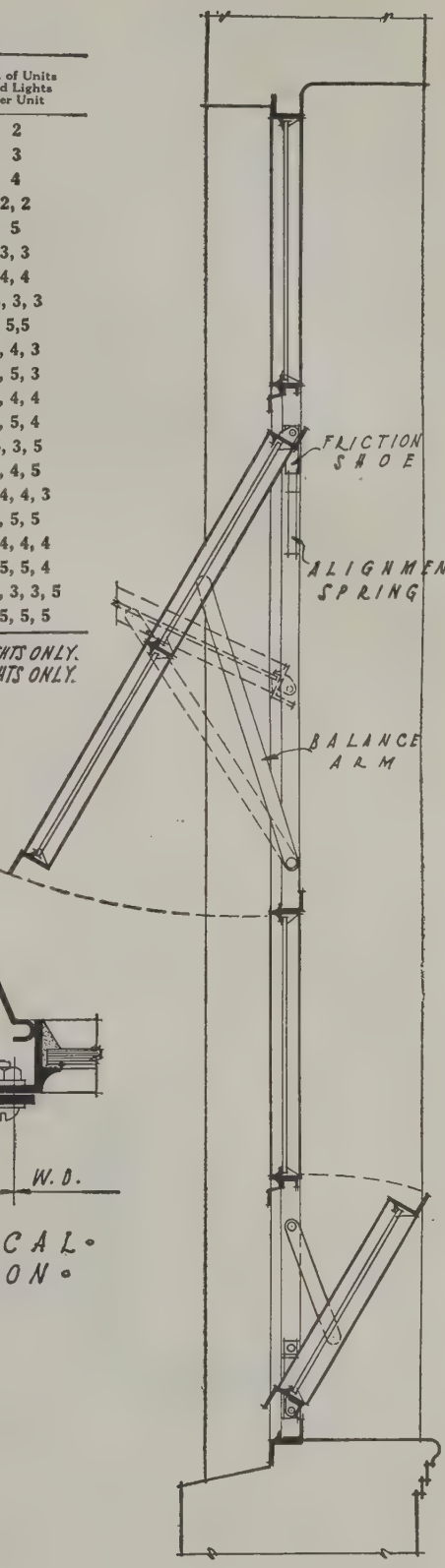
VERTICAL MULLION



OUTSIDE

HORIZONTAL SECTION

SCALE: 3" = 1'-0"



SECTION SHOWING OPERATION OF VENTS

Fenestra, August 1928	Commercial Projected Windows Details and Combinations	Plate No. GC-302

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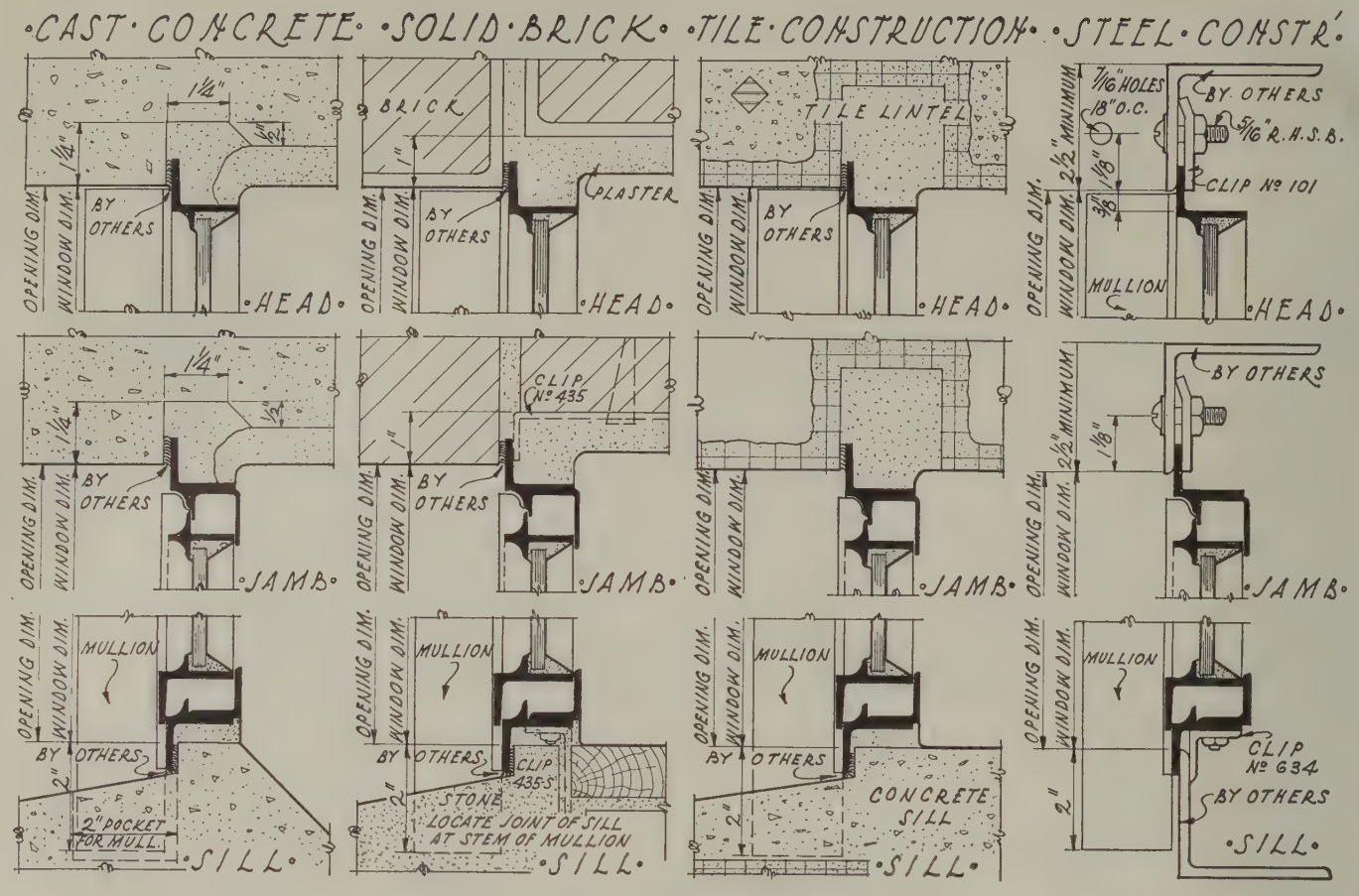
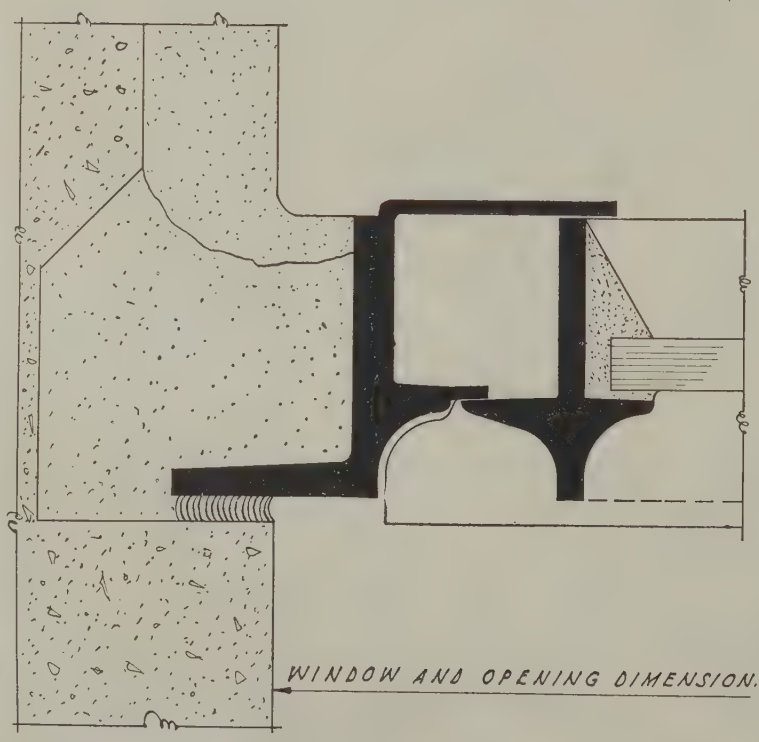
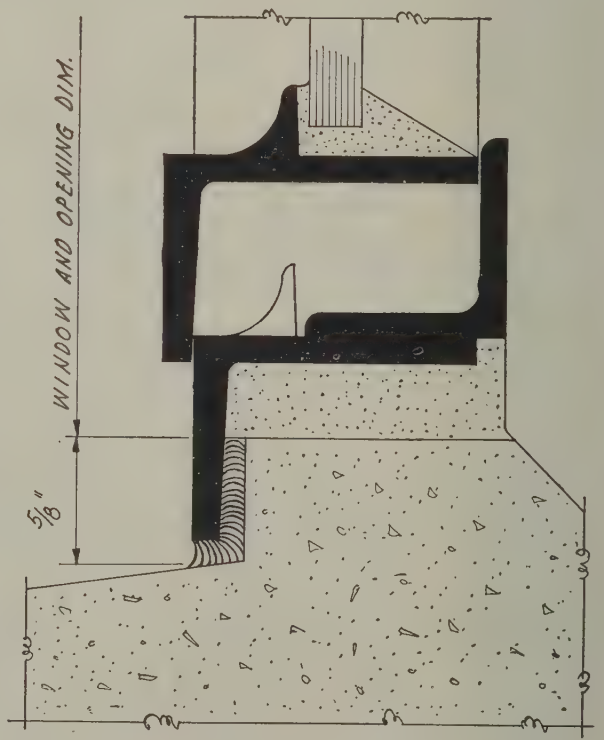




FULL SIZE DETAIL OF JAMB



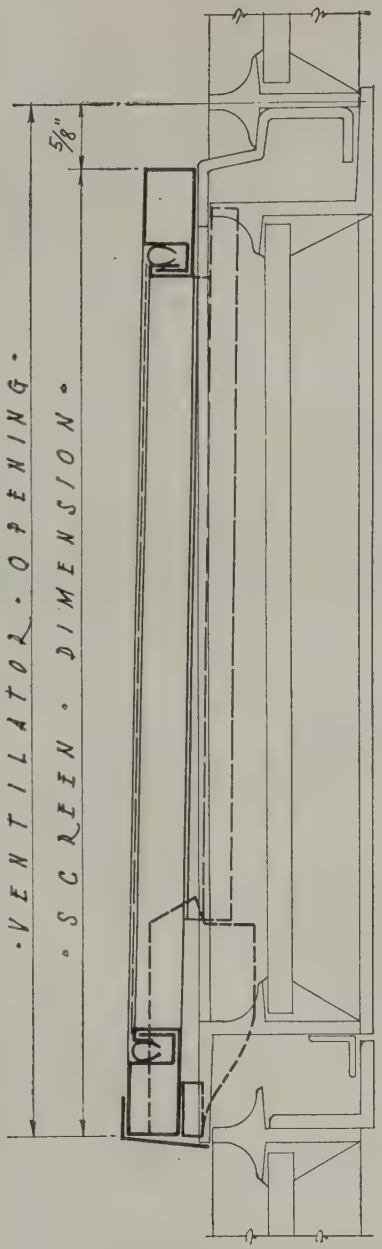
FULL SIZE DETAIL OF SILL

Fenestra August 1928

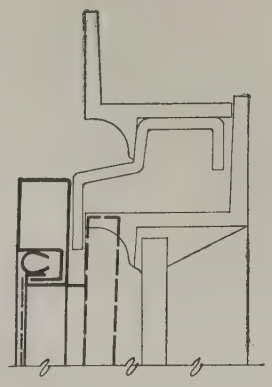
Commercial Projected Windows
Installation Details

Plate No GC-303

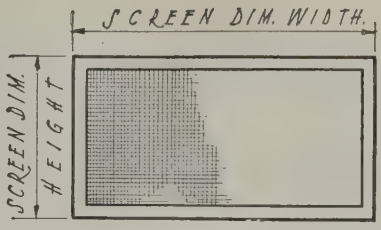
Continued on next page



VERTICAL SECTION



DETAIL WHEN VENT COMES TO HEAD



SIZE OF VENT	SIZE OF SCREEN	
	WIDTH	HEIGHT
4 PANE 12×18	23 7/8"	36 1/8"
6 PANE 12×18	36 1/4"	36 1/8"
8 PANE 12×18	48 5/8"	36 1/8"
4 PANE 14×20	27 7/8"	40 1/8"
6 PANE 14×20	42 1/4"	40 1/8"
8 PANE 14×20	56 5/8"	40 1/8"

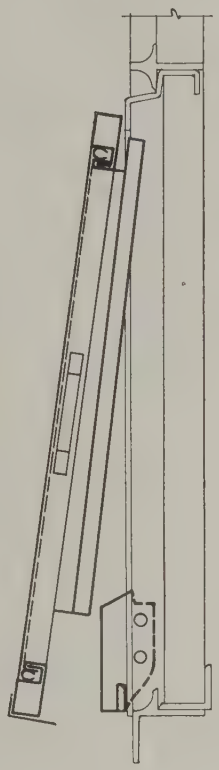
SIZES SHOWN ABOVE ARE STANDARD. ANY SIZE NOT SHOWN IS SPECIAL. SCREEN WIDTH AND HEIGHT CAN BE DETERMINED BY SUBTRACTING DIMENSIONS SHOWN ON SECTIONS, FROM THE VENTILATOR OPENING.

SCREEN FRAMES ARE MADE OF OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL.

CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE

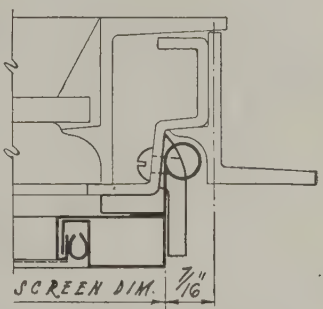
WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

IF SCREENING IS NOT SPECIFIED AND LATER IS DESIRED, IT WILL BE NECESSARY TO DRILL HOLES FOR CLIPS IN FIELD.

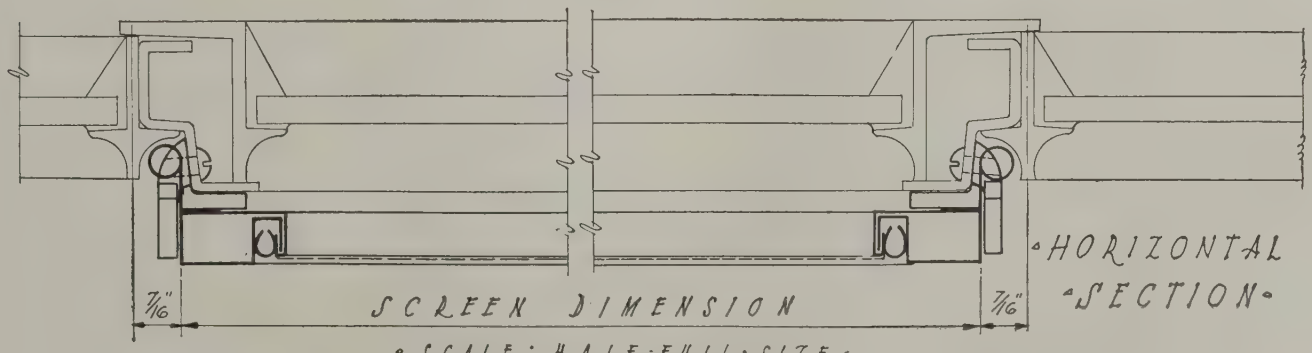


METHOD OF ATTACHING SCREEN TO WINDOW

FIRST-OPEN VENTILATOR SLIDE END OF BAFFLE UNDER WEATHERING.
SECOND-PUSH SCREEN UP AS FAR AS IT WILL GO.
THIRD -BRING BOTTOM OF SCREEN FRAME IN TIGHT AGAINST OUTSIDE OF WINDOW
FOURTH-PUSH SCREEN DOWN FORCING BAFFLE BACK OF LUG ON BRACKET.



DETAIL WHEN SCREEN COMES TO JAMBS



HORIZONTAL SECTION

SCALE: HALF FULL SIZE

Fenestra *August 1928*

Commercial Projected Windows
Screening Details

Plate No GC-304

Continued on next page

(L) HORIZONTALLY PIVOTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

(L-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(L-2) General

Horizontally Pivoted Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

(L-3) Materials

(L-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(L-3b) Frame Members—All frame members shall be special angle sections.

(L-3c) Muntins—Muntins shall be 1⅜" deep.

(L-3d) Vertical Mullions—Vertical mullions shall be standard Fenestra hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(L-3e) Horizontal Mullions—

Note: Horizontal structural mullions are not furnished by the window manufacturer. Include structural steel horizontal mullions in Structural Steel Specifications.

(L-4) Construction

(L-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted, at all corners. Provide continuous two point, flat-contact weathering between ventilators and frames.

(L-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase their strength at the point of intersection. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 40. An exclusive Fenestra feature.

(L-4c) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(L-4d) Structural Steel Clips—Furnish in types adapted to conditions, all necessary clips and bolts for attaching windows to structural steel.

Note: All structural steel is furnished by others. Include in steel specifications all punching to accommodate clips. Where masonry work will interfere with installation of clips at time windows are erected, provide that clip bolts be included and attached by the steel contractor.

(L-4e) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to be attached in the field.

(L-5) Attached Hardware

Note: Attached at factory.

(L-5a) Ventilator Pivots—All ventilators shall be horizontally pivoted and supported by external, adjustable, special, solid rolled, steel butts double machine riveted through window bars and weathering.

Note: Butts are set 2" above center unless otherwise specified. Butts may be set 4" below ventilator top where windows are required to be relatively rain protecting when open or where center pivoting would throw the upper half of the sash in conflict with piping, sway bracing or other interior obstructions. If required, so specify.

All butts shall have ⅝" solid steel bolts equipped with washers and nuts; each pin shouldered to insure constant, free and easy ventilator operation.

(L-5b) Operator Provisions—All ventilators shall be provided with solid rolled steel Z bar brackets, triple machine riveted to ventilator sill for attachment of operating hardware.

(L-6) Detached Hardware

Note: See Fenestra Page 40.

(L-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

Note: Select type desired.

(L-6b) Provide malleable iron cam latches and rolled steel stay bars.

(L-6c) Provide malleable iron cam latches, chain, chain catches and pulley brackets.

(L-7) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 49 to 53.

(L-8) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows can be erected in prepared opening. (See Fenestra Page 35.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(L-8a) All Horizontally Pivoted Windows shall be erected in preparing openings by the Fenestra Construction Company, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(L-8b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing.
Standard Fenestra sill anchors shall be used under the following conditions: (Use 2 clips for windows up to 6'-6" wide and 4 clips for windows over 6'-6").
(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.
(2) In all cases where the window is over 5'-0" wide, regardless of the location of the ventilators.
(3) In all multiple unit openings where mullions are not anchored into the sills.
All ventilators shall be properly adjusted before glazing.

(L-8c) Apply all hardware in accordance with the manufacturer's directions.

(L-9) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:
One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at a reasonable added cost, will do field painting after erection. If required, so specify here, including specification for paint and its application.

(L-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(L-10a) Glass—Glass shall be (¼" rough wire) (¼" factory ribbed) (⅛" factory ribbed) (double strength).

Note: ¼" thick glass is recommended. Single strength glass is not recommended.

(L-10b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

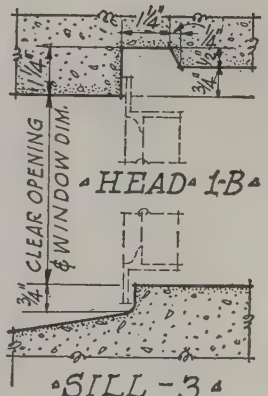
(L-10c) Glazing—All Horizontally Pivoted Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel spring, glazing clips furnished by the window manufacturer. (4 clips for each fixed light and 6 for each ventilator light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (L-9).

(L-11) Screens

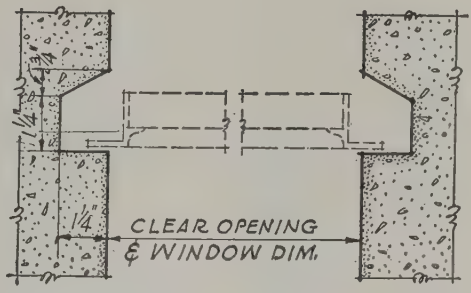
Note: Special metal pivoted ventilator screens may be used. These lie close to the ventilator, the upper half outside, the lower half inside, with insect-proof closures at ventilator pivot line. Screens are not ordinarily included by the window manufacturer and should, therefore, be provided for under another division of the specification.

Continued on next page

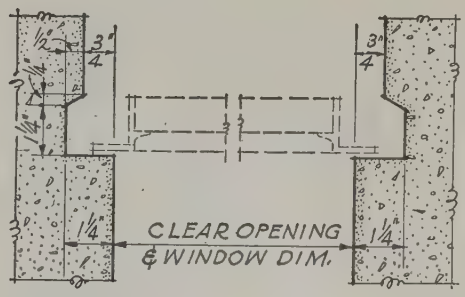


HEAD-1-B

SILL-3

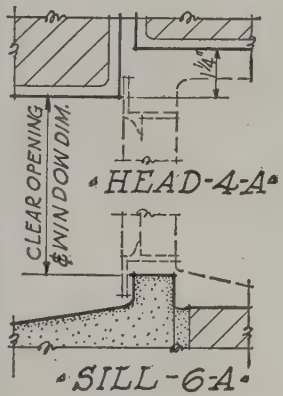


JAMB-2 FOR MULTIPLE UNITS ONLY



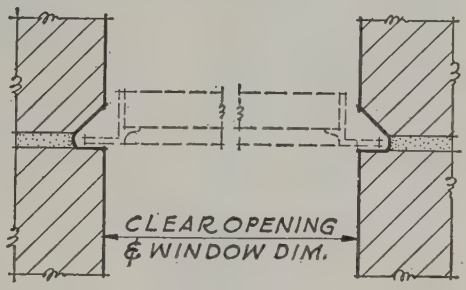
JAMB-2-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN CONCRETE

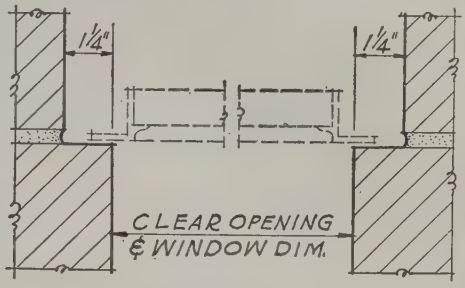


HEAD-4-A

SILL-6-A

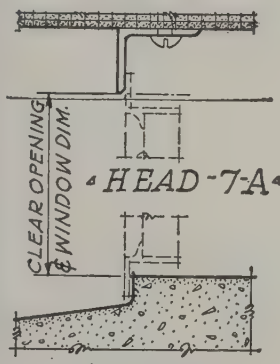


JAMB-5 FOR MULTIPLE UNITS ONLY



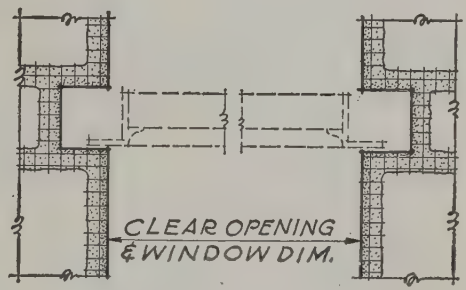
JAMB-5-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN BRICK

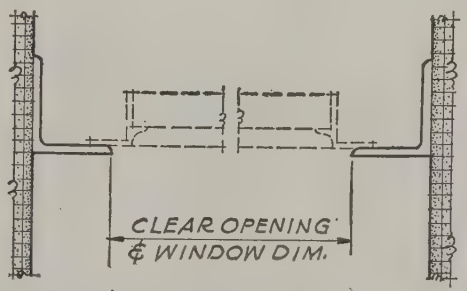


HEAD-7-A

SILL-9

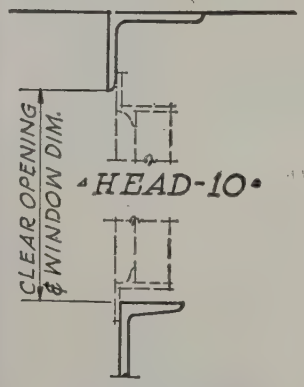


JAMB-8 FOR MULTIPLE UNITS ONLY



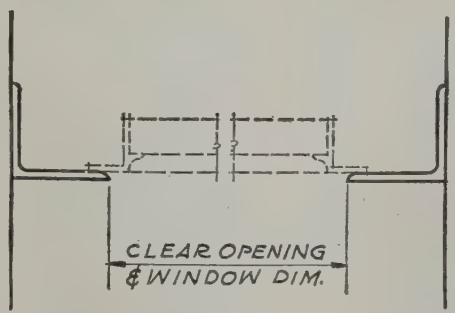
JAMB-8-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN TILE



HEAD-10

SILL-12-A



JAMB-11 FOR MULTIPLE UNITS ONLY

INSTALLATION IN STEEL

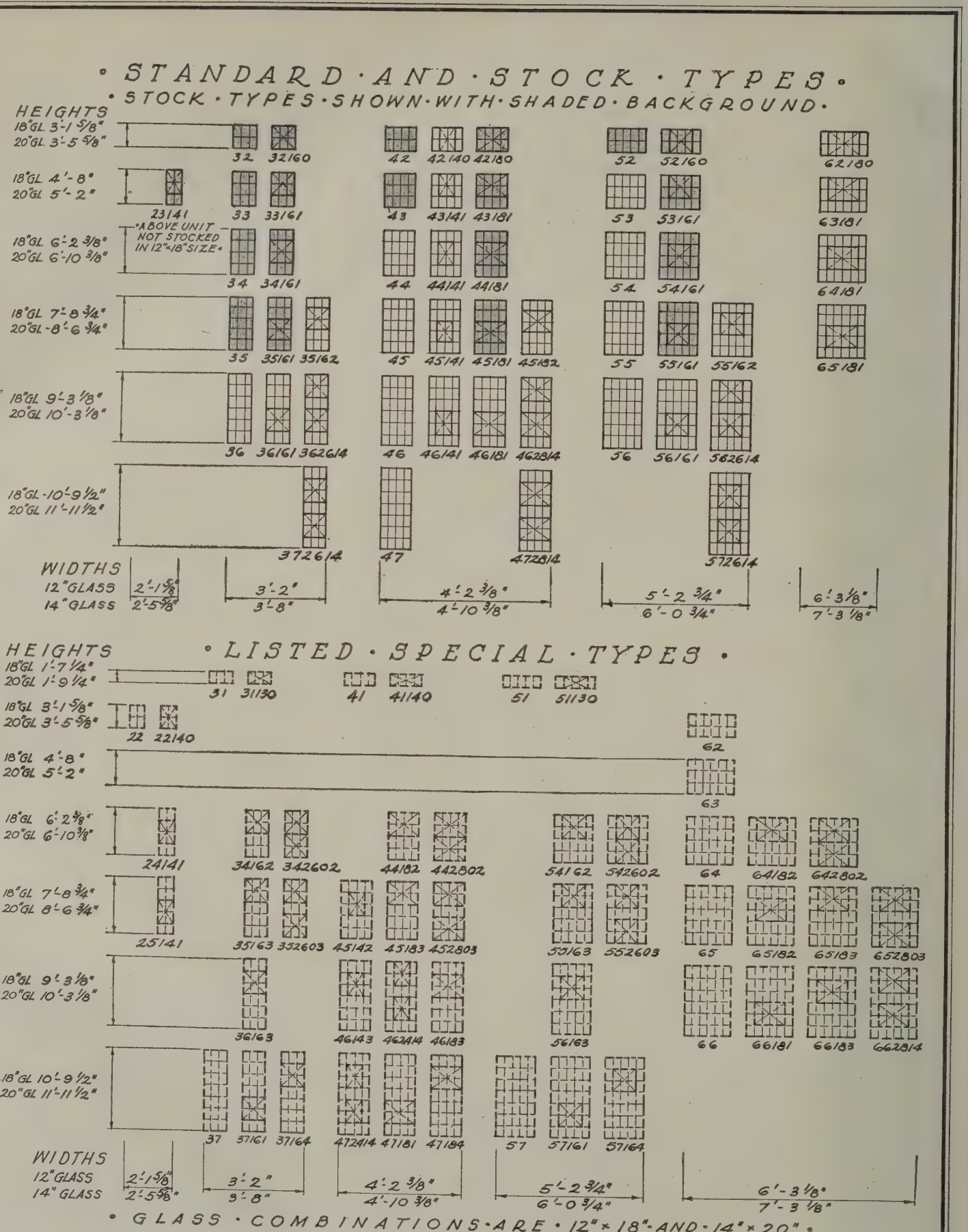
NOTE:-

WE STRONGLY RECOMMEND THE INSTALLATION OF FENESTRA SIDEWALL WINDOWS AFTER THE WALLS OF BUILDING ARE PRACTICALLY COMPLETED.

IN EVERY CASE, REGARDLESS OF WHETHER SINGLE UNITS OR COMBINATIONS OF UNITS ARE TO BE USED, THE OPENING SHOULD BE PREPARED IN ACCORDANCE WITH THE DIMENSIONS SHOWN IN THE INSTALLATION DETAILS ON PLATES L-104 & L-105. REBATES AND ANGLES SHOWN HAVE BEEN ACCEPTED BY BUILDERS AND CONTRACTORS AS THE BEST PRACTICE AND THESE SHOULD BE CLOSELY FOLLOWED.

Fenestra August 1928	Horizontally Pivoted Windows Prepared Openings	Plate No. L-101

Continued on next page



Fenestra *August 1928*

Horizontally Pivoted Windows
Types and Sizes

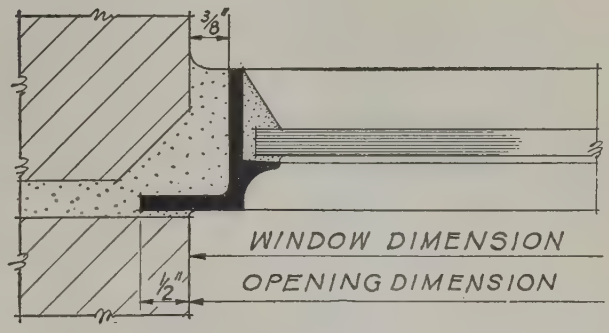
Plate No *L-102*

Continued on next page

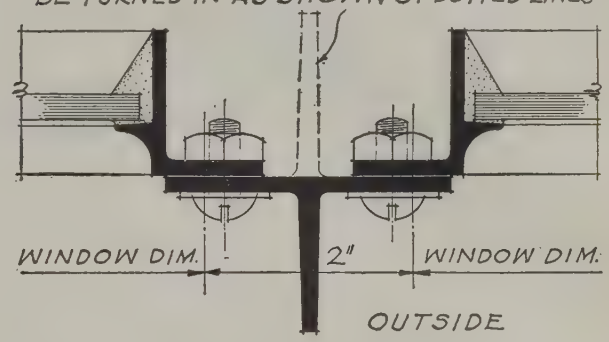
SYMMETRICAL COMBINATIONS

OPENING DIMENSIONS				NO. UNITS IN OPENING	NO. LIGHTS IN OPENING	ARRANGEMENT OF UNITS IN OPENING. FIGURES INDICATE THE NUMBER OF LIGHTS IN WIDTH OF EACH UNIT.
18" HEIGHTS		20" HEIGHTS				
PANES	DIM.	PANES	DIM.			
2	3'-1 5/8"	2	3'-5 5/8"			
3	4'-8"	3	5'-2"			
4	6'-2 3/8"	4	6'-10 3/8"			
5	7'-8 3/4"	5	8'-6 3/4"			
6	9'-3 1/8"	6	10'-3 1/8"			
7	10'-9 1/2"	7	11'-11 1/2"			
12" WIDTHS		14" WIDTHS				
* 2'-1 5/8"		* 2'-5 5/8"		1	2	2
3'-2"		3'-8"		1	3	3
4'-2 3/8"		4'-10 3/8"		1	4	4
4'-5 1/4"		5'-1 1/4"		2	4	2,2
5'-2 3/4"		6'-0 3/4"		1	5	5
6'-3 1/8"		7'-3 1/8"		1	6	6
6'-6"		7'-6"		2	6	3,3
8'-6 3/4"		9'-10 3/4"		2	8	4,4
9'-10"		11'-4"		3	9	3,3,3
10'-7 1/2"		12'-3 1/2"		2	10	5,5
10'-10 3/8"		12'-6 3/8"		3	10	3,4,3
11'-10 3/4"		13'-8 3/4"		3	11	3,5,3
11'-10 3/4"		13'-8 3/4"		3	11	4,3,4
12'-8 1/4"		14'-8 1/4"		2	12	6,6
12'-11 1/8"		14'-11 1/8"		3	12	4,4,4
13'-2"		15'-2"		4	12	3,3,3,3
13'-11 1/2"		16'-1 1/2"		3	13	4,5,4
13'-11 1/2"		16'-1 1/2"		3	13	5,3,5
14'-11 7/8"		17'-3 7/8"		3	14	4,6,4
14'-11 7/8"		17'-3 7/8"		3	14	5,4,5
15'-2 3/4"		17'-6 3/4"		4	14	3,4,4,3
16'-0 1/4"		18'-6 1/4"		3	15	5,5,5
16'-0 1/4"		18'-6 1/4"		3	15	6,3,6
16'-6"		19'-0"		5	15	3,3,3,3,3
17'-0 5/8"		19'-8 5/8"		3	16	5,6,5
17'-0 5/8"		19'-8 5/8"		3	16	6,4,6
17'-3 1/2"		19'-11 1/2"		4	16	4,4,4,4
17'-3 1/2"		19'-11 1/2"		4	16	3,5,5,3
17'-6 3/8"		20'-2 3/8"		5	16	3,3,4,3,3
18'-1"		20'-11"		3	17	6,5,6
18'-6 3/4"		21'-4 3/4"		5	17	3,4,3,4,3
19'-1 3/8"		22'-1 3/8"		3	18	6,6,6
19'-4 1/4"		22'-4 1/4"		4	18	3,6,6,3
19'-4 1/4"		22'-4 1/4"		4	18	4,5,5,4
19'-7 1/8"		22'-7 1/8"		5	18	3,4,4,4,3
20'-7 1/2"		23'-9 1/2"		5	19	3,5,3,5,3
21'-5"		24'-9"		4	20	5,5,5,5
21'-5"		24'-9"		4	20	4,6,6,4
21'-7 7/8"		24'-11 7/8"		5	20	4,4,4,4,4
21'-10 3/4"		25'-2 3/4"		6	20	3,3,4,4,3,3

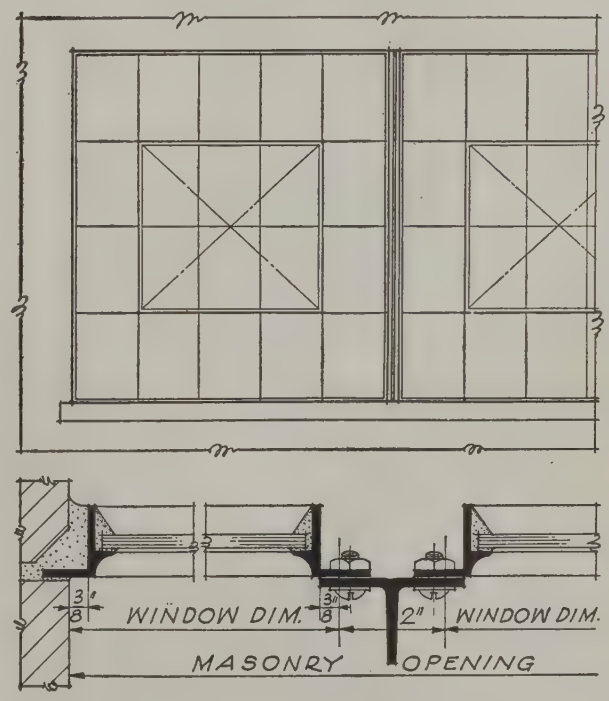
* TWO LIGHT WIDE UNITS ARE FURNISHED IN THREE LIGHT HEIGHTS ONLY



WHEN DESIRED STEM OF MULLION CAN BE TURNED IN AS SHOWN BY DOTTED LINES



SCALE: HALF FULL SIZE



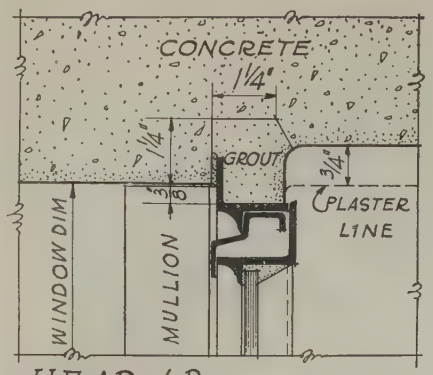
TYPICAL COMBINATION

SCALE: 3" = 1'-0"

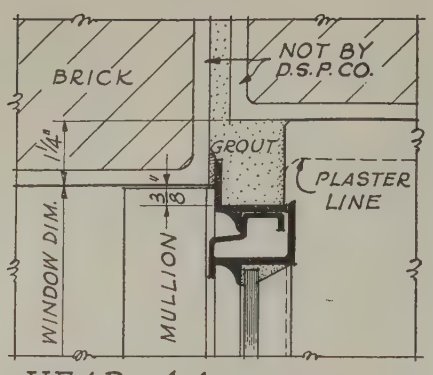
NOTE:- IN FIGURING OPENING SIZES FOR COMBINED UNITS, ADD TOGETHER THE WINDOW DIMENSIONS PLUS 2" FOR EACH VERTICAL MULLION. STANDARD COMBINATIONS ARE GIVEN IN THE TABLE. WHEN USING TABLE ALWAYS COMBINE 18" HEIGHTS WITH 12" WIDTHS AND 20" HEIGHTS WITH 14" WIDTHS.

Fenestra August 1928 | *Horizontally Pivoted Windows* Standard Combinations | **Plate No.** L-103

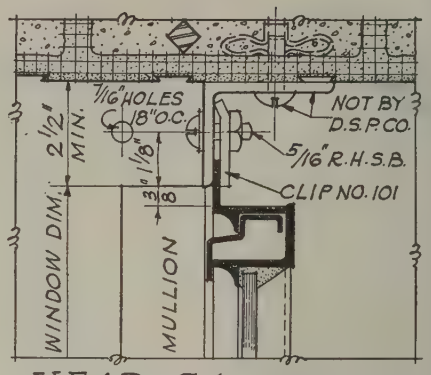
Continued on next page



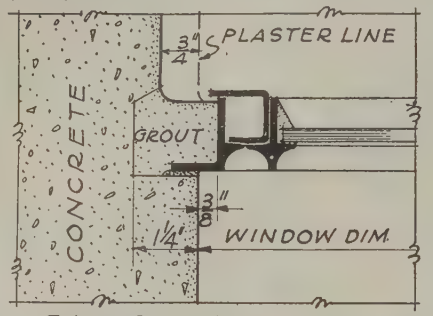
"HEAD-1-B" REBATE IN THE SOFFIT PERMITS INSTALLATION OF WINDOWS AFTER WALL IS BUILT.



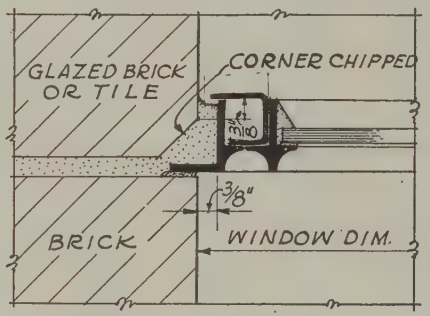
"HEAD-4-A" ANGLE SHOULD ALWAYS BE OFFSET AS SHOWN



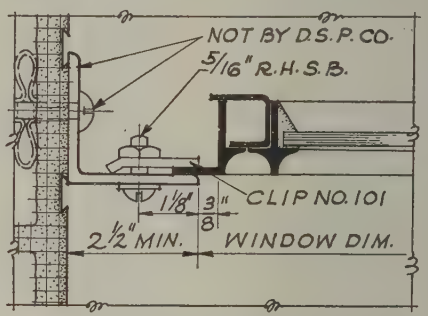
"HEAD" 7-A "STEEL ANGLE FRAME IN TILE OPENINGS.



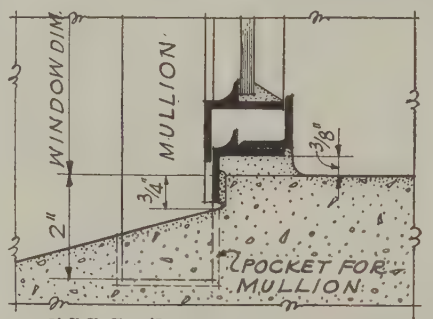
"JAMB-2-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS



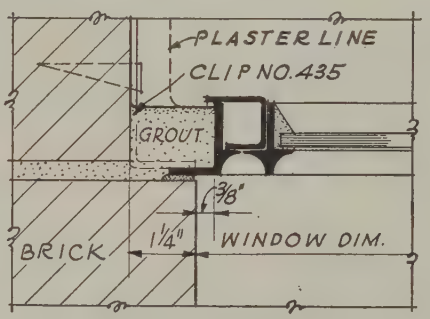
"JAMB-5" FOR MULTIPLE UNIT OPENINGS ONLY.



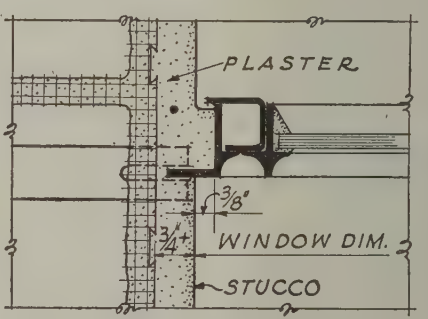
"JAMB-8-A" STEEL ANGLE FRAME IN TILE OPENINGS.



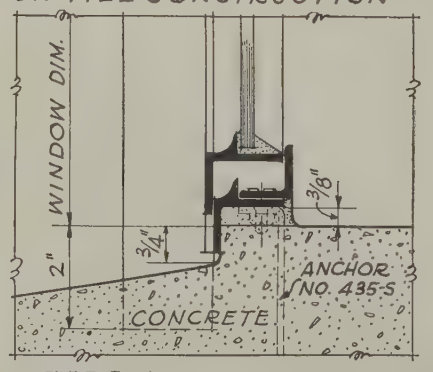
"SILL-3" PRECAST CONCRETE MAY ALSO BE USED FOR BRICK OR TILE CONSTRUCTION.



"JAMB-5-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS.

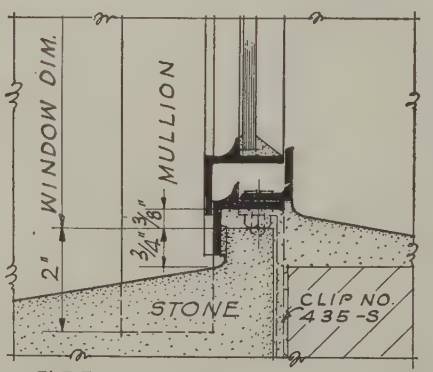


"JAMB-8-B" WITH SPLIT CLIP FURNISHED BY D.S.P. CO.



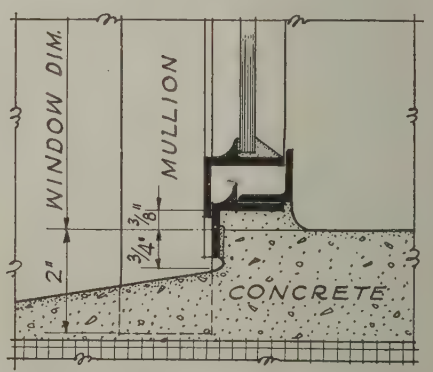
"SILL-3-A" POURED CONCRETE ANCHOR CLIP FURNISHED BY D.S.P. CO.

"CONCRETE"



"SILL-6-A" CUT STONE. AS ALTERNATES USE DETAILS 3 OR 3-A.

"BRICK"



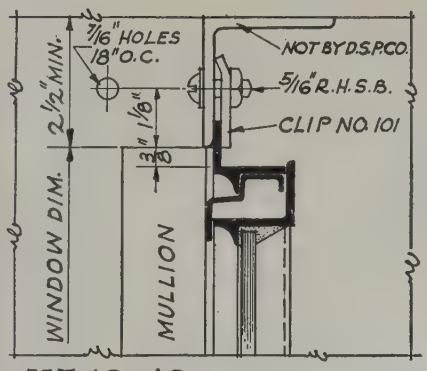
"SILL-9" CONCRETE SILL, POURED AFTER WINDOW IS SET

"TILE"

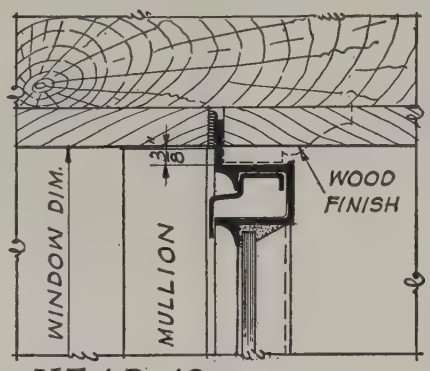
"SCALE: 3" = 1'-0"

Fenestra, August 1928	Horizontally Pivoted Windows Installation Details	Plate No. L-104

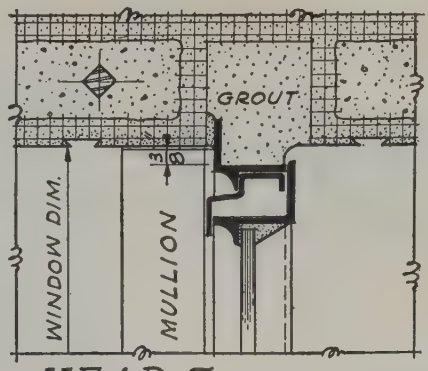
Continued on next page



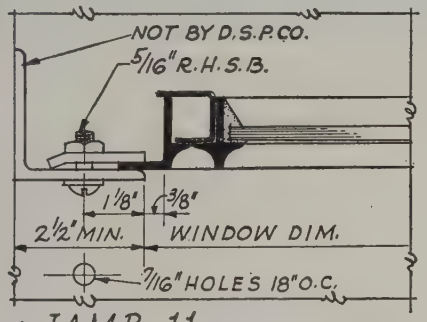
▲HEAD-10▲ STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



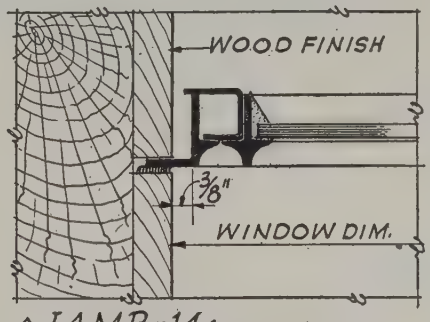
▲HEAD-13▲ DOTTED LINES SHOW ALTERNATE FINISH.▲



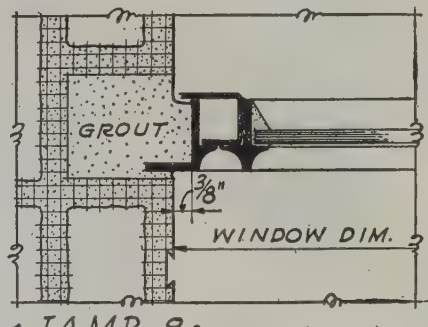
▲HEAD-7▲ FOR TILE LINTEL WITH STEEL WINDOW RAGGLE AS SHOWN



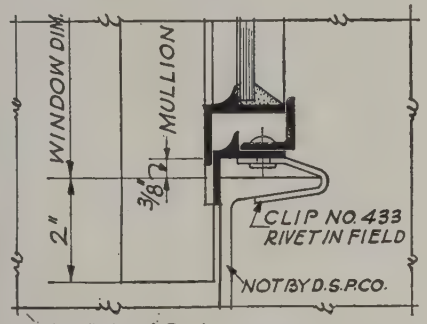
▲JAMB-11▲ STEEL ANGLE
CLIP & BOLT FURNISHED BY D.S.P.CO.



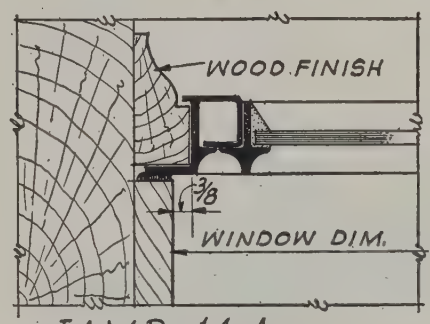
▲JAMB-14▲ PLAIN TRIM.



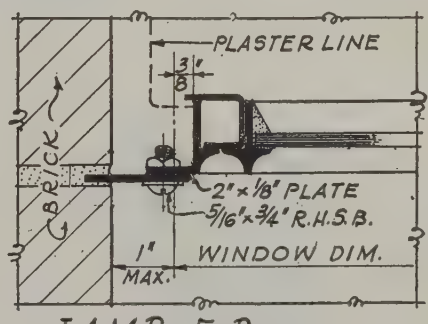
▲JAMB-8▲ FOR TILE WITH STEEL WINDOW RAGGLE AS SHOWN.



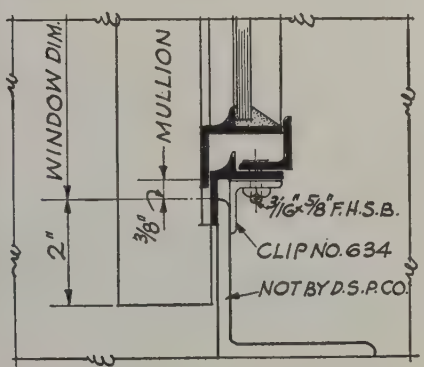
▲SILL-12-A▲ STEEL CHANNEL
CLIP & RIVET FURNISHED BY D.S.P.CO.



▲JAMB-14-A▲ MOLDING FINISH ALTERNATE FOR JAMB-14

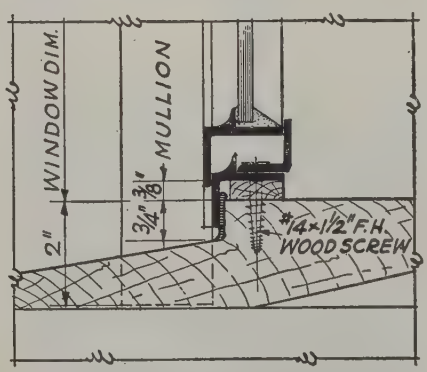


▲JAMB-5-B▲ DETAIL USING JAMB PLATE



▲SILL-12-B▲ STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.

▲STEEL▲



▲SILL-15▲ WOOD APRON & SILL.

▲WOOD▲

▲SCALE: 3"=1'-0"▲

▲MISCELLANEOUS▲

THE MULLIONS SHOWN WITH THESE DETAILS HAVE THE STEM TURNED OUT. IT IS ADVISABLE TO DO THIS AS GREATER STIFFNESS IS SECURED.

WITH STEEL WORK THIS IS ESSENTIAL IN ORDER TO AVOID NOTCHING OF THE STEEL OR A SPECIAL CUT-OFF OF MULLIONS.

ANCHORING MULLIONS AT SILL AS SHOWN IS RECOMMENDED.

▲SCALE: 3"=1'-0"▲

Fenestra August 1928

Horizontally Pivoted Windows
Installation Details

Plate No L-105

Continued on next page

HORIZONTALLY PIVOTED WINDOW FITTINGS AND HARDWARE

Fig. 1

Fig. 2

Fig. 3

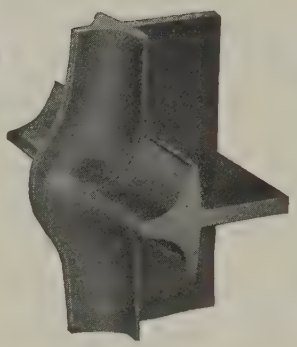


Fig. 4

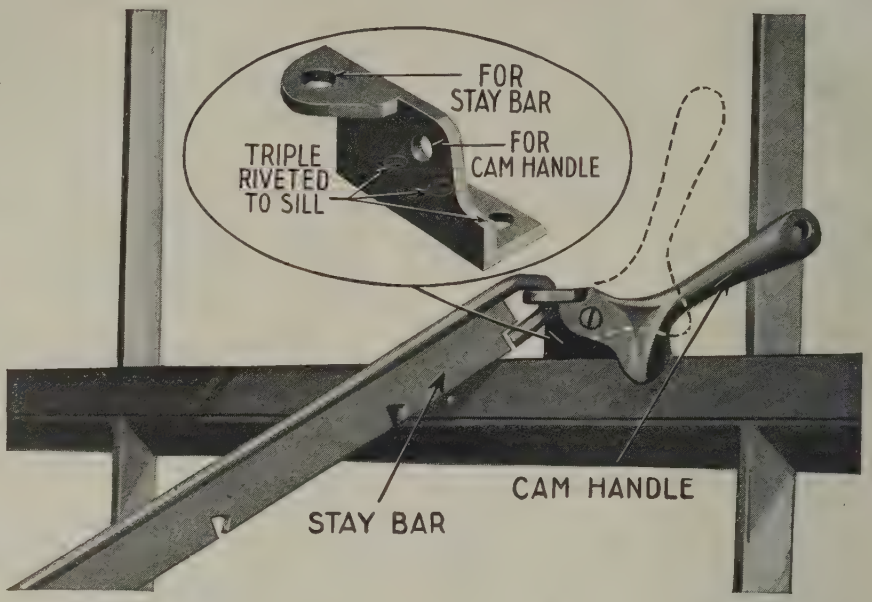


Fig. 7

Figs. 1, 2, 3 and 4 show four views of the patented Fenestra joint by means of which vertical and horizontal bars are interlocked with increased strength at the point of intersection. Fig. 1 shows the horizontal bar with nick cut out. Fig. 2 shows the vertical bar with slot. Fig. 3 shows vertical bar expanded to receive horizontal bar. Fig. 4 shows the completed Fenestra joint.

Fig. 5 shows the Fenestra butt. Fig. 6 shows the weathering member at ventilator sill, mitered to guide water out of the building. Fig. 7 shows the cam handle, stay bar and riveted Z-bar bracket. Fig. 8 shows the spring latch, chain and pulley at the head of ventilator. Fig. 9 shows the cam handle at the sill with endless chain passing over pulley at the head. Fig. 10 shows the spring latch at the sill with chain passing over pulley at head; also chain cleats attached either to the muntins or the building construction.

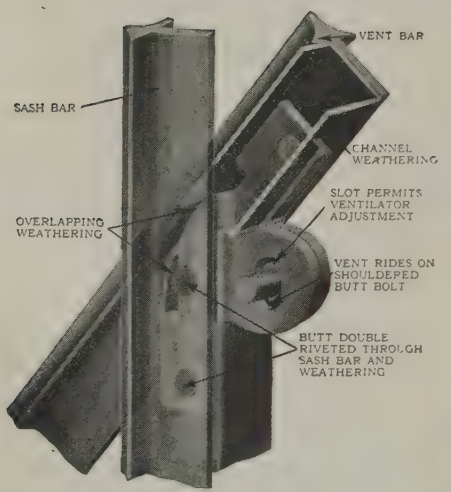


Fig. 5

Fig. 8

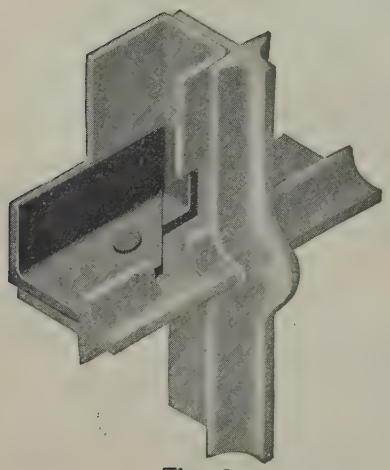


Fig. 6

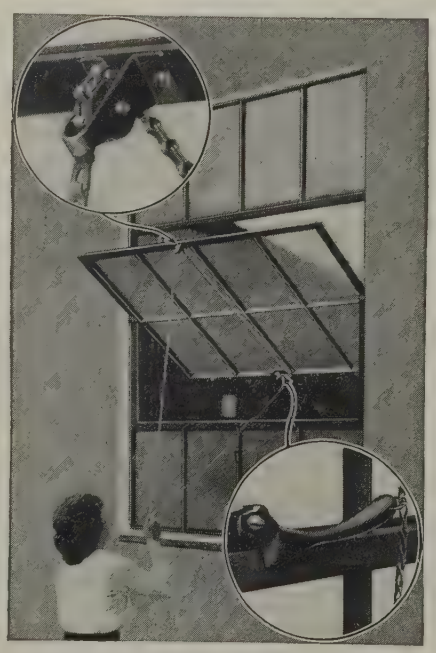


Fig. 9

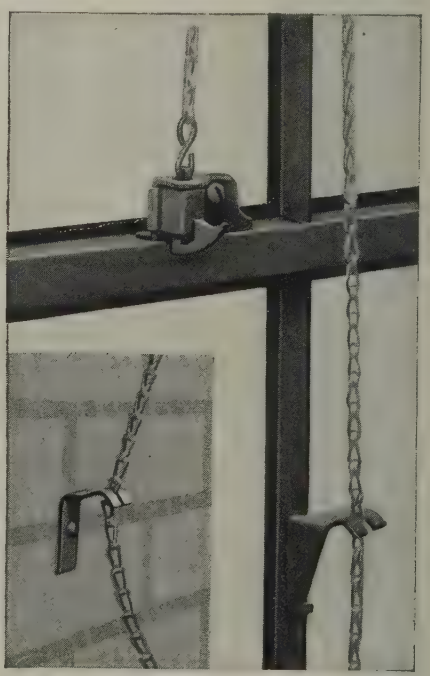
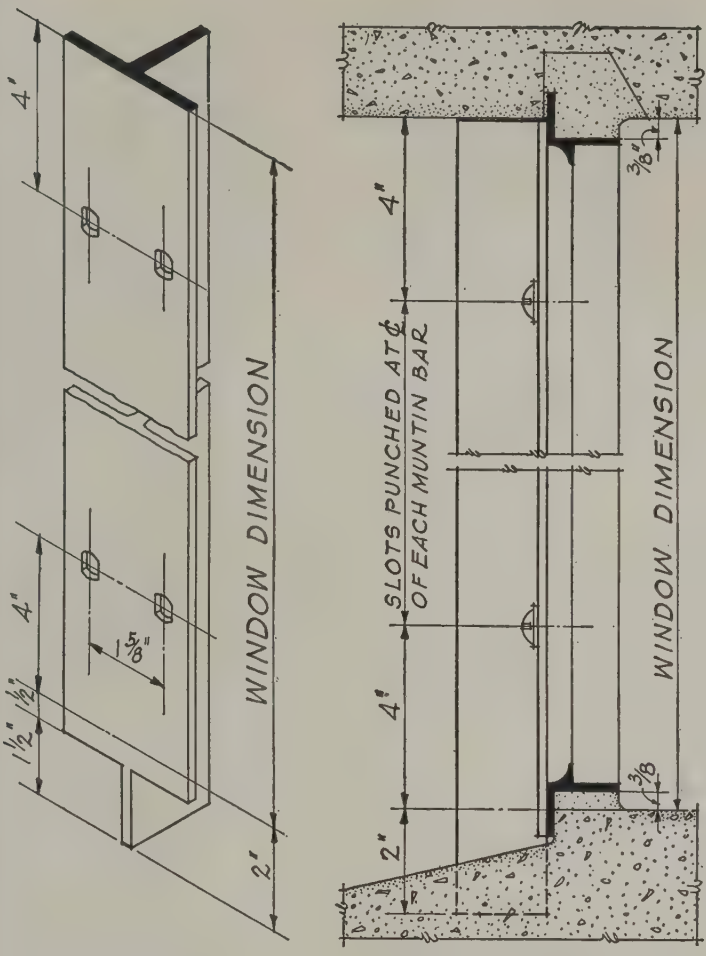


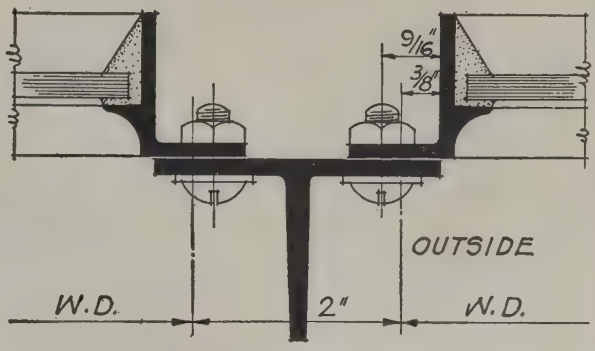
Fig. 10

Continued on next page



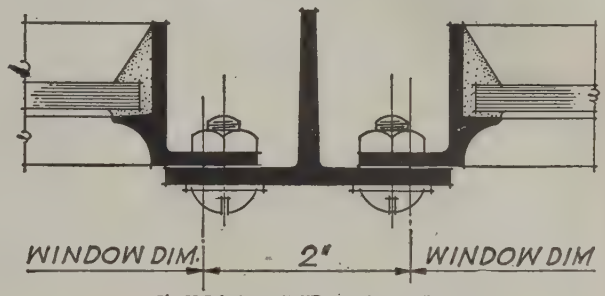
SKETCH VERTICAL SECTION

VERTICAL MULLION DETAILS

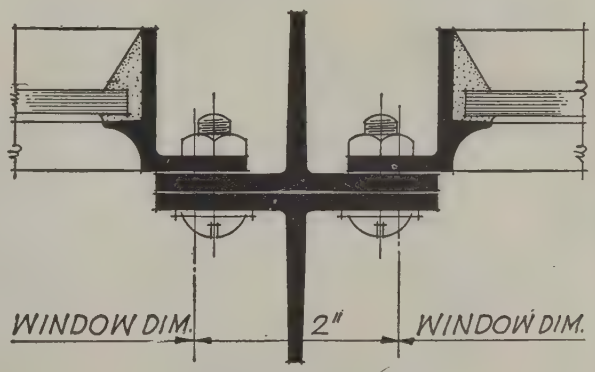


STEM TURNED OUT

RECOMMENDED DETAIL. THE OUTSTANDING LEG PROVIDES ADDITIONAL RIGIDITY. CAN BE USED FOR SASH UP TO 7 LIGHTS HIGH, 20" GLASS. MULLIONS MAY BE USED WITH STEM TURNED IN AS SHOWN BELOW IF DESIRED.



STEM TURNED IN

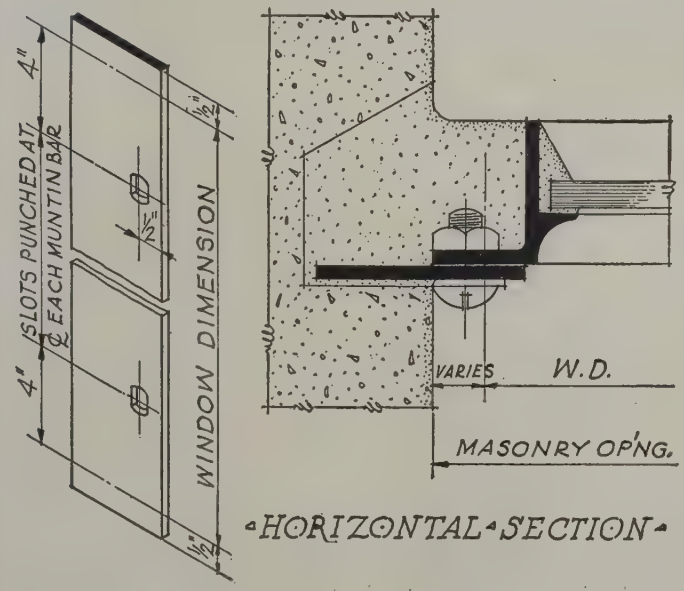


DOUBLE MULLION

SHOULD BE USED ON SASH HIGHER THAN 7 LIGHTS 20" GLASS, OR WHERE EXTRA WIDE OPENINGS ARE TO BE FILLED AND WHERE THE EXPOSURE IS SEVERE.

NOTE:- PROVISION SHOULD ALWAYS BE MADE FOR ANCHORING MULLIONS IN THE SILL. SEE VERTICAL SECTION ABOVE.

BOLT HOLES ARE PUNCHED TO MATCH THE JAMB BARS OF SASH, 4" FROM WINDOW DIMENSION POINT AT TOP AND BOTTOM AND OPPOSITE EACH MUNTIN BAR.



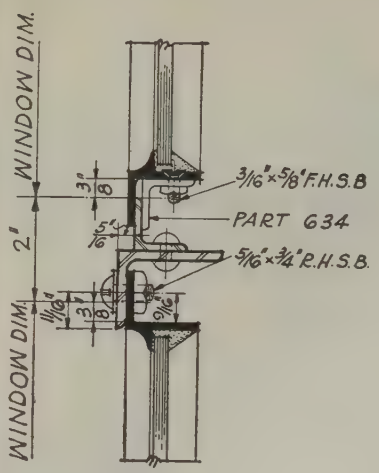
HORIZONTAL SECTION

JAMB PLATE DETAILS

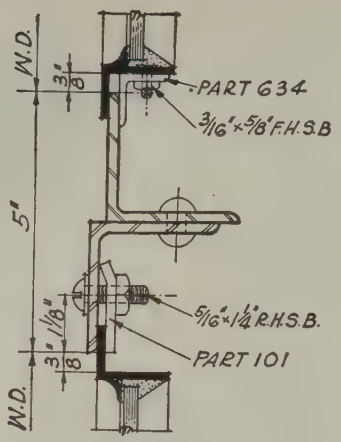
SCALE: HALF FULL SIZE

Fenestra August 1928	Horizontally Pivoted Windows Vertical Mullion Details	Plate No L-106

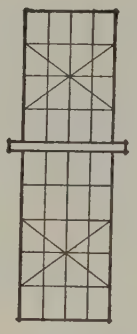
Continued on next page



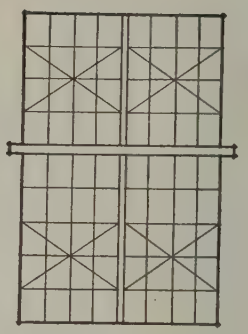
•TYPE-1•



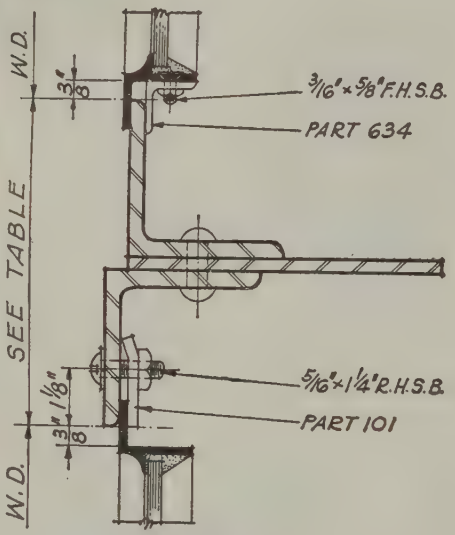
•TYPE-2•



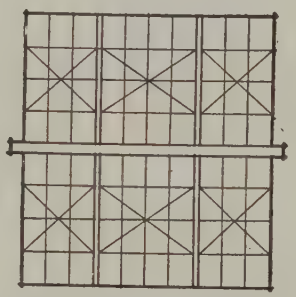
•TYPICAL OPENING•
•TYPE NO. 1•



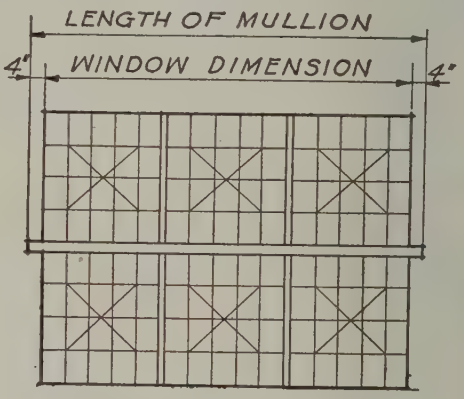
•TYPICAL•OPENING•
•TYPE•NO. 2•



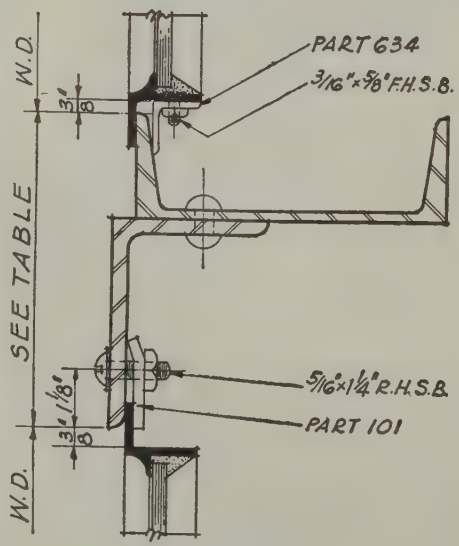
•TYPE-3•



•TYPICAL•OPENING•
•TYPES•NO.3&4•



•TYPICAL•OPENING•
TYPES•NO.3&4•



•TYPE-4•

•DETAILS•SCALE: 3"-1'-0"•

•TABLE•OF•HORIZONTAL•MULLION•SIZES•

LIGHTS WIDE	MULL. TYPE NO.	•ANGLES• REQ'D.	•ANGLES• •SIZE•	PLATE OR CHANNEL	ESTIMATED WEIGHT OF MULL PER FT.	BETWEEN WINDOW DIMENS.
SINGLE UNIT OPENINGS	1	1	1"×1"×1/8"	NONE	3.0 LBS.	2"
		1	2"×1½"×3/16"			
•12"×18" SIZE GLASS•						
3 TO 9	2	2	2½"×2½"×3/16"	NONE	6.5 LBS.	5"
10 TO 13	3	2	2½"×2½"×3/16"	6"×¼" PLT.	11.5 LBS.	5¼"
10 TO 13	4	1	3½"×2½"×¼"	4" CHANNEL	10.5 LBS.	5¼"
14 TO 18	3	2	3"×3"×5/16"	6"×¼" PLT.	17.5 LBS.	6⅛"
14 TO 18	4	1	4"×3"×5/16"	6" CHANNEL	15.5 LBS.	6⅛"
•14"×20" SIZE GLASS•						
3 TO 8	2	2	2½"×2½"×3/16"	NONE	6.5 LBS.	5"
9 TO 11	3	2	2½"×2½"×3/16"	6"×¼" PLT.	11.5 LBS.	5¼"
9 TO 11	4	1	3½"×2½"×¼"	4" CHANNEL	10.5 LBS.	5¼"
12 TO 16	3	2	3"×3"×5/16"	6"×¼" PLT.	17.5 LBS.	6⅛"
12 TO 16	4	1	4"×3"×5/16"	6" CHANNEL	15.5 LBS.	6⅛"

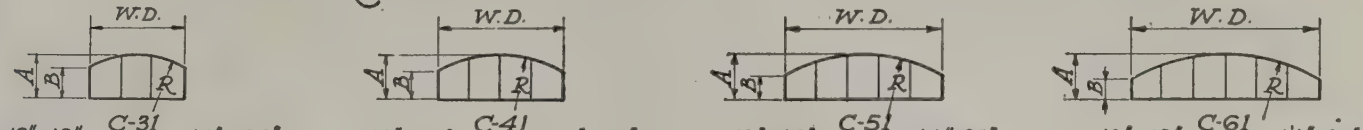
Fenestra August 1928

Horizontally Pivoted Windows
Horizontal Mullion Details

Plate No L-107

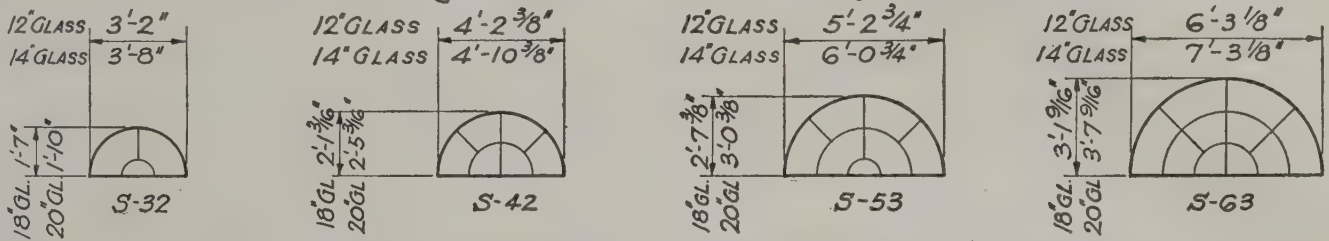
Continued on next page

CAMBER HEAD UNITS ONE PANE HIGH



	12"×18"	14"×20"
C-31	3'-2" - W.D. -	3'-8"
	1'-6 1/8" - A -	1'-8 1/8"
	1'-1" - B -	1'-2 1/4"
	3'-2" - R -	3'-8"
C-41	4'-2 3/8" - W.D. -	4'-10 3/8"
	1'-6 1/8" - A -	1'-8 1/8"
	-11 3/8" - B -	1'-0 5/16"
	4'-2 3/8" - R -	4'-10 3/8"
C-51	5'-2 3/4" - W.D. -	6'-0 3/4"
	1'-6 1/8" - A -	1'-8 1/8"
	-9 1/16" - B -	-10 3/8"
	5'-2 3/4" - R -	6'-0 3/4"
C-61	6'-3 1/8" - W.D. -	7'-3 1/8"
	1'-6 1/8" - A -	1'-8 1/8"
	-8 1/16" - B -	-8 7/16"
	6'-3 1/8" - R -	7'-3 1/8"

SEMICIRCULAR UNITS NOT OVER SIX PANES WIDE



	12" GLASS	14" GLASS	18" GL.	20" GL.
S-32	3'-2"	3'-8"	1'-7"	1'-10"
S-42	4'-2 3/8"	4'-10 3/8"	2'-1 3/16"	2'-5 3/16"
S-53	5'-2 3/4"	6'-0 3/4"	2'-7 3/8"	3'-0 3/8"
S-63	6'-3 1/8"	7'-3 1/8"	3'-1 9/16"	3'-7 9/16"

* ALL ABOVE CAMBER HEAD AND SEMICIRCULAR UNITS HAVE NO. 70 SECTION AT SILL FOR ATTACHMENT TO TOP OF SINGLE SQUARE HEAD SASH, OR FOR INDIVIDUAL INSTALLATION. SEE FIG.-1 BELOW.

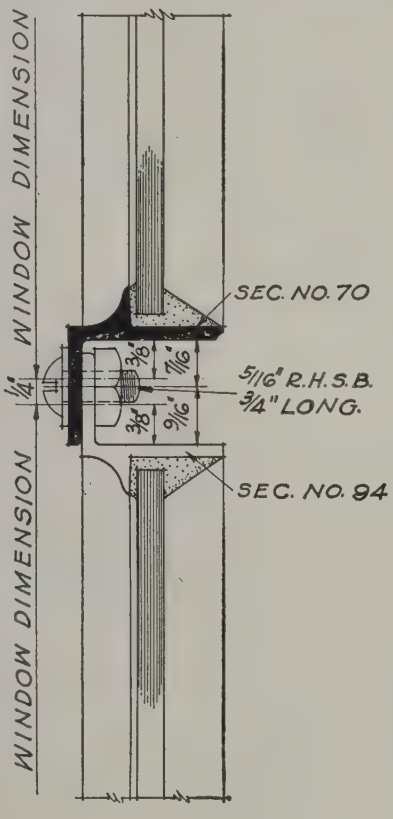


FIG.-1

SECTION THRU UNIT UP TO AND INCLUDING SIX PANES IN WIDTH.

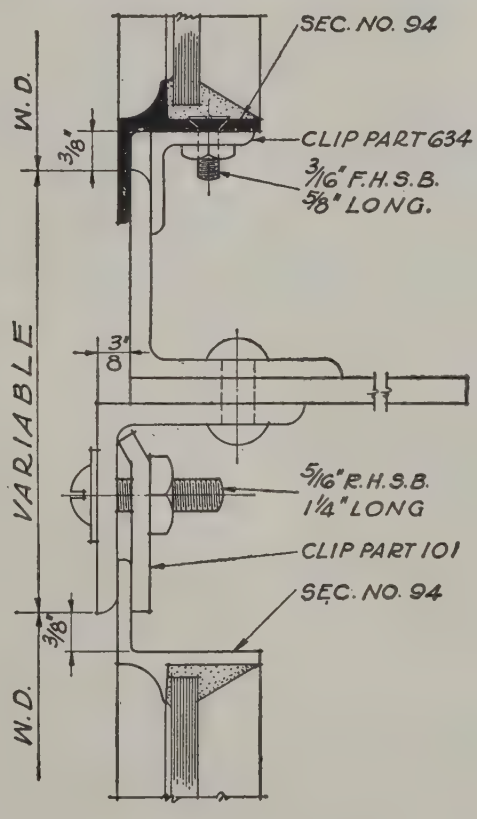
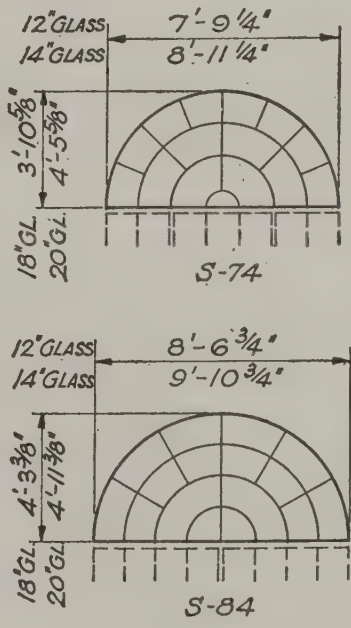


FIG.-2

SECTION THRU UNIT OVER SIX PANES IN WIDTH. FOR SIZE OF STRUCTURAL MULLION SEE PLATE L-107

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE



	12" GLASS	14" GLASS	18" GL.	20" GL.
S-74	7'-9 1/4"	8'-11 1/4"	3'-10 5/8"	4'-5 3/8"
S-84	8'-6 3/4"	9'-10 3/4"	4'-3 3/8"	4'-11 3/8"

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE HAVE NO. 94 SECTION AT SILL FOR ATTACHMENT TO MULTIPLE UNIT OPENING WITH STRUCTURAL HORIZONTAL MULLION, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. 2

* DETAILS * SCALE: HALF * FULL * SIZE *

Fenestra August 1928	Horizontally Pivoted Windows Camber and Semi-Circular Heads	Plate No. L-108

Continued on next page

(P) CONTINUOUS TOP HUNG WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Structural Steel Truss spacing, best adapted to the use of standard Continuous Window units, is in multiples of 4′ (16′, 20′, 24′) to accommodate standard 4′ centering for girt butt attachment.

Note: Intermediate structural vertical members should be provided approximately 8′ to 12′ apart.

Note: Structural Steel Girts, at heads and sills of Continuous Windows, are not furnished by the Window Manufacturer, and are so noted on the window details. These girts should be provided for in the Structural Steel Specifications including punching for attachment of window butts in accordance with standard Fenestra punching details. (See Fenestra, Page 45.)

Note: Sheet metal flashing at heads, sills, and ends of runs at building construction, is not furnished by the Window Manufacturer, and is so noted on the window details. This flashing should be provided for in the Roofing and Sheet Metal Specifications.

(P-1) Work Included

Note: List and locate. (See paragraph 13, Fenestra Page 2.)

(P-2) General

Continuous Top Hung Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

Note: Fenestra Continuous Windows are particularly designed for use in monitor and sawtooth roof construction where the plane of the windows is on a slope. They may be used in vertical planes where necessary. The chief advantage of this type of window lies in the fact that it provides for an easily and rapidly operated continuous opening from one end of the building to the other.

Note: Standard units of Continuous Windows measure 20′ in length (dimension points equal the clear opening). We recommend, for the economical arrangement of operator arms and to permit girt punching on even 4′ centers for butt attachment, that units vary on multiples of 4′ (8′, 12′, 16′). Smaller units may be used, if necessary, in widths varying in multiples of 2′ (8′, 10′, 12′, 14′, 16′, 18′).

(P-3) Materials

(P-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(P-3b) Head and End Jamb Members—Head and end jamb members shall be special angles.

(P-3c) Muntins—Muntins shall be special Ts 1⅝″ deep.

(P-3d) Sills—Sills shall be special design sections with a long down-standing leg bent at the end to make close contact with the building construction. Provide weep holes for drainage.

(P-4) Construction

(P-4a) Window Units—All members of the window shall be accurately fitted and rigidly riveted at the joints to form standard panel units. Panels shall be joined, end to end midway between T muntins, by splice plates bolted to head and sill members.

Note: Panels are joined at the time of erection.

Note: Riveted assembly assures a strong, tight joining of members, with sufficient flexibility to withstand unusual strain thus obviating the danger of breaks due to imperfect welds.

(P-4b) Stationary End Sections—At the ends of all swing sections next the building construction there shall be provided stationary 1′ panels.

(P-4c) Stationary Intermediate Sections—Between the ends of swing sections there shall be provided stationary 2′ panels.

(P-4d) Weathering Caps—The joint between ends of swing sections and stationary end sections (and stationary intermediate sections) shall be covered and protected by a specially formed, 14 gauge, steel channel with one leg secured to the end angle of the swing section and designed to overlap the end angle of the stationary section.

(P-4e) Storm Panels—Where so indicated, provide 2′ wide storm panels secured to stationary end (and intermediate) panels with a steel plate and to the sill by sill clips. Panels shall underlap the swing window section and shall be provided at sill with a formed continuous drip board, set over the sill flashing.

(P-5) Attached Hardware

Note: Attached at factory.

Butts—All Continuous Windows shall be top hung on heavy malleable iron butts, with ⅜″ brass pins, spaced 4′ apart on centers. Butts shall be rigidly riveted to the head angle and furnished with bolts for attachment to the building girts.

(P-6) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 49 to 53. In selecting type best adapted to the particular conditions, we advise consultation with our representative.

(P-7) Erection

All Continuous Windows shall be erected by the Fenestra Construction Company, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

All windows shall be erected in a thoroughly, workmanlike manner ready for glazing.

(P-8) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(P-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(P-9a) Glass—Glass shall be (¼″ rough wire glass).

(P-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(P-9c) Glazing—All continuous windows shall be glazed from the outside. All glass shall be set in a heavy bed of putty and secured at muntins and end angles by angle clips secured with bolts. Face putty at sills, applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. (See note Paragraph P-8.)

Continuous Fixed Windows

Note: The specification for Continuous Fixed Windows is the same as that for Continuous Top Hung Windows except that all window units are stationary (no swing sections). Heavy steel angle clips bolted to the window head and the building girts are substituted for the butts. Steel sill clips, furnished with the window and shipped flat, are bolted to the sill of the window and bent around the steel sill girt to rigidly secure the window in position at the bottom.

Continuous Bottom Hung Windows

Note: In general the specification for Continuous Bottom Hung Windows is the same as that for Continuous Top Hung Windows except in the following particulars:

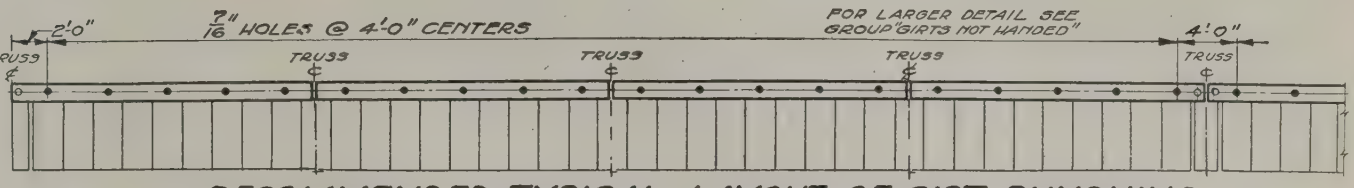
(a) The head section is a special T.

(b) The sill section is a special angle designed to take the butts attached to a special sill girt.

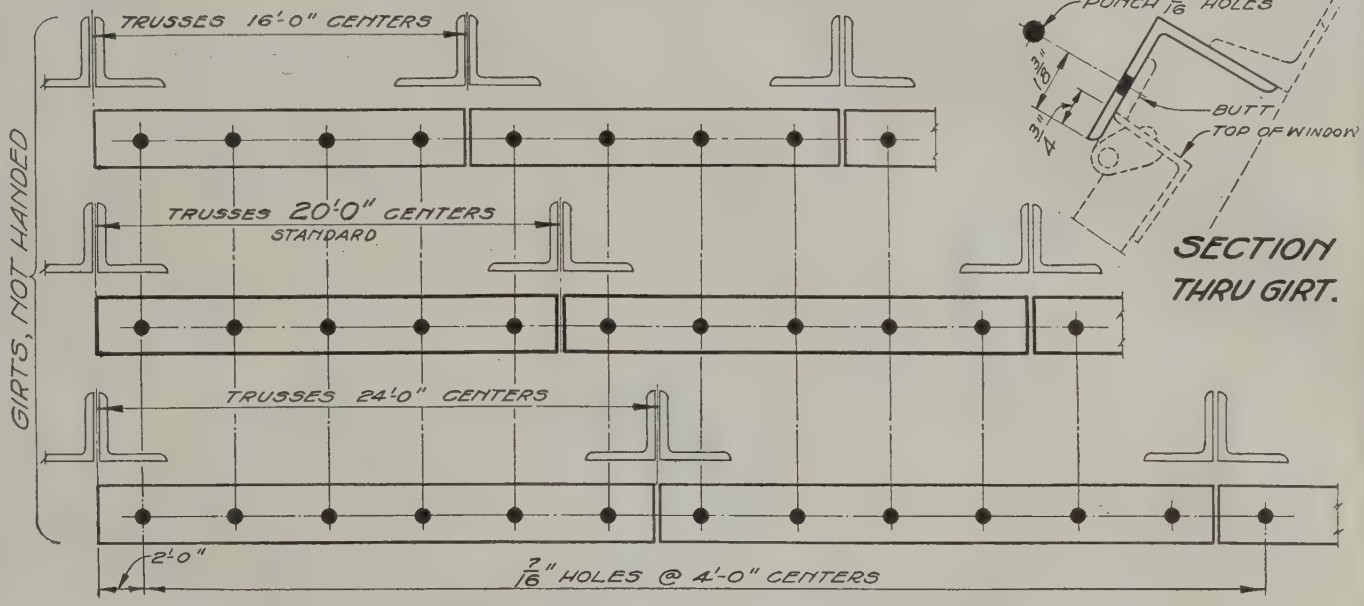
(c) The weathering caps are attached, with the legs out, to the fixed end or intermediate panels instead of to the swing sections.

(d) The windows are glazed on the inside with face putty at both head and sill.

Continued on next page

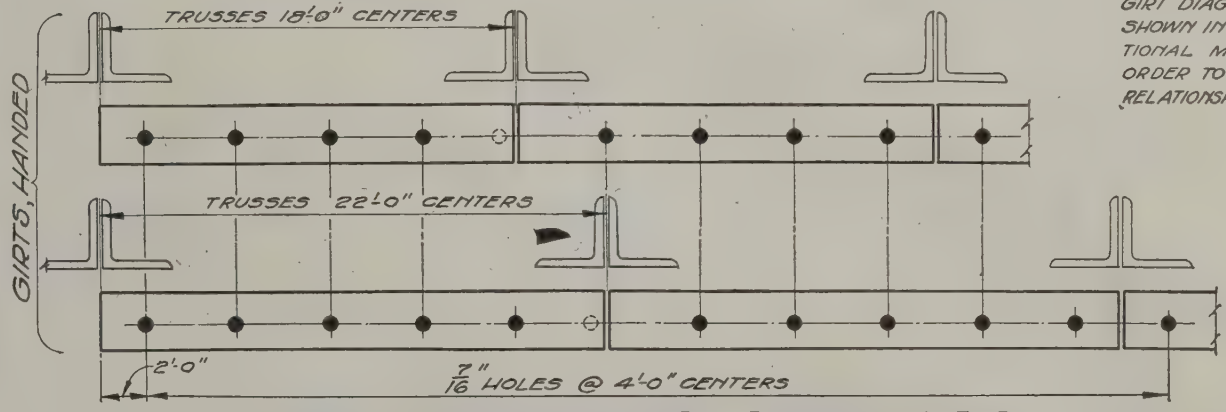


RECOMMENDED TYPICAL LAYOUT OF GIRT PUNCHING FOR STANDARD 20'-0" TRUSS CENTERS.



SECTION THRU GIRT.

TYPICAL LAYOUT OF GIRT PUNCHING FOR TRUSS CENTERS OF 16, 20 AND 24'-0".



NOTE:-TRUSSES ON GIRT DIAGRAM ARE SHOWN IN A CONVENTIONAL MANNER IN ORDER TO SHOW THE RELATIONSHIP TO GIRTS.

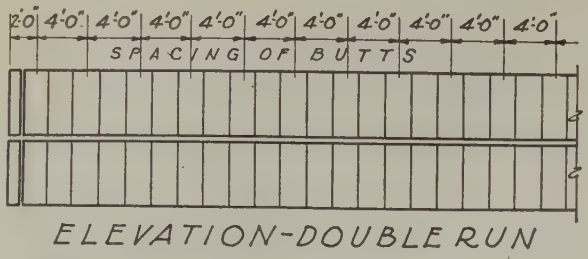
TYPICAL LAYOUT OF GIRT PUNCHING FOR TRUSS CENTERS OF 18 AND 22'-0"

SPACING OF TRUSS CENTERS:-
TRUSS CENTERS OF 17, 19, 21, 23 AND 25 FEET REQUIRE FOUR STYLES OF GIRT PUNCHING (TWO RIGHT AND TWO LEFT) AND SHOULD THEREFORE BE AVOIDED.

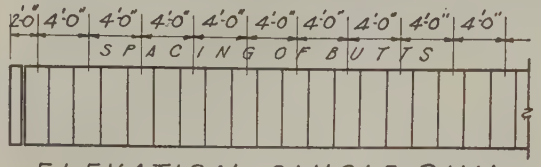
GIRT PUNCHING:-
HOLES OCCURING AT JOINT OF GIRTS SHOULD BE OMITTED. SUCH HOLES WILL BE LOCATED AND PUNCHED BY WINDOW ERECTORS

Fenestra, August 1928	Continuous Windows, Top Hung Girt Punching	Plate No. P-101

Continued on next page



ELEVATION-DOUBLE RUN



ELEVATION-SINGLE RUN

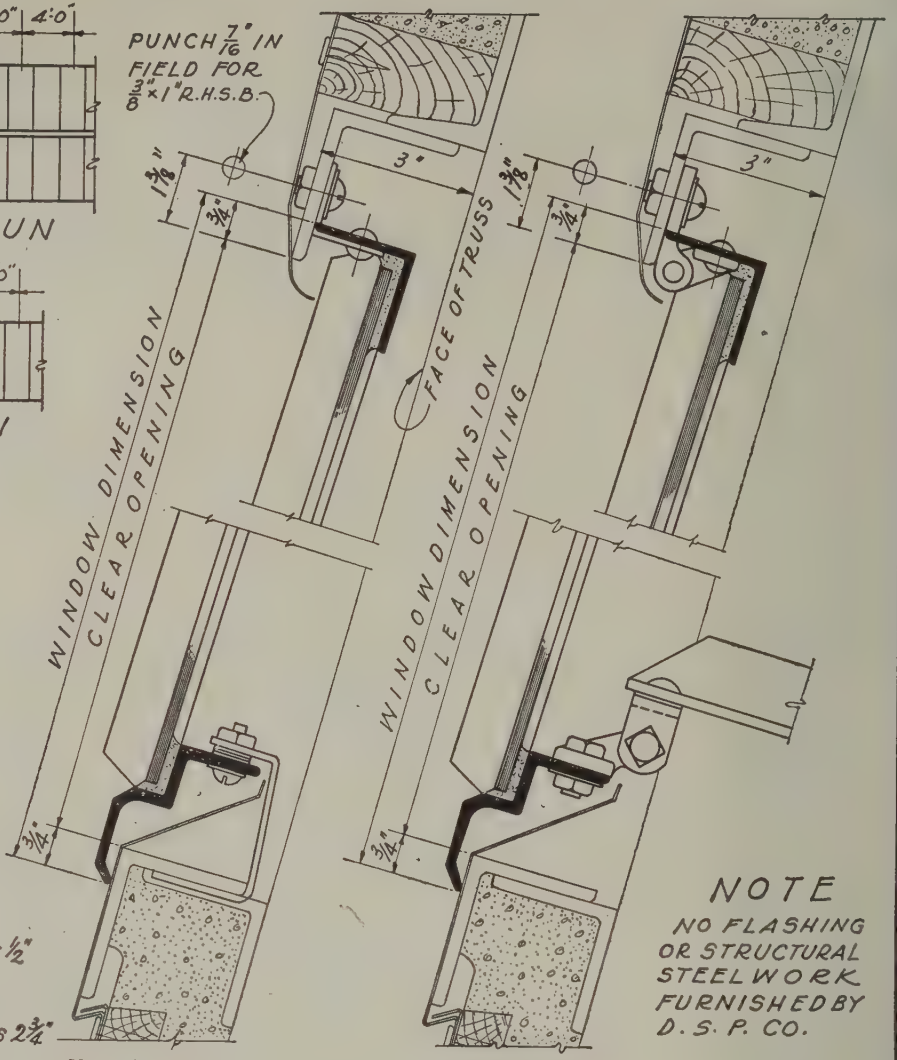
WINDOW HEIGHT	GLASS WIDTH	GLASS HEIGHT
3'-0"	23 1/2"	2'-9 1/4"
4'-0"	23 1/2"	3'-9 1/4"
5'-0"	23 1/2"	4'-9 1/4"
6'-0"	23 1/2"	5'-9 1/4"

TABLE OF WINDOW DIMENSIONS AND CLEAR OPENINGS.	
WINDOW-D.	CLEAR O.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"

GLASS SIZES

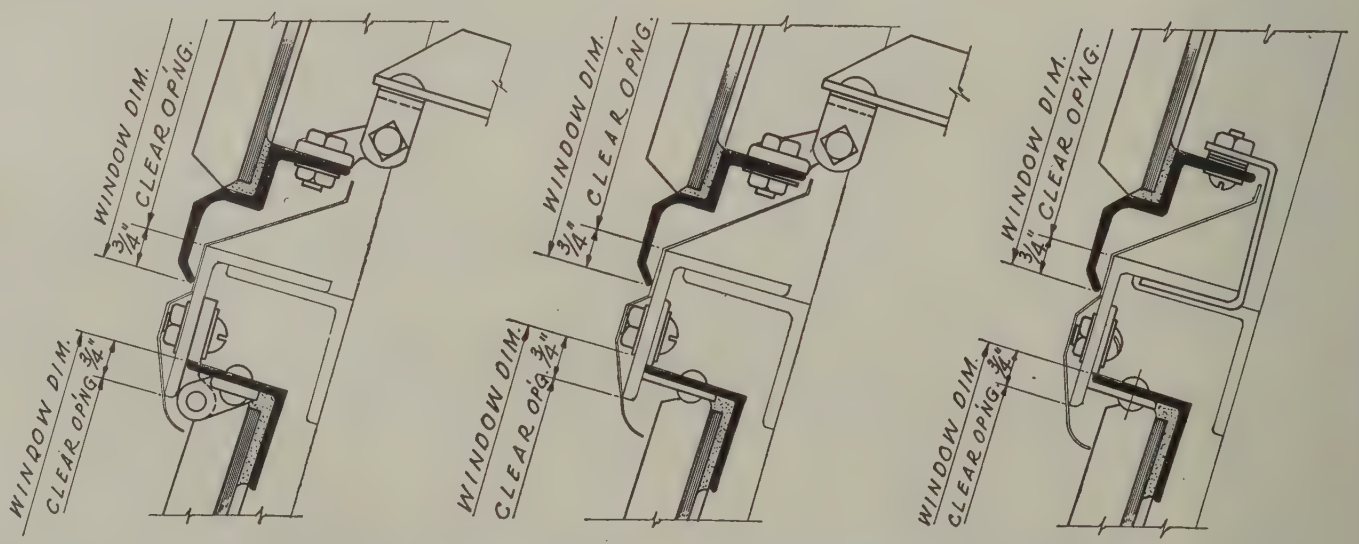
WIDTH
EQUALS BAR CENTERS MINUS 1/2"

HEIGHT
EQUALS SASH DIMENSION MINUS 2 3/4"



FIXED SWING

NOTE
NO FLASHING OR STRUCTURAL STEEL WORK FURNISHED BY D. S. P. CO.



SWING OVER SWING SWING OVER FIXED FIXED OVER FIXED

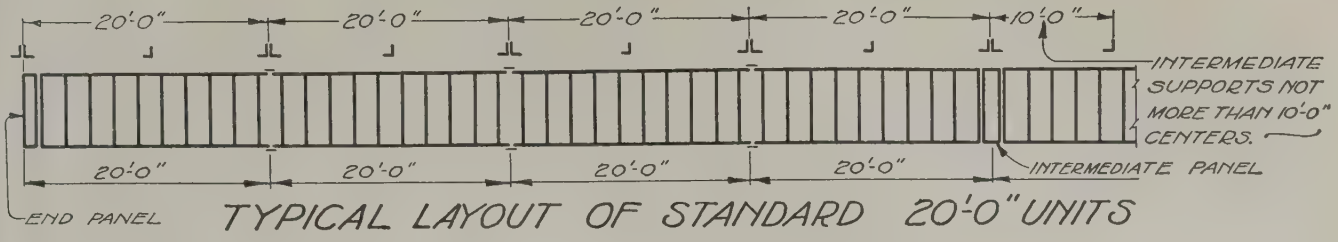
SCALE: 3"-1'-0"

Fenestra August 1928

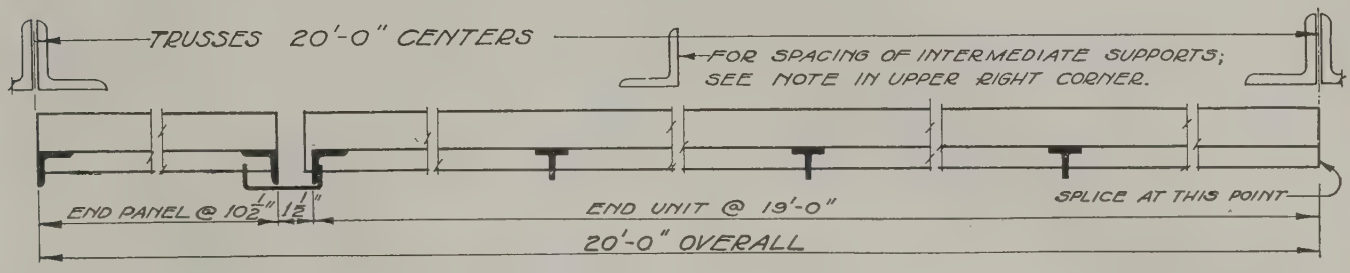
Continuous Windows, Top Hung
Typical Cross Sections

Plate No P-102

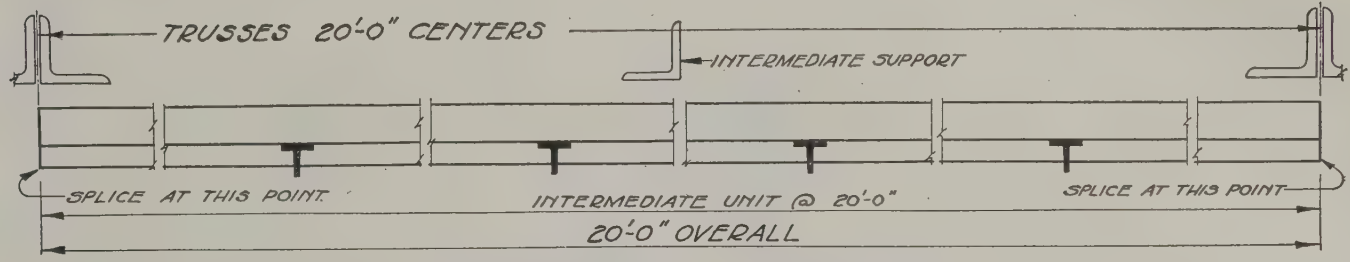
Continued on next page



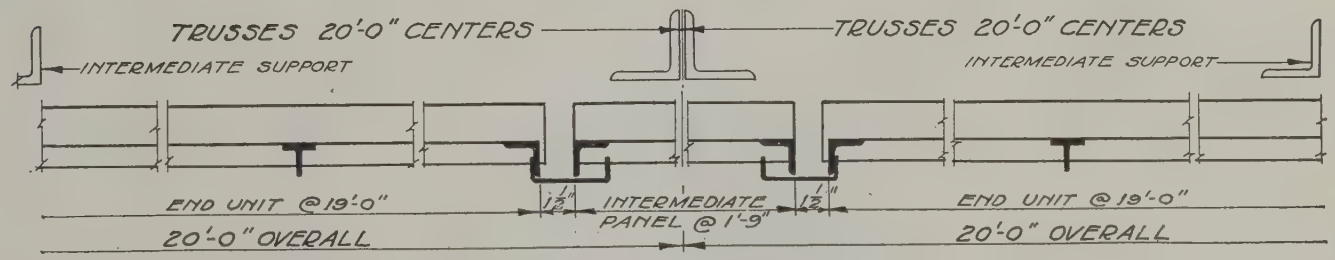
TYPICAL LAYOUT OF STANDARD 20'-0" UNITS



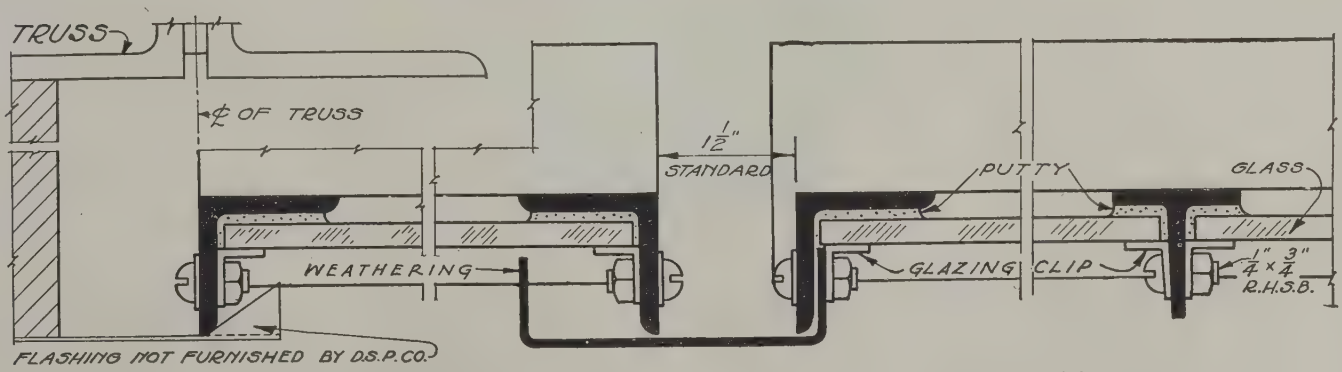
TYPICAL END UNIT WITH PANEL



TYPICAL INTERMEDIATE UNIT WITHOUT PANELS



TYPICAL INTERMEDIATE UNITS WITH PANEL

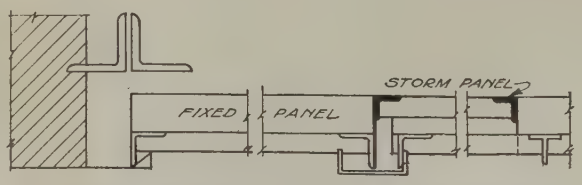


HORIZONTAL SECTION AT END OF RUN

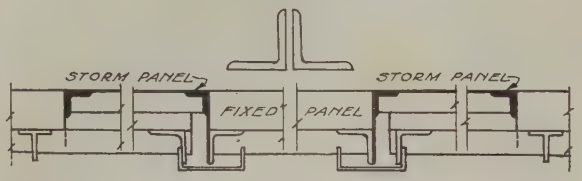
SCALE: HALF FULL SIZE

Fenestra, August 1928	Continuous Windows, Top Hung Details of Typical Units	Plate No. P-103

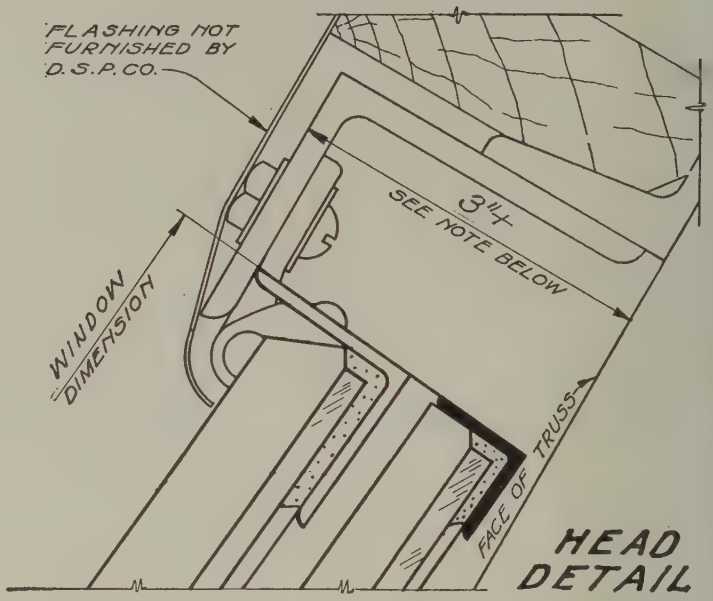
Continued on next page



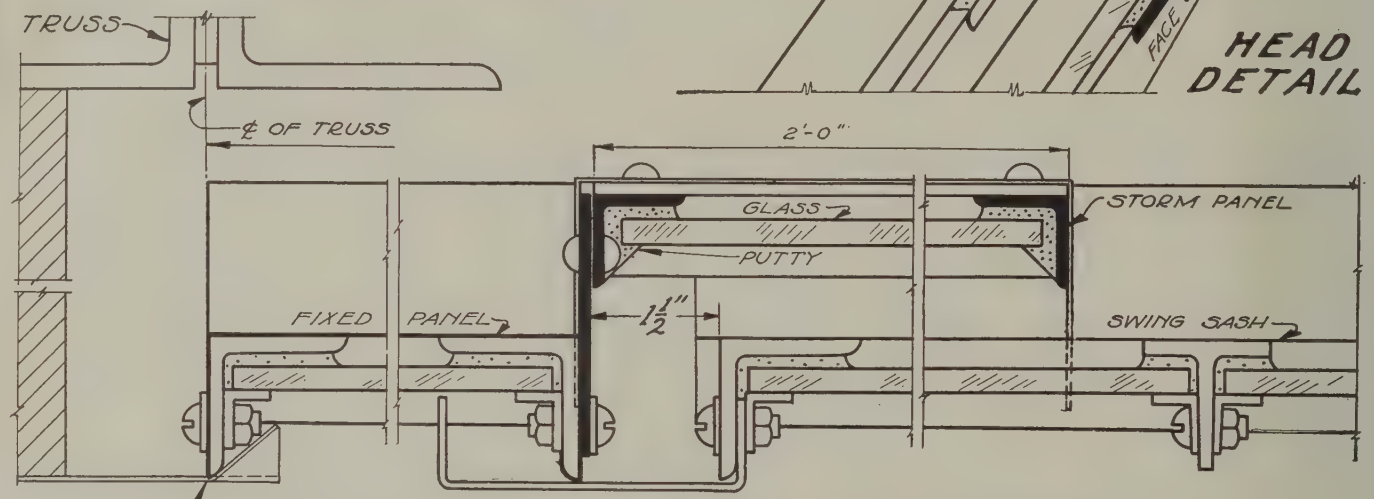
TYPICAL DETAIL AT END OF SWING RUN



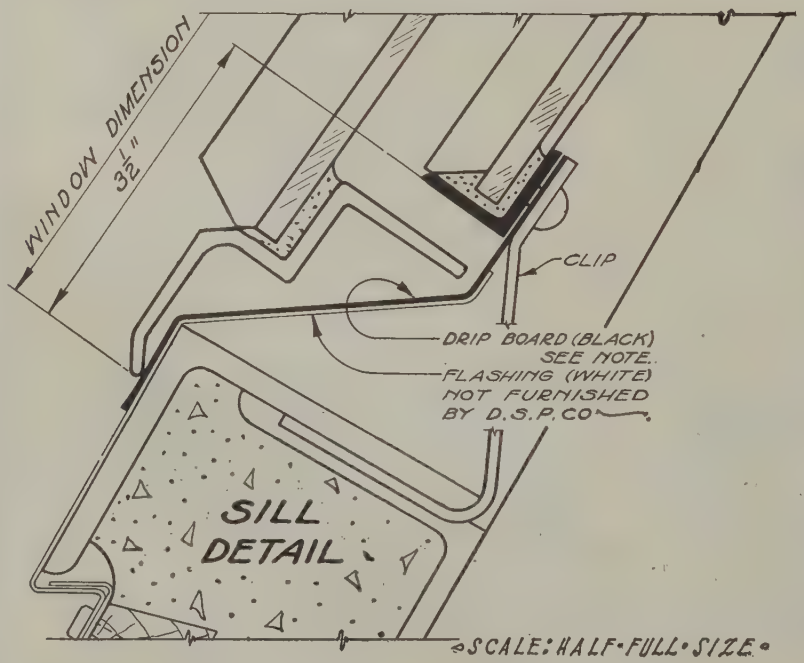
TYPICAL DETAIL BETWEEN SWING RUNS



HEAD DETAIL



TYPICAL HORIZONTAL SECTION THRU STORM PANEL



NOTE

Storm panels can be used only with top hung windows. They are recommended only for windows 30° or less off the vertical.

When panels are used in front of vertical steel members or diagonal bracing a clear distance of not under 4 in. must be used.

A drip board (shown in black at sill) is furnished as part of panel. This drip should not be confused with flashing at sill which is not furnished by Detroit Steel Products Company.

The height of glass in panel is equal to window dimension minus 4 in. The glass width is 1 ft. 11½ in.

Fenestra August 1928	Continuous Windows, Top Hung Storm and End Panels	Plate No P-104

Continued on next page

MECHANICAL OPERATING DEVICES

While the designing of mechanical operators for the various types of Fenestra windows is not in any sense complicated, so many different building conditions are encountered that it is impossible to lay down hard and fast rules, limits and specifications which the architect may use without first consulting a Fenestra representative.

The following specifications and plates therefore should be regarded as explanatory and advisory only.

Fenestra operators are not sold as separate and distinct products, but rather as a method of securing the satisfactory opening and closing of Fenestra windows by mechanical means. Therefore, any mechanical operators recommended by Fenestra representatives are just as dependable as the Fenestra butt or cam handle or any other standard device which the architect himself might specify.

All operating equipment, and especially electrically controlled equipment, needs occasional inspection and lubrication. Therefore, provision should be made by which powers and motors may be reached without undue inconvenience. A "cat walk" or a movable platform is suggested where ladders are impractical.

A plate door is sometimes installed in the fixed panels between the runs of Continuous Windows so that the powers may be reached from the roof. Such doors may be had at added cost if specified.

(SA) WORM AND GEAR OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

***Note:** This operator is designed primarily for horizontally pivoted ventilators but may, in some cases, be used on top pivoted ventilators.*

(SA-1) Work Included

***Note:** List and locate. (See paragraph 13, Fenestra Page 2.)*

(SA-2) General

All operators, so indicated, shall be *Fenestra* Worm and Gear as manufactured by Detroit Steel Products Company.

(SA-3) Material

(SA-3a) Power—Power shall be a machine cut, cast iron worm operating a cast iron segmental worm gear assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to eliminate friction. The hub of the segment gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

***Note:** Power may be erected in an inclined or inverted position to clear cranes, pipes or other obstructions.*
***Note:** The power may be located at either end of the run or at any intermediate point. Recommended limits are given on Fenestra Page 55.*

(SA-3b) Power Transmission—Power line shall be 1″ black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions. Line shall be supported on adjustable steel brackets, bolted to the window mullions or to the building construction. Adjustable steel operating arms (one to each ventilator) shall be rigidly clamped to the line and pivoted to steel arm extensions attached to the ventilators through steel hinge brackets.

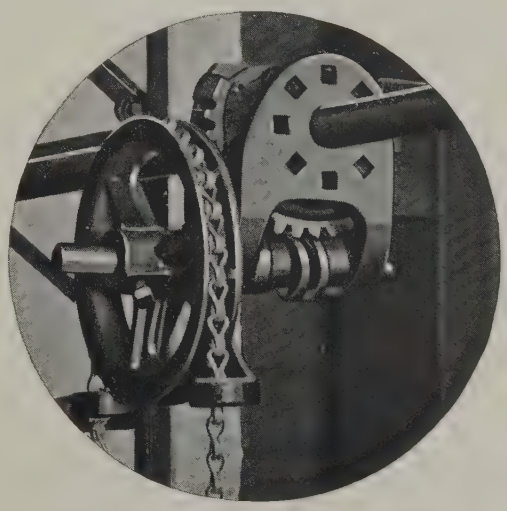
(SA-3c) Manual Operation—
***Note:** Select type.*

(1) ***Chain***—Power shall be operated by a chain, operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through end of the shaft shall be provided for additional protection.

***Note:** When the power must be erected in an inclined or inverted position (see Note SA-3a) to clear obstructions or to make the ventilators visible from the operating station, chain may be carried over idlers to any convenient point.*

(2) ***Pipe***—Power shall be operated by a 1″ black, wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4′ above the floor.

***Note:** When the power is installed in an inclined or inverted position (see Note SA-3-a) the pipe may be offset through the use of universal joints.*



Power for Worm and Gear Operator

(SA-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

***Note:** Further painting should be provided for in the Painting Specifications.*

***Note:** Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1), at reasonable added cost will do field painting after erection. If required, so specify, including specifications for paint and its application.*

(SA-5) Erection

All operators shall be erected by the Fenestra Construction Company.

***Note:** See Paragraph 5, Fenestra Page 1.*

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SB) RACK AND PINION OPERATOR—Specifications

Notes are explanatory or advisory only, and need not be included in the specifications.

***Note:** This operator is primarily adapted for use on ventilators pivoted 4″ from the top, but can be used successfully on horizontally pivoted ventilators.*

(SB-1) Work Included

***Note:** List and locate. (See Paragraph 13, Fenestra Page 2.)*

(SB-2) General

All Operators, so indicated, shall be *Fenestra* Rack and Pinion as manufactured by Detroit Steel Products Company.

(SB-3) Material

(SB-3a) Power—

***Note:** Three types of power are available. Select and specify that best adapted to the condition.*

***Note:** Power may be located at either end of the run or at any intermediate point of the run. Recommended limits are given on Fenestra Pages 56 and 57.*

(1) ***Light Power***—Light Power shall be a 32 to 1 reduction, machine cut steel, worm operating a semisteel worm gear

(Continued on Fenestra page 50)

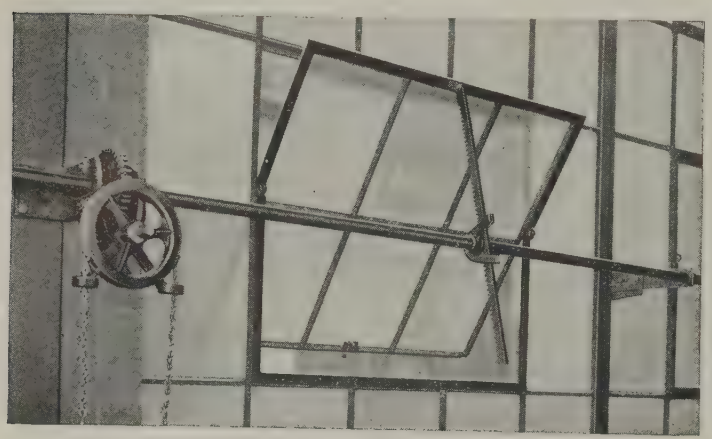
Continued on next page

assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.

(2) ***Heavy Power***—Heavy Power shall be a 45 to 1 reduction machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line to which it shall be securely attached so as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.



Rack and Pinion Operator, Manually Controlled

(3) ***Electrical Power***—Electrical Power shall be a 71 to 1 reduction, machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. The power shall be operated by a cast iron sprocket wheel keyed to the worm shaft and motor driven through a chain drive. The electrical equipment shall be mounted directly beneath and joined to the power gear case forming a complete power unit. The power unit shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 53 and should be included here.

(SB-3b) Power Transmission—Power Transmission lines shall be 1" black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions.

Lines shall be supported on adjustable, steel brackets, bolted to window mullions or to building construction.

Operating arms (one to each ventilator) shall be straight steel racks, clamped in mesh with pinions, rigidly secured to the line. (Arms shall be attached at the head of horizontally pivoted ventilators to pressed steel hinge brackets, and shall pull in.) (Arms shall be attached at the sill of top pivoted ventilators to Z bar brackets through pressed steel hinge brackets and shall push out.)

Note: Specify either or both arm attachments as required.

(SB-3c) Manual Operation—

Note: Select either type for "Light" or "Heavy" Power. Omit if Electric Power is used.

(1) ***Chain***—Power shall be operated by a chain operating over a chain-wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through the end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SB-3a) to clear obstructions or to make the ventilators visible from the operating station, the chain may be carried over idlers to any convenient point.

(2) ***Pipe***—Power shall be operated by a 1" black wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4' above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SB-3a), the pipe may be offset through the use of universal joints.

(SB-3d) Electrical Operation—Power shall be electric, motor operated.

Note: See Electrical Power (SB-3a3).

(SB-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the Fenestra Construction Company, *(see Paragraph 5, Fenestra Page 1,) at reasonable added cost, will do field painting after erection. If required so specify here, including specifications for paint and its application.*

(SB-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect operating condition.

(SC) SCREW TYPE OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: This operator is designed primarily for use on exceptionally high openings such as those in power houses, entirely filled with windows and structural mullions. It may be used on either horizontally pivoted ventilators or ventilators pivoted 4" from the top in individual bays, either within or beyond reach from the floor. The operator lies close to the inside face of the window out of the way of cranes and other obstructions. Where so provided for, powers and electrical mechanism may be concealed within the wall.

(SC-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(SC-2) General

All Operators, so indicated, shall be *Fenestra* Screw Type as manufactured by Detroit Steel Products Company.

(SC-3) Material

(SC-3a) Power—

Note: Two types of power are available. Select and specify that best adapted to the condition.

Note: The power may be located at either side of the opening or at any intermediate point. Recommended limits are given on Fenestra Pages 58 and 59.

Note: In bays of extreme width and height, flexibility of ventilator control may be secured by operating the upper runs from one power and the lower runs from another.

(1) ***Manual Power***—Power shall be applied through open bevel gears to operate a ¾" vertical threaded, steel shaft in an upward and downward direction.

Note: The operation is similar to that of an automobile jack.

Continued on next page

Gears shall be operated by a hand wheel provided with a handle.

The power shall be assembled within and shall be supported by an open, cast iron housing adapted to rigid attachment to the window mullion or building construction.

Provide a guide secured to the vertical shaft which shall fit over a guide T, attached to the window mullion. Guide T shall be provided with stops which shall limit the travel of the guide and shaft.

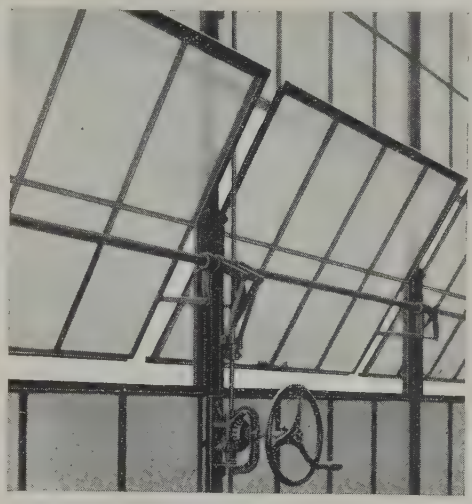
(2) ***Electrical Power***—Power shall be applied through bevel gears to operate a ¾" vertical threaded, steel shaft in an upward and downward direction. The gears shall be assembled and oil-encased in a dust-proof gear-box. Gears shall be operated by electrical power either direct connected through a universal joint or by means of a cast iron sprocket and chain drive.

The electrical equipment and the gear case shall be mounted to form a complete unit on a heavy steel bracket plate adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 53 and should be included here.

(SC-3b) Power Transmission—Power transmission lines shall be 1" black wrought iron pipe joined into a continuous line by steel plugs, with a drive fit riveted in two directions. Lines shall be supported close to the face of the window on heavy cast iron brackets rigidly attached to the mullions and building construction. Cast iron pivoted lever arms (two to each ventilator) shall be rigidly clamped to the power lines and attached to the ventilator jamb bars with malleable iron hinge brackets.

Heavy cast iron cross heads, secured to the vertical power shaft, shall operate attached cast iron rocker arms rigidly clamped to the power lines. When the power is applied the rocker arms shall rotate the power lines.



Screw Type Operator, Manually Controlled

(SC-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired the Fenestra Construction Company *(see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.*

(SC-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SD) TENSION OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Tension Operators are in general design and operation similar to Continuous Operators. They are made for use on long runs of horizontally pivoted windows. The chief difference is in the design of operating arms and the chief advantages lie in its easy operation and the fact that windows up to 300' may be operated from one power.

Note: To avoid repetition where the specifications are the same as that for Continuous Operator this is so noted. Where not identical, use clauses here given. For specification for Continuous Operator, see Fenestra Page 52.

(SD-1) Work Included

Note: Same as (SE-1).

(SD-2) General

All horizontally pivoted ventilator operators, so indicated, shall be *Fenestra* Tension Operators as manufactured by Detroit Steel Products Company.

(SD-3) Material

(SD-3a) Power—

Note: Same as (SE-3a).

(SD-3b) Stops—

Note: Include only where Manual operation is used.

On either side of the power case, the worm shaft shall extend to receive rigidly attached, double, steel, stop clutches (two in all). As the operator opens the window an auxiliary stop attached to the rack shall strike the upper end of a steel lever (pivoted to a bracket on the power case) causing the lower end of the lever (which is broached over the worm shaft) to engage one of the stop clutches and cut off the power. When the operator closes the window, a similar arrangement shall function to automatically cut off power at the proper point. Levers and clutches for each stop shall be automatically disengaged by coil springs. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SD-3c) Power Supports—

Note: Same as (SE-3c).

(SD-3d) Power Transmission—

Note: Same as (SE-3d).

(SD-3e) Operating Arms—Operating arms shall be adjustable, straight, steel channels. Arms shall be rigidly attached, through a malleable iron and steel universal swivel clamp, to the tension line and the other end shall be secured to the top of the window through a steel pivoted hinge. Arms shall operate to pull the window in from the top.

(SD-3f) Manual Operation—

Note: Same as (SE-3f).

(SD-3g) Electrical Operation—

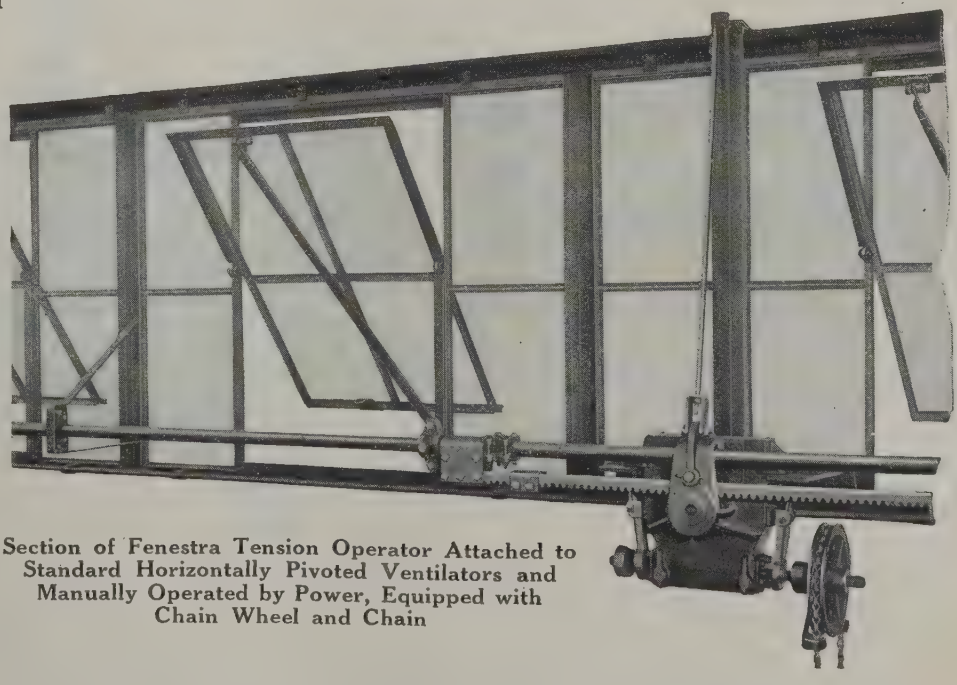
Note: Same as (SE-3g)

(SD-4) Painting

Note: Same as *(SE-4).*

(SD-5) Erection

Note: Same as (SE-5).



Section of Fenestra Tension Operator Attached to Standard Horizontally Pivoted Ventilators and Manually Operated by Power, Equipped with Chain Wheel and Chain

Continued on next page

(SE) CONTINUOUS OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed to operate from a single power, one or several continuous windows in line (top hung, or bottom hung) located in either vertical or sloping planes.

Note: The power developed through the tension line is applied to the window through straight motion levers so arranged that the leverage increases faster than the load thus making the operation continuously easier as the window opens. This is a basic principle exclusive in Fenestra Continuous Operator.

Note: The unusually heavy construction, and the extreme care with which all material is selected and fitted, give this power exceptional strength and reliability.

(SE-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2).

(SE-2) General

All continuous window operators shall be *Fenestra* Continuous Operators as manufactured by Detroit Steel Products Company.

(SE-3) Material

(SE-3a) Power—Power shall consist of a case hardened, machine cut, high carbon steel worm operating a special alloy, non-ferrous bronze, worm gear with straight face, machine cut teeth and extra heavy hub and rim.

Worm and gear shall be oil-encased, assembled in an accurately machined, oil-tight box. Worm and worm shaft shall be turned down from a solid steel bar. The worm shaft shall be made with long radial bearing surfaces and shall be provided with ball thrust, friction reducing bearings.

Note: The unusual length of the worm shaft radial bearing surfaces assures gear alignment and ease of operation without binding.

The worm gear shall fit tightly over a 1″ squared, steel shaft which shall extend to drive a high carbon steel, heat treated pinion in mesh with a rack.

Worm gear and pinion shall be separated by a spacer and all three shall be broached out to accurately fit the shaft with the permanence and reliability of a single piece.

The rack shall be of high carbon steel with machine-cut teeth of stub tooth design. The rack shall be suspended at each end from the power transmission tension line, by rigid rack hangers which thrust against clamps securely attached to the line, thus transmitting the power in a horizontal direction.

Note: The length of runs which may be operated from a single power can only be determined by consultation with a Fenestra representative since numerous factors must be considered, such as: the type of windows (top hung, bottom hung,, etc.), their location (vertical or horizontal plane), their height, the degree of opening desired, the time permitted for opening or closing, and, if manually operated, the effort to be exerted on the chain.

(SE-3b) Stop—

Note: Include only where Manual Operation is used.

Opposite the worm drive wheel, the worm shaft shall extend to receive a rigidly attached steel stop clutch. As the operator closes the window, an auxiliary stop attached to the rack, shall strike a malleable iron lever causing it to engage the stop clutch, and cut off the power. As the operator opens the window, the lever and clutch are disengaged automatically by a coil spring. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SE-3c) Power Supports—Each power shall be supported by two steel brackets, especially designed to withstand great lateral pressure. Each bracket shall be rigidly attached to the building construction and shall be trussed with ½″ tension rods with adjusting U bolt hangers.

(SE-3d) Power Transmission—Power transmission (tension) line shall be 1″ black, wrought iron pipe in lengths not to exceed 20′, joined into a continuous line by solid steel plugs, with a drive fit, riveted in two directions.

Tension line shall be supported on 2″x3″ steel angle brackets with legs turned down, spaced approximately 10′ apart and rigidly attached to the building construction.

Brackets shall be slotted to permit adjustment and shall carry at their upper, outer ends, cast iron roller housings and solid steel rollers to support the tension line.

(SE-3e) Operating Arms—Operating arms or levers shall be steel angles consisting of two arms, one twice as long as the other.

Note: The operating arm assemblies are spaced in conjunction with the tension line brackets, approximately 10′ apart.

One end of the long arm shall be rigidly clamped through a universal pivoted joint, to the tension line and the other end shall be secured to the window through a universal pivoted joint bracket. One end of the short arm shall be attached through a universal pivoted joint to the top of the cast iron roller housing on the tension line support bracket, the other end being pivoted to the center of the long arm.

All universal joints shall be provided with bronze bushings.

(SE-3f) Manual Operation—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the extended, flattened end of the worm shaft and shall be secured by a set screw, a cotter pin through the end of the shaft providing additional protection.

Note: To clear obstructions or make the windows visible from the operating station, chain may be carried over idlers to any convenient point.

(SE-3g) Electrical Operation—Power shall be operated by an electrical power unit operating through a sprocket and chain. Hub of sprocket shall be keyed to the extended end of the worm shaft. Electrical power unit shall be mounted beneath and secured to the power by rigidly attached auxiliary steel brackets.

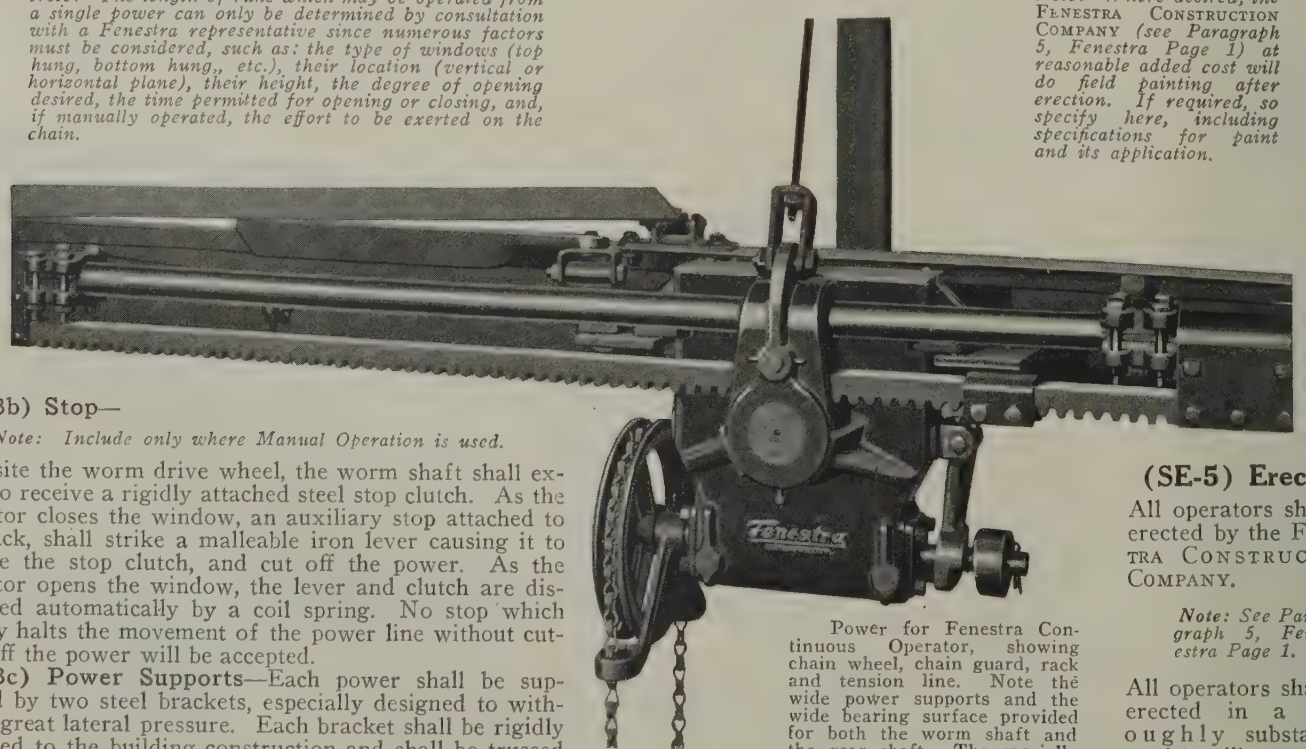
Note: Complete specifications of Electrical Equipment given on Fenestra Page 53, should be included here.

(SE-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.



Power for Fenestra Continuous Operator, showing chain wheel, chain guard, rack and tension line. Note the wide power supports and the wide bearing surface provided for both the worm shaft and the gear shaft. The specially designed Fenestra stop is shown on the worm shaft at the opposite end from the chain wheel

(SE-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

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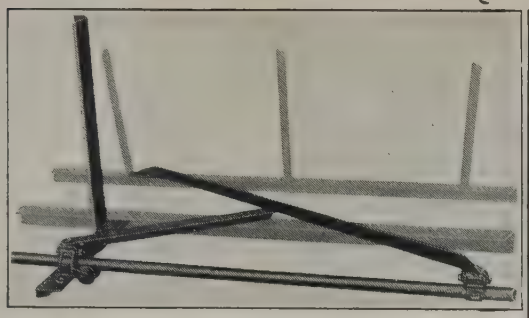


Above is shown a "close up" of the power transmission on Fenestra Continuous Operator. Note the 2x3 in. steel angle bracket supporting the line; the two operating arms, one twice as long as the other: one end of the long arm clamped to the pipe through a universal joint and the other attached to the window. The short arm is attached to the top of the cast iron roller housing while the other end is pivoted to the center of the long arm. For detailed description, see Paragraph SE-3e, Fenestra Page 52

At the right is shown part of two runs of Fenestra Continuous Operator as installed in the plant of the Commonwealth Steel Co., Granite City, Ill. The upper run of windows is closed while the lower run is partially open. This picture illustrates very well the operation of long runs of continuous top hung windows from a single power

CONTINUOUS WINDOW OPERATOR (CABLE TYPE)

Note: This operator is primarily adapted to use on Continuous Top Hung Windows.

The operator is designed for either hand or electrical operation and is identical to the continuous window mechanical operator except in one respect. Both ends of the transmission line are connected to chains which pass over roller bearing idlers rigidly supported on steel idler brackets (guyed to the building construction where possible) and are attached to continuous steel rods. The steel rods are carried directly beneath the transmission tension line and are supported through holes in the tension line brackets. The ends of the steel rods next the power are connected to either end of the power rack. The proper tension in rods is accomplished through turn buckles furnished in the rod lines.

In this operator the transmission line (the 1" pipe) is always in tension both when opening and closing the windows. For details, see Fenestra Page 62.

(SF) ELECTRICAL EQUIPMENT FOR OPERATORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(SF-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

(SF-2) General

All Mechanical Operators, electrically controlled, shall be provided by the Operator Manufacturer, with complete electrical equipment, as hereinafter specified. The operator manufacturer shall provide complete wiring diagrams.

(SF-3) Electrical Equipment

(SF-3a) Motors—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: Motors operating on 220 volt or 440 volt, 60 cycle, 3 phase alternating current are recommended. Direct current motors are not carried in stock, but if alternating current is not available, a special motor for 230 volt, direct current, can be supplied.

Note: Specify current furnished.

(SF-3b) Power Connections—Motors shall be connected to power by means of sprockets and chains, or direct connected through universal joints as best adapted to power requirements.

(SF-3c) Reversing Switches—Standard Magnetic Reversing Switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator, either in opening or closing may be stopped or started at any point by manipulation of push buttons.

(SF-3d) Limit Switches—Limit Switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed, yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

(SF-3e) Push Button Stations—Push Button Stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidently operated.

(SF-4) Electrical Construction

Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the Electrical Equipment furnished by the Window Operator Manufacturer and that furnished by himself.

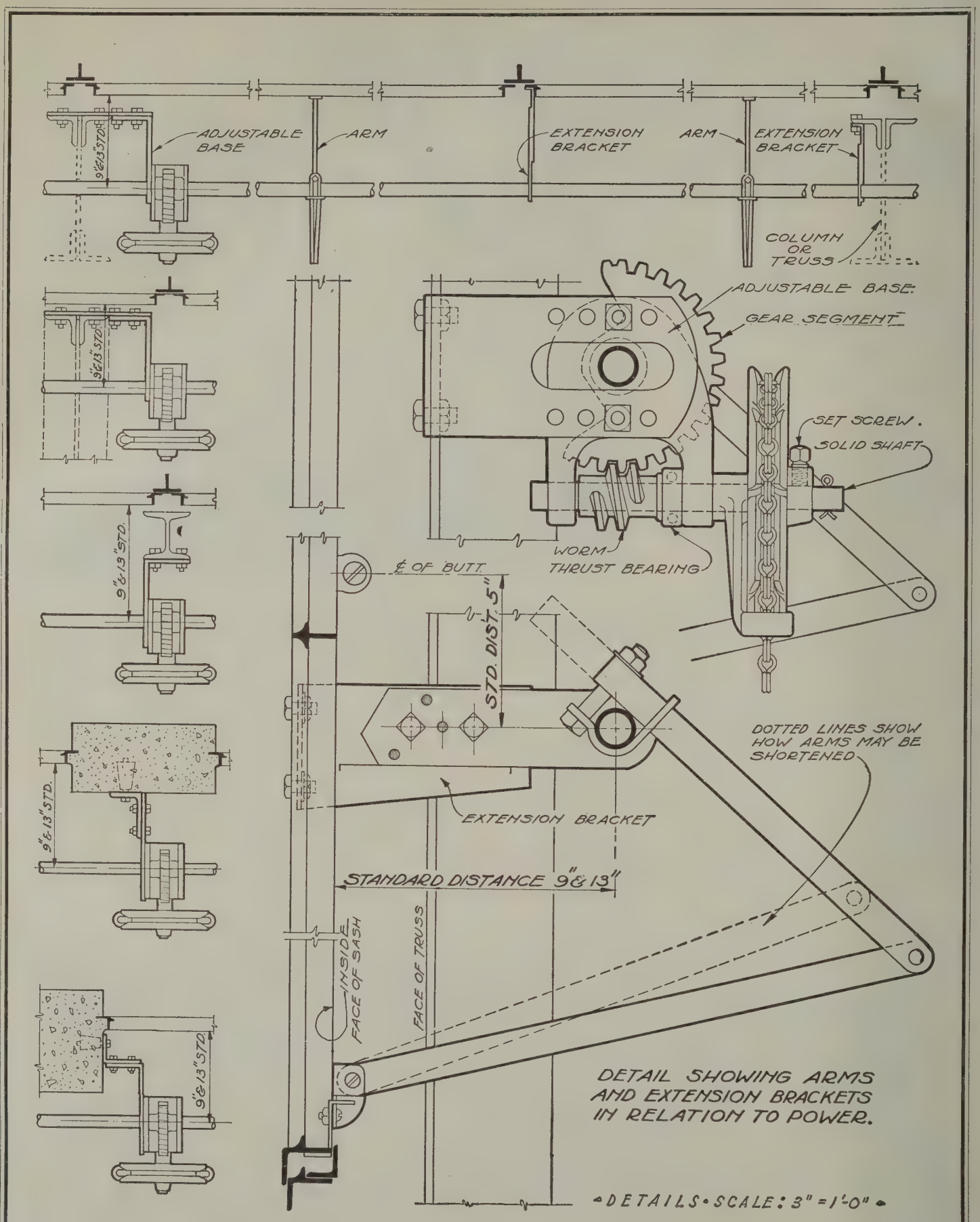
All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, sightly manner, parallel with structural features of the building and rigidly and neatly secured. Where walls are plastered, conduit shall be concealed.

The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him, developing during the above named period shall be promptly and satisfactorily made good at his expense.

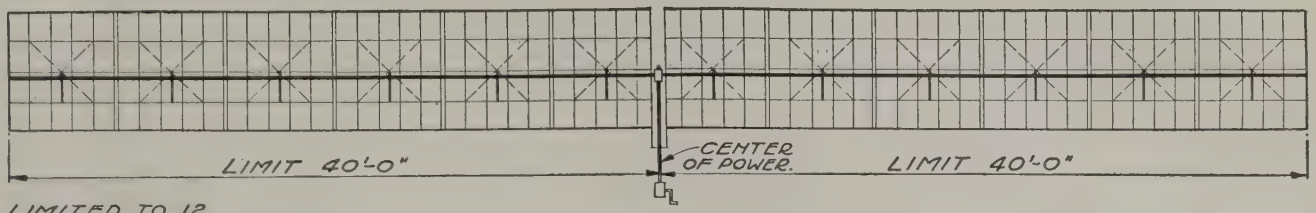
FENESTRA PAGE 53 (SEE PLATE ON PAGE 66; ELECTRICAL PLATES ON PAGES 57, 59, 61, 65, 66)

Continued on next page



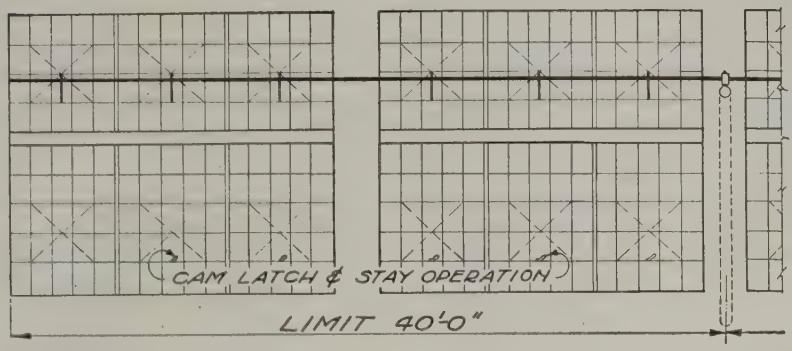
Fenestra, August 1928	Worm and Gear Operator Typical Details	Plate No S-101

Continued on next page



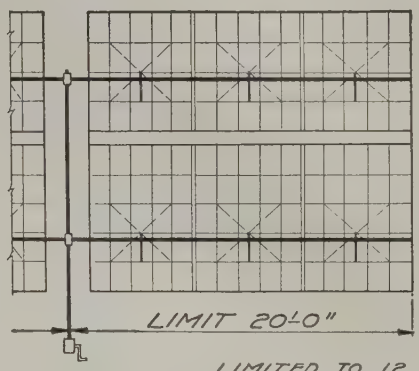
LIMITED TO 12 STANDARD 2 PANE HIGH VENTS.

TYPICAL SINGLE RUN



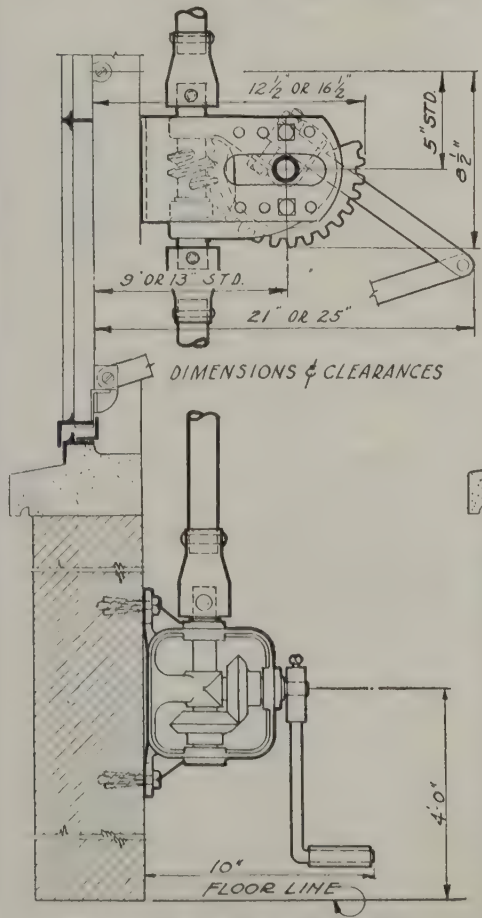
LIMITED TO 12 STANDARD 2 PANE HIGH VENTS.

TYPICAL SINGLE RUN

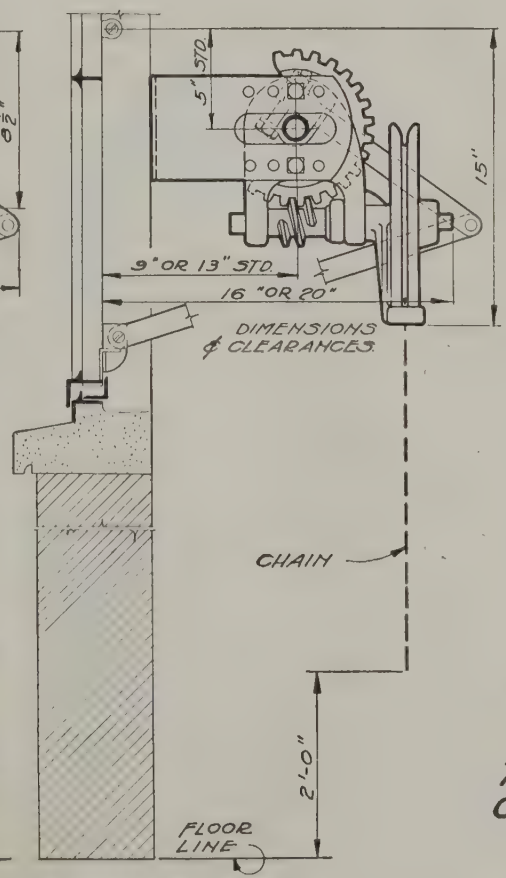


LIMITED TO 12 STANDARD 2 PANE HIGH VENTS

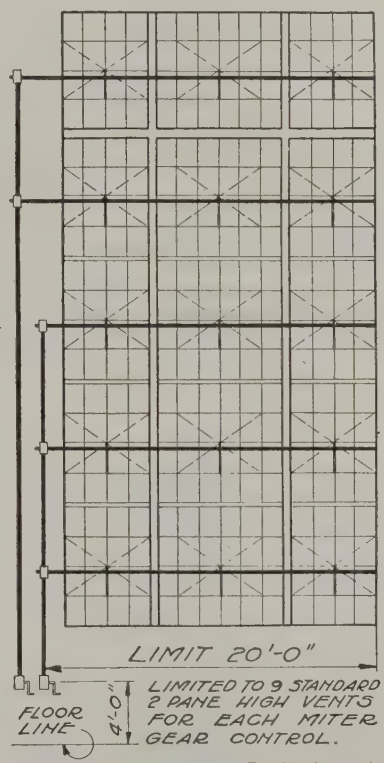
TYPICAL DOUBLE RUN



MITER GEAR OPERATION



CHAIN OPERATION

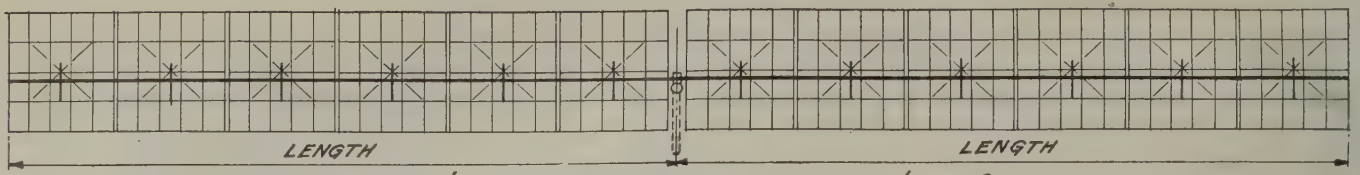


TYPICAL MULTIPLE RUNS OPERATED IN SINGLE BAYS.

• DETAILS • SCALE: 1½" = 1'-0" •

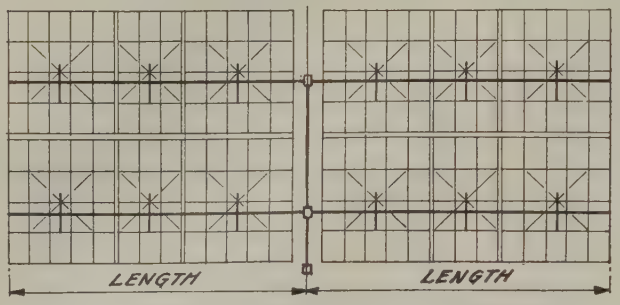
Fenestra, August 1928	Worm and Gear Operator Bay Operation	Plate No. S-102

Continued on next page



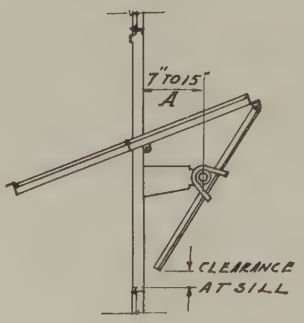
LIMITED EACH SIDE TO 80' AND 12 HOR. PIVOTED VENTS OR 40' AND 6 TOP PIVOTED VENTS

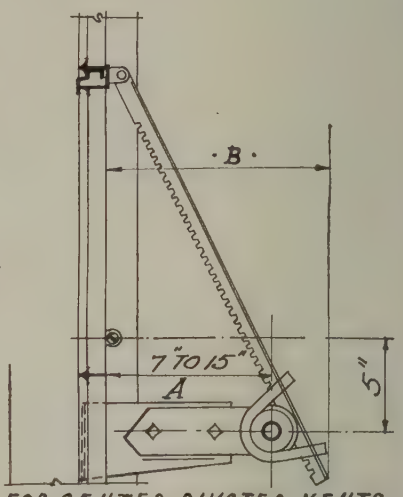
·TYPICAL·SINGLE·RUN·



LENGTH LIMITED TO HALF THAT OF SINGLE RUNS WITH TOTAL NUMBER OF VENTS THE SAME.

TYPICAL DOUBLE RUN

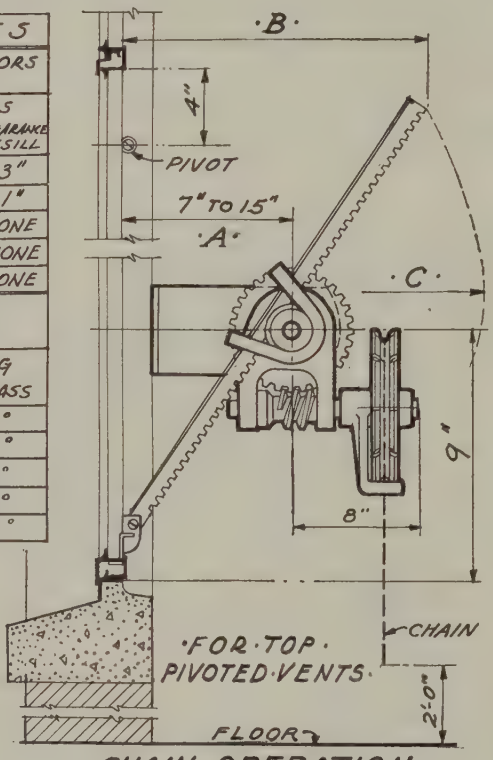




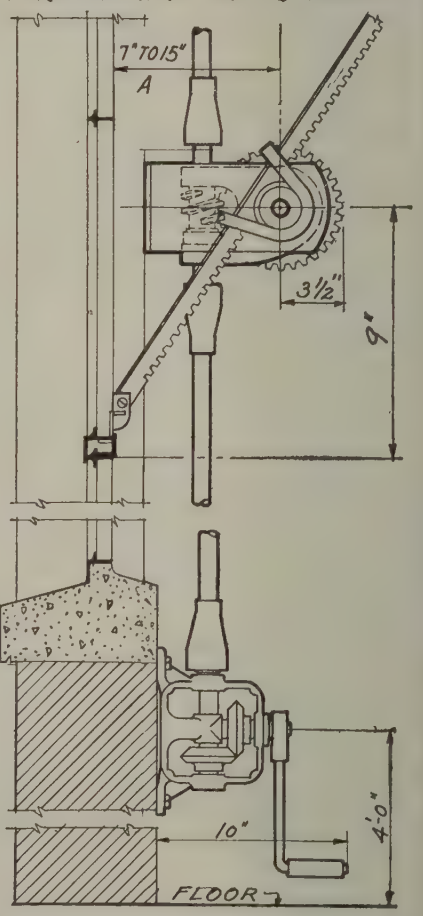
·FOR·CENTER·PIVOTED·VENTS·

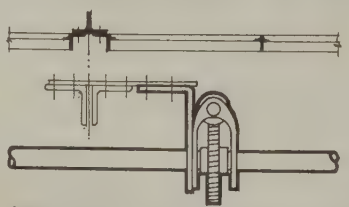
TABLE OF CLEARANCES TWO PANE HIGH VENTILATORS PIVOTED 2" ABOVE CENTER						
18" GLASS				20" GLASS		
A	B	ANGLE OPNG.	CLEARANCE AT SILL	B	ANGLE OPNG.	CLEARANCE AT SILL
7	12	60°	NONE	11	90°	3"
9	14½	70°	NONE	13½	90°	1"
11	16½	80°	NONE	15½	80°	NONE
13	18½	90°	NONE	17½	90°	NONE
15	21	90°	NONE	20	90°	NONE

TWO PANE HIGH TOP PIVOTED VENTILATORS				
A	B	C	ANGLE OF OPENING 18" GLASS	ANGLE OF OPENING 20" GLASS
7	24½	28	60°	50°
9	29½	30	60°	50°
11	31½	31	50°	50°
13	33½	33	50°	40°
15	35½	35	40°	40°

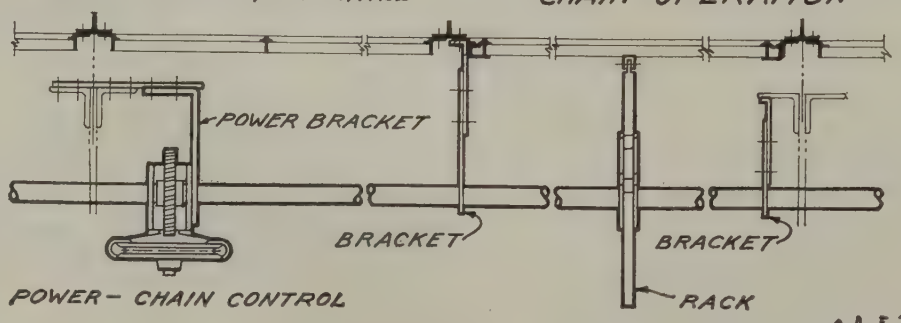


CHAIN OPERATION





POWER SET FOR MITER GEAR CONTROL



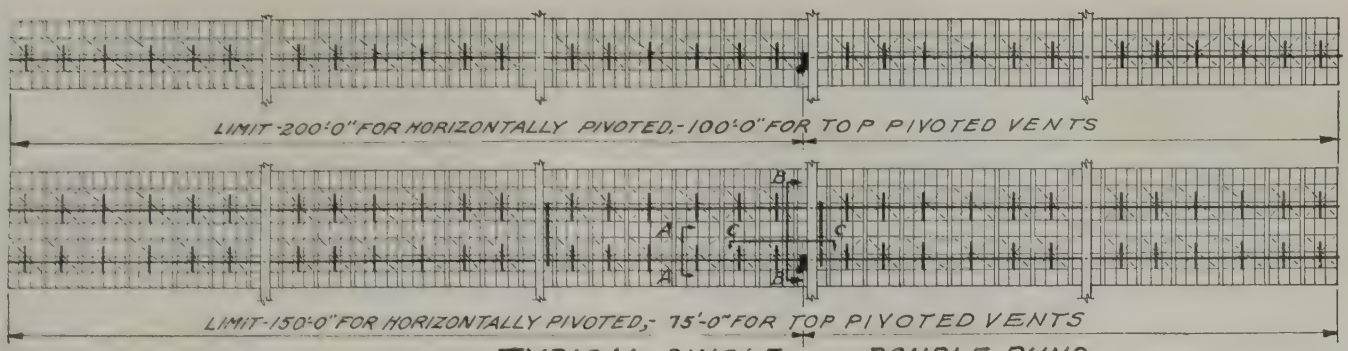
POWER – CHAIN CONTROL

MITER GEAR OPERATION

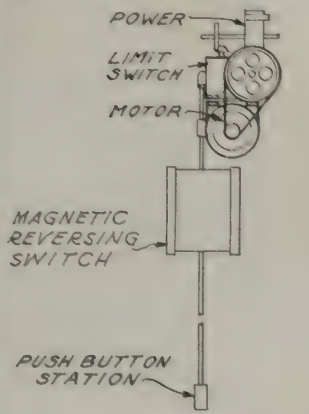
·DETAILS·SCALE:¾"=1'-0"·

Fenestra August 1928	Rack and Pinion Operator Typical Details	Plate No S-201

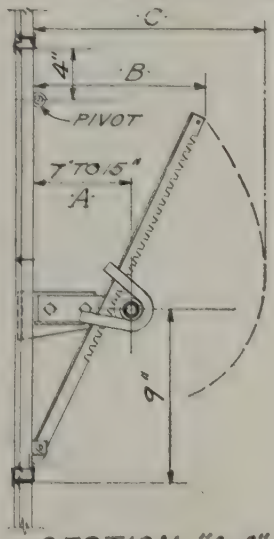
Continued on next page



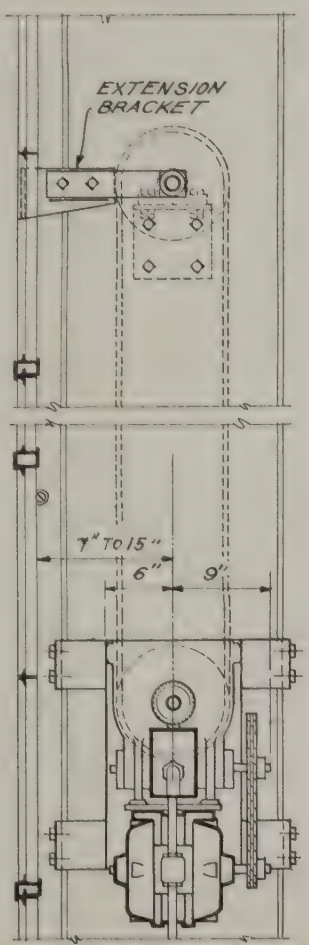
TYPICAL SINGLE AND DOUBLE RUNS.



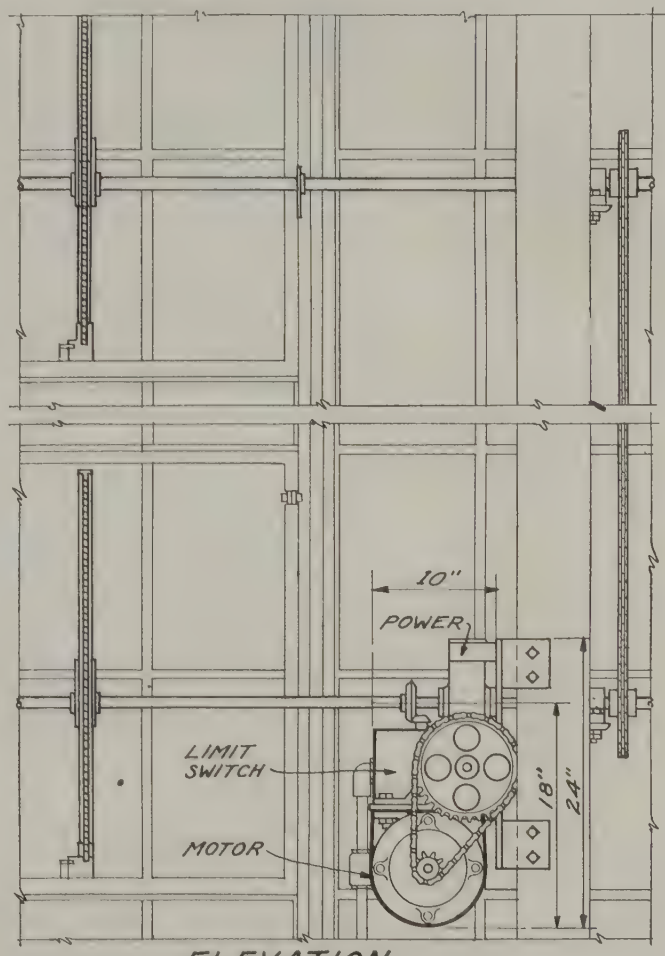
TYPICAL INSTALLATION



SECTION "A-A"

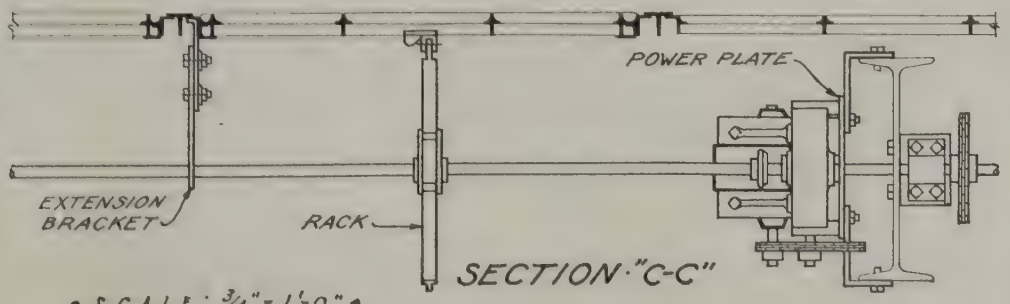


SECTION "B-B"



ELEVATION

CLEARANCES FOR RACK TWO PANE HIGH TOP PIVOTED VENTS.				
A	B	C	OPENING ANGLE 18" GLASS	OPENING ANGLE 20" GLASS
7	24½	28	60°	50°
9	29½	30	60°	50°
11	31½	31	50°	50°
13	33½	33	50°	40°
15	35½	35	40°	40°



SECTION "C-C"

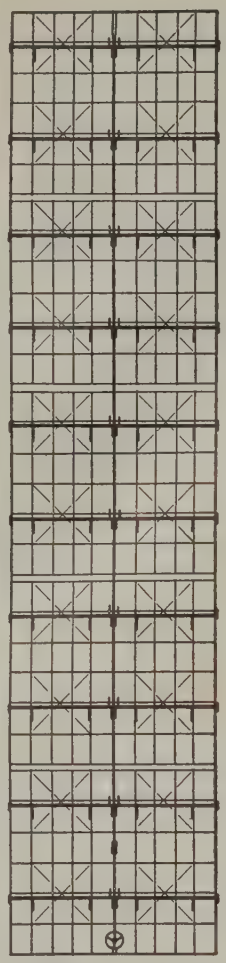
SCALE: 3/4" = 1'-0"

Fenestra August 1928

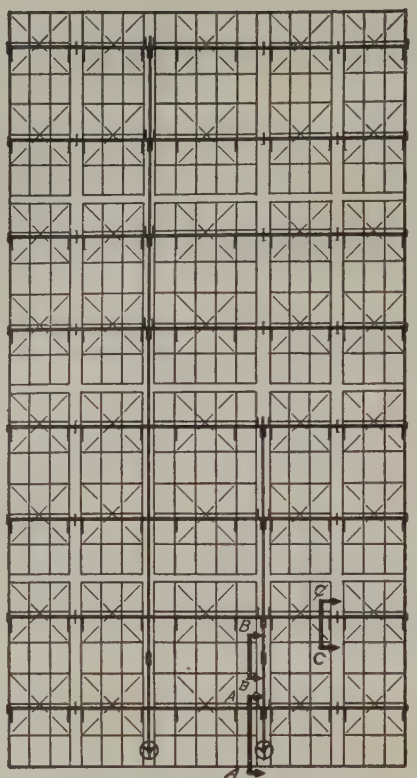
Rack and Pinion Operator
Electrically Controlled

Plate No S-202

Continued on next page



OPERATOR ATTACHED TO T-BAR MULLION

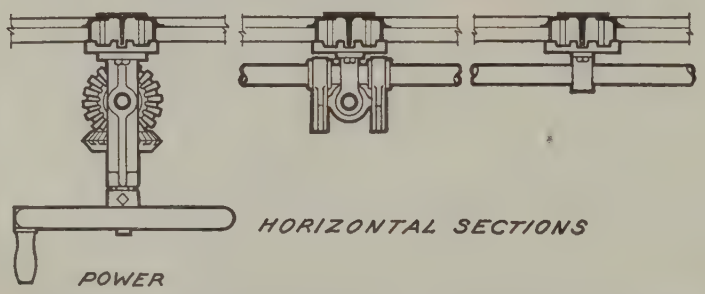


OPERATOR ATTACHED TO STRUCTURAL MULLION

NOTE

ONE POWER IS LIMITED TO OPERATE TWENTY, TWO PANE HIGH TOP PIVOTED VENTS TO OPEN OUT, OR FIFTY, TWO PANE HIGH VENTS PIVOTED 2" ABOVE CENTER. ONE FIXED PANE AT SILL REQUIRED FOR POWER CLEARANCE.

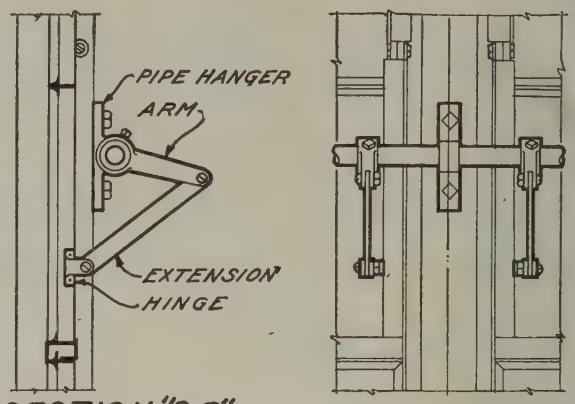
TYPICAL INSTALLATIONS



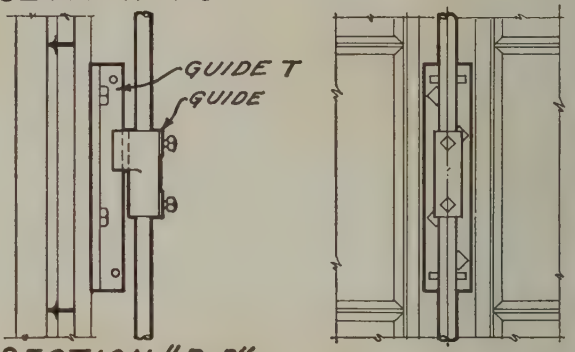
HORIZONTAL SECTIONS

POWER

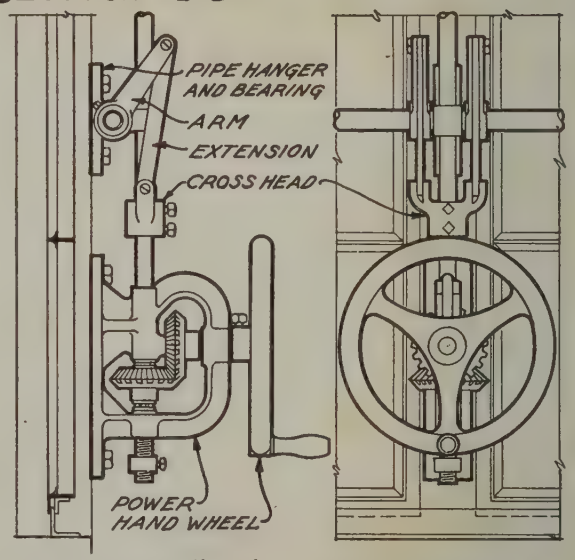
OPERATOR ATTACHED TO T-BAR MULLION



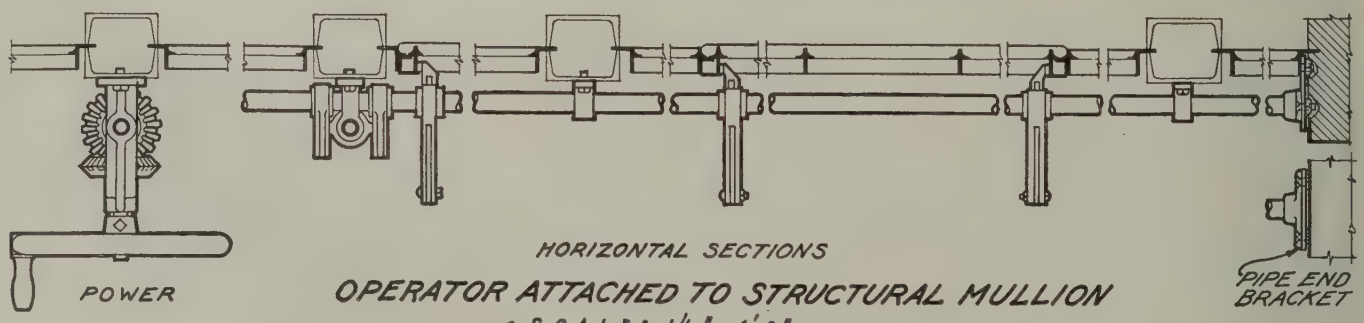
SECTION "C-C"



SECTION "B-B"



SECTION "A-A" ELEVATION



HORIZONTAL SECTIONS

POWER

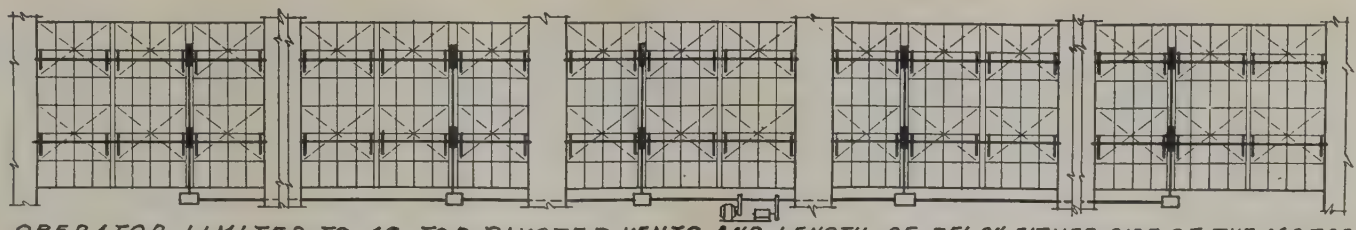
PIPE END BRACKET

OPERATOR ATTACHED TO STRUCTURAL MULLION

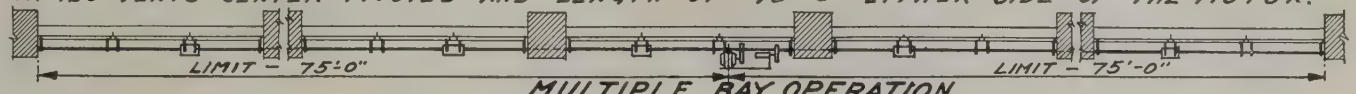
SCALE: 1½" = 1'-0"

Fenestra August 1928	Screw Type Operator Typical Details	Plate No. S-301

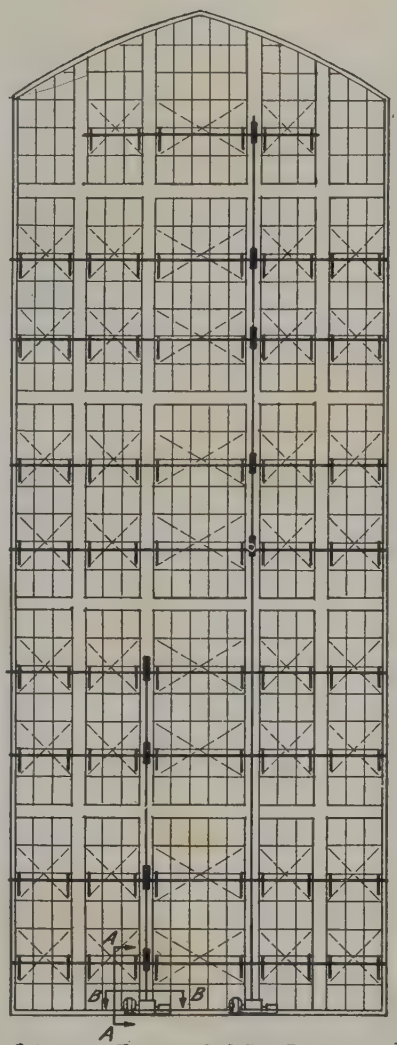
Continued on next page



OPERATOR LIMITED TO 48 TOP PIVOTED VENTS AND LENGTH OF 75'-0" EITHER SIDE OF THE MOTOR, OR 120 VENTS CENTER PIVOTED AND LENGTH OF 75'-0" EITHER SIDE OF THE MOTOR.

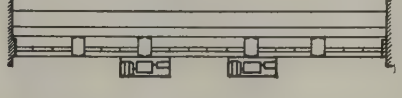


MULTIPLE BAY OPERATION

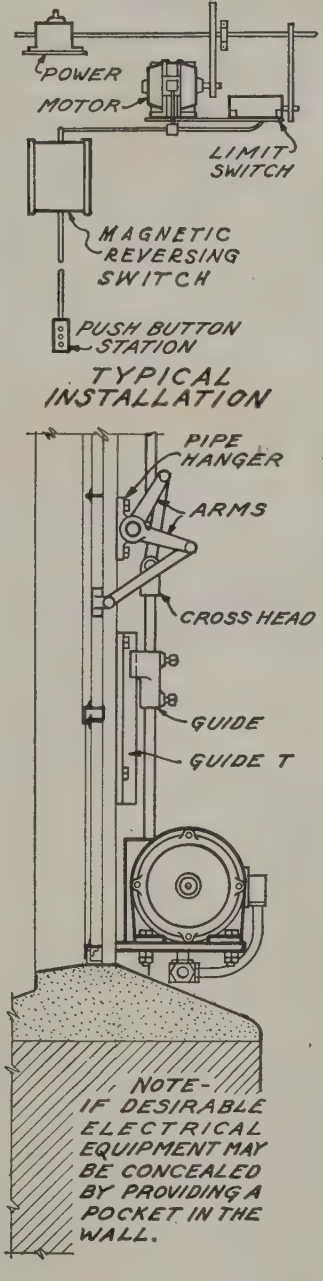


SINGLE BAY OPERATION

OPERATOR LIMITED TO 8 TIERS AND 24 TOP PIVOTED VENTS OR 8 TIERS & 48 VENTS CENTER PIVOTED.

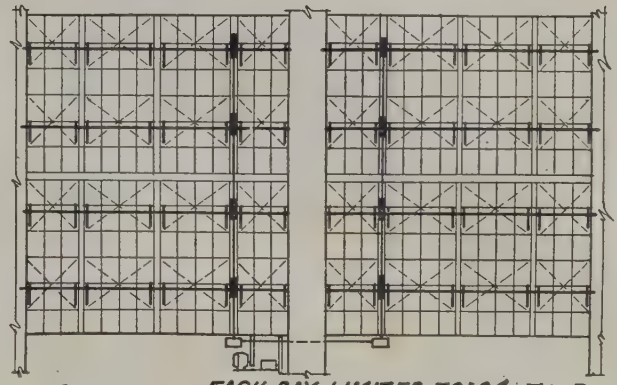


PLAN



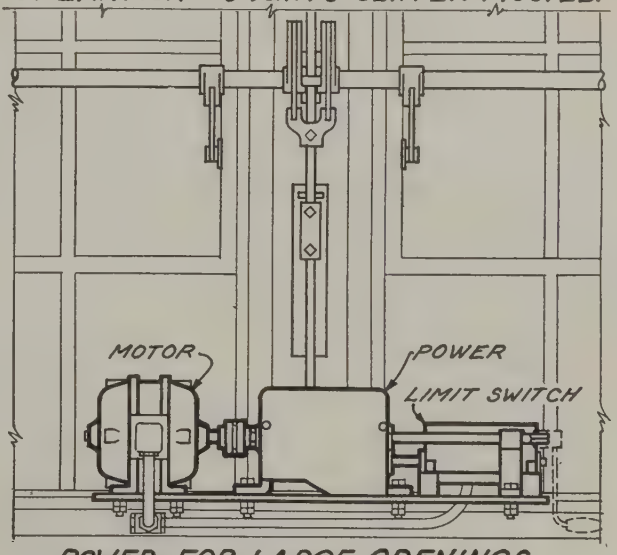
TYPICAL INSTALLATION

SECTION "AA"

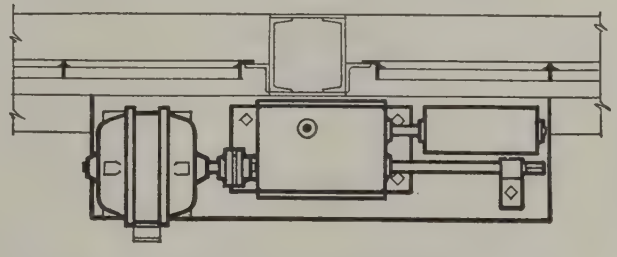


2 BAY OPERATION

EACH BAY LIMITED TO 24 TOP PIVOTED VENTS OR TO 48 VENTS CENTER PIVOTED.



POWER FOR LARGE OPENINGS

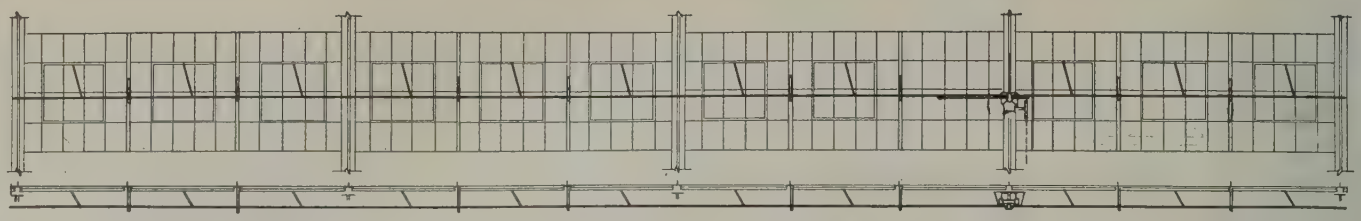


PLAN-POWER FOR LARGE OPENINGS.

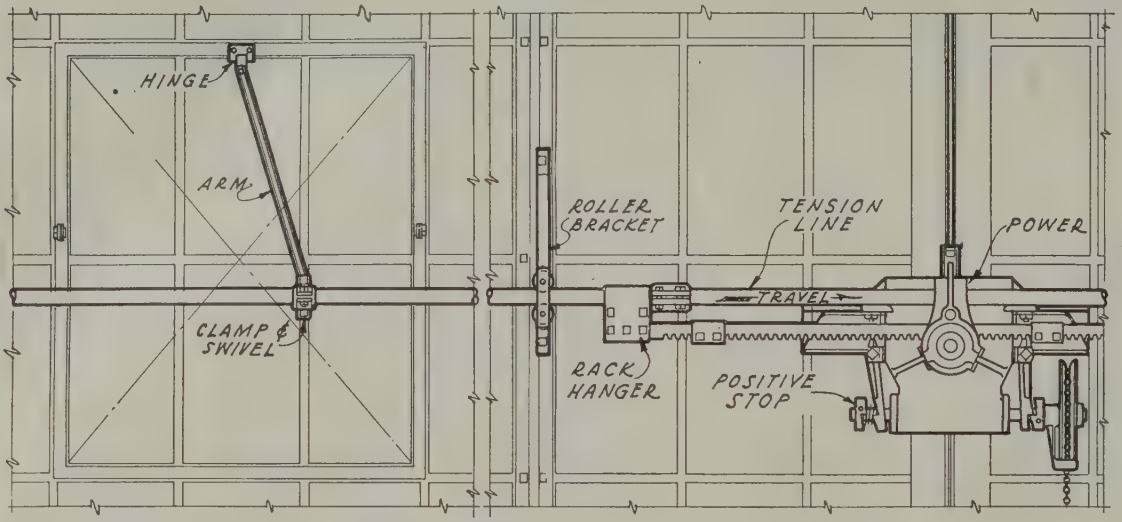
SCALE: 3/4" - 1'-0"

Fenestra, August 1928	Screw Type Operator Electrically Controlled	Plate No. S-302

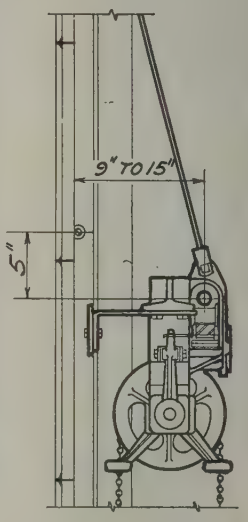
Continued on next page



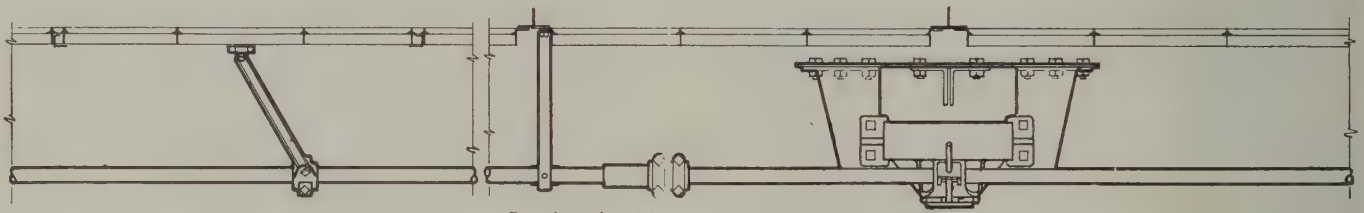
• INSIDE • ELEVATION • AND • PLAN • OF • OPERATOR •



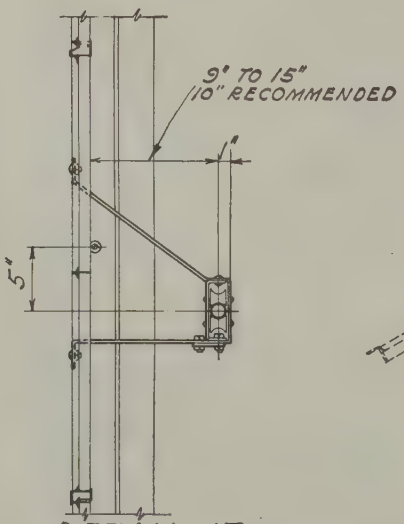
• INSIDE • ELEVATION •



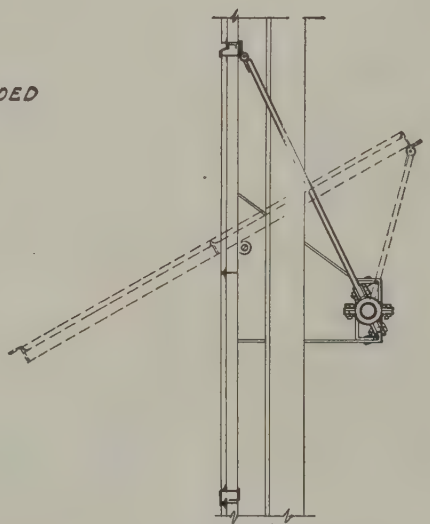
• SECTION •



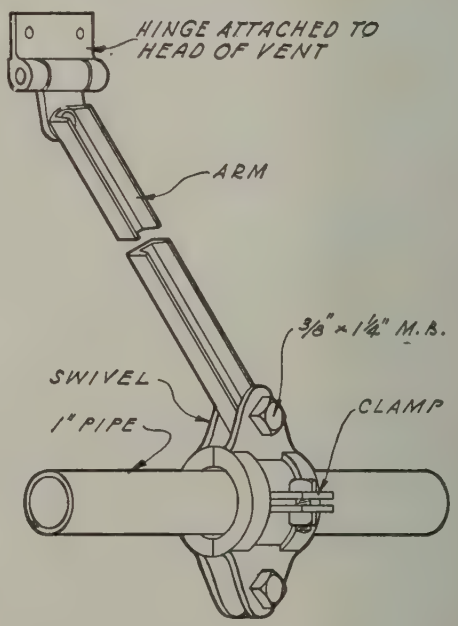
• PLAN •



• DETAIL • AT • ROLLER • BRACKET •



• DETAIL • AT • ARM •

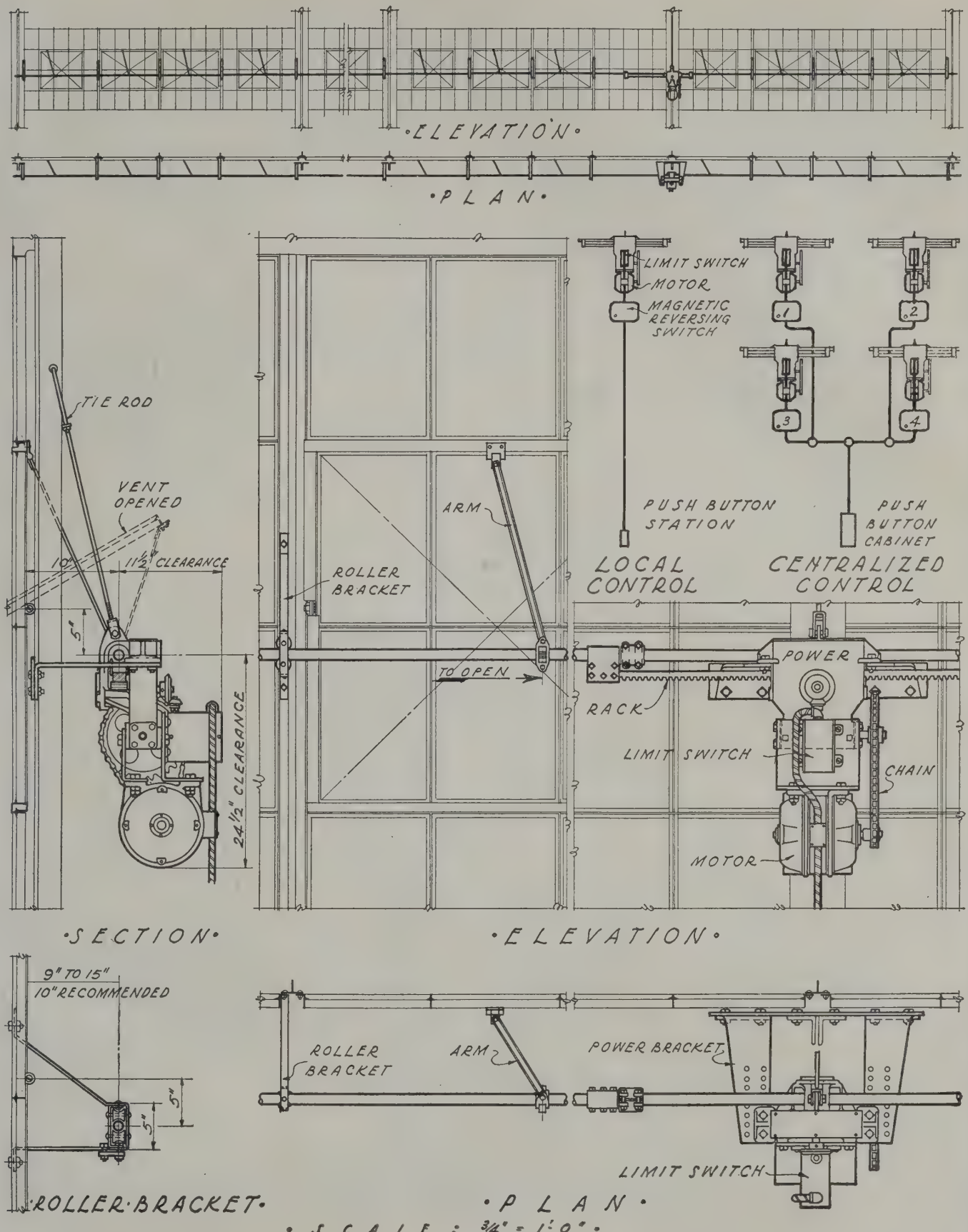


• DETAIL • OF • SWIVEL •

• SCALE : 3/4" • 1'-0" •

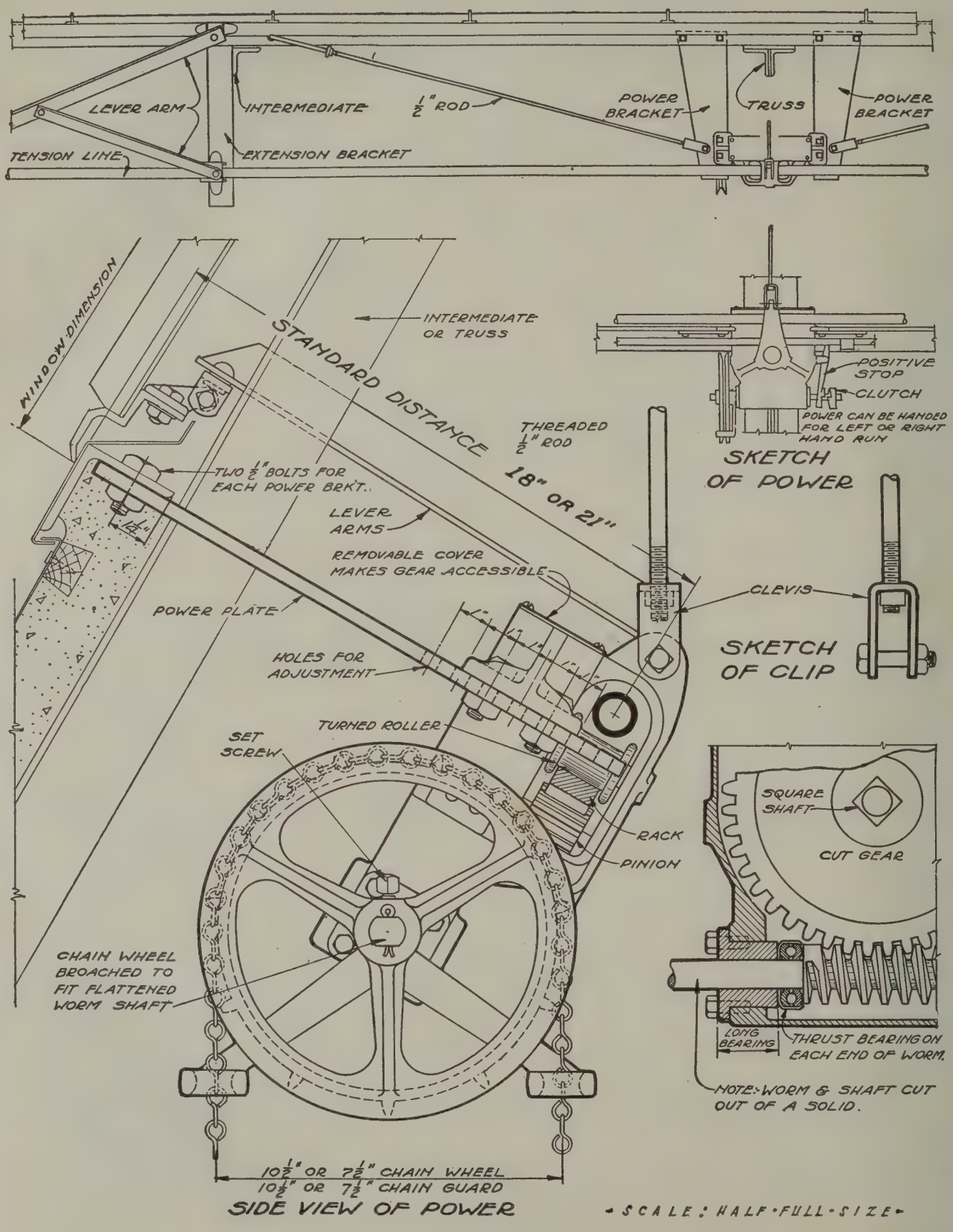
Fenestra *August 1928*	*Tension Type Operator* *Typical Details*	**Plate No** *S-401*

Continued on next page •



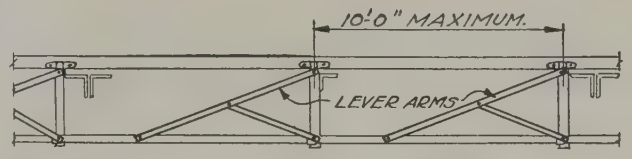
Fenestra August 1928	Tension Type Operator Electrically Controlled	Plate No S-402

Continued on next page

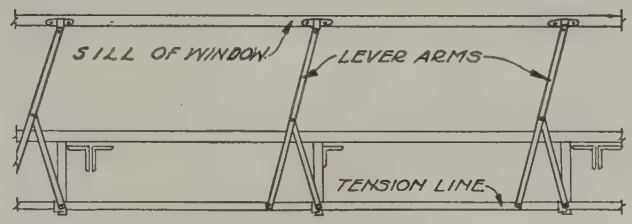


Fenestra August 1928	Continuous Type Operator Typical Details	Plate No S-501

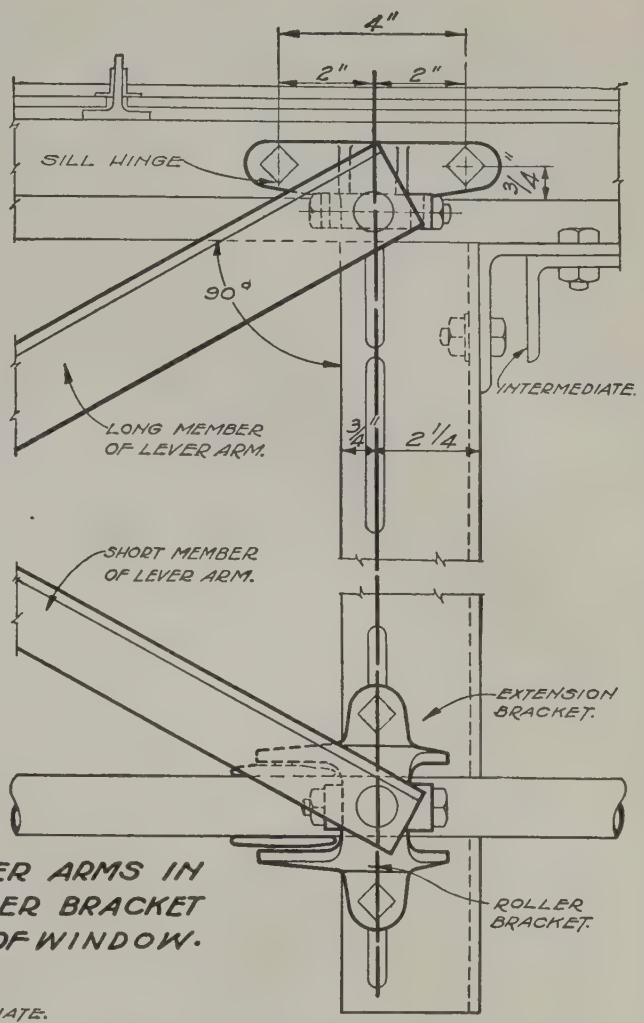
Continued on next page

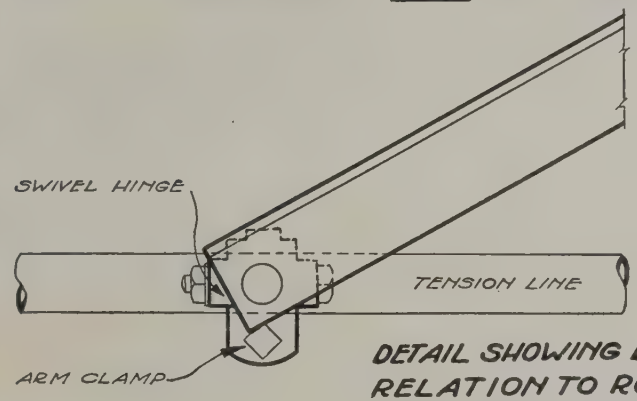


DETAIL OF LEVER ARMS IN CLOSED POSITION

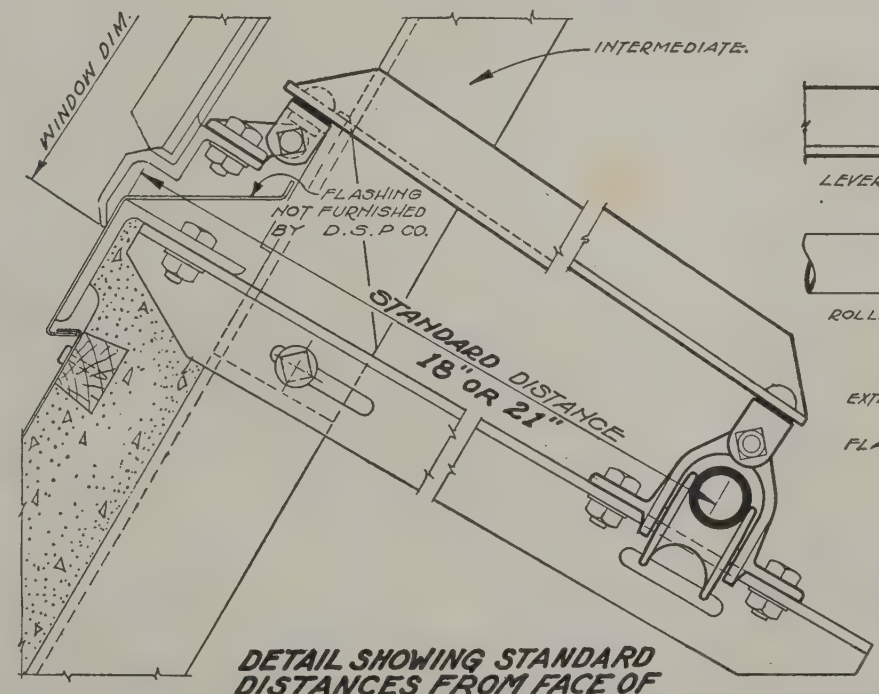


DETAIL OF LEVER ARMS IN OPEN POSITION.

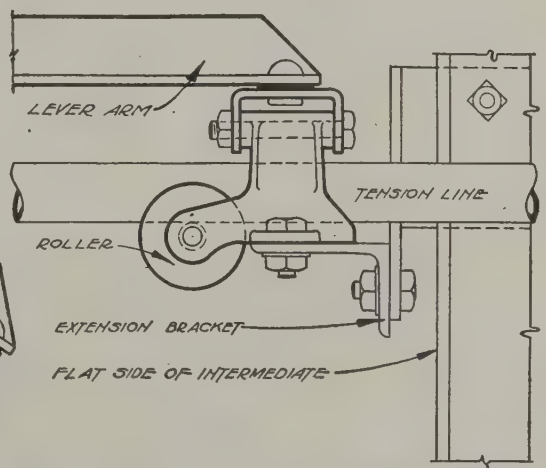




DETAIL SHOWING LEVER ARMS IN RELATION TO ROLLER BRACKET AND SILL HINGE OF WINDOW.



DETAIL SHOWING STANDARD DISTANCES FROM FACE OF SILL TO TENSION LINE

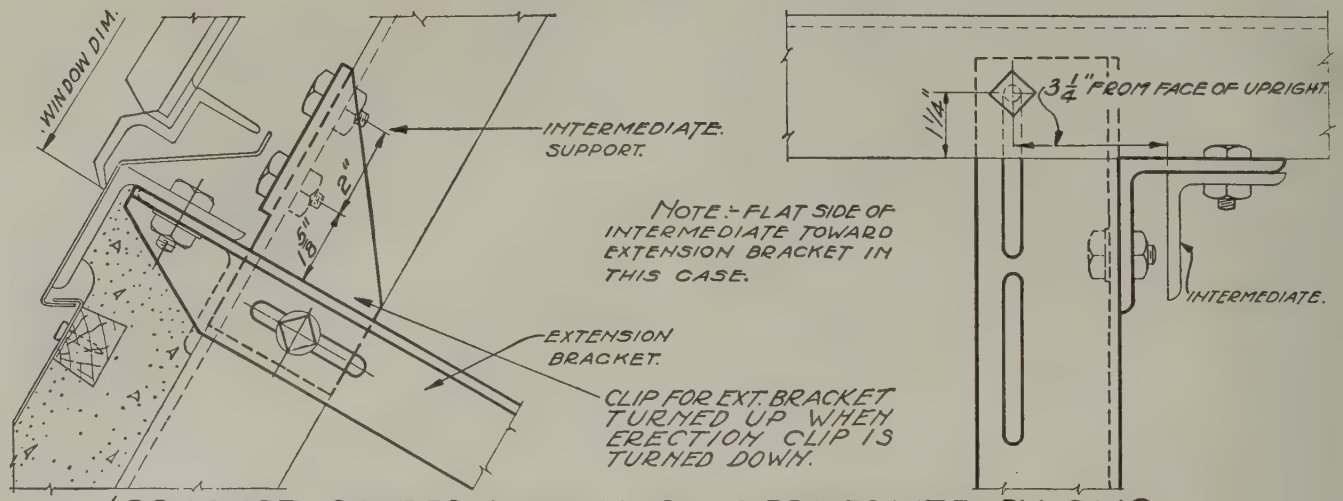


END VIEW SHOWING SWIVEL HINGE OF LEVER ARM AND ALSO ROLLER SUPPORT FOR TENSION LINE.

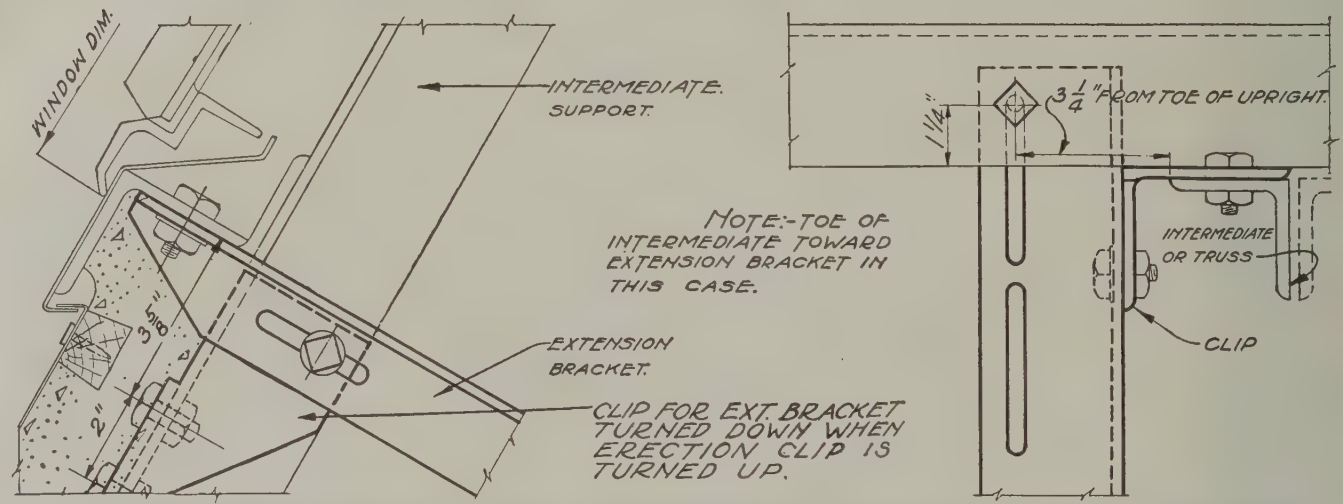
SCALE: HALF FULL SIZE

Fenestra, August 1928	Continuous Type Operator Lever Arm Assembly	Plate No. S-502

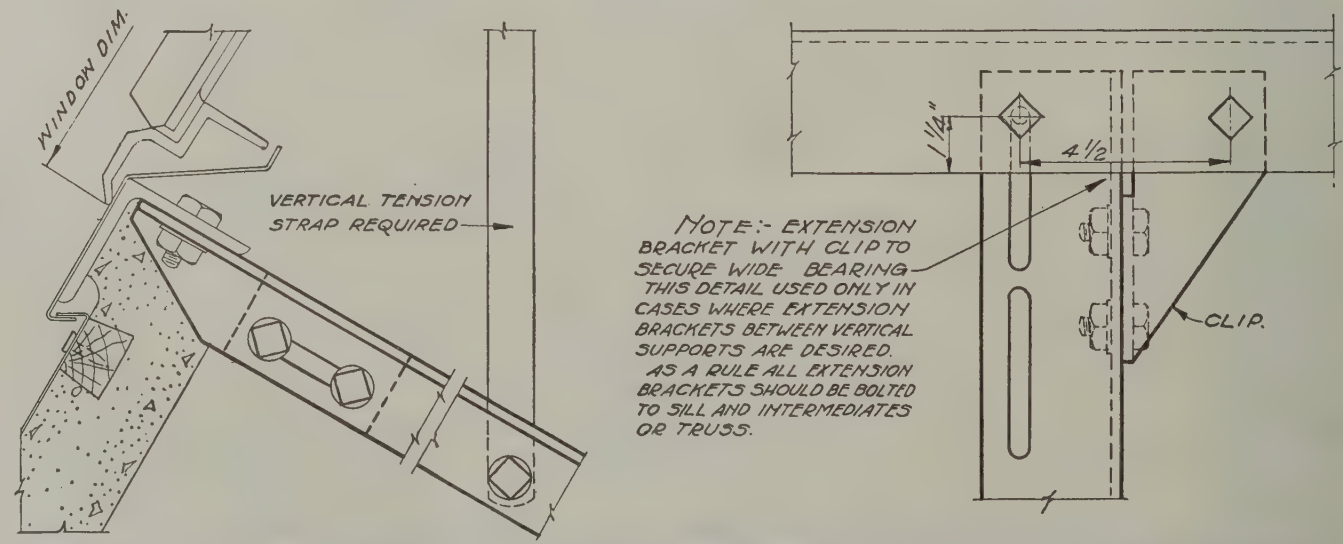
Continued on next page



BRACKET BOLTED TO SILL & INTERMEDIATE BY CLIP



BRACKETS BOLTED TO SILL AND INTERMEDIATES, OR TRUSSES, BY CLIPS

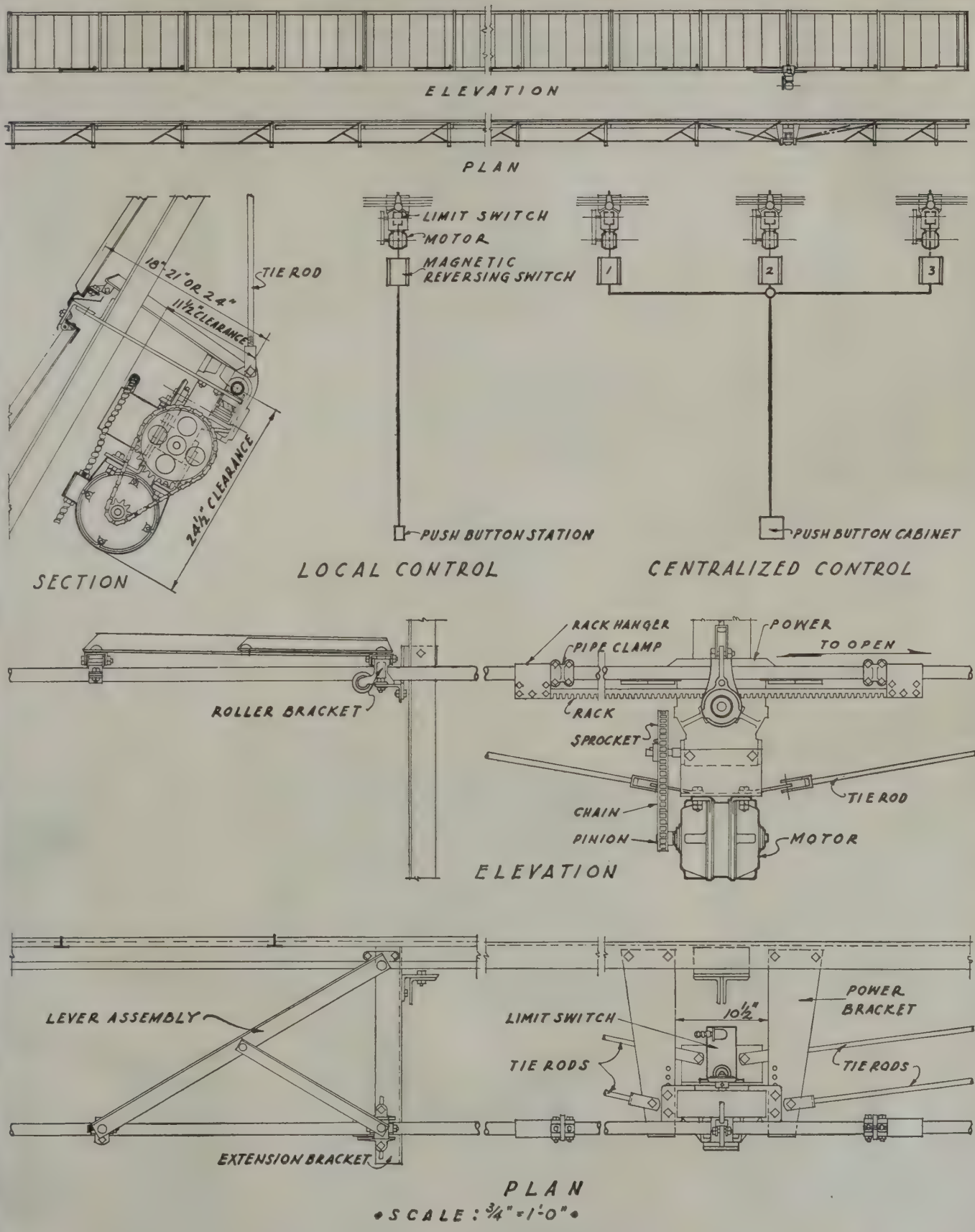


BRACKET BOLTED DIRECTLY TO SILL BETWEEN TRUSSES OR INTERMEDIATES

• SCALE: HALF • FULL • SIZE •

Fenestra, August 1928	Continuous Type Operator Extension Bracket Details	Plate No S-503

Continued on next page



Fenestra August 1928	Continuous Type Operator Electrically Controlled	Plate No S-504

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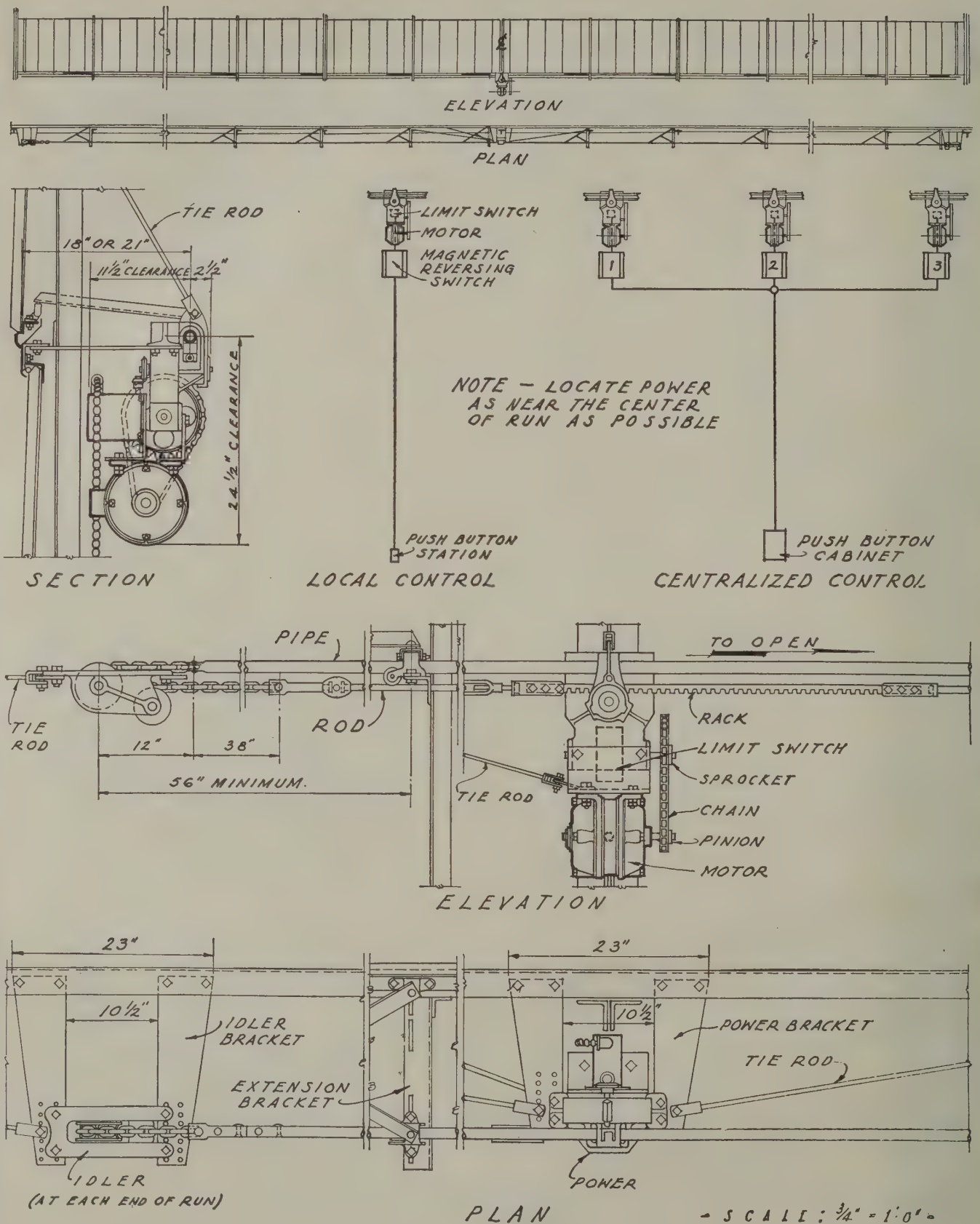


Fenestra, August 1928	Continuous Cable Type Operator Electrically Controlled	Plate No. S-505

Continued on next page

(V) SWINGING AND SLIDING STEEL DOORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Both Channel and Tubular doors are made to swing or slide and in single and double units. Specify as required.

(V-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

Note: In lists or schedules, indicate whether swing doors open "In" or "Out" and which jamb carries the hinges.

(V-2) General

All doors shall be *Fenestra* (Channel) (Tubular) Steel Doors as manufactured by DETROIT STEEL PRODUCTS COMPANY.

Note: Specify whether Channel, Tubular or both.

(V-3) Materials

(V-3a) Door Frames, etc.—

Note: We strongly recommend that all door frames be included with the Miscellaneous Structural Steel or Ornamental Iron and that they be included under these or similar other specification divisions, for the reason that the frames in all cases should be installed when the building is erected to assure rigid anchorage. Steel doors, on the contrary, should be installed only after the building is erected.

Note: Provide, therefore, that all frames shall be made to the exact dimensions furnished by the Door Manufacturer and that they shall be erected plumb, true and rigidly anchored. Include provisions for slotted, sliding door thresholds and supports for sliding door tracks where these are required.

Note: Where particularly desired, 4" channel frames for swing doors only, will be furnished with the doors at added cost. If required, so specify. (See Fenestra Page 69.)

(V-3b) Door Panels—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All panel frame members shall be (equal leg channel) (angle) sections.

Note: Channels are used for channel doors and angles for tubular doors. Include either or both as required.

Muntins shall be 1⅜" deep. Solid panels shall be of 13 gauge steel.

(V-3c) Door Stiles and Rails—

(1) Door stiles and rails shall be of heavy rolled steel channels.

(2) Door stiles and rails shall be of heavy square steel tubing.

Note: Specify either or both as required.

(V-3d) Sliding Door Closure and Guide Plates and Meeting Stile Astragals—Closures and guides (and meeting stile astragals) shall be of heavy steel plates.

(V-4) Construction

(V-4a) Door Panels—All panel frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon air hammer riveted. Solid panels shall be secured by angles riveted to the panel frame and muntin members.

(V-4b) Channel Doors—Channel stiles and rails shall be butted together over solid corner castings, through riveted with countersunk rivets. Stiles and rails shall be riveted to frame of panel. Door stiles shall be reinforced with a steel plate at butts.

(V-4c) Tubular Doors—Tubular stiles and rails shall be mitered and butt welded at corners. Panel frames shall be attached to stiles and rails with countersunk machine screws.

(V-4d) Closures—Closure plates at top and back edges of sliding doors shall be attached with countersunk machine screws.

(V-4e) Guides and Astragals—Guide (and astragal) plates on the face of sliding doors shall be attached with countersunk through rivets.

(V-4f) Glazing Angles—All glass shall be secured with glazing angles, neatly mitered at angles. Angles shall be secured to frames with brass machine screws and to muntins with machine screws and nuts.

(V-4g) Hardware Provisions—Stiles, where required, shall be tapped to receive hardware attached at the time of erection.

(V-5) Attached Hardware

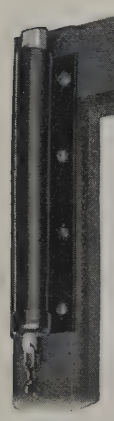
Note: Attached at factory.

(V-5a) Butts—All swinging doors shall be equipped with standard (4½"x4½") (6"x4½") steel butts with non-risable loose pins. The number of butts to each door shall be such as to adequately carry the weight.

Note: 4½"x4½" butts are used on channel doors, 6"x4½" on tubular doors. Include either or both as required.

(V-5b) Latch-and-Locks—All swinging single doors shall be equipped with standard, bronze face, mortise latch-and-locks.

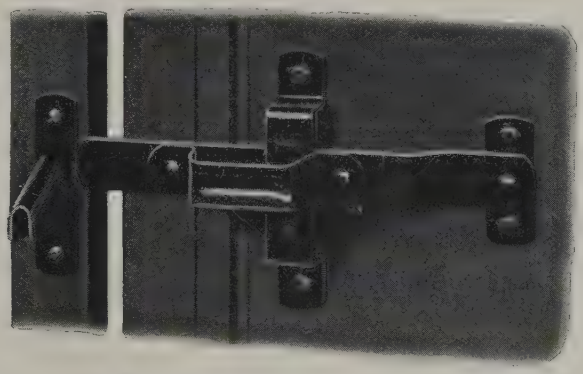
(Continued on Fenestra page 68)

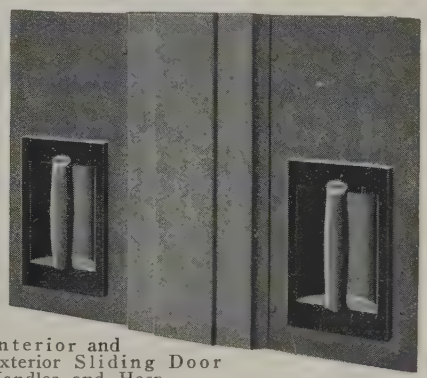


Head Shot Bolt with Chain

(Right) Swinging Door Latch and Strike

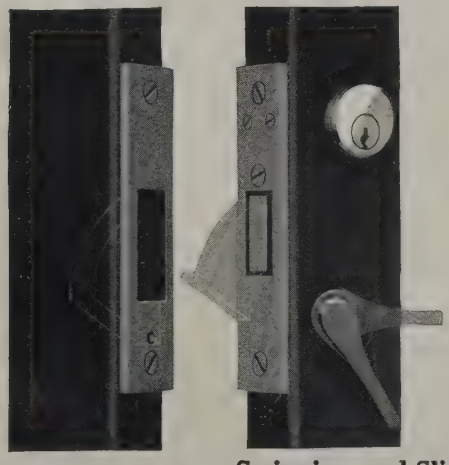
(Below) Cylinder Lock for Sliding Door

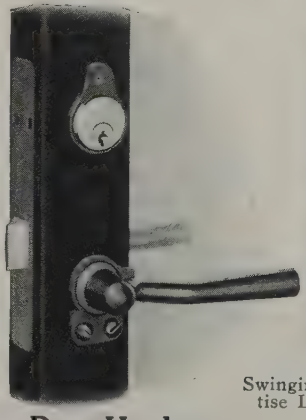


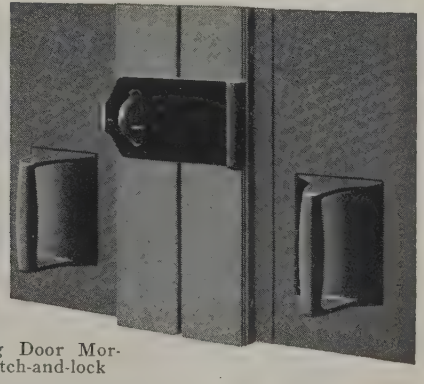


Interior and Exterior Sliding Door Handles and Hasp

Sill Shot Bolt







Swinging Door Mortise Latch-and-lock

Swinging and Sliding Door Hardware

Continued on next page

Note: Cylinders are installed after erection.

Note: Omit if surface Japanned iron latch and strike are selected. See (V-6b).

(V-5c) Sliding Door Handles—All sliding doors shall be equipped with combination flush and projecting iron handles, one to each door, solidly riveted to the steel panels.

(V-6) Detached Hardware

Note: See Fenestra Page 67.
Note: All detached hardware shall be shipped carefully packed to prevent damage till applied for use.

(V-6a) Swing Door Cylinders and Handles—All swing doors shall be equipped with malleable iron handles, and bronze faced cylinders and escutcheons.

Note: Use when latch-and-locks are included, see (V-5b). Where master keying is necessary, we prefer to key to our own system. If cylinder master keying is required, so specify here.

(V-6b) Swing Door Latches—All swinging doors shall be equipped with surface, Japanned iron door latches and strikes.

Note: Omit if mortised latch-and-locks are selected. See (V-5b) and (V-6a).

(V-6c) Shot Bolts—All fixed leaves of double swing doors shall be equipped with standard surface, spring shot bolts (Japanned iron case and steel bolts). Top bolt shall be chain operated. Bottom bolt shall be foot operated.

(V-6d) Sliding Door Hasps—All sliding doors shall be equipped with hinged hasps and staples.

(V-6e) Sliding Door Tracks—All sliding doors shall be equipped with standard steel tracks and adjustable roller bearing trucks, complete with track brackets.

(V-6f) Special Hardware—

Note: Special hardware, such as standard fire exit panic bolts, standard door checks, etc., will be furnished where desired. If required, so specify.

(V-7) Erection

(V-7a) All Steel Doors shall be erected by the Fenestra Construction Company under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(V-7b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(V-7c) Apply all hardware in accordance with the manufacturer's directions.

(V-8) Painting

All Fenestra Steel Doors shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(V-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications. See Paragraph 10, Fenestra Page 2.

(V-9a) Glass—Glass shall be ¼" thick, rough wire.

(V-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(V-9c) Glazing—All glass shall be bedded in putty and secured with glazing angles.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (V-8).

(Y) AIRPLANE HANGAR DOORS—Specifications

Note: Limitations.
Practical limits are determined largely by shipping facilities, height of tunnels, width of bridges, etc. Dimensions up to 8 ft. x 20 ft. are safe with 10 ft. x 22 ft. as a possible maximum.

(Y-1) Work Included

Note: List and locate.

(Y-2) General

All doors shall be Fenestra Airplane Hangar Doors as manufactured by the Detroit Steel Products Company.

(Y-3) Materials

(Y-3a) Door Frames, etc.—

Note: All framing to be included with the Miscellaneous Structural Steel or Ornamental Iron and included under other specification divisions.

(Y-3b) Door Panels—Upper panels of doors shall be provided with glass panels constructed of solid rolled steel frame sections and muntin bars of 1⅜" depth with glazing angles to secure the glass. Lower panels shall consist of solid 13 gauge steel plates.

(Y-3c) Door Stiles and Rails—All door stiles and rails shall be made of 2½x2½" steel tubing. Rails shall be solidly welded to stiles at all junctions.

(Y-3d) Weathering—Weathering between doors shall consist of rubber strips secured by continuous metal retainers to the stile of one door making contact weathering against the stile of adjacent door. Weathering at center doors shall be of steel.

(Y-4) Construction

(Y-4a) Door Panels—Frames of glass panels shall be mortise and tenon, air hammer riveted at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon, air hammer riveted. Solid panels shall be secured to tube frame.

Note: Where glazing angles are specified all glass shall be secured with glazing angles mitered at corners. Angles shall be secured with machine screws tapped to frame, and with machine screws and nuts to muntins.

(Y-4b) Carriage—All doors shall rest on double flanged, malliron wheels so designed as to roll on steel tracks carrying the entire weight of the doors. Each wheel shall be mounted by housings and plates, and equipped with roller or swivel ball bearings and Alemite lubricated.

(Y-4c) Guides—Bronze bushed steel rollers shall be attached to the head rail of each door, to serve as guides and reduce friction, and minimize the transverse load on structural steel members.

(Y-4d) Pilot Doors—(Hinged pilot doors supplied as specified.)

(Y-4f) Swing Doors—Unless otherwise specified a swing door approximately five feet in width, to fold back against the wall, will be furnished at each end of the door opening, to provide track clearance for curved track type doors. (See plate Y-101.)

(Y-5) Attached Hardware

(Y-5a) Locks—Suitable locking hardware, such as cane bolts, etc., shall be supplied, placed at the center of each door.

(Y-6) Erection

(Y-6a) All doors shall be erected by the Fenestra Construction Company under a separate contract.

(Y-6b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(Y-7) Painting

(Y-7a) All doors shall be given one coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications: One additional coat of paint should be applied after erection and before glazing. Further painting should be deferred until at least three weeks after glazing, to permit putty to set. One or additional coats may then be applied as desired.

Note: Where desired, the Fenestra Construction Company will do field painting after erection, at reasonable added cost. If required, so specify here, including specification for paint and its application.

(Y-8) Glass and Glazing

Note: The following should be included in the Glazing Specifications.

(Y-8a) Glass shall be ¼" thick, rough wire.

(Y-8b) Putty shall be a high grade of steel window putty.

(Y-8c) Glazing—All glass shall be bedded in putty and secured with glazing angles.

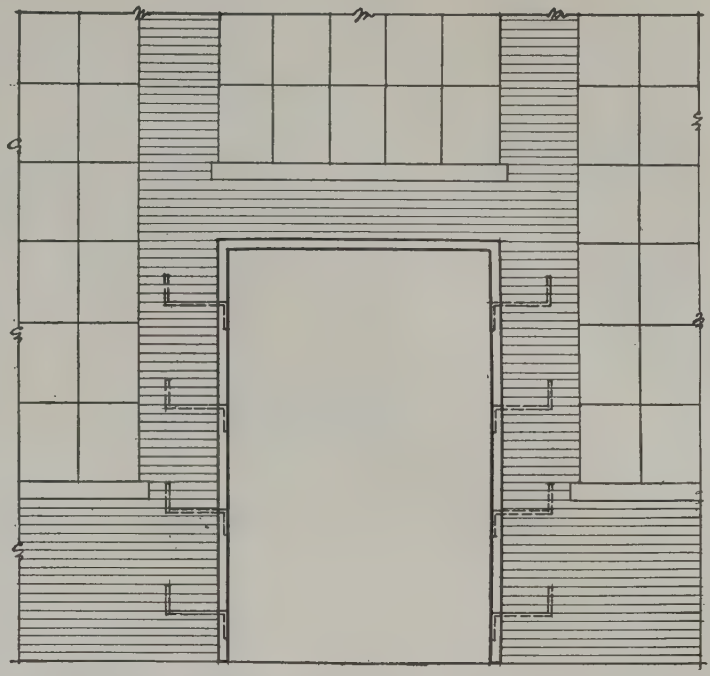
Continued on next page

• STANDARD • AND • STOCK • TYPES •

TYPES SHOWN SHADED ARE CARRIED IN STOCK

NOTE - THE ABOVE UNITS WILL BE MADE WITH CHANNEL TRIM AND CAN BE USED FOR EITHER SWING OR SLIDING DOORS.

DIMENSIONS SHOWN ARE OVERALL DOOR SIZES WITH OPENING CLEARANCES DEDUCTED. FOR CLEARANCES SEE PLATE NO. V-102.

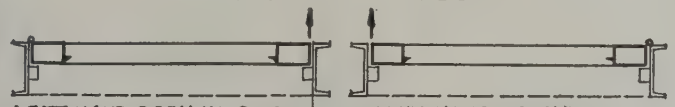


• ELEVATION • OF • TYPICAL • DOOR • FRAME •

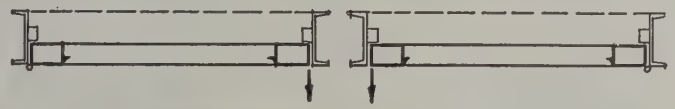
NOTE - STANDARD DOOR FRAMES FOR SWING DOORS ONLY ARE MADE OF 4" STRUCTURAL STEEL CHANNEL AND ARE EQUIPPED WITH HEAVY ZEE ANCHORS ON EACH SIDE SPACED ABOUT 2'-0" ON CENTERS TO ANCHOR FRAME INTO THE MASONRY. HOLES IN FRAME FOR HINGES ARE DRILLED AND TAPPED IN SHOP TO MATCH DOORS.

FRAMES FOR SINGLE DOORS ARE SHIPPED ASSEMBLED, USING AN ANGLE TIE ACROSS THE BOTTOM. FRAMES FOR DOUBLE DOORS ARE SHIPPED KNOCKED DOWN AND MUST BE BOLTED TOGETHER IN FIELD.

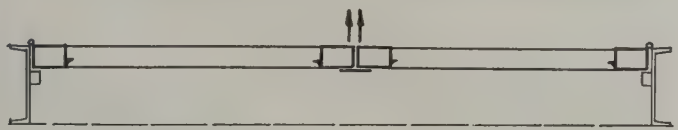
• SWING • DOORS •



• LEFT • HAND • OPEN • IN • DOOR • • RIGHT • HAND • OPEN • IN • DOOR •



• LEFT • HAND • OPEN • OUT • DOOR • • RIGHT • HAND • OPEN • OUT • DOOR •



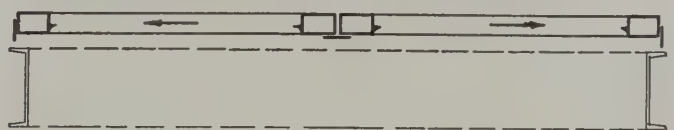
• DOUBLE • SWING • OPEN • IN • DOOR •

• DOUBLE • SWING • OPEN • OUT • DOOR •

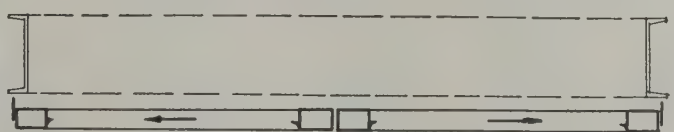
• SLIDING • DOORS •

• INSIDE • SLIDING • DOOR - LEFT • • INSIDE • SLIDING • DOOR - RIGHT •

• OUTSIDE • SLIDING • DOOR • LEFT • • OUTSIDE • SLIDING • DOOR • RIGHT •



• DOUBLE • INSIDE • SLIDING • DOOR •

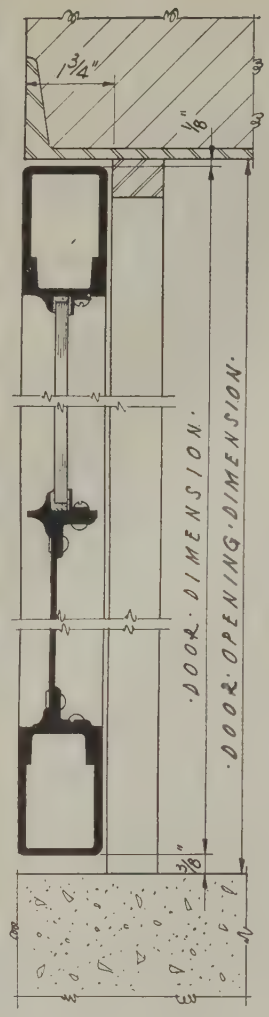


• DOUBLE • OUTSIDE • SLIDING • DOOR •

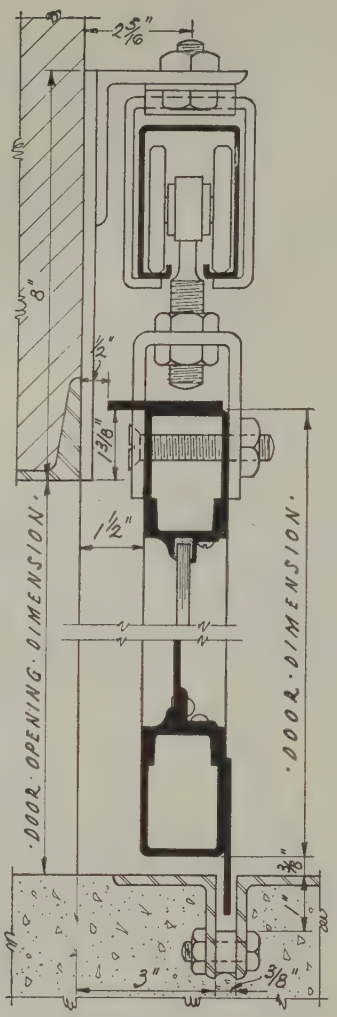
• DESIGNATION • OF • DOORS •

Fenestra August 1928	Swinging and Sliding Doors Types, Sizes and Handing	Plate No V-101

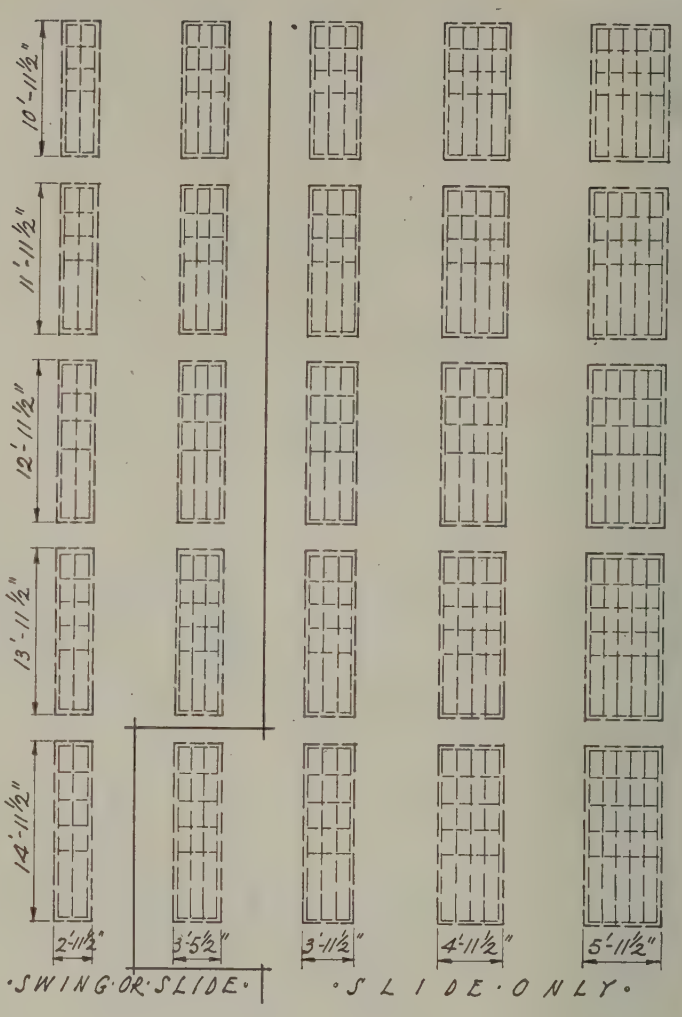
Continued on next page



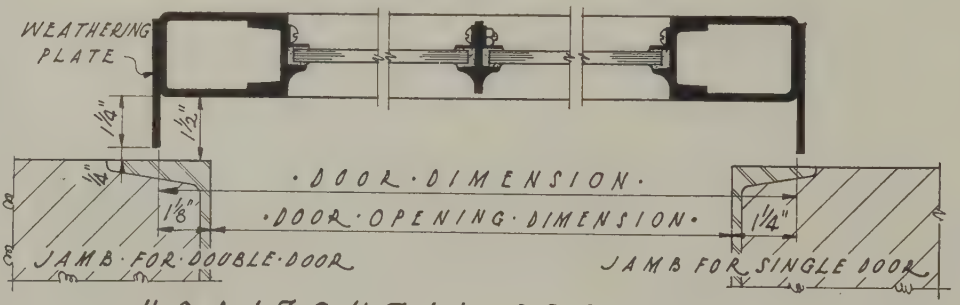
VERTICAL SECTION
SWING DOOR



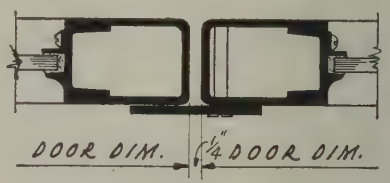
VERTICAL SECTION
SLIDING DOOR

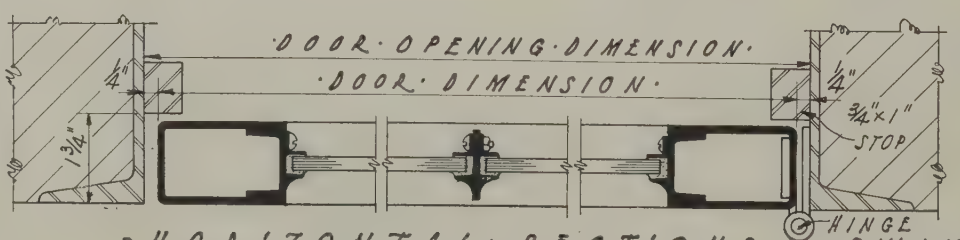


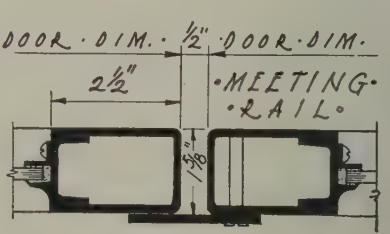
LISTED SPECIAL TYPES



HORIZONTAL SECTIONS SLIDING DOORS





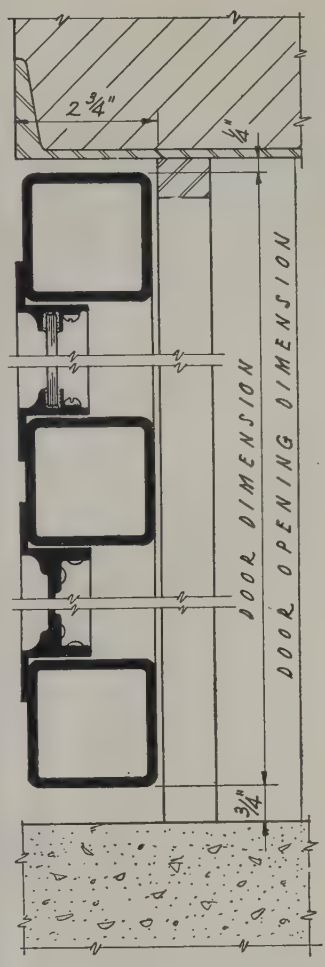


HORIZONTAL SECTIONS SWING DOORS

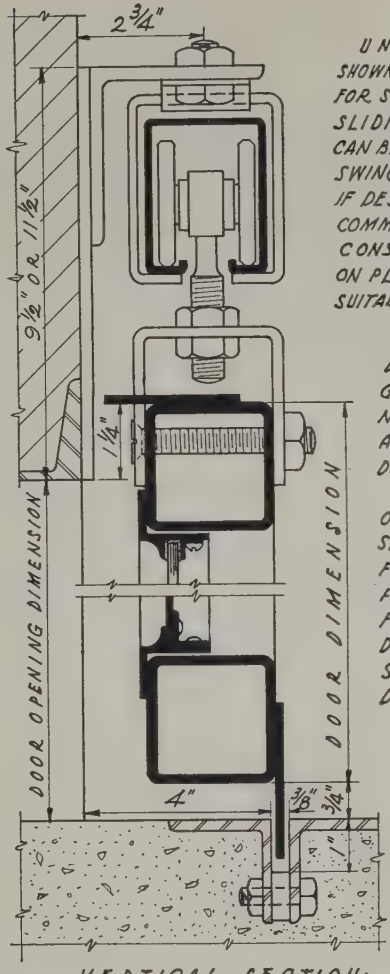
SCALE: 3" = 1'-0"

Fenestra August 1928	Swinging and Sliding Doors Typical Channel Doors	Plate No V-102

Continued on next page



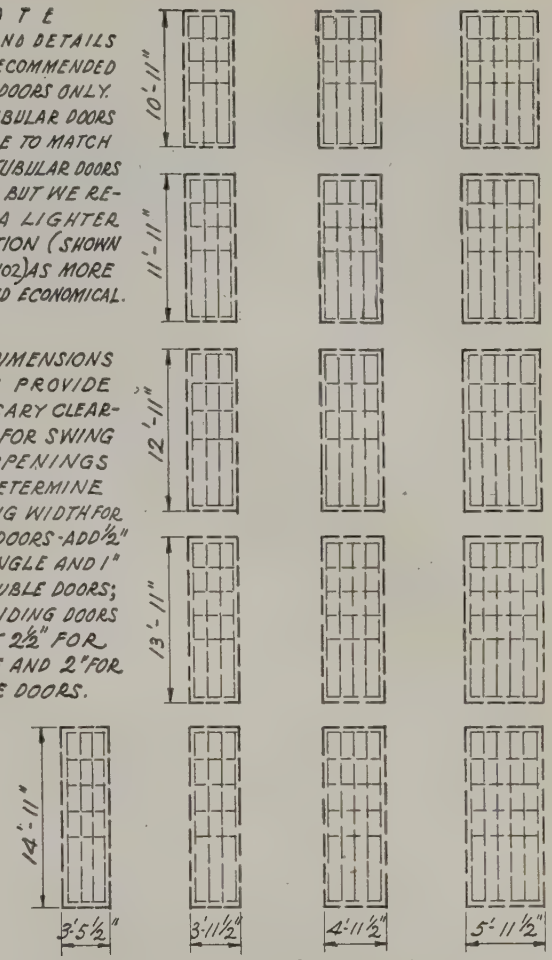
• VERTICAL SECTION •
• SWING DOOR •



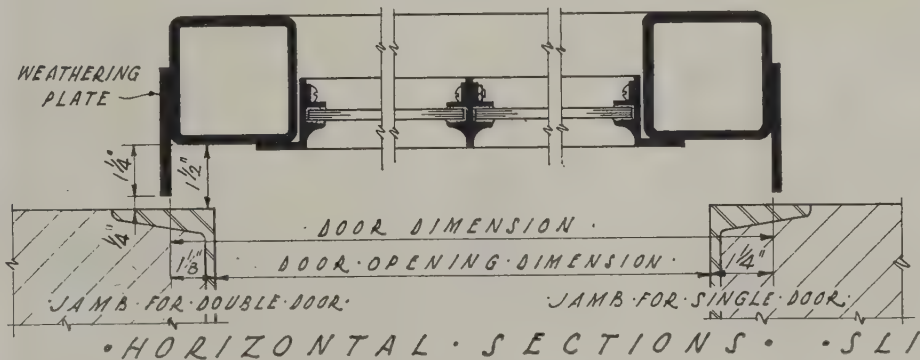
• VERTICAL SECTION •
• SLIDING DOOR •

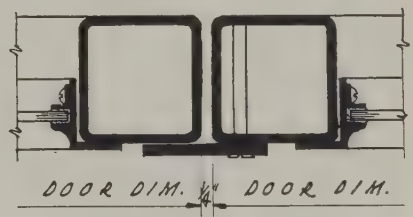
NOTE
UNITS AND DETAILS SHOWN ARE RECOMMENDED FOR SWING DOORS ONLY. SLIDING TUBULAR DOORS CAN BE MADE TO MATCH SWINGING TUBULAR DOORS IF DESIRED BUT WE RECOMMEND A LIGHTER CONSTRUCTION (SHOWN ON PLATE V-102) AS MORE SUITABLE AND ECONOMICAL.

DOOR DIMENSIONS GIVEN PROVIDE NECESSARY CLEARANCES FOR SWING DOOR OPENINGS TO DETERMINE OPENING WIDTH FOR SWING DOORS - ADD ½" FOR SINGLE AND 1" FOR DOUBLE DOORS; FOR SLIDING DOORS DEDUCT 2½" FOR SINGLE AND 2" FOR DOUBLE DOORS.



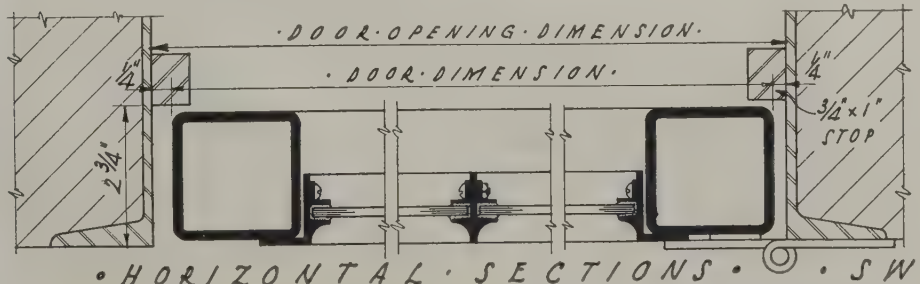
• LISTED SPECIAL TYPES •

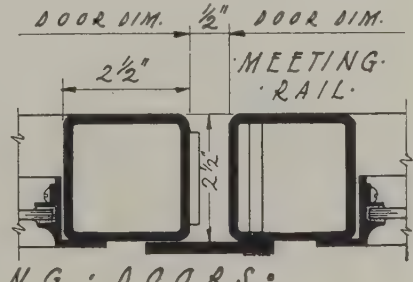




• MEETING • • RAIL •

• HORIZONTAL SECTIONS • • SLIDING DOORS •

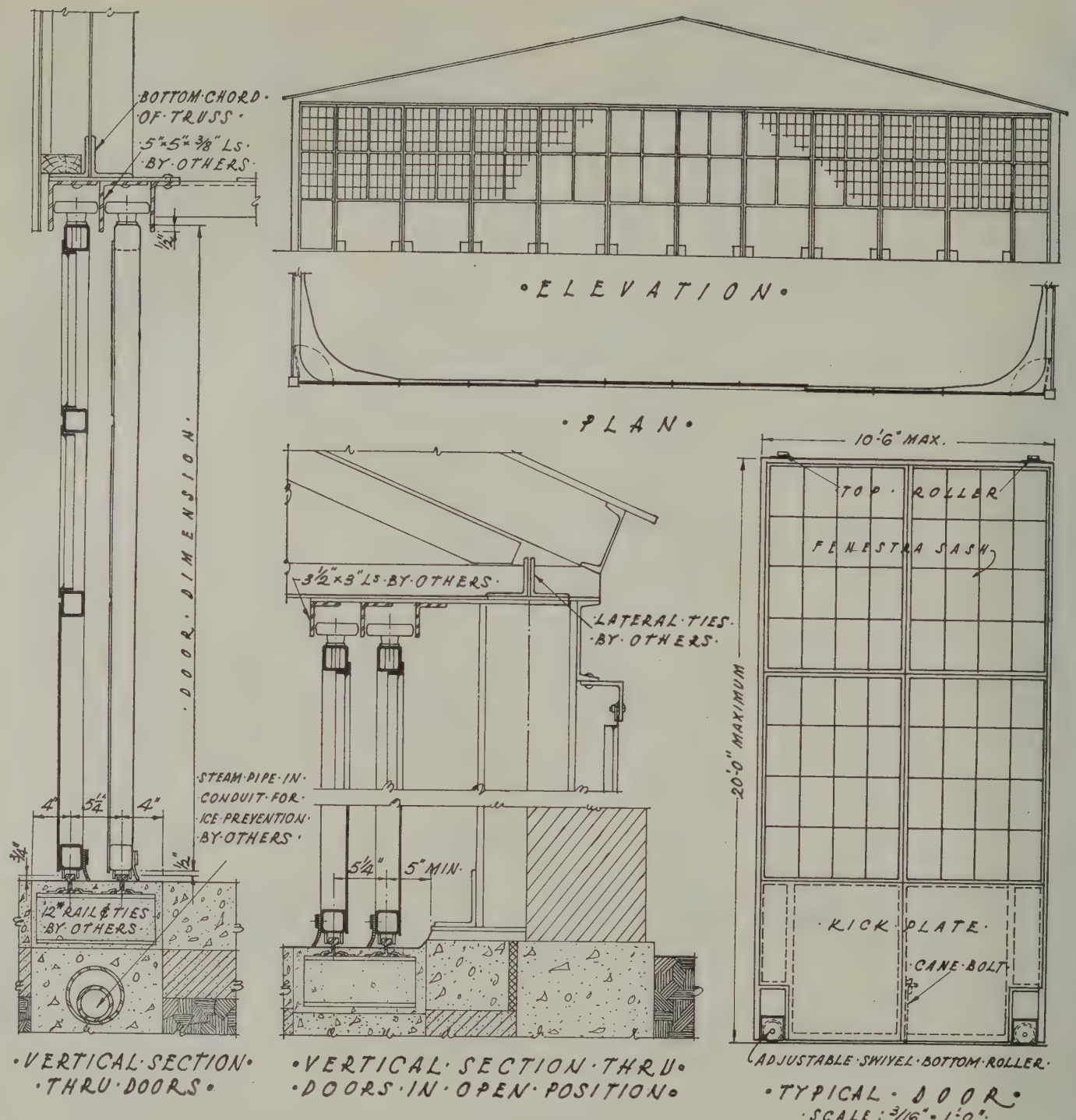




• HORIZONTAL SECTIONS • • SWING DOORS •
• SCALE: 3" = 1'-0" •

Fenestra August 1928	Swinging and Sliding Doors Typical Tubular Doors	Plate No V-103

Continued on next page



Fenestra, August 1928	Airplane Hangar Doors Curved Track Type	Plate No. Y-101

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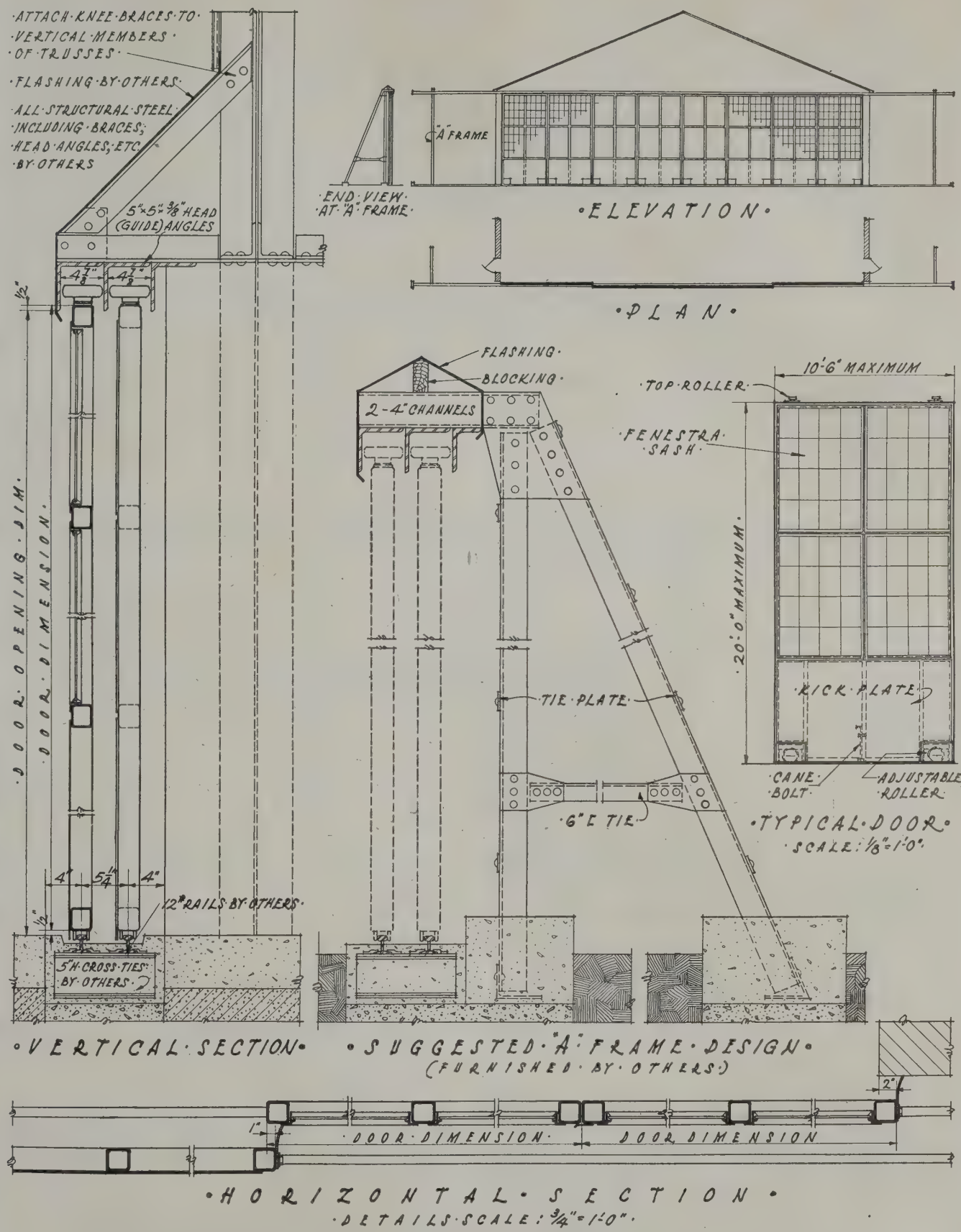

Fenestra August 1928	Airplane Hangar Doors Straight Track Type	Plate No Y-102

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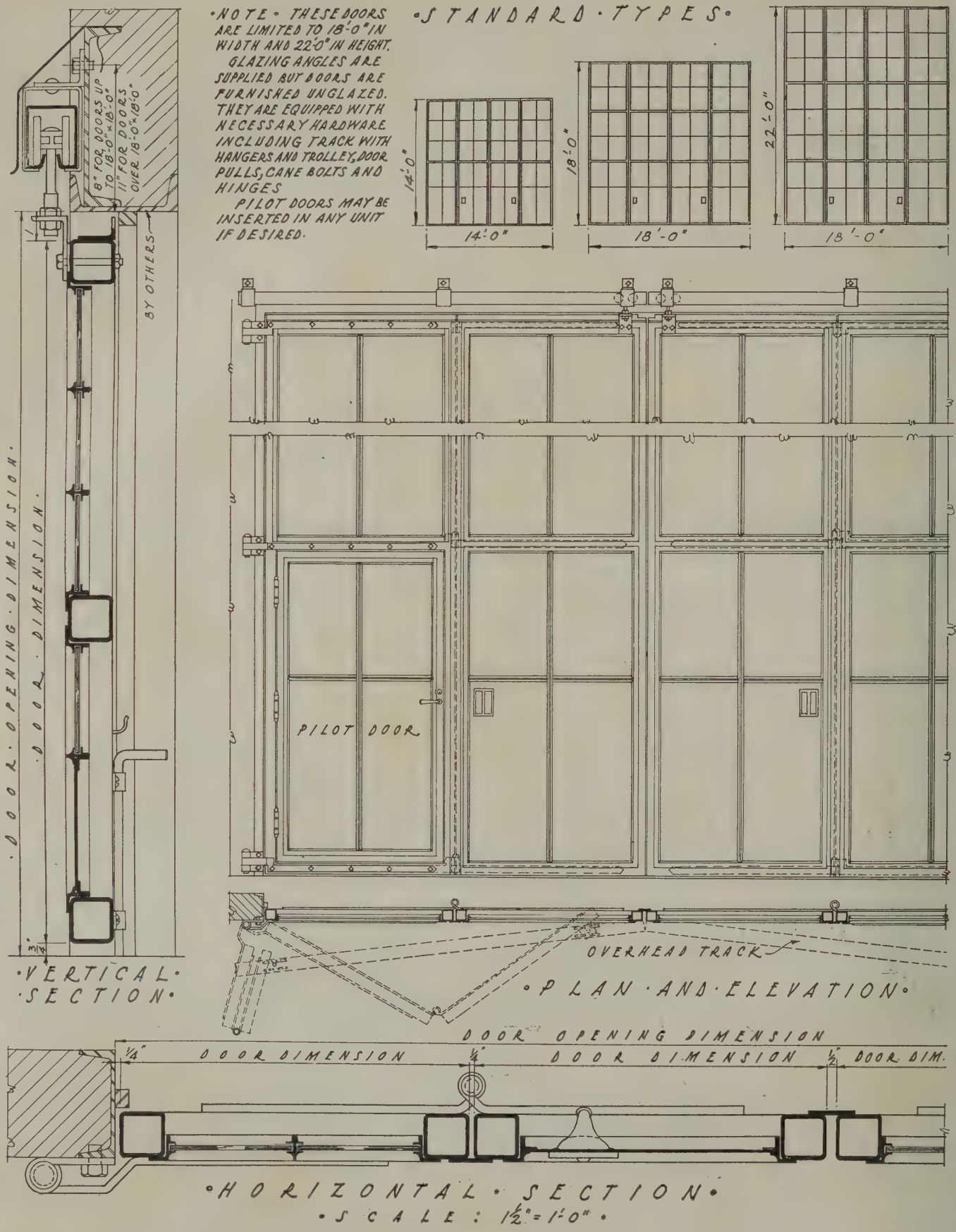
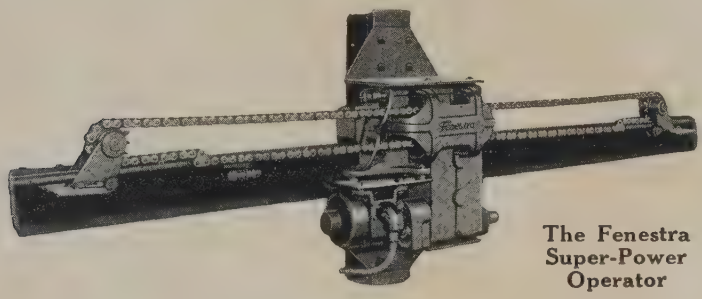


Fenestra August 1928	Accordion Doors Elevations and Details	Plate No Z-103

Continued on next page

SUPER-POWER OPERATOR

For exceptionally large industrial buildings where unusual operating service is desired on long runs of continuous top hung windows, we are prepared to supply the Fenestra Super-power which, in connection with continuous operator transmission line and lever arms, will handle conveniently top hung continuous windows in runs up to 600 ft.



The Fenestra Super-Power Operator

The utmost care has been used both in workmanship and materials to produce a device that combines smooth, even, efficient action with superlative strength and durability.

The power consists of a heavy, double, spur gear reduction of especially heat treated alloy steel and a case hardened steel worm engaging a heavy, special alloy, non-ferrous bronze, worm gear. Shafts for all spur gears are of heat treated alloy steel with generously proportioned bearings. The worm shaft has, in addition, combination radial and thrust bearings of ball bearing type. The entire mechanism is enclosed in an accurately machined oil-tight case.

The power is usually located in the center of the run, operating a transmission line on either side through a heavy, continuous, roller type, chain drive. The motor is direct connected to the power by means of spur gears.

Conditions demanding the use of this super equipment are unusual. We strongly recommend consultation with Fenestra engineers who will be glad to make suggestions without obligation.

POWER AND AUXILIARY POWER

The Fenestra Power and Auxiliary Power are designed for use on any tension operator where it is desired to operate several banks or runs of sash, one above another, from the same power station. Naturally it is used chiefly with continuous operator and is equally applicable to either manual or electrical control.

The device consists of a steel pinion which moves with the main power and which is connected through a steel shaft with universal joints, to a similar pinion in mesh with a rack on each of the other runs of windows. Thus the several pinions move in unison causing the tension lines on the various runs to act simultaneously.

The width of opening and the number and length of runs naturally vary with the requirements of the job.

SPECIAL DOOR DESIGNS

Occasionally we are asked to solve some special door problem which arises in connection with buildings of unusual or peculiar design and our engineers are always glad to co-operate on such requests.

A typical example of this service was the design and manufacture of 20 Fenestra vertically sliding doors for the Detroit Seamless Steel Tube Company. These doors were operated by a worm and gear device connected by means of a steel shaft to pulleys over which the doors were counterbalanced against counterweights.

UNDERWRITERS' WINDOWS

In most buildings, standard Fenestra steel windows afford ample fire protection. Under certain conditions, however, types carrying the label of the Underwriters' Laboratories, Inc., are desirable or required.

Windows bearing the Underwriters' label are limited to 7x12 ft., either dimension being taken as height or width. Multiples of these sizes can be used to any width by the use of the standard Fenestra T-bar mullion between units, providing the width between mullions does not exceed 7 ft. and the area does not exceed 84 sq. ft.

¼-in. wire glass must be used in all panes and is limited to 48 in. in either width or height and a total exposed area of not more than 350 sq. in. Glass to be held in place by $\frac{7}{16}$ x $\frac{5}{8}$ x No. 16 gauge pressed steel angles, tapped to outside frame and ventilator frame members but bolted through all muntin bars.

Ventilators can be pivoted 2 in. above center or 4 in. down from the top to open out or may be of the projected open out type. The total area of the ventilators cannot exceed 3000 sq. in.

Each horizontally pivoted ventilator must be operated separately, either with standard cam handles and chain or with standard cam handle and stay bar, except those pivoted 4 in. from the top which must be operated by standard cam handles and stay bar only. Each projected ventilator must be operated separately by standard hardware of the cam handle type or of the kick out type for chain and pole operation and can be either iron or bronze for hand or pole operation. No other hardware except that listed can be used.

FENESTRA DETENTION WINDOWS

Fenestra Detention Windows are designed to act as a combination steel window and steel grating in prisons, asylums, hospitals and reform schools. They offer the advantages of a good weathertight, fire-resisting window with the strength of steel gratings.

Small glass lights are used, generally 7x9 in., with one pane high ventilators, pivoted 4 in. from top. Ventilators can be operated individually or in multiple runs controlled from one or more central stations.

Frequently Fenestra Detention Windows are used unglazed as gratings outside movable wood windows; in such instances only fixed light units are specified.

There are no standard types or sizes, consequently a variety of ventilator arrangements can be furnished. Large installations have been made in such typical buildings as:

Wisconsin State Penitentiary, Waupun, Wis.
Northern Insane Hospital, Norlum, Wash.
Michigan Home for the Feeble Minded, Lapeer, Mich.
Wingdale Prison, New York, N. Y.
Coquitam Asylum, Vancouver, B. C. in Canada

ACCORDION DOORS

Fenestra Accordion Doors are designed for roundhouses and buildings of that nature that require extra large door openings. Fenestra Accordion Doors are similar in appearance and construction to the Airplane Hangar Doors, but are suspended by trolley hangers which hold the doors true to line and guide them as they are opened. (See Plate on Page 74.)

The jamb hinges consist of a strap made of heavy steel which extends entirely across the door. The double eye pintle has a large steel pin. Pilot doors can be installed where desired and are constructed of 2½x2½ in. tubular trim. Pilot doors are equipped with cylinder locks while main doors are fitted with hasp and staple so they can be locked with padlock.

Fenestra

for all industrial structures
commercial buildings
schools and institutions
homes and apartments

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan

GENFIRE STEEL COMPANY

(THE GENERAL FIREPROOFING BUILDING PRODUCTS)

YOUNGSTOWN, OHIO

For Branch Offices, see page B1694

Products

STEEL CASEMENT WINDOWS and DOORS; STEEL BASEMENT WINDOWS; COMMERCIAL and ARCHITECTURAL PROJECTED WINDOWS.

Also Steel Pivoted Windows; Continuous Windows; Utility Steel Doors and Frames; Mechanical Window Operators.

Architectural Details, A.I.A. filing size on all types of windows and doors sent free on request.

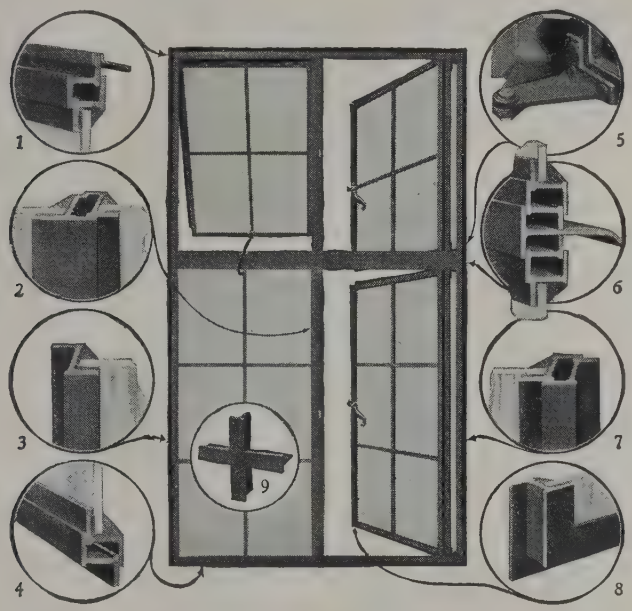
For Waterproofings, Dampproofings and Technical Paints, see page A74.

For Metal Lath, Steel Joists, and other Metal Building Specialties, see pages B1694-1695.

Model No. 5 Steel Casement

Factory built single or combination units of Model No. 5 Casements are delivered complete, ready to fill the opening and can be erected by us with a minimum of field labor, assuring complete satisfaction.

The new casements are beautiful in appearance with the latitude so desired by the architect and builder in the execution of the design. They are permanent, weathertight and foolproof, to give lasting satisfaction and greatest investment value.



Genfire Casement Construction Details—Model No. 5

(1) *Continuous Head Drip* showing the shape and proper position when attached, forming a drip over swing portions of unit.

(2) *Vertical Meeting Rail* of heavy hot-rolled section, smoothly finished on inside. Used in all combination units having both fixed and swing portions. The same detail as transom bar in combination with swing or fixed transoms.

(3) *Zee-bar Sections* used on outside frame members of all combinations and around swing portion of casement.

(4) *Sill Sections* of Zee bars affording ease of erection in any type of construction; showing the wide lap double contact for positive weathering.

(5) *Friction Type Extension Hinge* allows for the easy cleaning of windows on the outside and when adjusted has the proper amount of friction to hold the ventilator open in any desired position without the use of an adjuster.

(6) *Transom Bar,* tee section used between upper and lower units in transom combinations forming a drip over lower ventilators.

(7) *Stiles* of sash and frame of Zee sections showing the wide lap double contact and insulating air space and baffle that insures proper weathering.

(8) *Corners of Sash and Frame* are mitered, electrically butt welded and ground smooth.

(9) *Muntin Intersections* made with a mitered and mechanically interlocked joint obtaining the maximum strength of muntin bars and securing a neat, flush surface on the inside. Vertical and horizontal muntins are of the same size affording a uniform putty face and permitting a satisfactory glazed installation with plate or leaded glass.

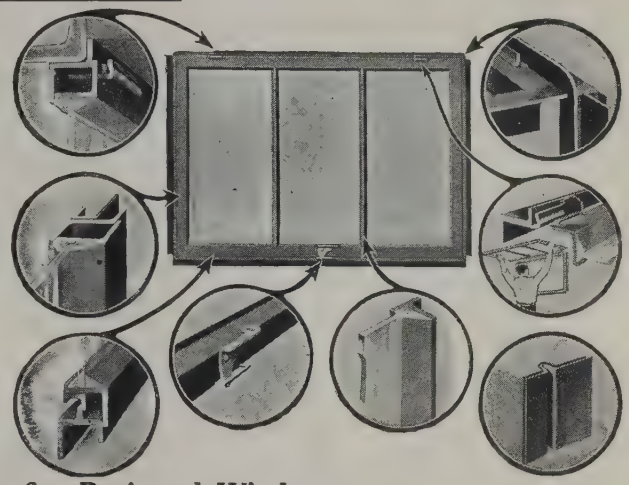
Steel Basement Windows

Genfire Basement Windows are made from hot-rolled billet steel, smoothly finished and then thoroughly painted, or may be obtained *galvanized* at slight extra cost. The narrow, extra rigid frame admits more light and the close-fitting, continuous, double contact weathering makes them weather tight. Construction details are shown above.

They are furnished complete for installation. No fitting of sash to frame, no hinges or locks to buy or no priming coat of paint to apply. They may be installed in concrete, masonry, or any other type of construction and cost less, installed, than ordinary wood windows.

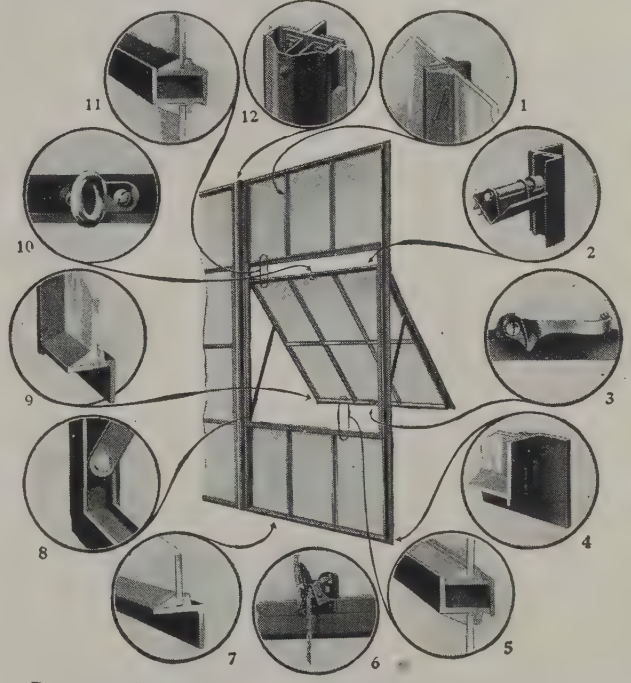
Genfire Steel Basement Windows are made in four standard sizes as follows:

Glass size	Lights wide	Window opening
10″ x 12″	3	2′ 9⅝″ x 1′ 3⅛″
10″ x 20″	3	2′ 9⅝″ x 1′ 11⅛″
14″ x 20″	2	2′ 7⅜″ x 1′ 11⅛″
12″ x 18″	3	3′ 3⅝″ x 1′ 9⅛″



Genfire Projected Windows

Genfire Projected Windows are made in two types, the commercial and the architectural. Where plain design and economy are important, the commercial type is ideal; where it is desired to have windows in keeping with architectural design such as for schools, office buildings, etc., the architectural type offers important advantages. Complete architectural details for both types of windows sent free on request.



Construction Details, Commercial Projected Window

(1) *Glazing*—Glass bed and face puttied and held in place with clips; staggered holes and flexible clips allow various thickness of glass.

(2) *Solid Brass Sliding Pivot*—Glazing bead of sash section acts as guide eliminating recess for collection of dirt and ice. Tension supplied by heavy encased coil spring.

(3) *Locking Handle*—Artistically designed of malleable iron sherardized (bronze at slight additional cost).

(4) *Corner Construction*—Mortised, tenoned and air-hammered.

(5) *Double Contact Weathering*—Section through sill at ventilator.

(6) *Automatic Chain Latch*—Automatic kick-out allows operation by chain of ventilator out of reach from floor.

(7) *Frame*—Heavy angle section at head, sill and jambs.

(8) *Heavy Brass Bushed Pivot*—$\frac{3}{16}$x1 in. supporting arm concealed when ventilator is closed.

(9) *Ventilator Frame Corner*—Rigid angle section, mortised and tenoned, air hammer riveted.

(10) *Pole Hook Ring*—To be used in conjunction with cam handle for operation of ventilator when out of reach from floor.

(11) *Double Contact Weathering*—At the head of ventilator.

(12) *Vertical Mullion*—Exterior tee bar to give necessary rigidity, with pressed metal cover on the inside to give pleasing appearance.

FEDERAL STEEL SASH COMPANY

WAUKESHA, WIS.

CHICAGO OFFICE, 165 Wacker Drive NEW YORK OFFICE, 103 Park Avenue

SALES REPRESENTATIVES IN PRINCIPAL CITIES

Products

Welded Solid Steel Windows: Pivoted, Continuous, Commercial Projected, Architectural Projected, Store Front, Basement and Utility; Ridge Ventilated Skylights; Welded Tubular Steel Industrial Doors.

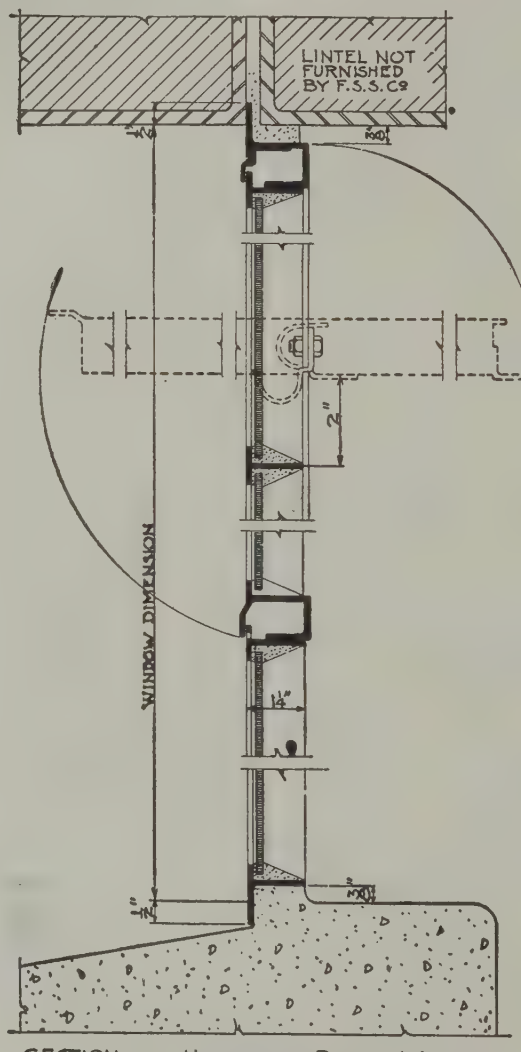
Also Mechanical Sash Operators.

Federal Welded Solid Steel Windows

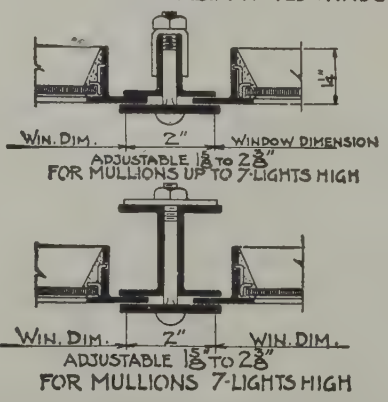
Federal Windows are all made from solid rolled steel sections with all joints electrically welded eliminating mechanical joints into which moisture may enter and set up corrosion. Federal units are electric arc welded in full size jigs which carry the complete unit, thereby assuring accuracy of dimension and absolute squareness. All muntin and frame faces are flat, eliminating dirt and moisture collecting ridges and reducing maintenance painting labor to a minimum.

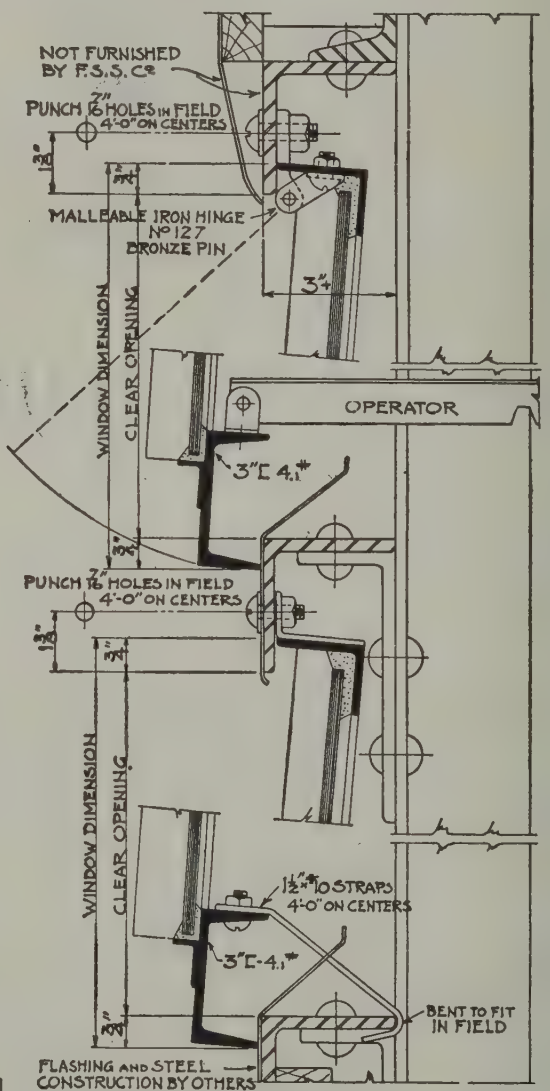
Federal welded construction also permits of satisfactory hot galvanizing after complete fabrication in order to meet extreme conditions, as during shipment and erection handling there is no movement at the welded joints with the resultant breaking of the protective coating.

The adjustable mullion construction insures a tight weathering joint between units, simplifies erection and makes unnecessary the forcing of units to overcome slight inaccuracies in masonry openings.

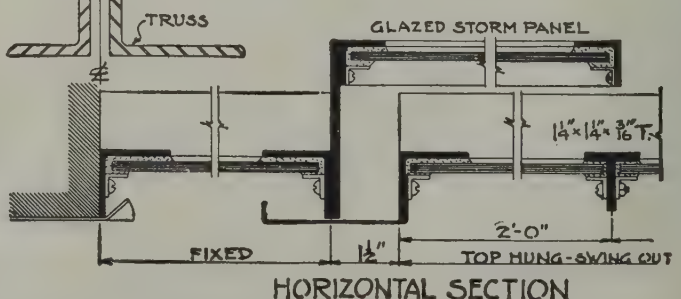


SECTION THRU HORIZONTALLY PIVOTED WINDOW





VERTICAL SECTION THRU CONTINUOUS WINDOWS

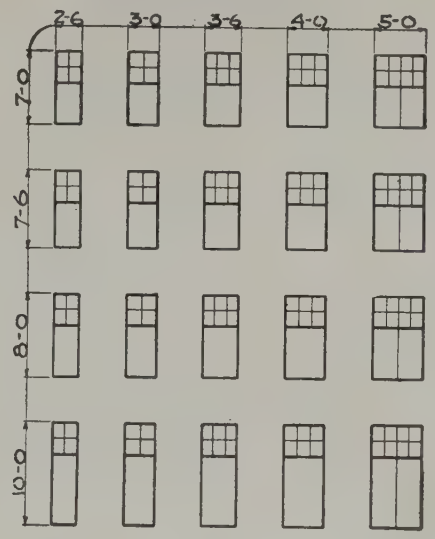


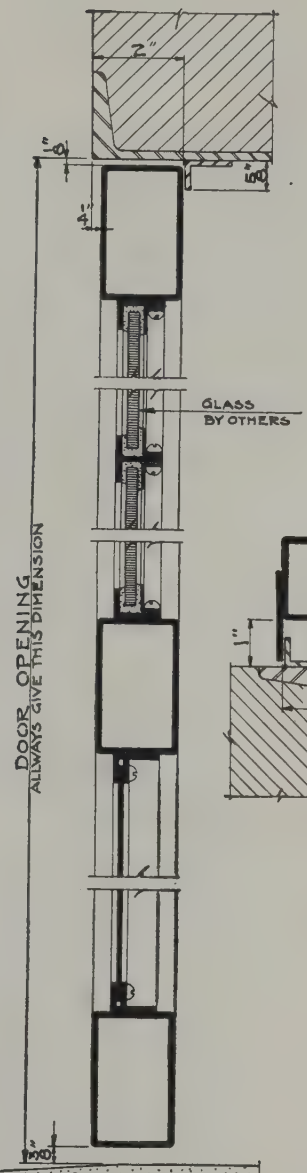
HORIZONTAL SECTION

Federal Welded Solid Steel Windows

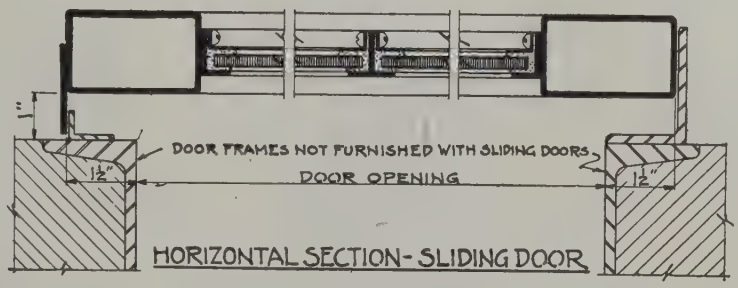
Continued on next page

STANDARD

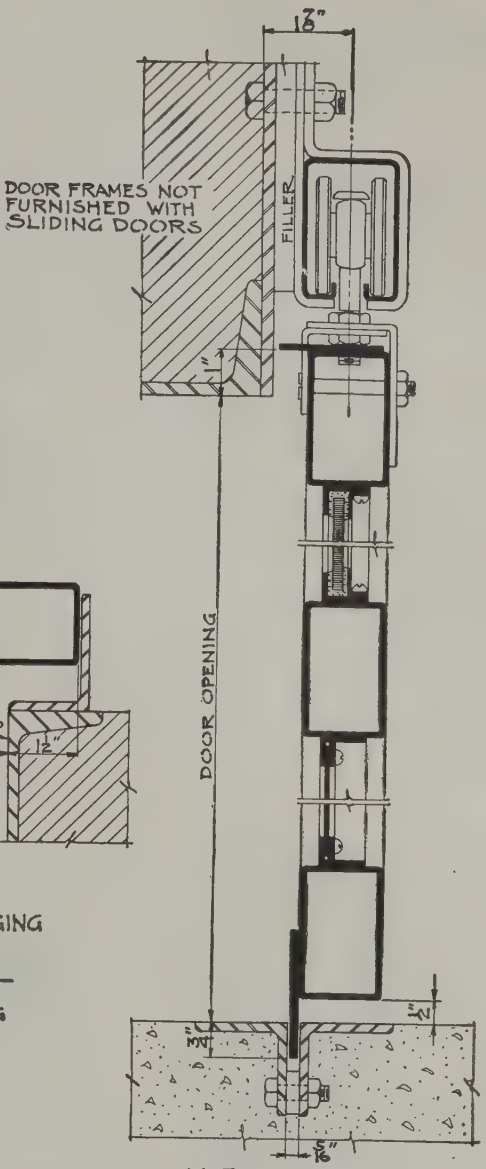




VERTICAL SECTION SWINGING DOOR



HORIZONTAL SECTION - SLIDING DOOR



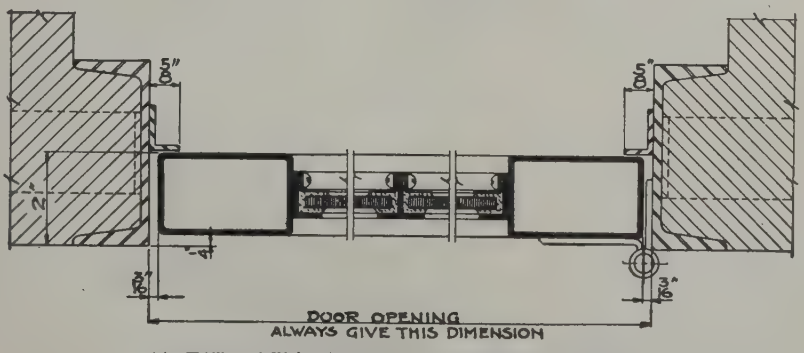
VERTICAL SECTION. SLIDING DOOR

STANDARD DOOR FRAMES FOR SWINGING DOORS ONLY:
4" CHANNEL WITH WALL ANCHORS

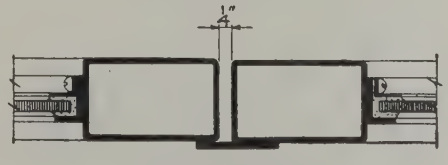
DOOR FRAMES WITH SASH CONNECTING AT HEAD AND OR JAMBS NOT FURNISHED BY F. S. S. Co

RECOMMENDED DOOR FRAMES

4" CHANNEL	6" CHANNEL	8" CHANNEL
WITH WALL ANCHORS DOOR OPENINGS UP TO 3'-6" × 8'-0" OR 4'-0" × 7'-6"	SINGLE DOOR OPENINGS UP TO 4'-0" × 10'-0" OR 5'-0" × 8'-0"	SINGLE DOOR OPENINGS UP TO 5'-0 × 12'-0" OR 6'-0 × 10'-0"
	DOUBLE DOOR OPENINGS UP TO 7'-0" × 10'-0"	DOUBLE DOOR OPENINGS UP TO 10'-0" × 12'-0"



HORIZONTAL SECTION - SWINGING DOOR



MEETING RAIL

Federal Welded Industrial Doors

ESTABLISHED 1827

WM. H. JACKSON COMPANY

Windows of Bronze

FOUNDRY AND SHOPS

335 Carroll Street

BROOKLYN, N. Y.

TELEPHONE
CUMBERLAND 4252

NEW YORK OFFICE: 2 West 47th Street—Telephone, Bryant 8930 CHICAGO OFFICE: 318 No. Michigan Avenue—Telephone, Dearborn 8450

Products

BRONZE CASEMENT WINDOWS.

BRONZE STANDARD DOUBLE HUNG WINDOWS.

BRONZE FIRE UNDERWRITERS DOUBLE HUNG WINDOWS.

For Ornamental Bronze and Iron Work, see page A882; for Stone Mantels, see page B1786; for Tile and Swimming Pools, see page C3883.

Jackson Windows

Jackson Windows are designed to meet the most exacting demands of architects and engineers. They are made airtight and watertight without the use of weatherstrips and are easy to install.

Bronze for Permanence

Permanence is the outstanding characteristic of Jackson Windows. The enduring bronze of which these windows are made and their perfection of manufacture give them an unlimited term of service.

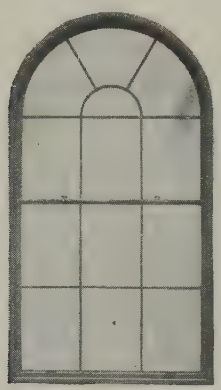
Economical

This quality of permanence, together with the fact that they require no maintenance, make Jackson Windows of solid bronze ultimately less expensive than other types. For example, the maintenance of an ordinary iron window will, in a short number of years, amount to more than the added price of a bronze window at the time of installation. In addition, the weathertightness of Jackson Windows decreases the cost of fuel. The iron window after a period of a few years begins to deteriorate and becomes more and more expensive to maintain, while the bronze window is in as perfect condition as when first installed and calls for no expense or care.

Catalogues and Service

Catalogue No. 21, "Jackson Windows of Bronze," will be sent on request.

Full size drawings will be sent also if required.



Type H2

Bronze Double Hung Window

Fisher Building, Detroit, Mich.

ALBERT KAHN, INC., Architects

H. G. CHRISTMAN-BURKE Co., Contractors

1950 Jackson Bronze Windows installed in this building, utilizing 210 tons of extruded bronze. All interior and exterior bronze work also executed by us utilizing 139 tons of cast and extruded bronze. Over 90 miles of extruded bronze sections used in this work

Type E

Bronze Casement Window

Some Recent Installations of Jackson Bronze Windows

BUILDING	LOCATION	ARCHITECT
Fidelity-Philadelphia Trust Co.	Philadelphia, Pa.	Simon & Simon
Burlington Trust Co.	Moorestown, N. J.	Simon & Simon
Central Savings Bank	New York, N. Y.	York & Sawyer
Federal Reserve Bank	New York, N. Y.	York & Sawyer
Transportation Building	New York, N. Y.	York & Sawyer
Bank of Hawaii	Honolulu, Hawaii	Mayers, Murray & Phillip
Guaranty Trust Co.	New York, N. Y.	Cross & Cross
Fisher Building	Detroit, Mich.	Albert Kahn, Inc.
First National Bank	Portchester, N. Y.	Uffinger, Foster & Bookwalter, Inc.
Legislative Building	Olympia, Wash.	Wilder & White
Drexel & Company	Philadelphia, Pa.	Charles Z. Klauder
Travelers Insurance Building	Hartford, Conn.	Voorhees, Gmelin & Walker
Royal Insurance Company	New York, N. Y.	Starrett & Van Vleck
Buckeye State Building & Loan Co.	Columbus, Ohio	Hopkins & Dentz
Graybar Building	New York, N. Y.	Sloane & Robertson
Equitable Trust Co.	New York, N. Y.	Trowbridge & Livingston
Union Institution for Savings	Boston, Mass.	Thomas M. James Co.
Mrs. G. R. Dodge Residence	Madison, N. J.	Geekie-Naughton, Inc.
Senator James Couzen Residence	Bloomfield Hills, Mich.	Albert Kahn, Inc.
Mrs. Florence Twombly Residence	New York, N. Y.	Warren & Wetmore

INTERNATIONAL CASEMENT CO., INC.

Solid Rolled Steel and Bronze Casement Windows and Austral Windows

JAMESTOWN, N. Y.

SALES OFFICES

NEW YORK, N. Y., 101 Park Avenue
ST. LOUIS, MO., Chemical Building
ATLANTA, GA., Bona Allen Building
CHICAGO, ILL., 844 Rush Street
CLEVELAND, OHIO, Insurance Center Building
LOS ANGELES, CAL., Transportation Building
SAN FRANCISCO, CAL., Hearst Building
BOSTON, MASS., 201 Devonshire Street
MINNEAPOLIS. MINN., Phelps Building
DAYTON, OHIO, Mutual Home Building

Products

INTERNATIONAL CASEMENTS and WINDOWS in solid rolled steel and drawn bronze.

COTSWOLD CASEMENTS and DOORS.

AUSTRAL SOLID STEEL WINDOWS.

Literature and Drawings

The following catalogues contain scale and full size details, photographs and measured drawings:

No. 6. International Austral Windows.
No. 7. International Casements (224 pages).
No. 10. International Cotswold Casements.

Specifications for International Steel Casement Windows Set to Rabbeted Wood Frames or Cut Stone

Solid rolled steel casement windows as manufactured by INTERNATIONAL CASEMENT CO., INC., or equal in the opinion of the architect. Steel sections of suitable design and weight, metal to metal contact, no loose strips. Bars hydraulically straightened, corners accurately machined, electrically welded and cleaned free from flux.

Casement manufacturer shall furnish and apply at the factory all hardware and operating devices, which shall be of solid bronze. Side hinged casements swinging out 5-ft. high and over shall have double grip bolt in addition to fastener, and side hinged casements swinging in 4 ft. 6 in. high and over shall be similarly equipped. Transoms out of reach from floor shall have operators that can be worked from the floor.

Sash shall be fitted with moulded steel glazing beads (glass stops) set with brass screws. Corners mitered and neatly fitted. All steel work cleaned free from rust and scale, painted two coats rust resisting paint, each coat separately baked on.

The casement window contractor shall set the casement sash. Frames to be bedded and pointed (inside and out) with approved mastic cement, finished in a workmanlike manner and guaranteed absolutely weathertight. If set to stone rabbets, lead expansion shields to be used.

Not included: glass, glazing, painting after erection, screens or preparation for same.

Specifications for International Steel Casement Windows Set to Masonry Reveals

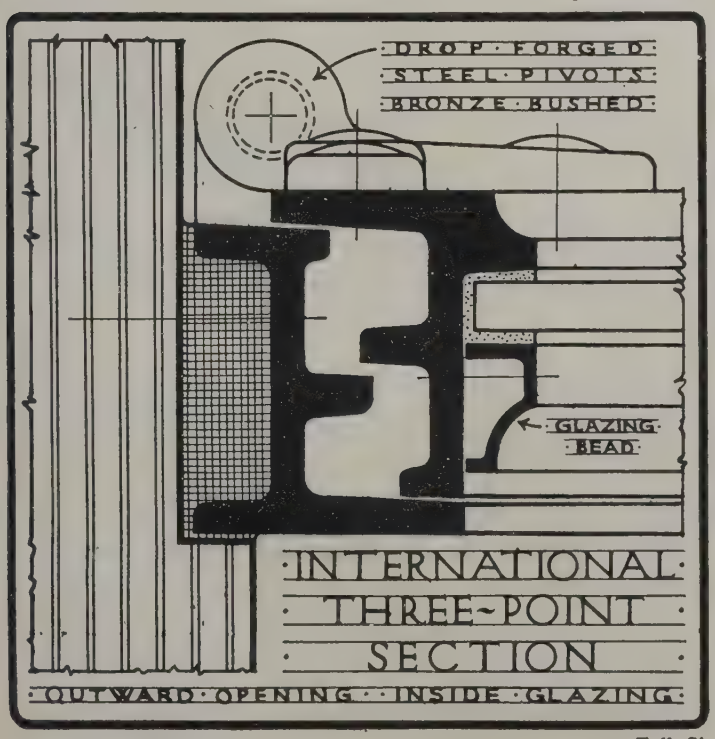
Sub-frames of pressed steel No. 12 gauge [No. 11 gauge, ingot iron] of size and contour as shown by scale details. If both dimensions exceed 7 ft. they shall be assembled at the factory, taken down and shipped knocked down. If under this size, corners shall be electrically welded and cleaned free from flux.

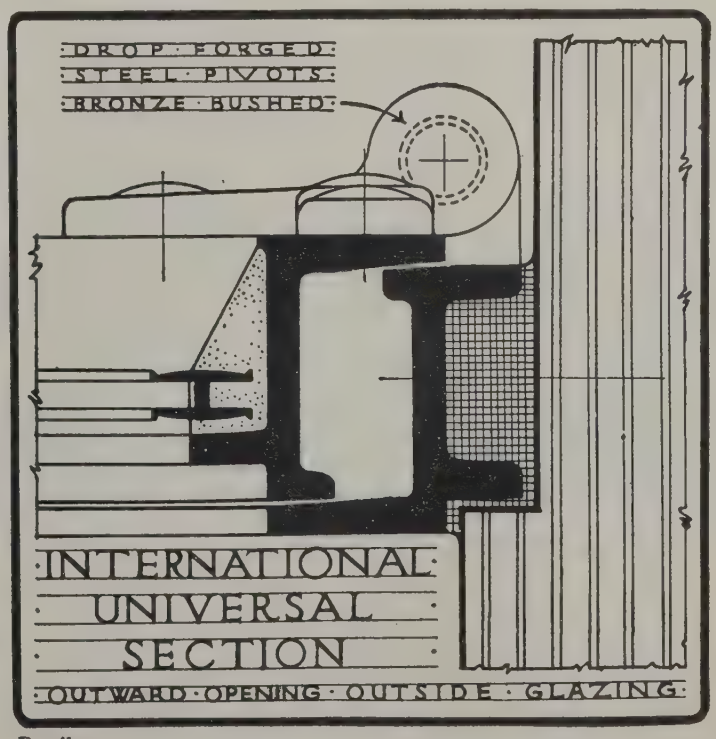
Steel work painted two heavy priming coats of rust resisting paint, each coat separately baked on.

The sub-frames are to be delivered to the building site by the casement manufacturer but must be set and built in by the mason. The masonry contractor will be required to set frames plumb and level, in close contact with masonry reveal at sides and head, and resting solidly on sill. After setting, wood spreaders or braces shall be placed in the frames to keep them true and square.

Calking—The calking between masonry and subframe to be covered under separate heading.

Casement Sash—Shall be of suitable design and weight, etc. (Copy specification.)





Full Size Details

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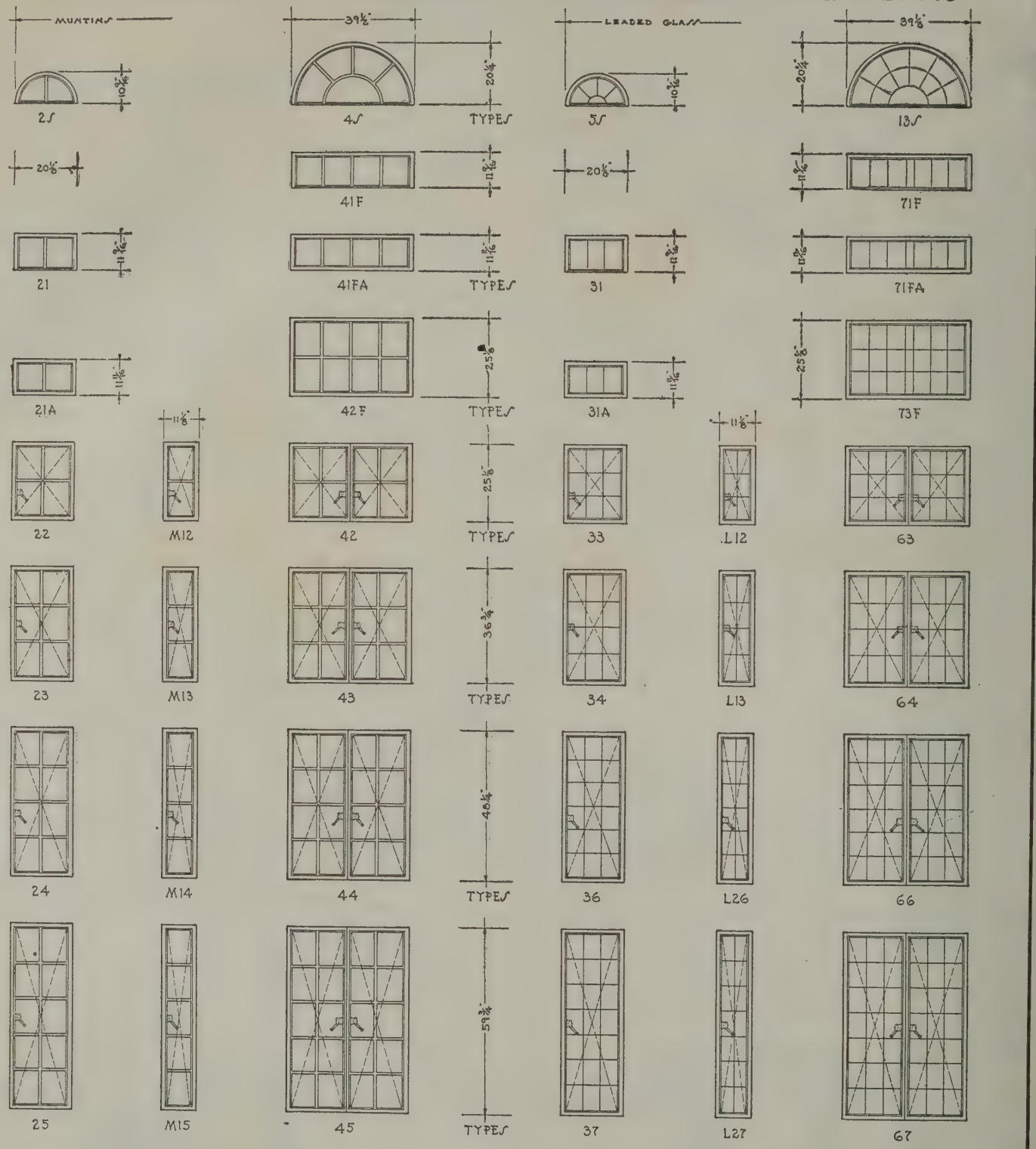


TYPES 2S - 4S - 5S - 13S - 41F - 71F - 21 AND 31 ARE FIXED SASH AND ARE SUITABLE FOR USE IN COMPOSITE UNITS ONLY ÷ TYPES 41FA - 71FA - 21A - 42F - 31A AND 73F ARE FIXED SASH BUT ARE SUITABLE AS TRANSOM LIGHTS IN SINGLE OPENINGS ÷ ALL OTHER TYPES ARE HINGED TO OPEN RIGHT OR LEFT OR THEY CAN BE SUPPLIED AS FIXED SASH ÷ COMBINATIONS OF VARIOUS TYPES CAN BE MADE BY THE USE OF STEEL MULLION AND TRANSOM BARS

Cotswold Casement Specification

(1) Casements of Cotswold type, made from heavy two-point steel section (not Cottage Sections) hinged at side opening outwards painted two coats of rust resisting paint, each coat separately baked on, hung on drop forged steel pivots bronze bushed and fitted with solid bronze hardware of standard design.

(2) Furnish leaded glass of standard sizes and design, first quality D.S.A. glass ½-in. lead cames, all horizontal cames steel reinforced.

(3) If steel muntins are required omit paragraph 2 and specify steel muntins to be furnished.

(4) The whole to be set by sash contractor and guaranteed weathertight.

Continued on next page

INTERNATIONAL COTSWOLD CASEMENTS AND DOORS

Residence at Montclair, N. J.
FRANCIS A. NELSON, Architect
International Cotswold Casements were used in the above residence

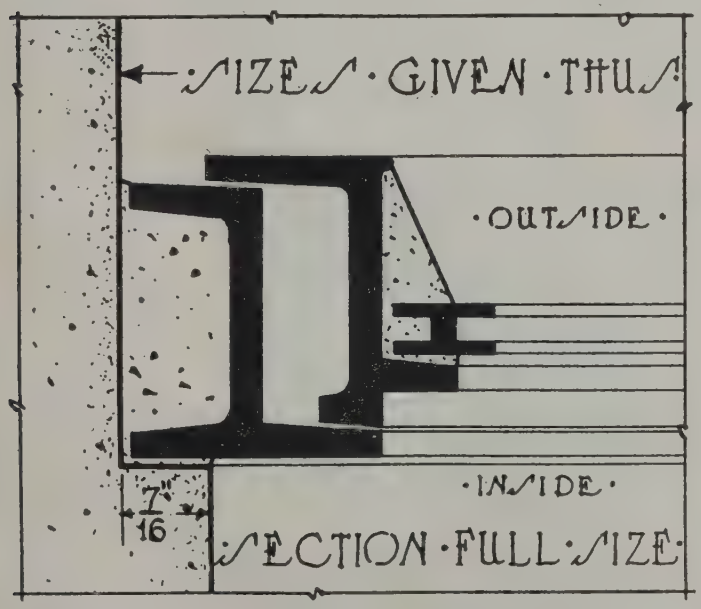
Cotswold Door Specification

(1) Doors of Cotswold type (either "L" or "M") made of heavy two-point steel sections, hinged at side opening outwards, painted two coats of rust resisting paint, each coat baked on separately, hung on drop forged steel pivots bronze bushed, having bronze intermediate hinges and fitted on the first opening leaf with bronze cremone bolt which can be operated from inside or out and security on inside by a safety catch. The other leaf being fitted with two bronze bolts, friction adjusters being supplied on each leaf. Galvanized kick panels to be provided.

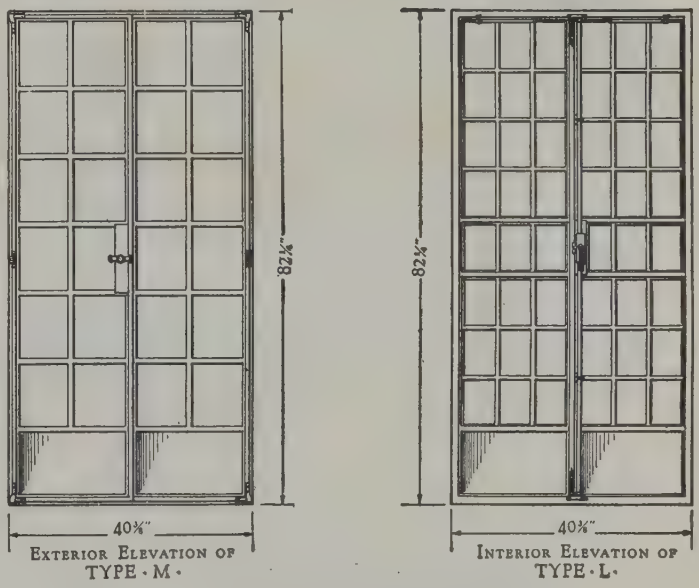
(2) (For "L" type only). Furnish leaded glass of standard sizes and design, first quality D.S.A. glass ½-in. lead cames, all horizontal cames steel reinforced.

(3) (For "M" type only). Doors to be divided into panes with rolled steel tee muntins.

(4) The whole to be set by sash contractor and guaranteed weathertight.



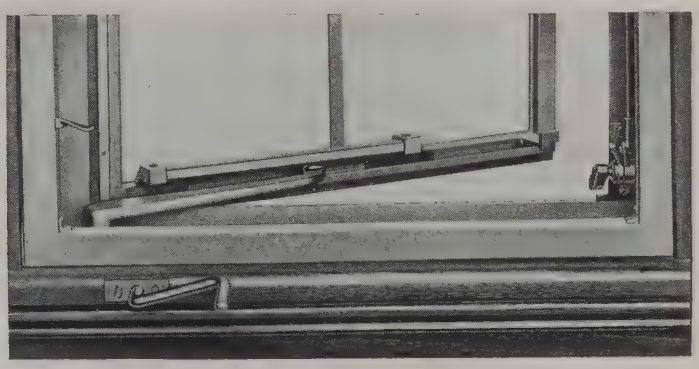
The above full size detail applies to Cotswold doors and casements. The corresponding fixed light section consists of a channel section of similar outline and gives the same sight line. Glazing angles are provided on doors Type "L" only and are optional on the casements of leaded light type. All other types have putty glazing.



Types and Sizes of Cotswold Doors

Ellison Window Operator

The Ellison window operator for out-swinging casement windows, either wood or steel, is designed to



operate through the stool of the window without opening the screen.

It is pleasing in appearance, simple and rugged in construction and foolproof in operation.

Built with ample strength to open and close the largest casement, self-locks in any position, and absolutely prevents rattling.

Continued on next page

INTERNATIONAL AUSTRAL WINDOWS IN STEEL AND BRONZE FOR OFFICE BUILDINGS & SCHOOLS

Girls' Senior High School, Atlanta, Ga.
EDWARDS & SAYWARD, Architects

International Austral Windows

Specifications—

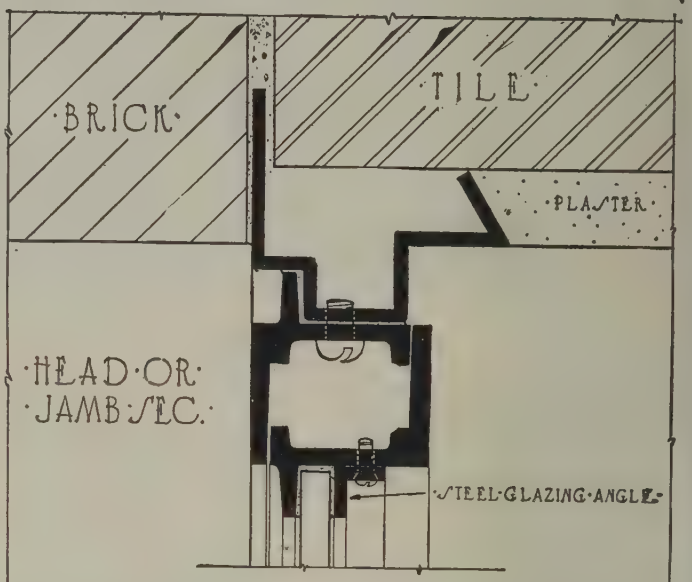
Windows where marked on plans to be copper-bearing steel with Austral balance arms as manufactured by the INTERNATIONAL CASEMENT CO., INC., Jamestown, N. Y. Sub-frames of No. 12 gauge steel, with welded corners, painted two priming coats, each coat separately baked on, to be delivered to building site, but same to be set up, built in and calked by mason contractor.

Sash to be of special shapes, made of copper bearing steel. All bars hydraulically straightened, corners electrically welded and cleaned from from flux.

Frames and sash carefully fitted to insure absolute weathertightness. Fit with steel glazing beads (glass stops) set with brass screws. Clean all steel work free from rust and scale and paint two heavy priming coats, each coat separately baked on.

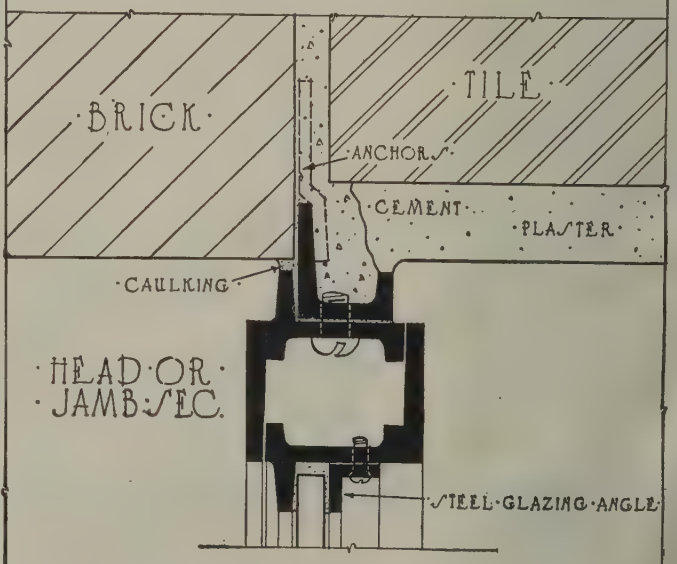
This contractor shall furnish all necessary hardware and fittings as follows: galvanized drop-forged steel window cleaner's bolts, shade brackets for both upper and lower sash with roller guides to hold cords. Polished cast bronze automatic cam catch and pull.

The sash shall be erected by this contractor after the plastering is completed. Same to be bedded and pointed in mastic cement and secured to subframe by machine screws. All to be finished in a workmanlike manner and guaranteed weathertight.



NO. 12 GA. PRESSED STEEL FRAME BUILT INTO MASONRY OPENINGS FOR INTERNATIONAL AUSTRAL ROLLED STEEL SASH

ONE HALF FULL SIZE DETAILS



NO. 86 ROLLED STEEL CHANNEL SECTION SET WITH INTERNATIONAL — AUSTRAL ROLLED STEEL SASH

HENRY HOPE & SONS

MAKERS OF

Metal Casements, Steel Windows, Leaded Glazing and Leadwork

B.C.M.
HOPE'S

101 PARK AVENUE
NEW YORK, N.Y.
Telephone: ASHLAND 8047 & 8048

B.C.M.
HOPE'S

STEEL & BRONZE WINDOWS suitable for Residences, Universities, Colleges, Public Buildings, Schools, etc.

SECTIONS as illustrated full size, based upon over 100 years' experience, provide two points of contact, with ample interior cavity to prevent capillary attraction. This system has proved weathertight in the most exposed situations throughout the world. These three sections are of universal application, and can be made to open outwards, inwards, or to pivot horizontally or vertically. We recommend as a general rule that casements should open outwards.

GLAZING & SETTING We keep a staff of fully qualified workmen, and undertake contracts including setting and glazing complete.

HARDWARE. Our hardware is of the highest class, made from BRONZE to U.S.A. Naval Specification, all working parts machined with ample bearing surfaces for everlasting wear. All hinges are of solid bronze, and horizontally and vertically pivoted casements are hung on our patent solid bronze cup pivots, which afford perfect security, easy working and exclusion of the weather.

QUALITY. We make three qualities: No. 1 fitted with Hope's bronze hardware; No 2 with iron hardware (the steel for both these qualities is finished with two coats of anti-corrosive paint); Quality No. 1A is finished with a stoved coat of enamel in addition.

· HOPE'S WINDOWS ·

TIMBESCOOMBE, SOMERSET ERIC FRANCIS, *Architect*

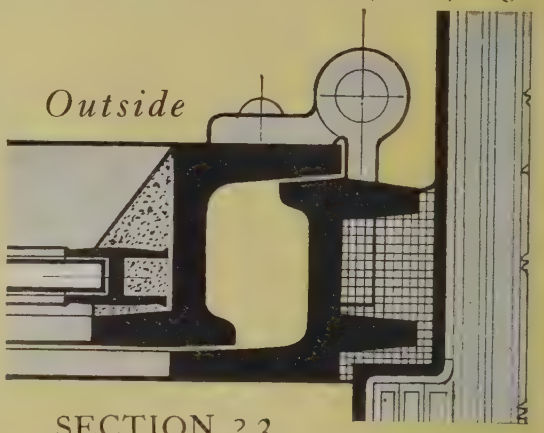
The finest buildings throughout the world are fitted with HOPE'S Casements

Continued on next page

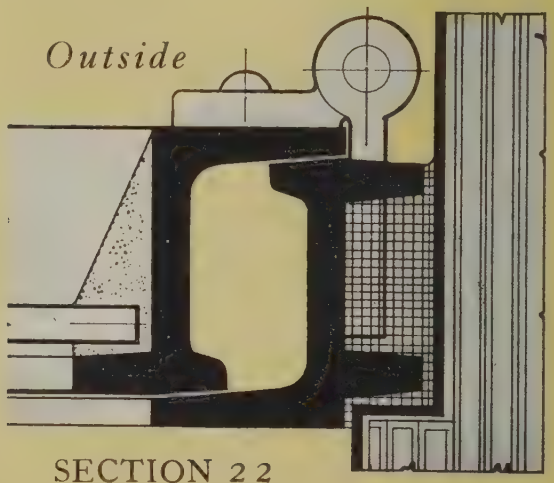
HOPE'S STEEL & BRONZE WINDOWS

FULL SIZE DETAILS AT JAMBS *of* SECTIONS No. 21, 22, 23

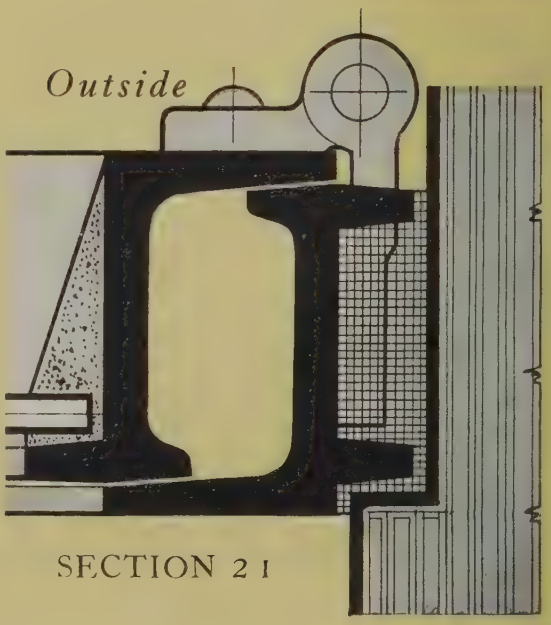
PHOTOGRAPH OF HOPE'S SIDE HUNG & TOP HUNG CASEMENT IN SECTION 23, QUALITY 1, HANDLE No. 1393, SLIDING STAY 223. THE TOP HUNG CASEMENT IS HUNG ON HOPE'S BRASS CUP PIVOTS, AND FITTED WITH HOPE'S PATENT CAM OPENER.



SECTION 23



SECTION 22



SECTION 21

FOR THE HIGHEST CLASS OF WORK WE RECOMMEND THE USE OF SOLID BRONZE. IT IS EVERLASTING IN WEAR, HAS A BEAUTIFUL SURFACE, AND IMPROVES IN COLOUR WITH AGE. WE MAKE ALL OUR SECTIONS IN THIS METAL, AND WILL FURNISH SAMPLES AND ESTIMATE OF THE COST WHEN DESIRED.

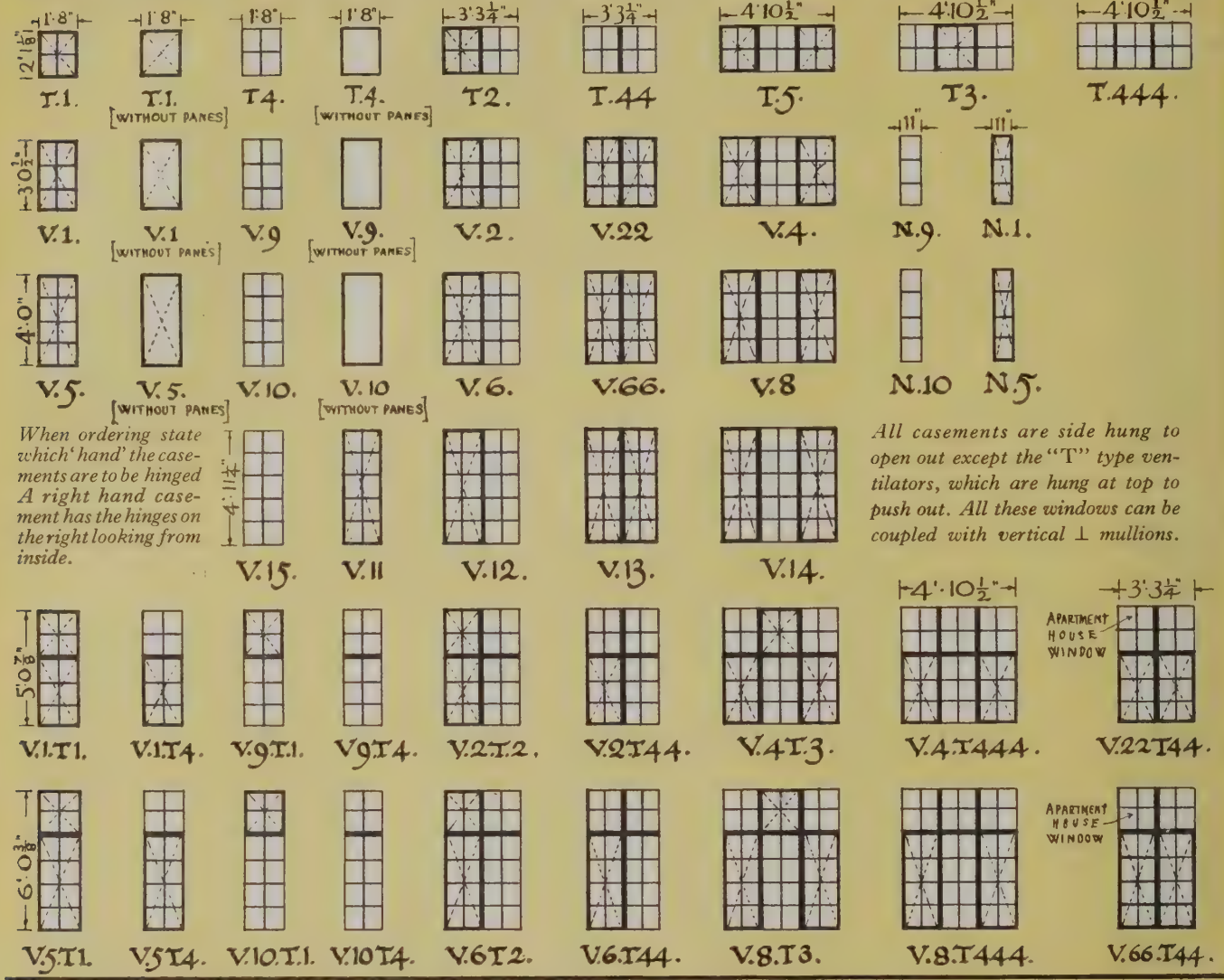
Continued on next page

HOPE'S FRENCH WINDOWS

HOPE'S STANDARD FRENCH WINDOWS ARE 6′10″ HIGH × 3′4½″ WIDE, AND ARE NOW FITTED WITH A SOLID BRONZE CREMORNE BOLT TO OPERATE FROM BOTH SIDES AND TO LOCK FROM THE INSIDE. THE PANES ARE THE SAME SIZE AS IN OUR STANDARD "L" TYPE WINDOWS, SO THAT WITH A PROPER ADJUSTMENT OF CILL LEVELS HORIZONTAL BARS WILL RANGE WITH EACH OTHER. WE ALSO MAKE THESE FRENCH WINDOWS, EXACTLY AS ABOVE, BUT WITH STEEL MUNTINS; THE PANE SIZE RANGES WITH OUR ORDINARY STANDARD WINDOWS. THESE WINDOWS ARE COMPLETE IN EVERY RESPECT AND ARE STOCKED IN NEW YORK.

Continued on next page

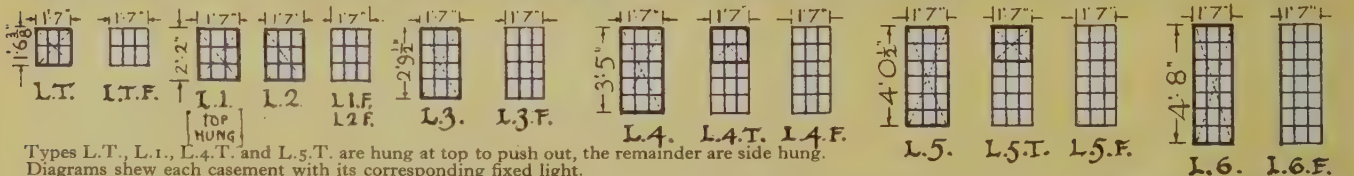
HOPE'S STANDARD STEEL WINDOWS



When ordering state which 'hand' the casements are to be hinged A right hand casement has the hinges on the right looking from inside.

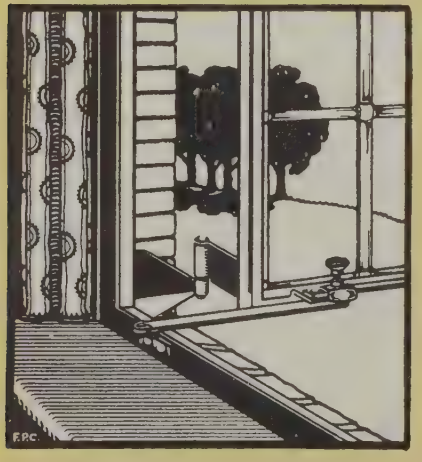
All casements are side hung to open out except the "T" type ventilators, which are hung at top to push out. All these windows can be coupled with vertical ⊥ mullions.

HOPE'S "L" TYPE STANDARD WINDOWS WITH LEADED GLASS

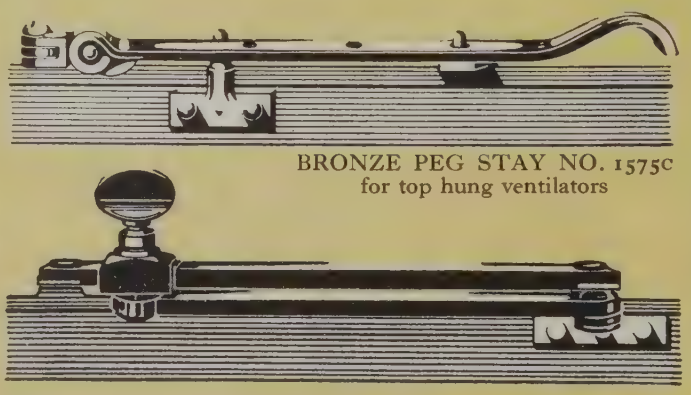


Types L.T., L.1., L.4.T. and L.5.T. are hung at top to push out, the remainder are side hung.
Diagrams shew each casement with its corresponding fixed light.

HOPE'S STANDARD FITTINGS

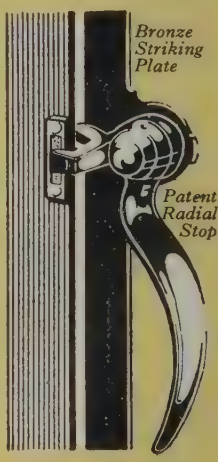


HOPE'S CLEANING HINGE
Inside view with window fully open



BRONZE PEG STAY NO. 1575C
for top hung ventilators

HOPE'S NON-PROJECTING SLIDING STAY No. 223C
with bronze rail, box and screw, for side hung casements



HOPE'S 2-POINT
BRONZE HANDLE

Continued on next page

HOPE'S STANDARD STEEL WINDOWS

A HOPE STANDARD L4 WINDOW *with* LEADED GLAZING

HOPE'S STANDARD STEEL WINDOWS ARE SUPPLIED WITH OR WITHOUT STEEL MUNTINS OR WITH LEADED GLAZING AS SHEWN. THEY ARE COMPLETE IN EVERY RESPECT READY FOR FIXING INTO BUILDING.

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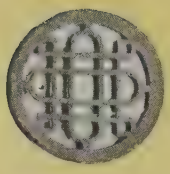
Continued on next page

HOPE'S HAND-WROUGHT LEADWORK



NO. 36

NO. 34

LEAD RAIN WATER PIPE
NO. 689. 4″×3″

LEAD RAIN WATER PIPE
NO. 690. 4″×3″

LEAD HEAD NO. 666. Width over ears, 29″

NO. 38. 10″×10″

LEAD FRETS

NO. 35. 10″×10″

LEAD GUTTER NO. 814. $6\frac{3}{4}$″×5″

ESTIMATES AND DRAWINGS, WITH SPECIAL DESIGNS TO HARMONISE WITH ANY ARCHITECTURAL STYLE, WILL BE SUPPLIED ON APPLICATION.

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Printed in England at The Kynoch Press

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Solid Nickel-Silver or Bronze Windows

NILES, MICH.

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WEIGHT HUNG, STANDARD CASEMENT, SPECIAL TRANSOM CASEMENT and PIVOTED TYPE WINDOWS made of Solid Nickel-Silver or Bronze.

VENTILATOR BRACKETS for controlling drafts from weight hung windows.

For Doors of solid nickel-silver and bronze, see pages A954-955.

For Store Fronts made of solid copper or bronze, see pages B2219-2225.

For Shower Bath Doors of solid nickel-silver and bronze, see page C2988.

Rustless Metal Windows

Kawneer windows are made in solid nickel-silver or bronze to meet the requirements of permanency for the better class of buildings. They are made from heavy cold rolled mouldings, all joints being mitered or coped and securely welded. With our method of forming mouldings we are able to build these windows weathertight. This reduces fuel costs and eliminates the use of weather strips. Upkeep costs are restricted to a minimum. Kawneer nickel-silver windows do not require painting on the outside but may be finished to correspond with decorative schemes.

Kawneer
SOLID NICKEL SILVER
WINDOWS

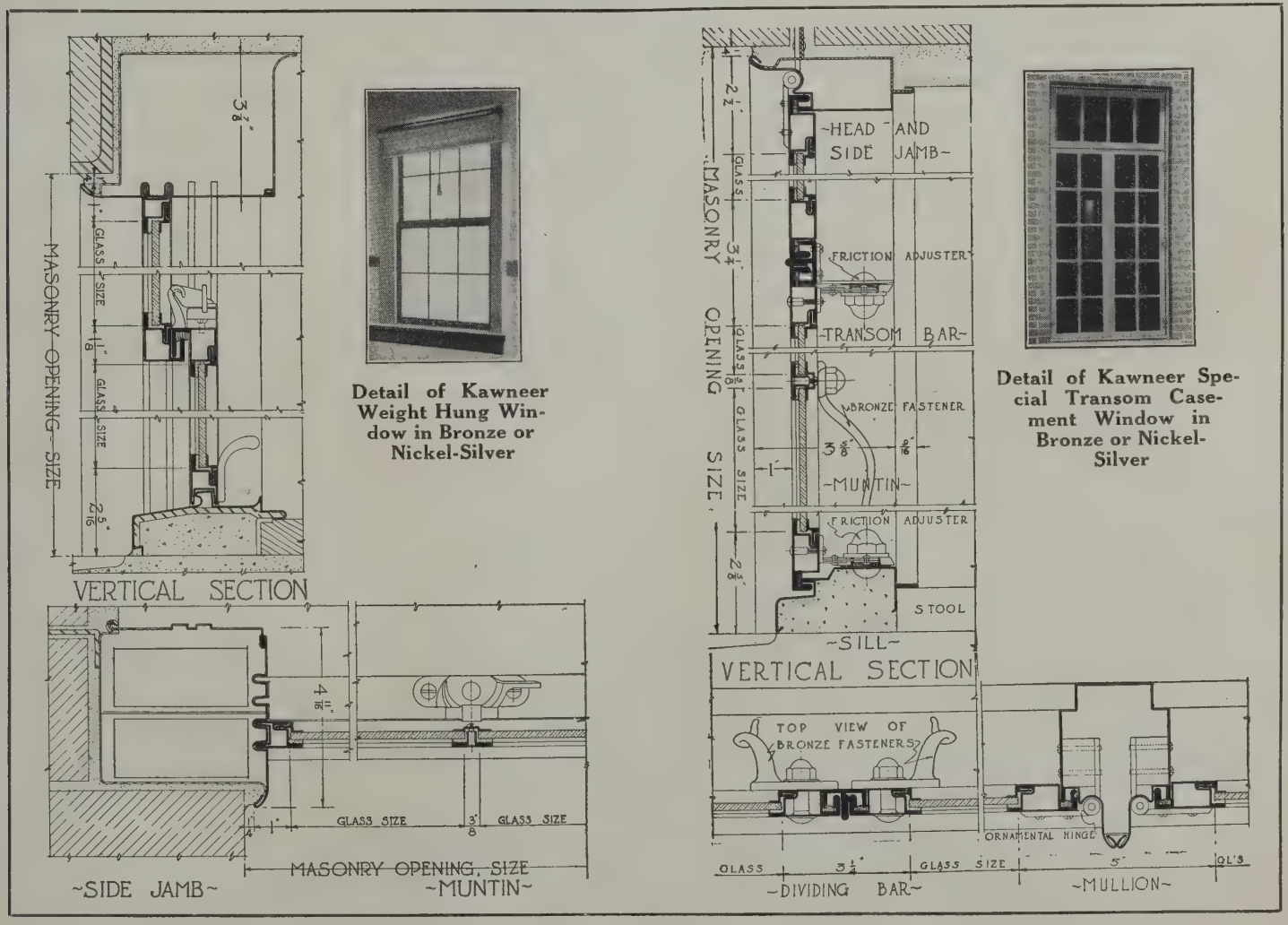
Types

Kawneer Solid Nickel-Silver or Bronze Windows are offered in standard weight hung, out swinging casements, special transom casement and pivoted types. Practically any style of the various types may be had. If desired they can be made with muntins, and in groups with mullions of corresponding metal.

Architectural Service

Information concerning Kawneer windows will gladly be furnished on request. A serviceable catalogue featuring our solid nickel-silver or bronze window has been published for the convenience of architects. The manufacturers will be glad to mail a copy of this catalogue or full size details.

Our Engineering Department will gladly co-operate with architects in solving problems concerning special window construction.



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Nationally distributed through Dealers in Building Material, Hardware and Structural Steel

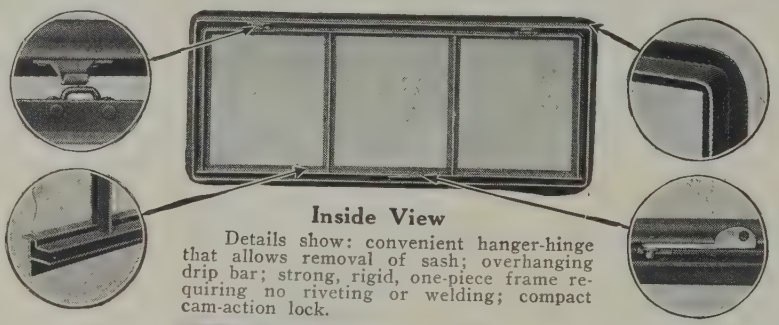
Product

KEWANEE COPPER STEEL BASEMENT WINDOWS.
For Kewanee Coal Chutes, see pages A706-707.

Kewanee Copper Steel Basement Windows

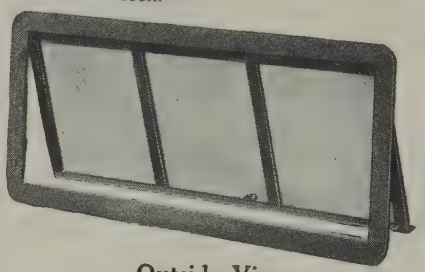
The old or new basement may be materially improved by the use of Kewanee Copper Steel Basement Windows, which will transform it into a light, airy room, readily utilized for laundry, workshop, playroom and many other purposes.

In remodeling a great opportunity is offered to modernize with Kewanee Windows. They are suitable not only for use in basements, but also for garages and a variety of other small buildings. Architects, builders and contractors recommend these improved Kewanee Copper Steel Windows because of their marked advantages.



Inside View

Details show: convenient hanger-hinge that allows removal of sash; overhanging drip bar; strong, rigid, one-piece frame requiring no riveting or welding; compact cam-action lock.



Outside View

Durable and Attractive—The strong, compact and efficient steel sections employed in Kewanee Windows admit 50% to 75% more light and air (depending upon the size of the wall opening) than the bulky wood frame and sash. Their trim, clean-cut lines add greatly to the appearance of the basement.

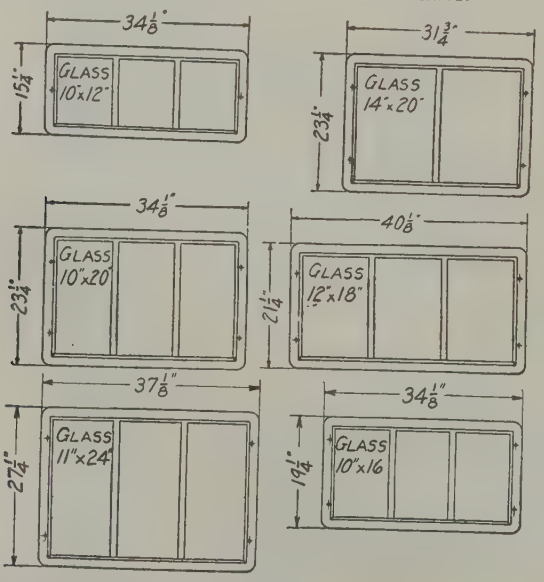
The Kewanee one-piece frame insures absolute rigidity with no possibility of distortion. Constructed of rust-resisting Copper Steel, Kewanee Windows are rotproof, fireproof, windproof, dustproof and verminproof, and in every way more durable than wood windows. Experts recommend steel basement windows because of the protection they provide against the ravages of termites or white ants.

Efficient and Convenient—Kewanee Windows open easily and lock securely. They never warp, bind or rattle. When closed, the hanger-hinge at the top and the cam-action lock at the bottom draw the sash and frame tightly together, all around, in a broad flat contact. This construction and the drip bar projecting over the bottom edge of the frame, make Kewanee Windows exceptionally weatherproof. When closed, the sash is firmly held in place by the hanger-hinge, but when swung open into the horizontal position it is readily lifted out for cleaning.

Furnished Complete—Kewanee Windows are shipped from factory with sash in frame, hardware attached, all coated with best metallic paint, and completely assembled in every detail (except glazing), ready to set in the openings without further preparation or fitting. Clips needed for glazing are included with each window. Screwholes in frame permit screens to be readily attached.

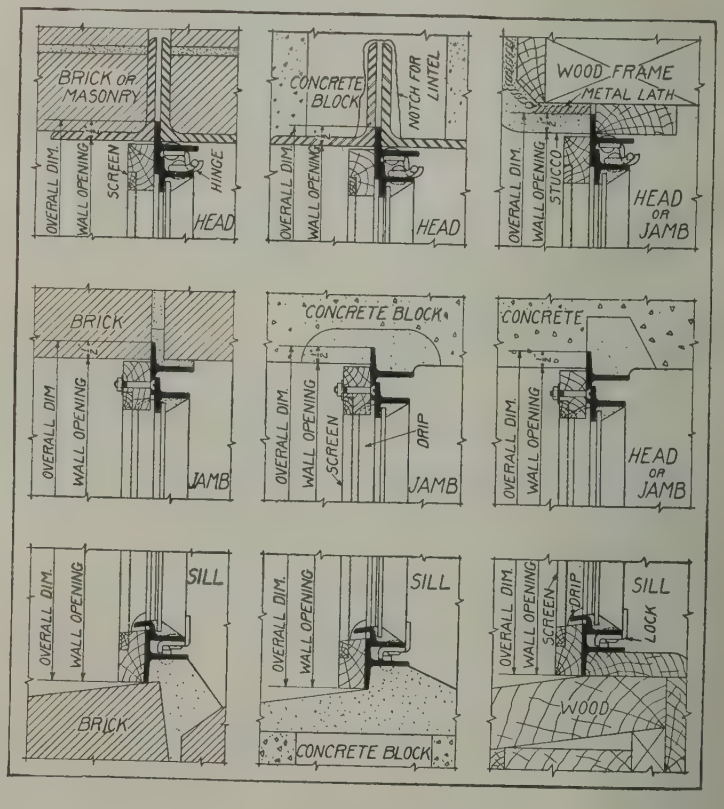
Easily Installed—Kewanee Windows are readily installed in any kind of construction. (Typical installations are shown below.) The sash, hinges and lock are contained entirely within the horizontal flange of the frame, which affords the workman a clean, definite masonry guide on all sides, that he can build up to without obstructions of any kind. He is not called upon to exercise any judgment as to the amount of clearance he should allow in order to insure a sightly job and free operation of the sash.

Low Cost—Standardization and quantity production have greatly reduced the cost of manufacture, so that you may now obtain Kewanee Copper Steel Windows at the same cost—installed—as wood windows.



STANDARD SIZES OF KEWANEE BASEMENT WINDOWS

Number of lights	Size of lights, in.	Over-all dimensions, in.		Wall opening required, in.		Net and shipping weight, lb.
		Width	Height	Width	Height	
3	10x12	34⅛	15¼	32¾	14¾	18
2	14x20	31¾	23¼	30⅜	22¾	20
3	10x20	34⅛	23¼	32¾	22¾	22
3	12x18	40⅛	21¼	38¾	20¾	23
3	10x16	34⅛	19¼	32¾	18¾	21
3	11x24	37⅛	27¼	35¾	26¾	25



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Lupton Steel Windows

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LUPTON SERVICE

General

Lupton Service is maintained to assist you in solving your problems in daylighting and natural ventilation. We will welcome the opportunity to work with you in submitting tentative designs showing practical application of our steel windows, operating devices and skylights.

By careful study and research we have established economies in manufacturing processes, new window designs and methods of control, a broad standardization of our products and new building designs to meet requirements of various industries so that good ventilation and daylight may be provided over unlimited floor areas.

In the following pages we present information concerning our products, to assist you in the preparation of details and specifications. Irrelevant matter has been eliminated. Text is used to supplement drawings only where it is necessary to give a clear idea of construction or application of our products.

Details are typical, showing construction and general principles underlying satisfactory installation.

Lupton Products are designed to give full investment value and to this end we offer our service and co-operation in whatever degree required to obtain satisfactory results in the natural daylighting and ventilating of your buildings.

Erection Service

Where preferred, we will erect any of our products, but stock items such as Pivoted, Basement and Residence Casement Windows are more often erected by others.

All other Lupton Products, however, because of their special application should be erected by our own forces.

Glazing

It is recommended that glazing be done by others on Pivoted, Basement, Commercial and Architectural Projected and Residence Casement Windows. However, we will do glazing for any of our products when this is preferred. Steel window putty should always be used for back and face puttying. Because various climates require variations in the ingredients of satisfactory putty, we recommend that putty be obtained from local sources. When this is impossible, putty may be secured from the Lupton Company or its sales representatives.

A special is an odd size between two less expensive standards

Continued on next page

LUPTON STEEL CASEMENTS—HEAVY TYPE

Lupton Casements were designed for use in monumental buildings, educational buildings, public libraries, banks, fine residences, club houses, first class hotels and office buildings and all other buildings of the same general character. Lupton Casements are the highest form of steel window construction and are made in sizes specified by the architect. Pages following list various types of ventilator operation and show construction details. Lupton will gladly co-operate by submitting tentative designs and finished drawings.

Side Hinged Ventilators

Maximum Size (Approximate)
Width 2 ft. 9 in. Height 8 ft. 0 in.

All hinged ventilators have solid bronze butts with steel pins. Double casements are equipped with Cremone Bolts; single casements with Cam handles. Sliding adjusters are used at the sill. In severe climates swing out type should be used in preference to swing in or vertically pivoted. In addition to its superior weathering, the swing out casement, when open, does not interfere with draperies.

Projected Ventilators

Maximum Size (Approximate)
Projected-In-at-Top or Bottom-Projected-Out
Width 4 ft. 6 in. Height 2 ft. 6 in.
Side Projected
Width 2 ft. 6 in. Height 5 ft. 0 in.

Projected ventilators are held open without adjusters or stay bars by an adjustable bronze friction shoe. Locking device is Cam handle, or spring catch and pull down for pole operation.

Projected-in-at-top or bottom-projected-out ventilators are mostly used for transoms or wherever a wide shallow panel is to be operated. Side projected can be used, instead of side hinged or vertically pivoted.

Pivoted Ventilators

Maximum Sizes (Approximate)
Vertically Pivoted
Width 4 ft. 3 in. Height 8 ft. 0 in.
Horizontally Pivoted
Width 4 ft. 6 in. Height 4 ft. 6 in.

Vertically pivoted ventilators are not recommended except where the desired width is too great for a side hinged ventilator. For both vertically and horizontally pivoted ventilators, peg and stay is furnished at the sill. Locking is by means of a Cam handle for vertically pivoted. On horizontally pivoted ventilators the stay bar serves as a lock.

Top Hinged and Bottom Hinged Ventilators

Maximum Size (Approximate)
Width 5 ft. 6 in. Height 4 ft. 0 in.

These are used mostly for transoms or where mechanical operators are to be used. Page 6 illustrates the bottom hinged type used in a semicircular head.

Muntins

All the above types of ventilators as well as stationary lights may be had with muntins.

General

Mullions and imposts permit combining two or more types of units to form a composite window.

Frames of 12 gauge steel plate may be used for this purpose (see pages 7 and 8).

Case hold adjusters (friction adjusters) may be used on hinged or pivoted ventilators.

We will co-operate in working out details for mechanical operators when these are required.

Note: When viewed from the inside a left-hand casement swings in or out from right to left and a right-hand casement swings in or out from left to right.

SPECIFICATION FOR STEEL CASEMENTS—HEAVY TYPE

Steel Casements—Heavy Type

1. Furnish and install where shown on drawings, Lupton Steel Casements (Heavy Type) as manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All steel casement windows should be accurately listed and located either in schedules on plans or in specifications. If more than one type of casement or more than one type of hardware be desired, each type should be separately listed and located or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show sections of frame members, details of construction, hardware, anchoring, etc.

Materials

3. Frame and Ventilator members shall be made of copper-bearing, rust-resisting steel specially rolled in solid, one-piece sections. Bars shall be straightened and sand-blasted.

4. Muntins shall be specially designed steel T bar section.

5. Vertical mullions shall be specially designed steel H section.

6. Imposts shall be specially designed steel lug bars.

Note: Two sizes of lug bars are standard, the width of the section being 4" for the large bar and 2½" for the small one. The large bar is used for the larger multiple unit casement windows.

Construction

7. All casement windows shall be designed for inside glazing.

8. All casement windows shall be straight and true, members in alignment and surfaces in a plane.

9. Ventilator and Frame Members shall be mitered at corners and solidly butt welded. Exposed welded surfaces shall be ground smooth. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

10. Muntin Bars shall be continuous from top to bottom and from side to side between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked at their intersections as not to decrease their ultimate strength.

11. Mullions shall be provided and bolts for attachment whenever two or more units are placed side by side in an opening.

12. Imposts shall be provided and bolts for attachment whenever two or more units are placed one directly above the other in an opening.

13. At the head of all open out ventilators a No. 16 gauge formed steel hot galvanized weather bar shall be used, except when condition necessitates the use of the lug bar, the lug bar shall be bent and used as weathering bar.

Note: (a) No. 12 gauge steel fins are furnished and attached in factory only when specified, at slight added cost.
(b) No. 14 gauge steel sill and jamb anchor clips are furnished only when specified.

Glazing Stops

14. Glazing stops shall be of detail shown on window manufacturers standard drawings and shall be made of drawn rolled steel. All stops shall be accurately coped and fitted.

Note: See details on pages 9 and 10.

Standard and special sizes look alike in the walls. Save the difference in costs

Continued on next page

Hardware

15. Solid bronze hinges with steel pins shall be attached to all side-hinged casements and painted with casements in factory. Additional solid bronze hardware, as listed below shall be fitted in shop and shipped unattached carefully packed to prevent damage until applied for use.

Note: The following hardware is available, list the types required.

For Double Casements (Side Hinged—Open Out)
Sliding adjuster.
Cremone bolt and pull handle.

For Single Casements (Side Hinged—Open Out)
Sliding adjuster.
Single locking device (ventilators up to 4′ 0″ in height).
Double locking device (ventilators up to 8′ 0″ in height).
Triple locking device (ventilators over 8′ 0″ in height).

For Double Casements (Side Hinged—Open In)
Sliding adjusters.
Cremone bolt and pull handle.

For Single Casements (Side Hinged—Open In)
Sliding adjusters.
Single locking device (ventilators up to 4′ 0″ in height).
Double locking device (ventilators up to 8′ 0″ in height).
Triple locking device (ventilators over 8′ 0″ in height).

For Vertically Pivoted Ventilators
Peg and stay adjuster.
Single locking device (ventilators up to 4′ 0″ in height).
Double locking device (ventilators up to 8′ 0″ in height).
Triple locking device (ventilators over 8′ 0″ in height).

For Horizontally Pivoted Ventilators
Peg and stay adjuster.

For Projected Ventilators—Bottom-Projected-Out
Within reach from floor—Cam handle.
Beyond reach from floor—Spring catch handle and pull down for pole operation.

For Projected Ventilators—Projected-In-at-Top
Within reach from floor—Cam handle.
Beyond reach from floor—Spring catch for pole operation.

Calking Cement

16. The window manufacturer shall furnish non-staining elastic calking cement (as indicated on window manufacturer's standard details) in quantities sufficient to make head, sill, jambs, mullions and imposts weathertight. Wooden filler-strips shall be furnished and used where indicated on details.

Erection

17. All Casement Windows shall be erected in prepared openings by the window contractor (unless otherwise specified).

18. All Casement Windows shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and imposts shall be bolted securely to frames. Calking cement and wooden filler-strips shall be neatly applied at points indicated on window manufacturer's standard details.

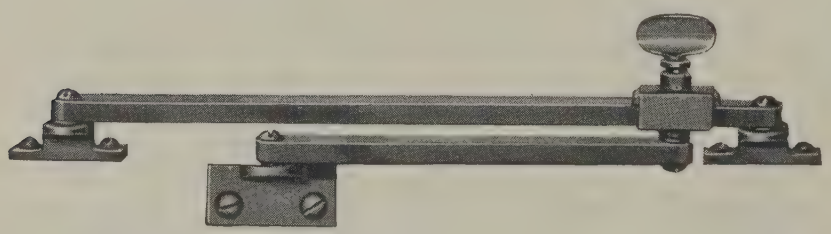
Note: Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with the installation details for Casement Windows. Note that when the continuous fins are built in the masonry, the placing of the furring tile at the jambs must be delayed until after the windows are set. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Glass and Glazing

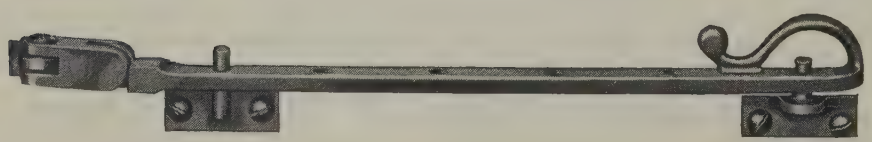
Note: Specify glass and glazing under proper heading elsewhere in general specifications of other trades.
(a) Do not specify single thickness glass.
(b) Specify a high grade steel casement putty.
(c) Specify that all casement windows shall be glazed from the inside and that all glass shall be set in a bed of putty and secured by the Lupton metal glazing stops.

HARDWARE FOR STEEL CASEMENTS—HEAVY TYPE

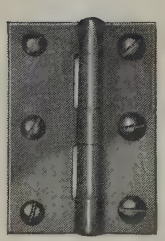
All hardware numbers are for solid bronze hardware highly polished, unless otherwise noted



Sliding Adjuster No. 231
For swing-out casements



Peg Stay No. 209
For horizontally pivoted casements. A similar peg stay No. 249 or a peg stay terminating in a scroll (No. 250) used on vertically pivoted casements



Bronze Butt No. 2200
With steel pin (not polished). Used on all hinged casements

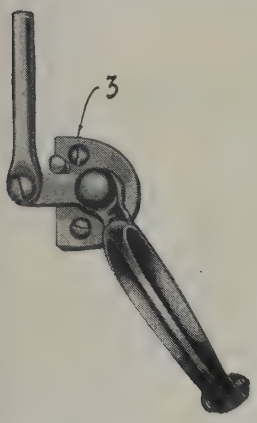
Exterior Sliding Adjuster
For swing-in casements. No. 230 for single casements up to 1 ft. 7 in. wide, or for double casements up to 3 ft. 0 in. wide. No. 229 for larger casements

Interior Sliding Adjuster No. 236
For swing-in casements

Continued on next page

HARDWARE FOR LUPTON STEEL CASEMENTS—HEAVY TYPE

All hardware numbers are for solid bronze hardware highly polished, unless noted otherwise. Cam handles, latches and spring catches are mounted either on the ventilator section or on steel plates welded to the ventilator



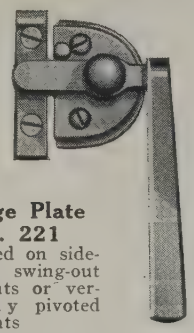
Double Locking Device
Right hand shown
Used on Side-hinged swing-out and Vertically Pivoted Casements, over 4 ft. 0 in. and up to 8 ft. 0 in. high. Consists of the following:
1. Auxiliary Latch No. 213
2. ½ in. Steel Tube
3. Right Hand Cam Handle No. 225
(Left Hand No. 226)

Similar device for Side-hinged Swing-in Casements consists of:
1. Auxiliary Latch No. 212
2. ½ in. Steel Tube
3. Cam Handle Right Hand No. 227
(Left Hand No. 228)

Triple Locking Device for use on Casements over 8 ft. 0 in. high is similar, with an additional auxiliary latch

Pull Down Ring No. 251
Used at top of Bottom-Projected-Out ventilators

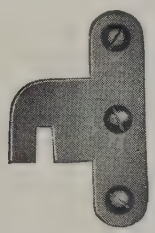
Spring Catch No. 243
Used at bottom of Bottom-Projected-Out ventilators beyond reach from floor



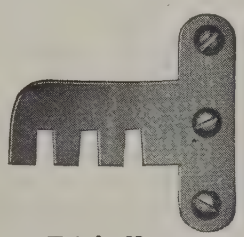
Wedge Plate No. 221
Used on side-hinged swing-out casements or vertically pivoted casements

Alternate Cam Handle
Right hand No. 210 shown—Left hand No. 211
When used in the double or triple locking device hardware numbers are as follows:
Swing-out, right hand No. 214—Left hand No. 215
Swing-in, right hand No. 216—Left hand No. 217

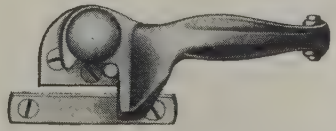
Cam Handle
Right hand No. 218 shown—Left hand No. 219
Used on side-hinged or vertically pivoted casements up to 4 ft. 0 in. high



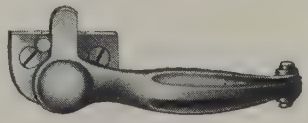
Single Keeper
Right hand No. 222 shown—Left hand No. 233
Used for cam handles on swing-in casements



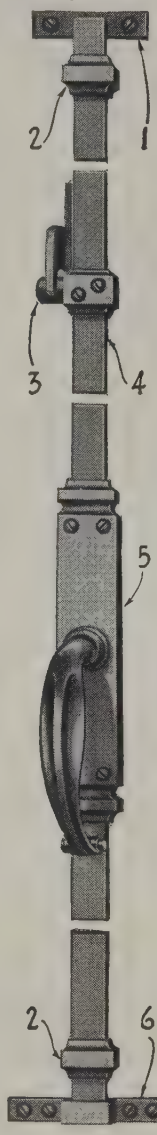
Triple Keeper
Right hand No. 223—Left hand No. 224
Used for cam handles on swing-in casements

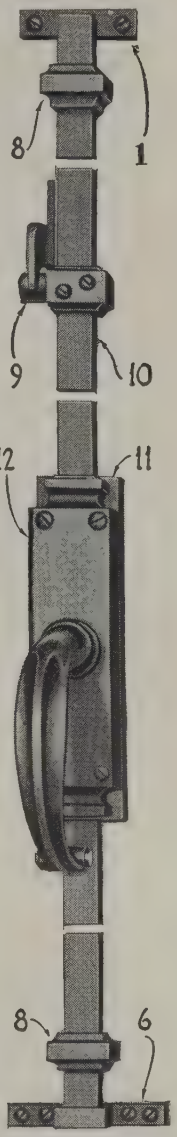


Cam Handle
Right hand No. 268 shown—Left hand No. 269
Used at bottom of Bottom-Projected-Out ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide. Two handles for wider ventilators



Cam Handle
Right hand No. 266 shown—Left hand No. 267
Used at top of Projected-In-at-Top ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide. Two handles used for wider ventilators





Cremone Bolts for Double Casements

BOLT FOR CASEMENTS UP TO 7 FT. 0 IN. HIGH
Consists of the following:
1. Keeper No. 291
Used at top and bottom of swing-out casements
Or
6. Keeper No. 285
Used at top and bottom of swing-in casements
2. Bar Guide No. 293
Spaced approx. 1 ft. 0 in. apart
3. Center Latch and Keeper
No. 286 above handle
No. 292 below handle
Spaced approx. 2 ft. 0 in. apart
4. Bronze Bar ½x¼ in.
5. Handle and Case No. 290
7. Pull Handle No. 237

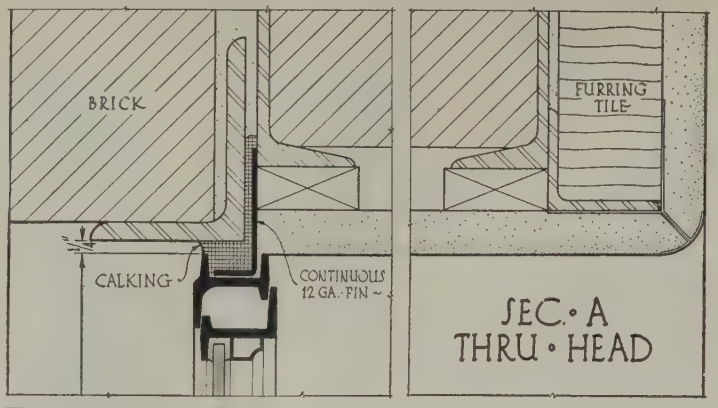
BOLT FOR CASEMENTS OVER 7 FT. 0 IN. HIGH
Consists of the following:
1. Keeper No. 291
Used at top and bottom of swing-out casements
Or
6. Keeper No. 285
Used at top and bottom of swing-in casements
8. Bar Guide No. 340
Spaced approx. 1 ft. 0 in. apart
9. Center Latch and Keeper
No. 337 above handle
No. 338 below handle
Spaced approx. 2 ft. 0 in. apart
10. Bronze Bar ⅝x¼ in.
11. Malleable Iron Base Plate No. 146
12. Handle and Case No. 256
7. Pull Handle No. 237

Spring Catch No. 248
Used at top of Projected-In-at-Top ventilators beyond reach from floor

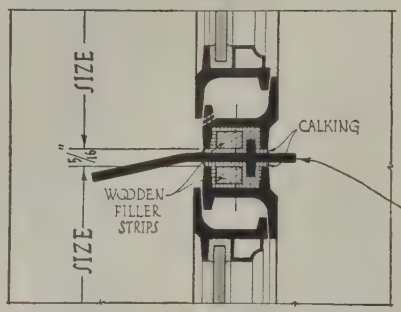
Continued on next page

LUPTON SIDE-HINGED CASEMENTS WITH PROJECTED TRANSOMS

SCALE FOR DETAILS 3" = 1'-0"



SEC. A THRU HEAD

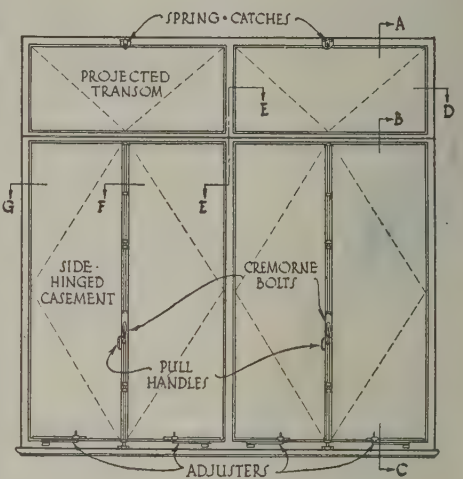


SEC. B THRU IMPOST

IMPOST BAR IMBEDDED IN WALL

SEC. C THRU SILL

SECTION VENTILATORS OPEN



INSIDE ELEVATION VENTILATORS CLOSED

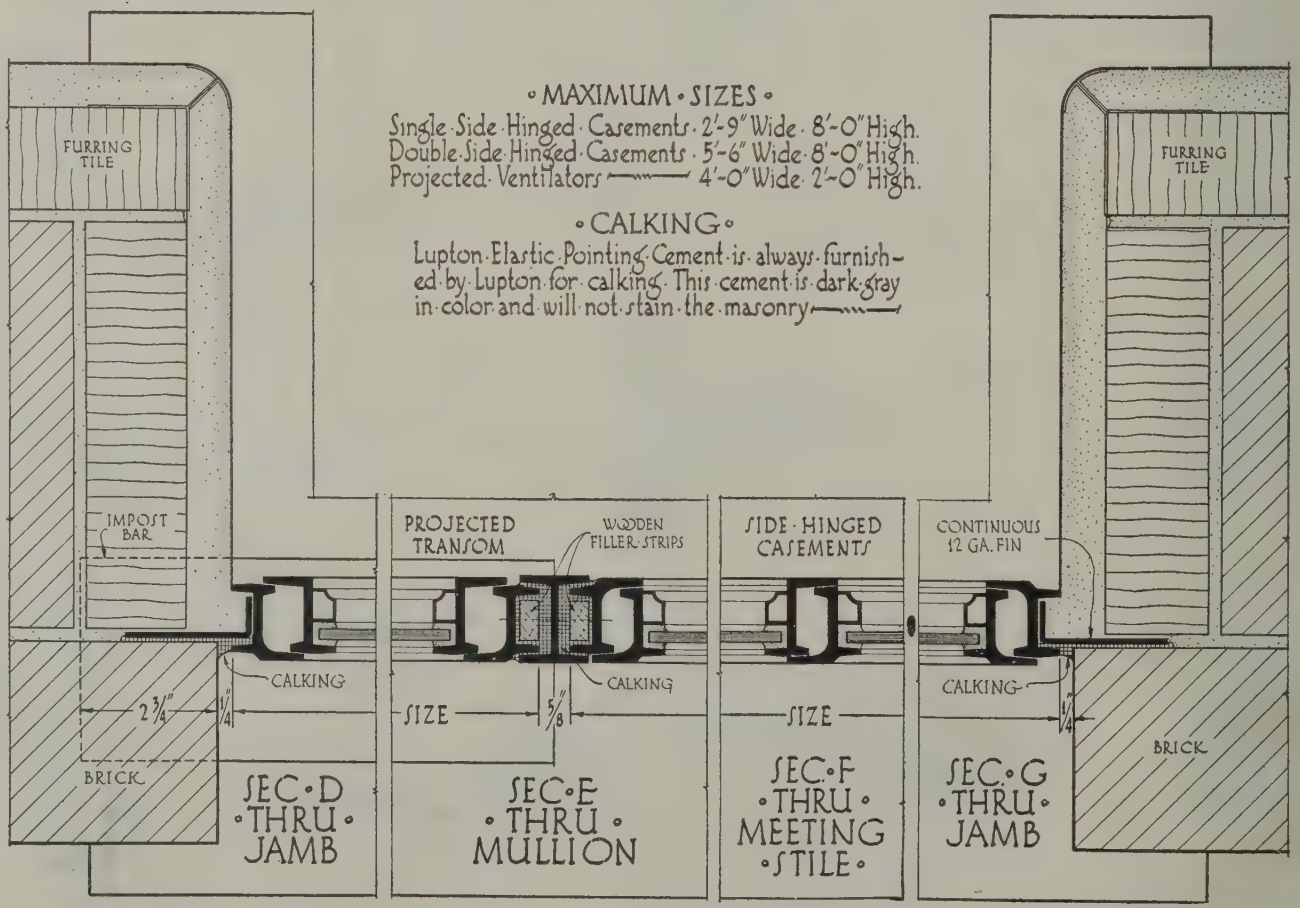
SCALE 1/4" = 1'-0"

MAXIMUM SIZES

Single Side Hinged Casements 2'-9" Wide 8'-0" High.
Double Side Hinged Casements 5'-6" Wide 8'-0" High.
Projected Ventilators 4'-0" Wide 2'-0" High.

CALKING

Lupton Elastic Pointing Cement is always furnished by Lupton for calking. This cement is dark gray in color and will not stain the masonry



SEC. D THRU JAMB

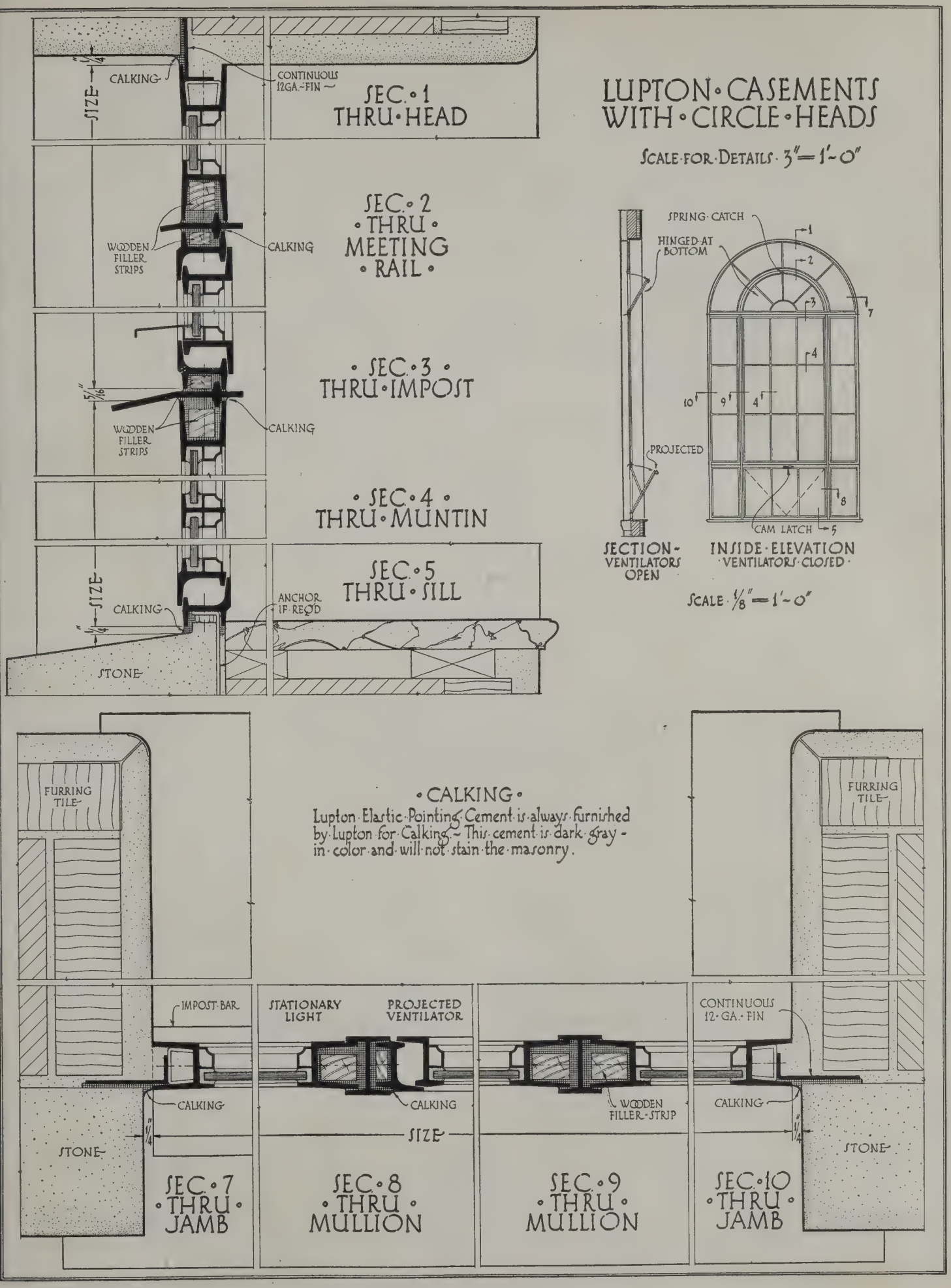
SEC. E THRU MULLION

SEC. F THRU MEETING STILE

SEC. G THRU JAMB

Use standard sizes for quicker deliveries—lower costs

Continued on next page

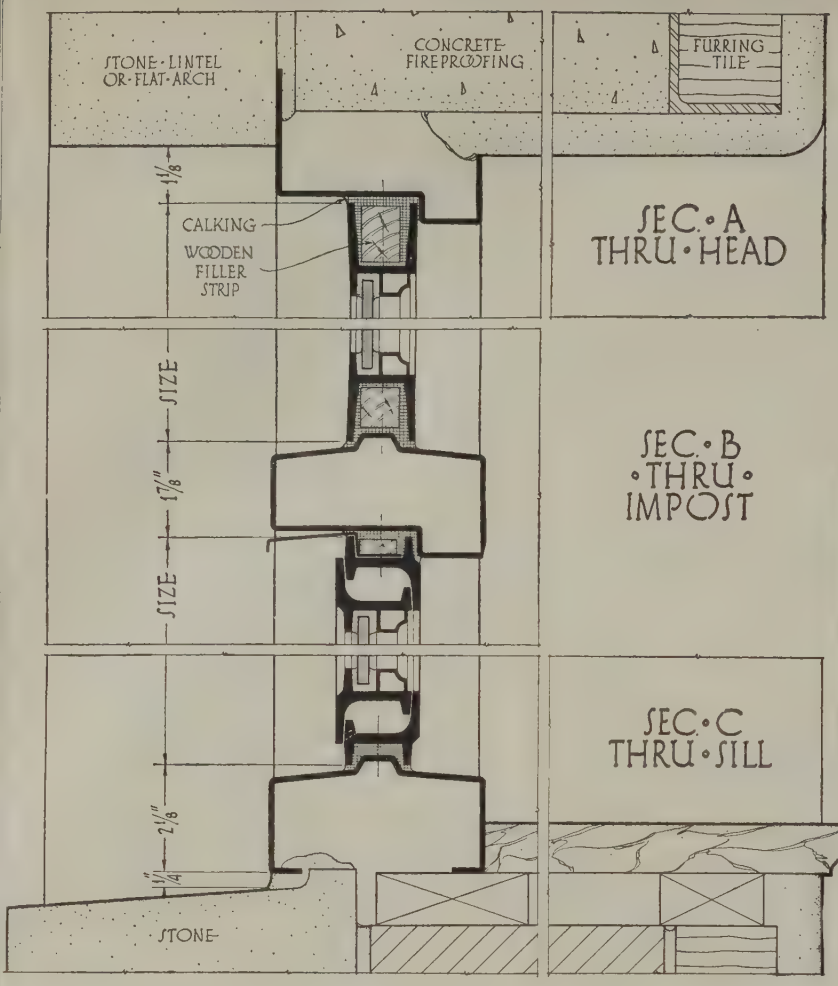


Standard sizes cost less than specials

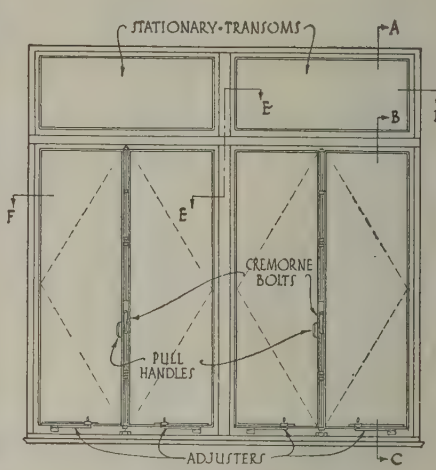
Continued on next page

• LUPTON • CASEMENTS • WITH • 4" • PLATE • FRAMES

SCALE • FOR • DETAILS • 3" — 1'-0"



SECTION
VENTILATORS OPEN



INSIDE • ELEVATION
VENTILATORS • CLOSED

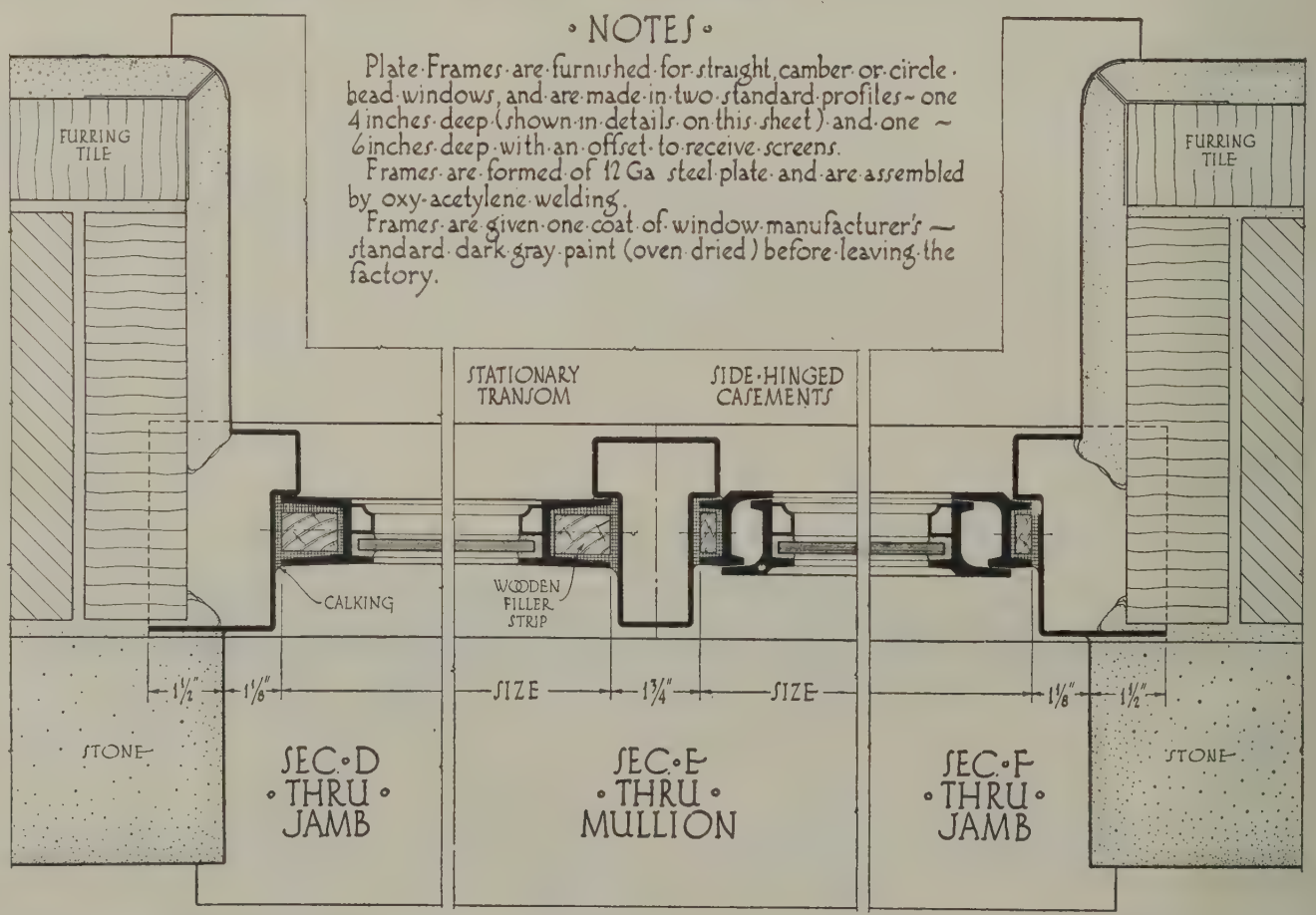
SCALE • ¼" = 1'-0"

• NOTES •

Plate • Frames • are • furnished • for • straight, camber • or • circle • head • windows, and • are • made • in • two • standard • profiles ~ one 4 inches • deep (shown • in • details • on • this • sheet) • and • one ~ 6 inches • deep • with • an • offset • to • receive • screens.

Frames • are • formed • of 12 Ga steel • plate • and • are • assembled by oxy-acetylene • welding.

Frames • are • given • one • coat • of • window • manufacturer's — standard • dark • gray • paint (oven • dried) before • leaving • the factory.

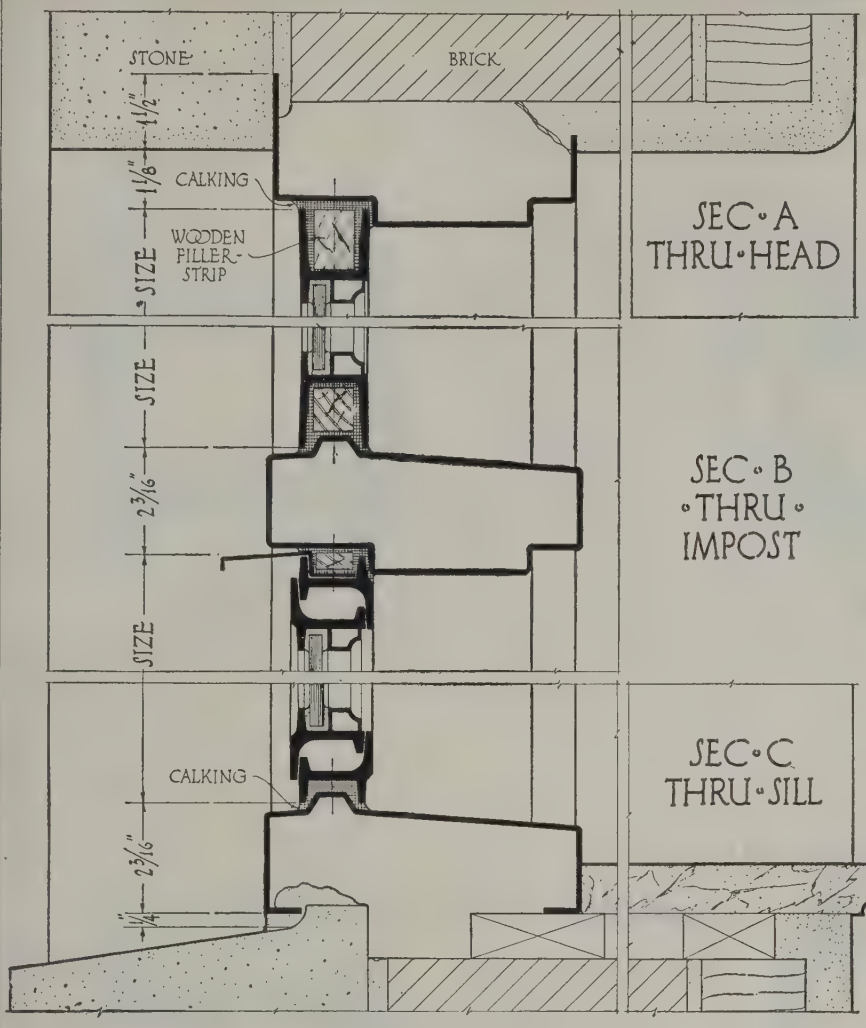


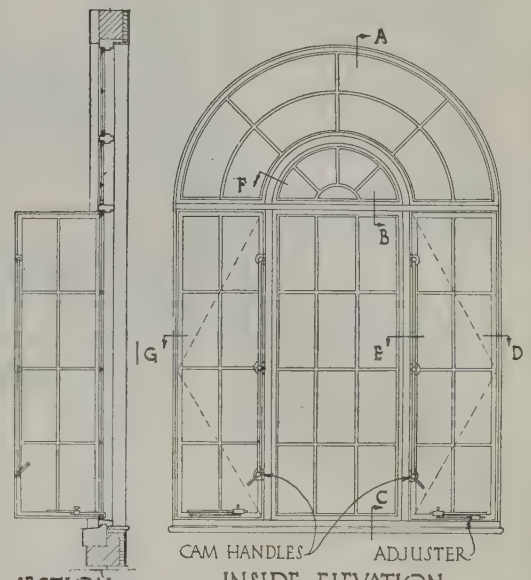
For quick deliveries, use standard sizes

Continued on next page

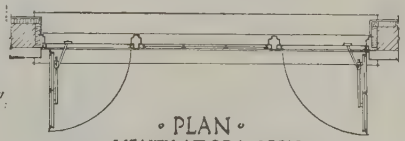
LUPTON CASEMENTS WITH 6" PLATE FRAMES

SCALE FOR DETAILS ~ 3" = 1'-0"



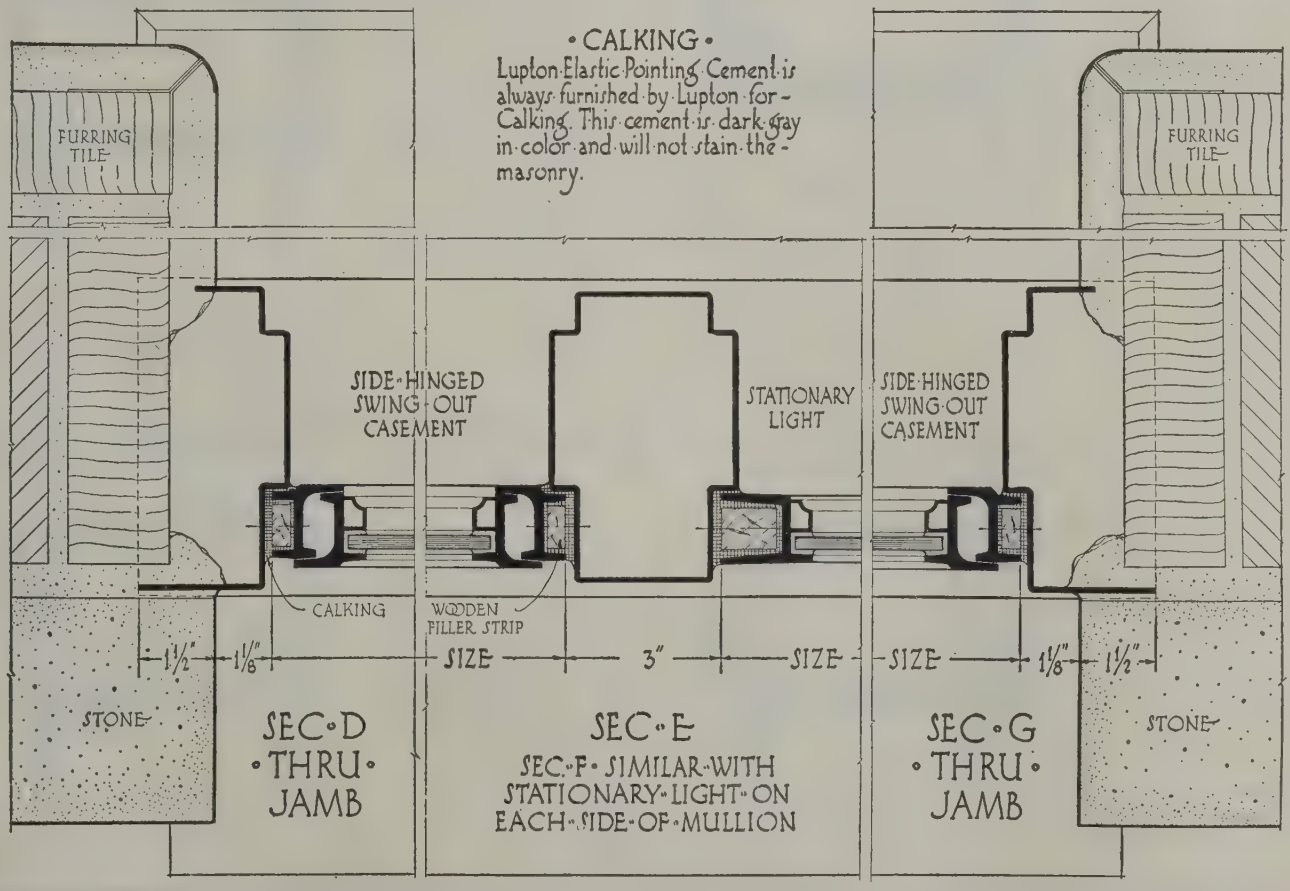


SCALE ⅛" = 1'-0"



CALKING

Lupton Elastic Pointing Cement is always furnished by Lupton for Calking. This cement is dark gray in color and will not stain the masonry.

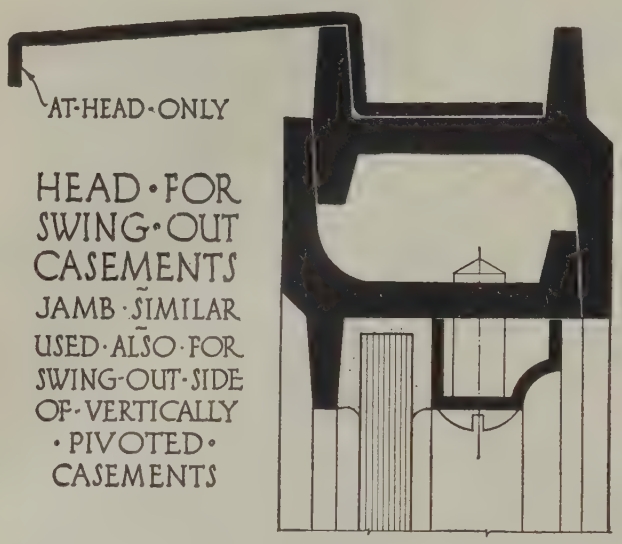


For lower costs use standard sizes

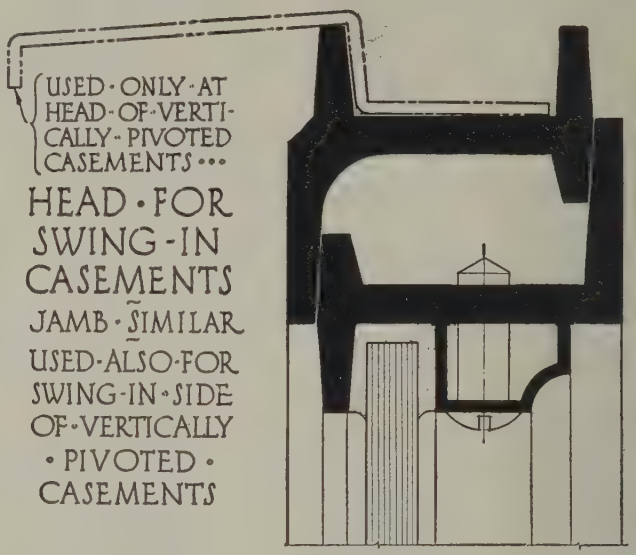
LUPTON PAGE 8

Continued on next page

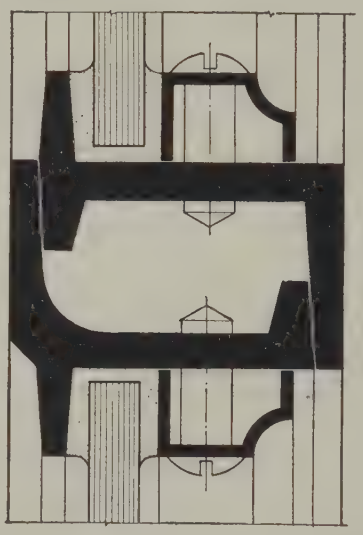
LUPTON · CASEMENTS - HEAVY · TYPE
· FULL · SIZE · SECTIONS ·



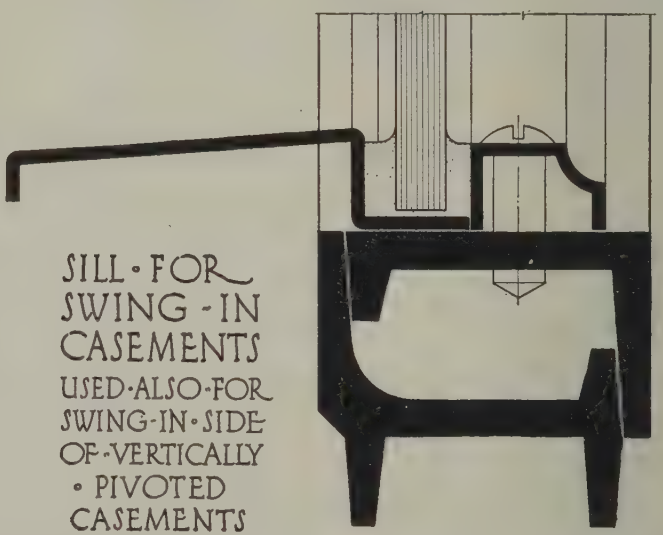
HEAD · FOR SWING · OUT CASEMENTS
JAMB · SIMILAR
USED · ALSO · FOR SWING-OUT · SIDE OF · VERTICALLY · PIVOTED · CASEMENTS



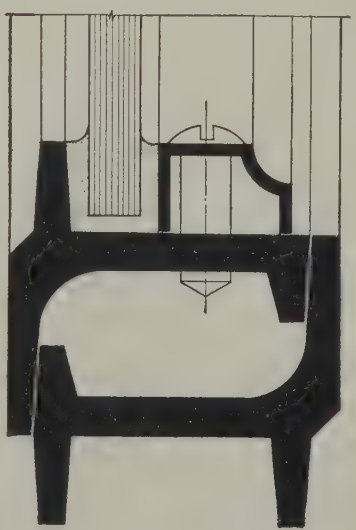
HEAD · FOR SWING - IN CASEMENTS
JAMB · SIMILAR
USED · ALSO · FOR SWING-IN · SIDE OF · VERTICALLY · PIVOTED · CASEMENTS



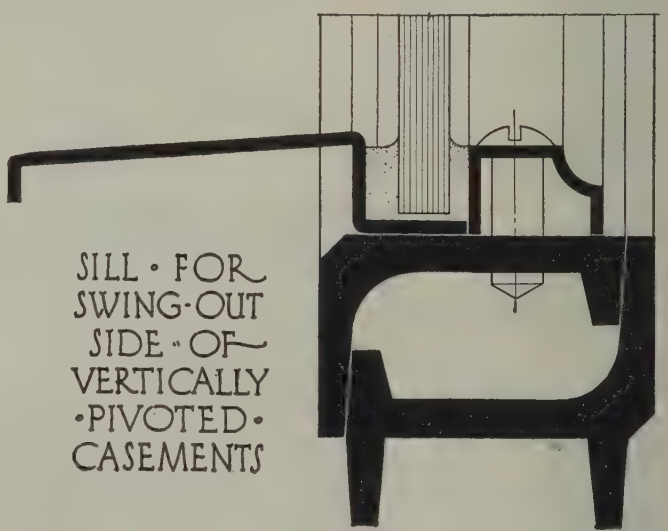
MEETING · STILE FOR · DOUBLE CASEMENTS
SWING - OUT · OR · SWING · IN ·



SILL · FOR SWING - IN CASEMENTS
USED · ALSO · FOR SWING-IN · SIDE OF · VERTICALLY · PIVOTED CASEMENTS



SILL · FOR SWING - OUT CASEMENTS

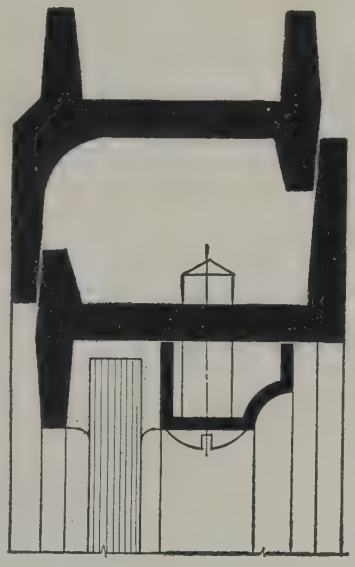


SILL · FOR SWING - OUT SIDE · OF VERTICALLY · PIVOTED · CASEMENTS

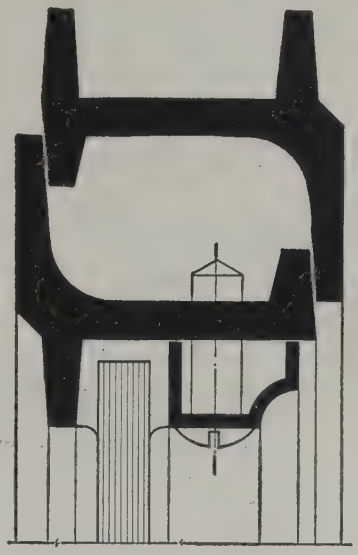
Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

Continued on next page

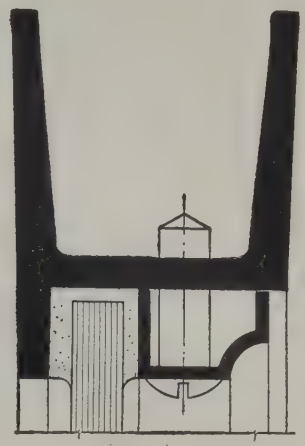
LUPTON · CASEMENTS - HEAVY · TYPE · FULL · SIZE · SECTIONS ·



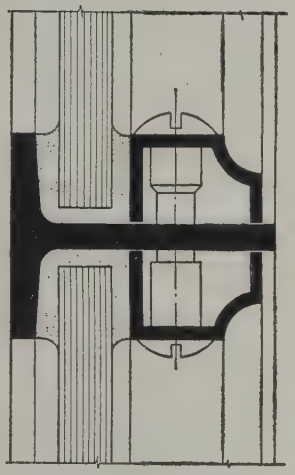
HEAD · FOR BOTTOM · PROJECTED · OUT VENTILATOR
HEAD · & · JAMB · FOR · PROJECTED IN · AT · TOP · VENTILATOR · SIMILAR



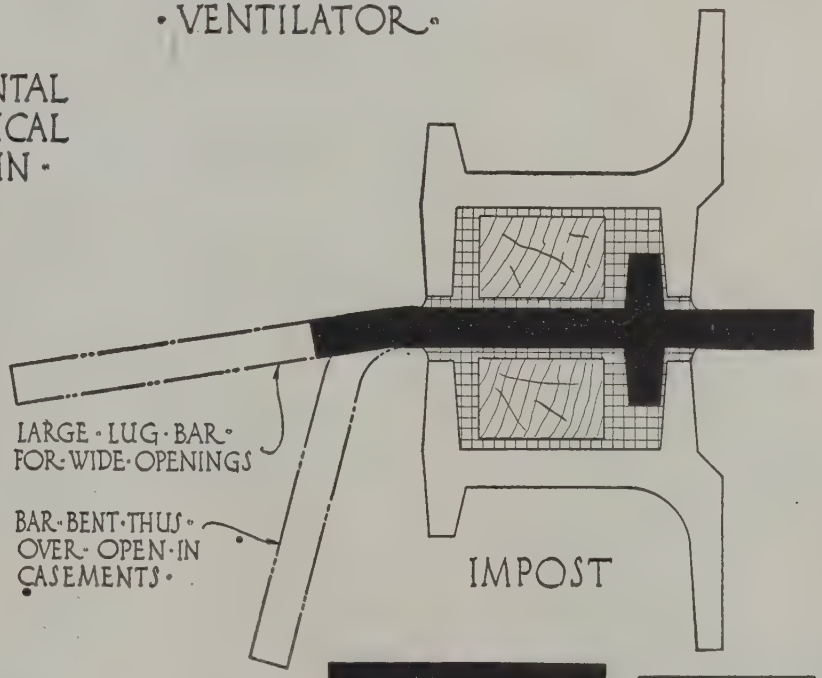
JAMB · FOR · BOTTOM PROJECTED · OUT · VENTILATOR ·

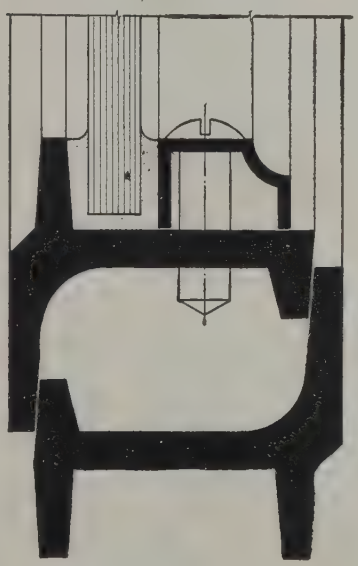


FRAME · MEMBER FOR · STATIONARY · LIGHT ·

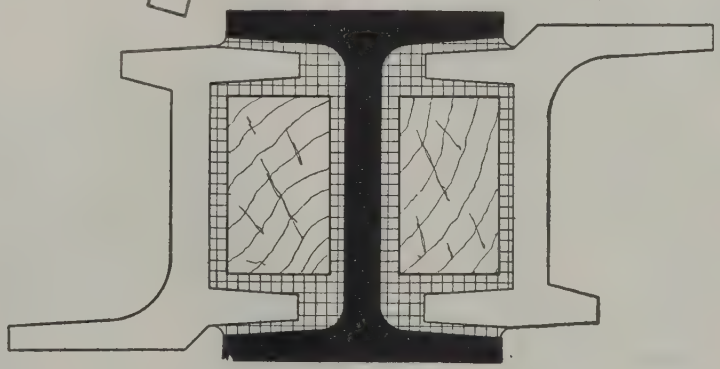


HORIZONTAL OR · VERTICAL · MUNTIN ·





SILL · FOR BOTTOM · PROJECTED · OUT VENTILATOR
SILL · FOR · PROJECTED · IN · AT · TOP · VENTILATOR · SIMILAR ·



MULLION

A special is an odd size between two less expensive standards

Continued on next page

LUPTON STEEL WINDOWS FOR STANDARD SIZE OPENINGS

Combination Projected Casements—Projected-In-at-Top Casements
Architectural Projected Windows—Double Hung Windows

Applying advanced principles of standardization, approved by the Division of Simplified Practice of the United States Department of Commerce, we have designed four types of standardized Lupton Steel Windows interchangeable through a range of fifty sizes.

These windows permit unlimited architectural expression and are available at moderate cost for use in office buildings, hotels, apartment houses, hospitals and similar high-grade structures.

All projected types have a friction shoe controlling the movement of ventilators, which holds them at any reasonable degree of opening, and eliminates the use of sill hardware.

LUPTON PROJECTED CASEMENT WINDOWS

Lupton Combination Projected Casements

These windows, by their unique design, bring a new high standard of natural ventilation to multiple-story buildings. They are the only windows that afford such positive air control. A horizontal inward-opening ventilator located at the bottom of the window admits fresh air without draft.

Above, forming the upper portion of the window, are two side-projected ventilators. By closing one of these and slightly opening the other against the breeze, an air movement is induced which siphons used air out of the window.

Thus, Lupton Combination Casements provide easily controlled, balanced ventilation through every window opening.

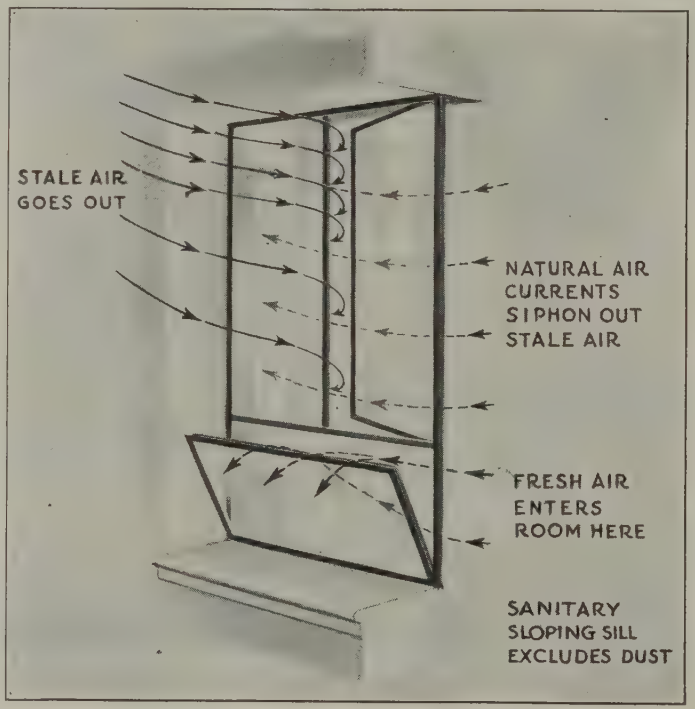


Diagram Showing How Lupton Combination Casements Assure Balanced Ventilation

Dotted arrows show natural fresh-air currents. Solid arrows show stale air moving outward by means of siphon action fully described in text

Lupton Single Casements—Details of these windows are the same as in the Lupton Combination Casements and have the same structural and 100% ventilation advantages. They offer an almost limitless number of arrangements and opening sizes when issued in any of the many combinations of which they are capable, both in the horizontal and vertical positions.

Lupton Projected-In-at-Top Casements

Maintenance of strict privacy, adequate ventilation without draft and abundant lighting are features of these windows.

They are particularly desirable for Medical Institutions, Art Museums, Hospitals, Solariums and similar buildings.

SPECIFICATION FOR LUPTON PROJECTED CASEMENT WINDOWS

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Projected Casement Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Projected Casement Windows should be accurately listed and located either in schedules, on plans or in specifications.

Shop Drawings

2. Submit in triplicate, for the architect's approval, complete shop and installation drawings. These shall show scaled sections of window and frame members, details of construction, hardware, anchoring, etc.

Materials

3. Ventilator and frame members shall be made of copper-bearing, rust-resisting, low-carbon steel, specially rolled in solid, one-piece sections.

4. Vertical Mullions shall be of 12 gauge plate, formed.

5. Imposts shall be of ⅜ in. thick, steel plate, with a 14 gauge galvanized weathering member.

6. Glazing Clips shall be $\frac{5}{16}$ in. by ½ in. rolled steel angles, 2 in. long.

Note: See List of Extras at end of specification.

Construction

7. All Projected Casements shall be designed for outside glazing.

8. All Projected Casement Windows shall be straight and true, members in alignment and surfaces in a plane. All joints shall be welded rigid and tight and so fabricated at the junctures or intersections as to prevent loss of strength.

9. Three sides of the ventilator shall be made of bars weighing not less than 1.7 lbs. per ft. and the remaining side of a bar weighing not less than 1.82 lbs. per ft. Frames shall be made of bars weighing not less than 2.14 lbs. per ft.

10. At the corners and joints of the frames and ventilators the members shall be mitered or notched framed together and heavily welded so as to make a rigid, tight connection.

Exposed, welded surfaces shall be ground smooth. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

11. Mullions and bolts for attachment shall be provided when two or more windows are placed side by side.

12. Imposts and bolts for attachment shall be provided when two or more windows are placed one above the other.

13. At the head of all Side Projected Out Ventilators a 16 gauge formed steel, hot galvanized, weather bar shall be used.

Continued on next page

14. Fins of 12 gauge steel for Head and Jambs shall be furnished, shipped unattached and applied in the field.

Note: See List of Extras at end of specification.

15. Anchor Clips of 14 gauge steel for Head, Jambs and Sill shall be furnished and applied in field.

16. Glazing Clips shall be held in place by steel machine screws.

Note: See List of Extras at end of specification.

17. Ventilators shall be accurately pivoted on two ventilator arms of solid steel. The two ventilator arms shall be attached to the ventilator and frame members by malleable iron arm blocks with brass pivot pins and washers. Ventilators shall be equipped with two bronze friction shoes, sliding in the outside frame member so as to guide the ventilator and prevent rattling. The friction shoes shall be equipped with a rustproof steel spring and adjusting screw, so designed to insure constant friction and hold the ventilator in an open position without the use of fasteners or adjusters.

Hardware

18. All Handles and Latches and Pull Down Rings shall be solid bronze with natural bronze finish. All hardware (listed below) shall be fitted in the shop and shipped unattached, carefully packed to prevent damage until applied for use.

Note: The following hardware is standard:

For Side-Projected-Out Ventilators

Bronze Cam Handle—for ventilators in windows less than 4 ft. 6 in. in height.

Double Locking Device—for ventilators in windows 4 ft. 6 in. or more in height.

For Projected-In-at-Top Ventilators

Bronze Cam Handle—for ventilators within reach from floor, one handle on windows up to 3 ft. 6 in. wide; two handles on windows over 3 ft. 6 in. wide.

Bronze Ring Type Cam Handle—for ventilators beyond reach from floor.

For Bottom-Projected-Out Ventilators

Pull Down Ring and Ring Type Cam Handle for pole operation.

Calking Cement

19. The window manufacturer shall furnish non-staining elastic calking cement and wooden filler-strips for mullions and imposts as shown in window manufacturer's standard details.

Note: See List of Extras at end of specification.

Erection

20. All Projected Casement Windows shall be erected in prepared openings by the window contractor (unless otherwise specified).

21. All Projected Casement Windows shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and Imposts (and continuous fins if specified) shall be bolted securely to windows. Calking cement and wooden filler-strips shall be neatly applied at mullions and imposts as shown on window manufacturer's standard details.

Note: See List of Extras at end of specification.

Note: Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with the installation details for Projected Casement Windows. Note that when the continuous fins are built in the masonry, the placing of the furring tile at the Jambs must be delayed until after the windows are set. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Painting

22. All Projected Casement Windows shall receive one coat of manufacturers' standard dark gray paint, oven-dried.

Note: The following should be provided for in the paint specifications: One additional coat of paint should be applied after erection, before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied, as required. It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the windows in order that it may not be painted over and cause imperfect contact.

Glass and Glazing

Note: Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel casement putty (ordinary wood sash putty must not be used).

(c) Specify that all Steel Projected Casements shall be glazed from the outside; that all glass shall be set in a bed of putty and secured by angle glazing clips; and that putty shall be applied in a neat, clean manner.

See List of Extras below.

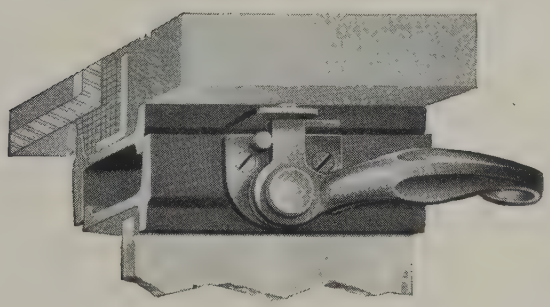
LIST OF EXTRAS

The following are furnished when specified at an added cost.

1. Continuous 12 gauge steel fins for head and jambs.
2. Non-staining elastic calking cement.
3. Application of calking cement at time of erection as shown on our standard details.
4. Continuous Glazing Angles to be substituted for Glazing clips. These glazing angles are made of hot rolled steel angle section $\frac{7}{8} \times \frac{29}{32} \times \frac{3}{32}$ in. They are cut in standard lengths with mitered ends, shipped loose and attached by the glazing contractor with the round head, udylited, steel machine screws supplied for the purpose.

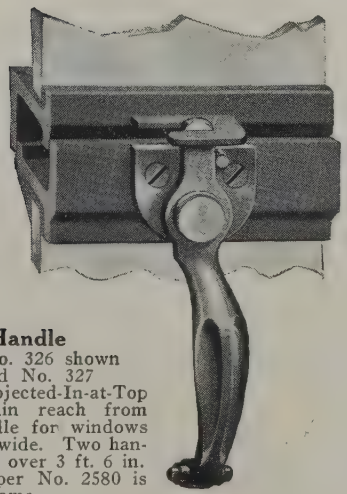
HARDWARE FOR LUPTON PROJECTED CASEMENT WINDOWS

All Handles and Latches Are Solid Bronze with Natural Bronze Finish



Ring Type Cam Handle No. 330

Used at center of Projected-In-at-Top Ventilators beyond reach from floor. For pole operation. Steel Keeper No. 2580 is welded to the frame



Cam Handle

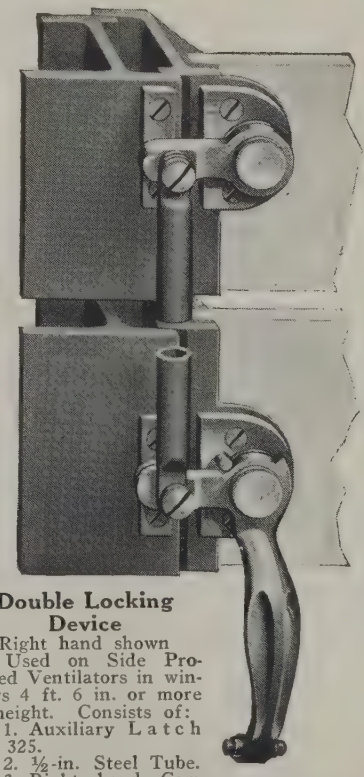
Right hand No. 326 shown —Left hand No. 327

Used on Projected-In-at-Top Ventilators within reach from floor. One handle for windows up to 3 ft. 6 in. wide. Two handles for windows over 3 ft. 6 in. wide. Steel keeper No. 2580 is welded to the frame

Cam Handle

Right hand No. 315 shown —Left hand No. 316

Used on Side Projected Ventilators in windows less than 4 ft. 6 in. in height. Mounted on Steel Backing Plate No. 2228 welded to frame of ventilator



Double Locking Device

Right hand shown

Used on Side Projected Ventilators in windows 4 ft. 6 in. or more in height. Consists of:

1. Auxiliary Latch No. 325.
2. ½-in. Steel Tube.
3. Right hand Cam handle No. 322—Left hand No. 323. Both Auxiliary Latch and Cam Handle are mounted on Steel Backing Plates No. 2228 welded to frame of ventilator

Continued on next page

COMBINATION • PROJECTED • CASEMENTS
100 PER • CENT • VENTILATED
• STANDARD • TYPES • AND • SIZES •

NOMINAL • SIZE * →		3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	V.D. DIMEN. SEE • DETAILS • FOR MEASURE POINTS
GLASS • SIZE →		15" / 33¼"	18" / 39¼"	21" / 45¼"	24" / 51¼"	27" / 57¼"	
4'-6"	50"	PS • 3654	PS • 4254	PS • 4854	PS 5454	PS • 6054	4' – 1⅜"
5'-0"	56"	PS 3660	PS 4260	PS 4860	PS • 5460	PS 6060	4' – 7⅜"
5'-6"	41¾"						3' – 5 5/32"
	17¾"	PST 3666	PST • 4266	PST • 4866	PST 5466	PST • 6066	1' – 5 5/32"
6'-0"	47¾"						3' – 11 5/32"
	17¾"	PST • 3672	PST 4272	PST 4872	PST • 5472	PST 6072	1' – 5 5/32"
6'-6"	53¾"						4' – 5 5/32"
	17¾"	PST • 3678	PST 4278	PST 4878	PST 5478	PST 6078	1' – 5 5/32"
7'-0"	53¾"						4' – 5 5/32"
	23¾"	PST • 3684	PST • 4284	PST • 4884	PST 5484	PST • 6084	1' – 11 5/32"
7'-6"	19"						1' – 6 23/64"
	41¾"						3' – 5 5/32"
	19 5/8"	PST 3690	PST 4290	PST • 4890	PST • 5490	PST 6090	1' – 7 3/64"
8'-0"	19"						1' – 6 23/64"
	47¾"						3' – 11 5/32"
	19 5/8"	PST 3696	PST • 4296	PST 4896	PST • 5496	PST • 6096	1' – 7 3/64"
8'-6"	19"						1' – 6 23/64"
	53¾"						4' – 5 5/32"
	19 5/8"	PST • 36102	PST • 42102	PST • 48102	PST • 54102	PST • 60102	1' – 7 3/64"
9'-0"	25"						2' – 0 23/64"
	53¾"						4' – 5 5/32"
	19 5/8"	PST • 36108	PST • 42108	PST • 48108	PST • 54108	PST • 60108	1' – 7 3/64"

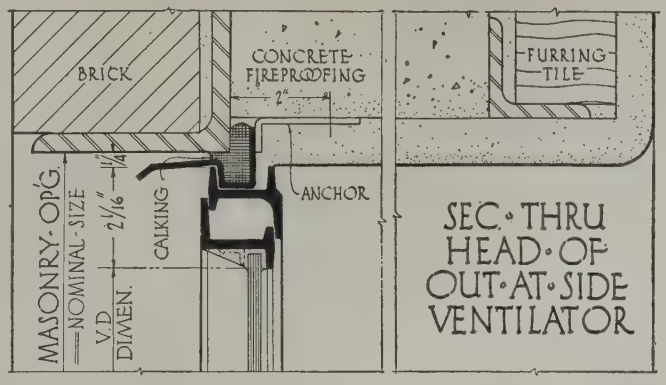
*Nominal Size equals the Masonry Opening required for one unit.

Standard and special sizes look alike in the walls. Save the difference in costs

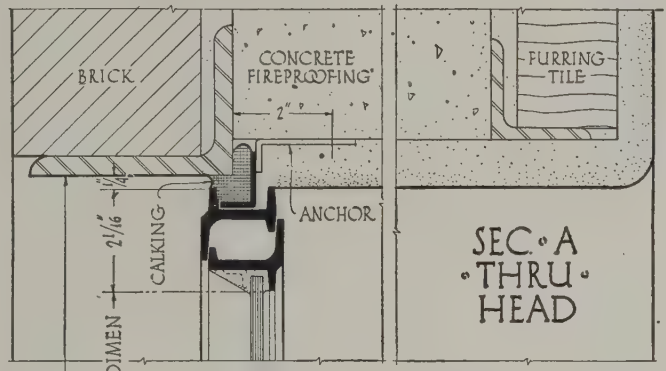
Continued on next page

COMBINATION PROJECTED · CASEMENTS 100 · PER · CENT · VENTILATED

SCALE · FOR · DETAILS ~ 3" = 1'~0"

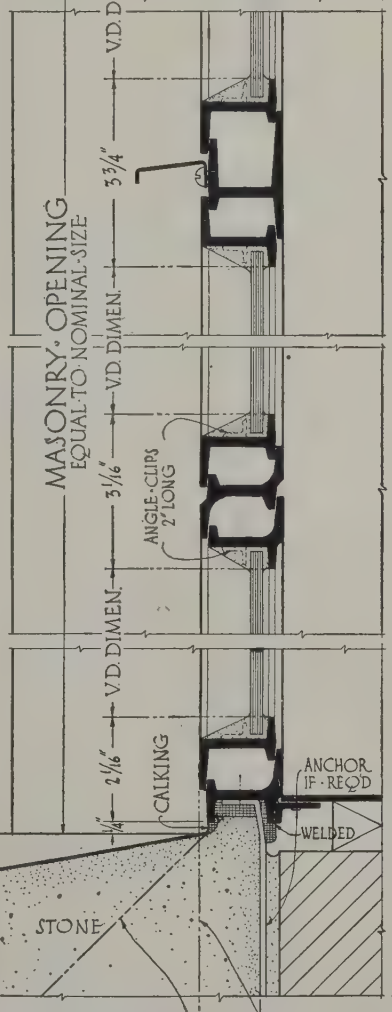


SEC. · THRU HEAD · OF OUT · AT · SIDE VENTILATOR



SEC. · A · THRU · HEAD

For · Full · Size · Sections see · pages ~ 23 · & · 24 ·



SEC. · B · · THRU · · MEETING · · RAIL ·

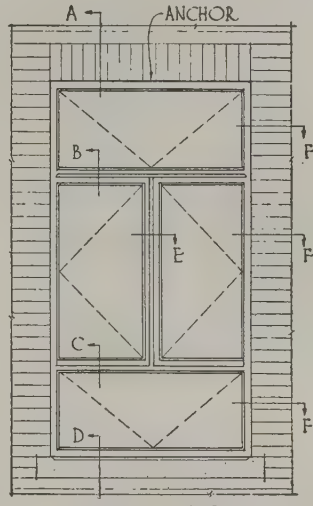
V.D. Dimens. are the vertical distances between sight lines.

SEC. · C · · THRU · · MEETING · · RAIL ·

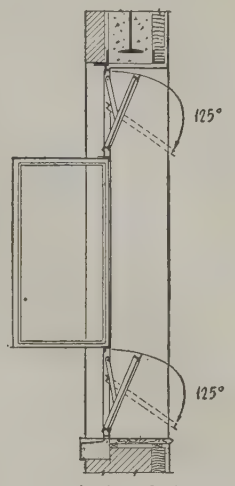
SEC. · D · THRU · · SILL ·

A · SILL · SLOPED · TO PREVENT COLLECTION OF DUST · MAY · BE · USED FOR · CASEMENTS · OR PROJECTED · WINDOWS

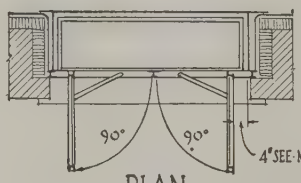
* 12 · GA · METAL · STOOL FURNISHED · WHEN · SPECIFIED · AT · AN · INCREASE · IN · PRICE



ELEVATION
VENTILATORS · CLOSED



SECTION
VENTILATORS · OPEN



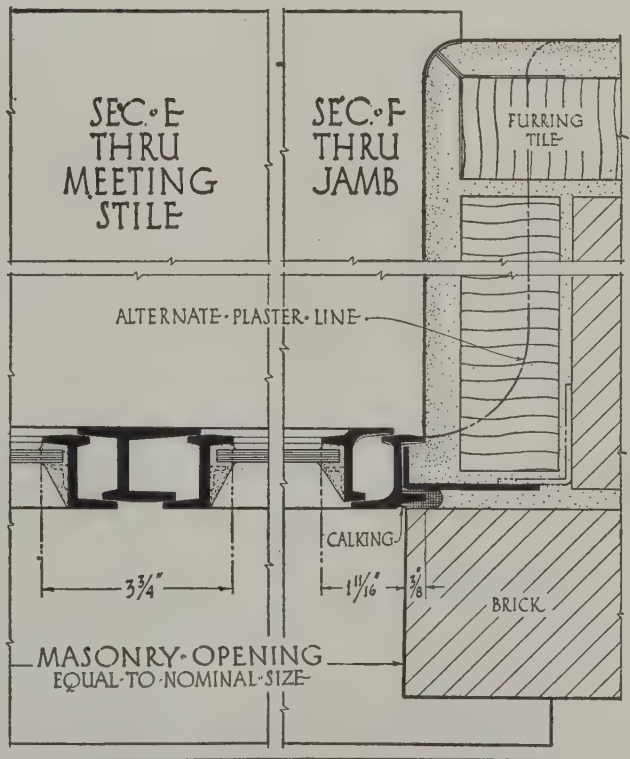
PLAN
VENTILATORS · OPEN

NOTE
In at top ventilators open ~ approximately 125° to permit cleaning from inside.
Out at side ventilators have approximately 4 inches clearance at jamb when open to permit cleaning from inside the building.

SCALE 1/4" — 1'-0"

SEC. · E · THRU MEETING STILE

SEC. · F · THRU JAMB



Use standard sizes for quicker deliveries—lower costs

Continued on next page

PROJECTED • CASEMENTS
100 PER • CENT • VENTILATED - IN • AT • TOP
• STANDARD • TYPES • AND • SIZES •

NOMINAL SIZE * →	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	V.D. DIMEN. SEE DETAILS FOR MEASURE POINTS
GLASS SIZE →	33¼"	39¼"	45¼"	51¼"	57¼"	
4' – 6"	23¾"					1' – 11 5/32"
	23¾"					1' – 11 5/32"
	PT·3654	PT·4254	PT·4854	PT·5454	PT·6054	
5' – 0"	17¾"					1' – 5 5/32"
	17¾"					1' – 5 5/32"
	15½"					1' – 2 15/16"
	PT·3660	PT·4260	PT·4860	PT·5460	PT·6060	
5' – 6"	19 5/8"					1' – 7 3/64"
	19 5/8"					1' – 7 3/64"
	17¾"					1' – 5 5/32"
	PT·3666	PT·4266	PT·4866	PT·5466	PT·6066	
6' – 0"	22 5/8"					1' – 10 3/64"
	22 5/8"					1' – 10 3/64"
	17¾"					1' – 5 5/32"
	PT·3672	PT·4272	PT·4872	PT·5472	PT·6072	
6' – 6"	25 5/8"					2' – 1 3/64"
	25 5/8"					2' – 1 3/64"
	17¾"					1' – 5 5/32"
	PT·3678	PT·4278	PT 4878	PT·5478	PT·6078	
7' – 0"	25 5/8"					2' – 1 3/64"
	25 5/8"					2' – 1 3/64"
	23¾"					1' – 11 5/32"
	PT·3684	PT·4284	PT 4884	PT·5484	PT·6084	
7' – 6"	19 5/8"					1' – 7 3/64"
	19 5/8"					1' – 7 3/64"
	19 5/8"					1' – 7 3/64"
	19 5/8"					1' – 7 3/64"
	PT 3690	PT·4290	PT 4890	PT·5490	PT·6090	
8' – 0"	19 5/8"					1' – 7 3/64"
	22 5/8"					1' – 10 3/64"
	22 5/8"					1' – 10 3/64"
	19 5/8"					1' – 7 3/64"
	PT·3696	PT 4296	PT 4896	PT 5496	PT·6096	
8' – 6"	19 5/8"					1' – 7 3/64"
	25 5/8"					2' – 1 3/64"
	25 5/8"					2' – 1 3/64"
	19 5/8"					1' – 7 3/64"
	PT·36102	PT·42102	PT·48102	PT·54102	PT·60102	
9' – 0"	25 5/8"					2' – 1 3/64"
	25 5/8"					2' – 1 3/64"
	25 5/8"					2' – 1 3/64"
	19 5/8"					1' – 7 3/64"
	PT·36108	PT 42108	PT·48108	PT·54108	PT·60108	

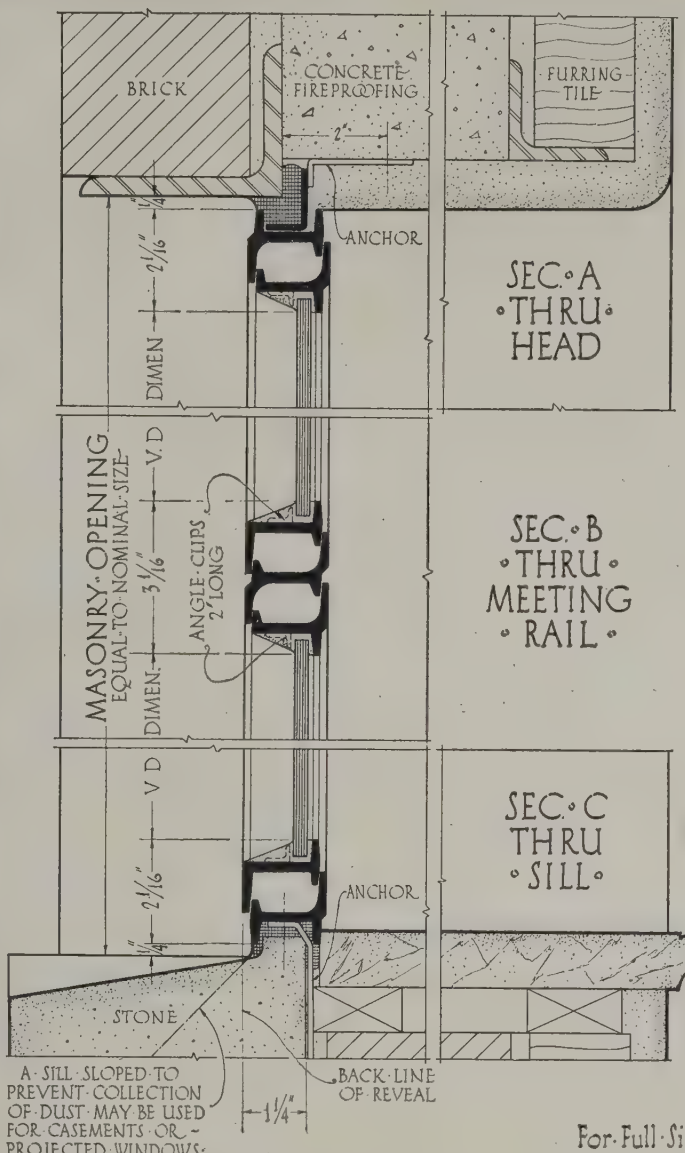
* Nominal Size equals Masonry Opening required for one unit.

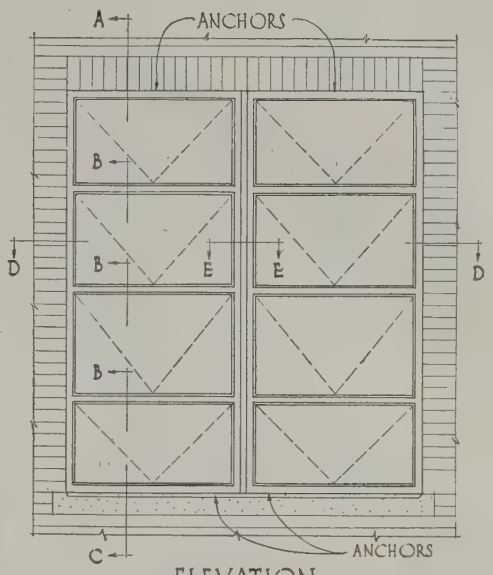
Standard sizes cost less than specials

Continued on next page

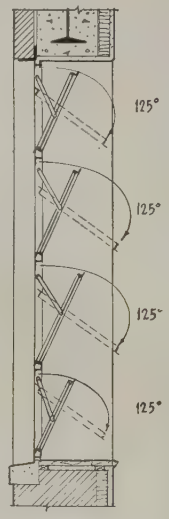
PROJECTED • CASEMENTS 100 PER • CENT • VENTILATED • IN • AT • TOP •

SCALE • FOR • DETAILS ~ 3″ = 1′ - 0″





ELEVATION
VENTILATORS • CLOSED



SECTION
VENTILATORS • OPEN

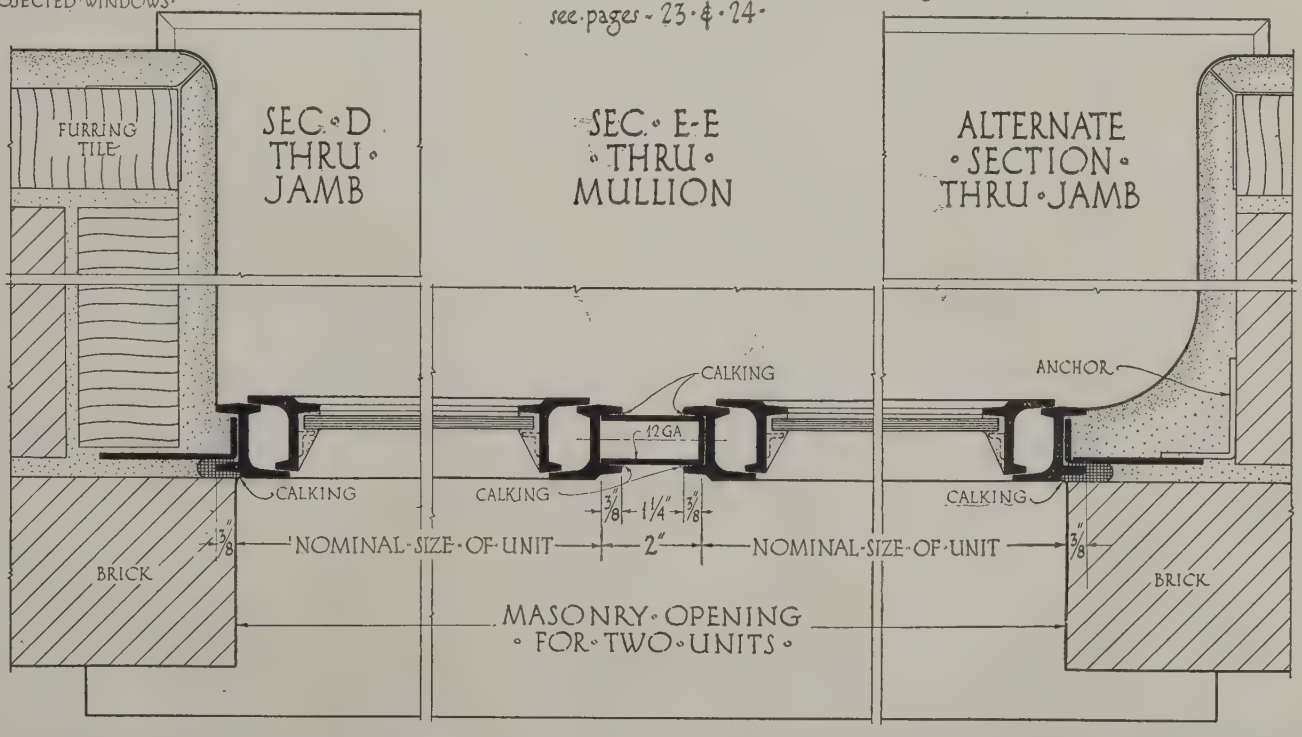
SCALE - 1/4″ = 1′ - 0″

• NOTE •

Ventilators • open • approximately • 125 ° • to permit • cleaning • to • be • done • from • inside the • building.

V. D. Dimens • are • the • vertical • distances ~ between • sight • lines.

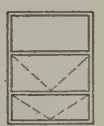
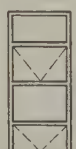
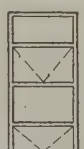
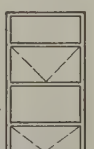
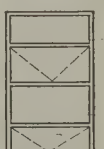
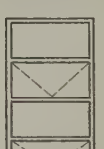
For • Full • Size • Sections see • pages ~ 23 • & • 24 •



For quick deliveries, use standard sizes

PROJECTED · CASEMENTS · PART · VENTILATED · IN · AT · TOP

LISTED · SPECIAL · TYPES · IN · STANDARD · SIZES

NOMINAL SIZE * →		3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	V.D. DIMEN. SEE DETAILS FOR MEASURE POINTS
GLASS SIZE →		33¼"	39¼"	45¼"	51¼"	57¼"	
4'-6"	23¾"	PPT 3654	PPT 4254	PPT 4854	PPT 5454	PPT 6054	1'-11 5/32"
	23¾"						1'-11 5/32"
5'-0"	19"	PPT 3660	PPT 4260	PPT 4860	PPT 5460	PPT 6060	1'-6 13/32"
	17¾"						1'-5 5/32"
	15½"						1'-2 15/16"
5'-6"	20⅞"	PPT 3666	PPT 4266	PPT 4866	PPT 5466	PPT 6066	1'-8 19/64"
	19⅝"						1'-7 3/64"
	17¾"						1'-5 5/32"
6'-0"	23⅞"	PPT 3672	PPT 4272	PPT 4872	PPT 5472	PPT 6072	1'-11 19/64"
	22⅝"						1'-10 3/64"
	17¾"						1'-5 5/32"
6'-6"	26⅞"	PPT 3678	PPT 4278	PPT 4878	PPT 5478	 PPT 6078	2'-2 19/64"
	25⅝"						2'-1 3/64"
	17¾"						1'-5 5/32"
7'-0"	26⅞"	PPT 3684	PPT 4284	PPT 4884	PPT 5484	PPT 6084	2'-2 19/64"
	25⅝"						2'-1 3/64"
	23¾"						1'-11 5/32"
7'-6"	20⅞"	PPT 3690	PPT 4290	PPT 4890	PPT 5490	PPT 6090	1'-8 19/64"
	19⅝"						1'-7 3/64"
	21⅝"						1'-9 3/64"
	19⅝"						1'-7 3/64"
8'-0"	20⅞"	PPT 3696	PPT 4296	PPT 4896	PPT 5496	PPT 6096	1'-8 19/64"
	22⅝"						1'-10 3/64"
	24⅝"						2'-0 3/64"
	19⅝"						1'-7 3/64"
8'-6"	20⅞"	PPT 36102	 PPT 42102	 PPT 48102	 PPT 54102	 PPT 60102	1'-8 19/64"
	25⅝"						2'-1 3/64"
	27⅝"						2'-3 3/64"
	19⅝"						1'-7 3/64"
9'-0"	26⅞"	PPT 36108	PPT 42108	PPT 48108	PPT 54108	 PPT 60108	2'-2 19/64"
	25⅝"						2'-1 3/64"
	27⅝"						2'-3 3/64"
	19⅝"						1'-7 3/64"

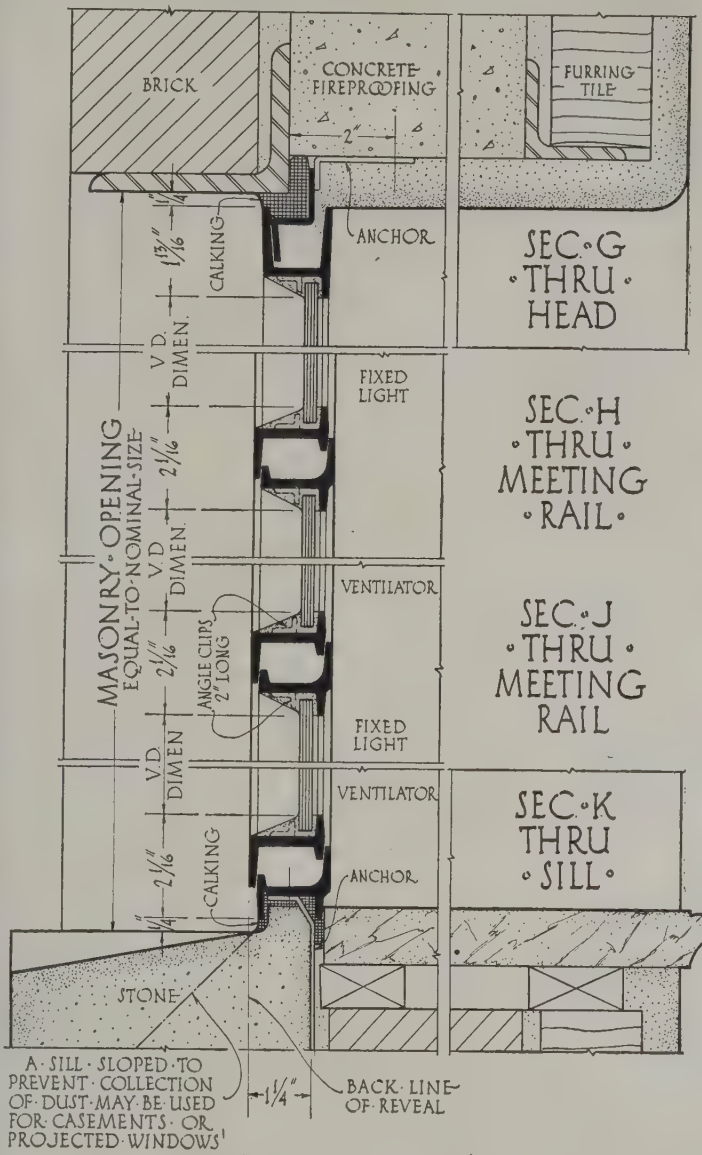
* Nominal Size equals Masonry Opening required for one unit

For lower costs use standard sizes

Continued on next page

PROJECTED CASEMENTS PART VENTILATED IN AT TOP

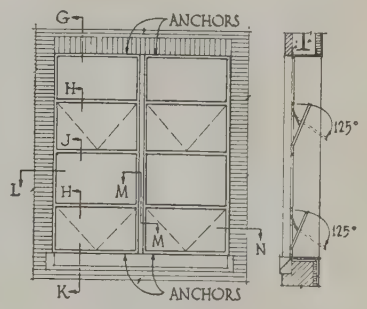
SCALE FOR DETAILS ~ 3″ = 1′-0″



• NOTE •
In at top ventilators open approximately 125° to permit cleaning to be done from inside the building

V.D. Dimensions are the vertical distances between sight lines.

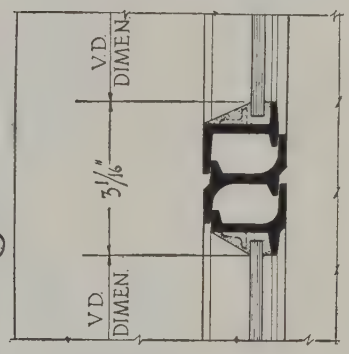
For Full Size Sections see pages 23 & 24



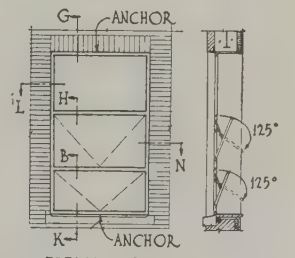
ELEVATION VENTILATORS • CLOSED •

SECTION VENTILATORS • OPEN •

SCALE 1/8″ = 1′-0″

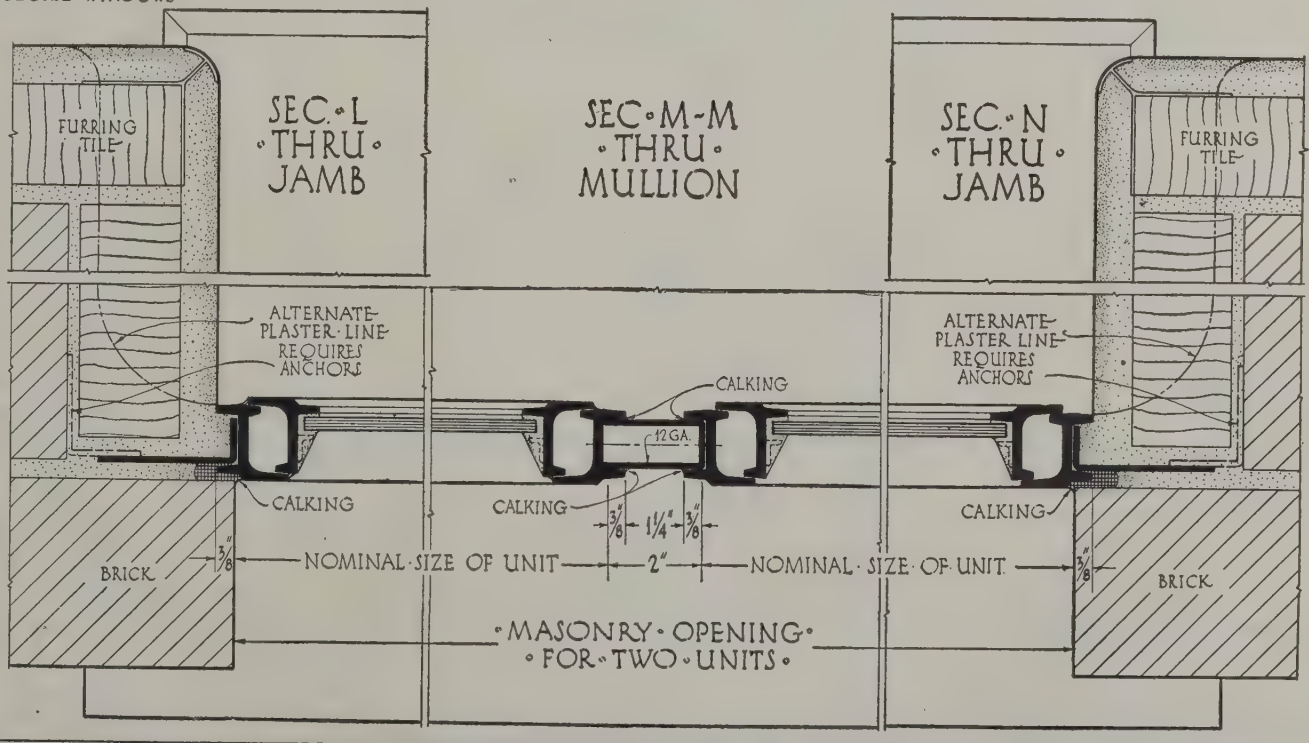


• SEC. B THRU • MEETING • RAIL



ELEVATION VENTILATORS • CLOSED •

SECTION VENTILATORS • OPEN •



Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

LUPTON PAGE 18

Continued on next page

SINGLE • PROJECTED • CASEMENTS

STANDARD • TYPES • AND • SIZES

SIDE • PROJECTED • OUT

NOMINAL SIZE *	GLASS SIZE	1'-6"	1'-9"	2'-0"		2'-3"	2'-6"
		15¼"	18¼"	Left Hand Casement 21¼"	Right Hand Casement	24¼"	27¼"
2'-0"	20"	PSL 1824 PSR 1824	PSL 2124 PSR 2124	PSL 2424	PSR 2424	PSL 2724 PSR 2724	PSL 3024 PSR 3024
2'-6"	26"	PSL 1830 PSR 1830	PSL 2130 PSR 2130	PSL 2430	PSR 2430	PSL 2730 PSR 2730	PSL 3030 PSR 3030
3'-0"	32"	PSL 1836 PSR 1836	PSL 2136 PSR 2136	PSL 2436	PSR 2436	PSL 2736 PSR 2736	PSL 3036 PSR 3036
3'-6"	38"	PSL 1842 PSR 1842	PSL 2142 PSR 2142	PSL 2442	PSR 2442	PSL 2742 PSR 2742	PSL 3042 PSR 3042
4'-0"	44"	PSL 1848 PSR 1848	PSL 2148 PSR 2148	PSL 2448	PSR 2448	PSL 2748 PSR 2748	PSL 3048 PSR 3048
4'-6"	50"	PSL 1854 PSR 1854	PSL 2154 PSR 2154	PSL 2454	PSR 2454	PSL 2754 PSR 2754	PSL 3054 PSR 3054
5'-0"	56"	PSL 1860 PSR 1860	PSL 2160 PSR 2160	PSL 2460	PSR 2460	PSL 2760 PSR 2760	PSL 3060 PSR 3060

BOTTOM • PROJECTED • OUT

NOMINAL SIZE *	GLASS SIZE	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"
		35¼"	41¼"	47¼"	53¼"	59¼"
1'-6"	14"	PB 3818	PB 4418	PB 5018	PB 5618	PB 6218
1'-9"	17"	PB 3821	PB 4421	PB 5021	PB 5621	PB 6221
2'-0"	20"	PB 3824	PB 4424	PB 5024	PB 5624	PB 6224

* Nominal Size equals the Masonry Opening required for one unit

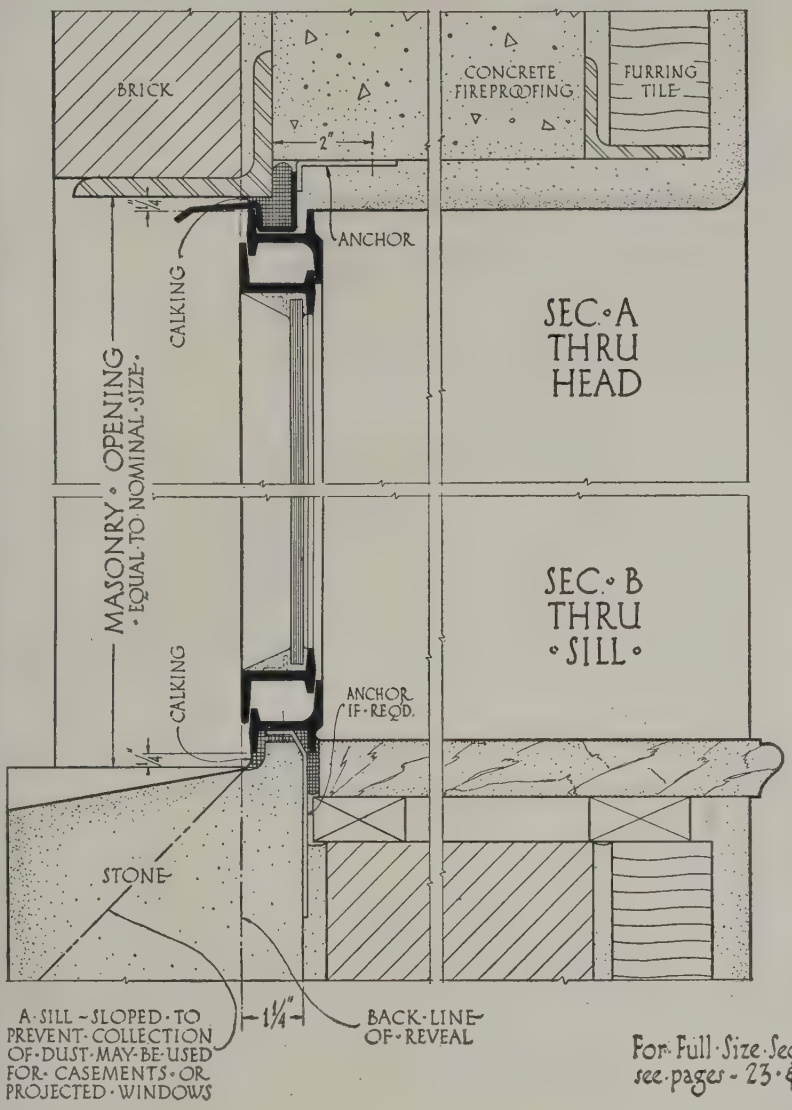
Note - All units are viewed from the inside

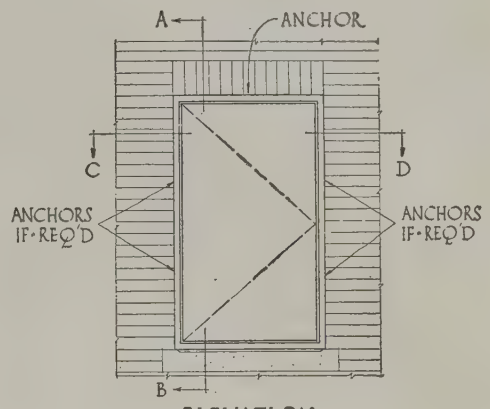
A special is an odd size between two less expensive standards

Continued on next page

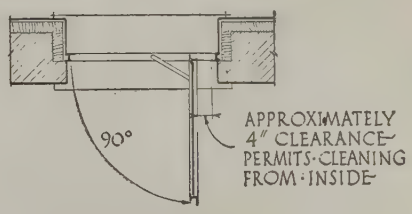
SINGLE PROJECTED · CASEMENTS OUT·AT·SIDE

SCALE·FOR·DETAILS ~ 3″ = 1′-0″





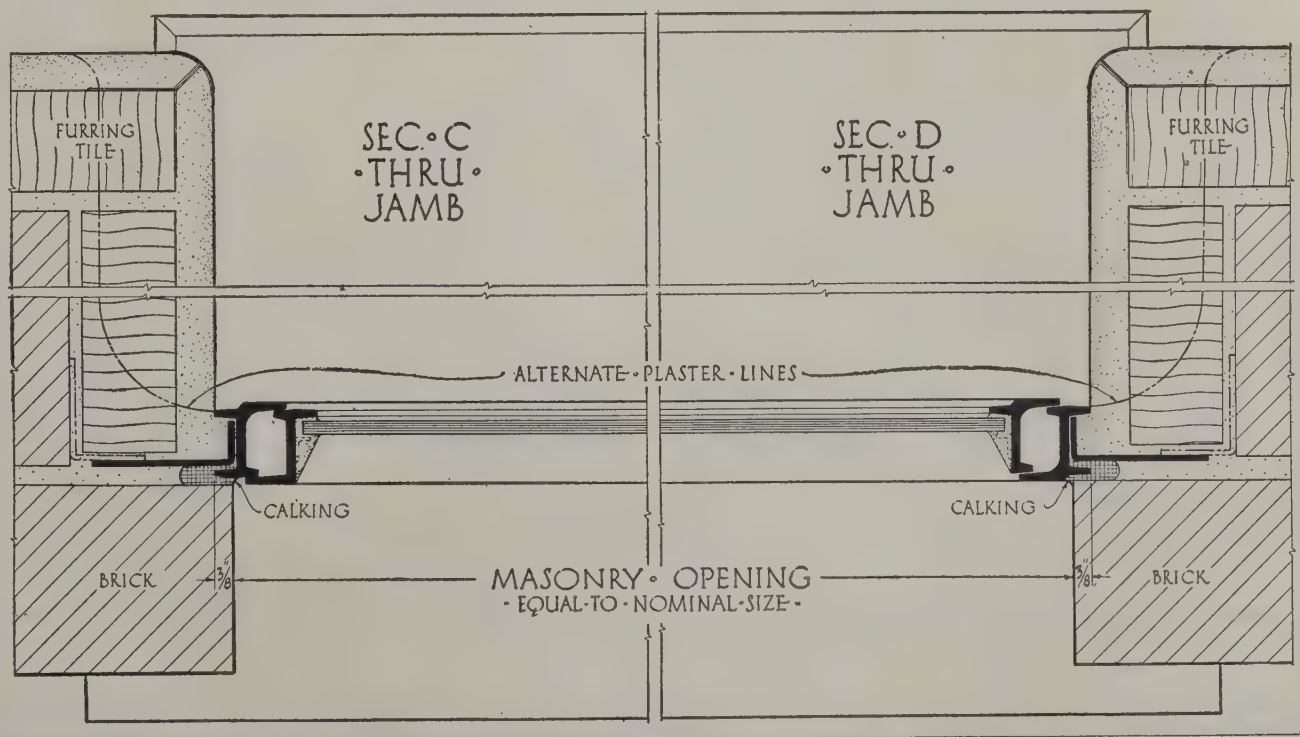
· ELEVATION ·
VENTILATOR· CLOSED



· PLAN ·
VENTILATOR· OPEN

SCALE ~ ¼″ = 1′-0″

For·Full·Size·Sections see·pages ~ 23·&·24·

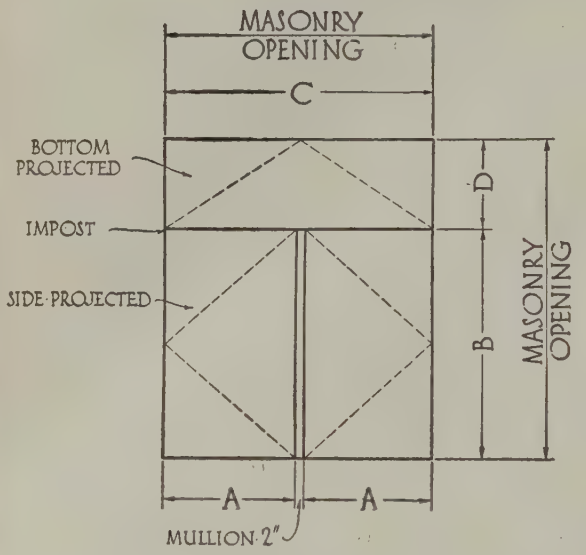


Standard and special sizes look alike in the walls. Save the difference in costs

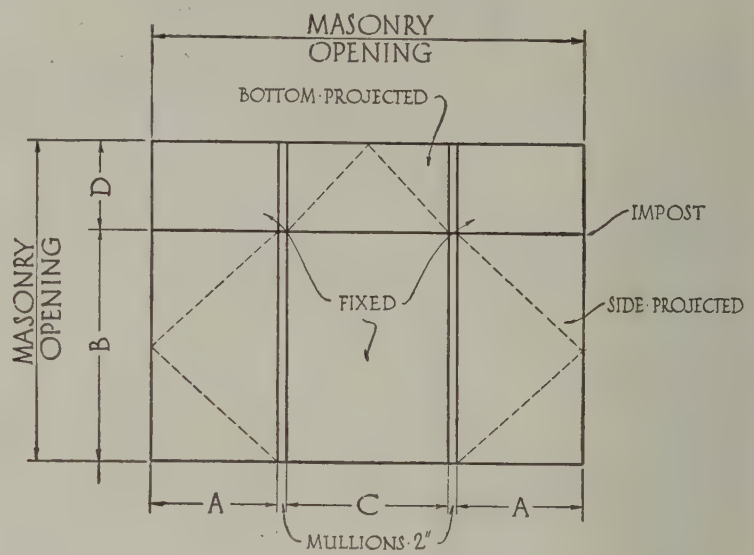
Continued on next page

WIDTHS & HEIGHTS OF MASONRY OPENINGS FOR COMPOSITE WINDOWS

TABLES GIVING MASONRY OPENING DIMENSIONS FOR TWO TYPICAL DESIGNS OF COMPOSITE WINDOWS



TYPICAL ELEVATION I



TYPICAL ELEVATION II

HEIGHTS OF MASONRY OPENINGS FOR ELEVATIONS I & II

DIMEN. B	DIMENSION D		
	1'-6"	1'-9"	2'-0"
2'-0"	3'-6"	3'-9"	4'-0"
2'-6"	4'-0"	4'-3"	4'-6"
3'-0"	4'-6"	4'-9"	5'-0"
3'-6"	5'-0"	5'-3"	5'-6"
4'-0"	5'-6"	5'-9"	6'-0"
4'-6"	6'-0"	6'-3"	6'-6"
5'-0"	6'-6"	6'-9"	7'-0"

NOTE
See Lupton page 19 for units used in combinations shown on this page.

A = Nominal Width of Side Projected Unit

B = Nominal Height of Side Projected Unit

C = Nominal Width of Bottom Projected Unit.

D = Nominal Height of Bottom Projected Unit.

WIDTHS OF MASONRY OPENINGS FOR ELEVATION I

DIMEN. A	DIMEN. C	MASONRY OPENING
1'-6"	3'-2"	3'-2"
1'-9"	3'-8"	3'-8"
2'-0"	4'-2"	4'-2"
2'-3"	4'-8"	4'-8"
2'-6"	5'-2"	5'-2"

WIDTHS OF MASONRY OPENINGS FOR ELEVATION II

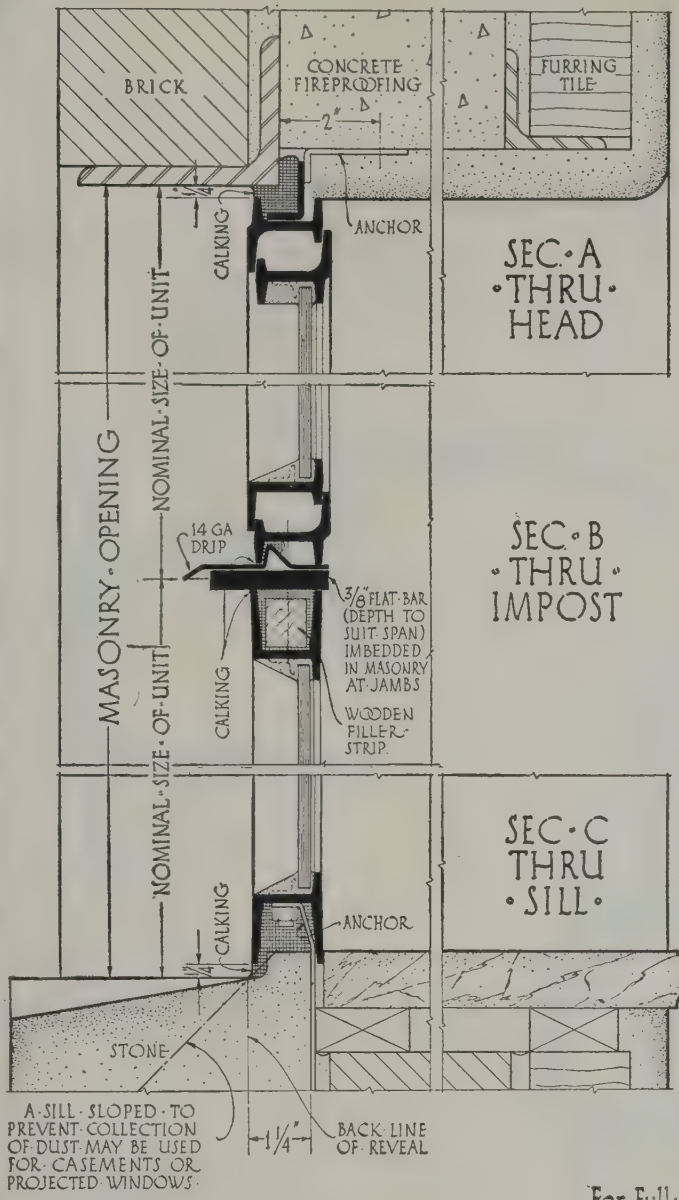
DIMEN. A	DIMENSION C				
	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"
1'-6"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"
1'-9"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"
2'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"
2'-3"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
2'-6"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"

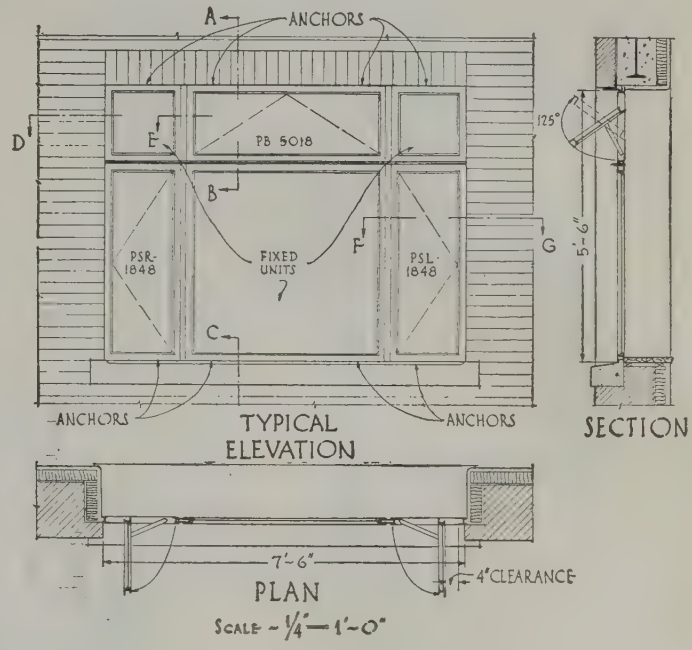
Use standard sizes for quicker deliveries—lower costs

Continued on next page

COMPOSITE · WINDOWS
SINGLE · PROJECTED · CASEMENTS COMBINED · WITH · FIXED · UNITS

SCALE · FOR · DETAILS ~ 3" = 1'-0"



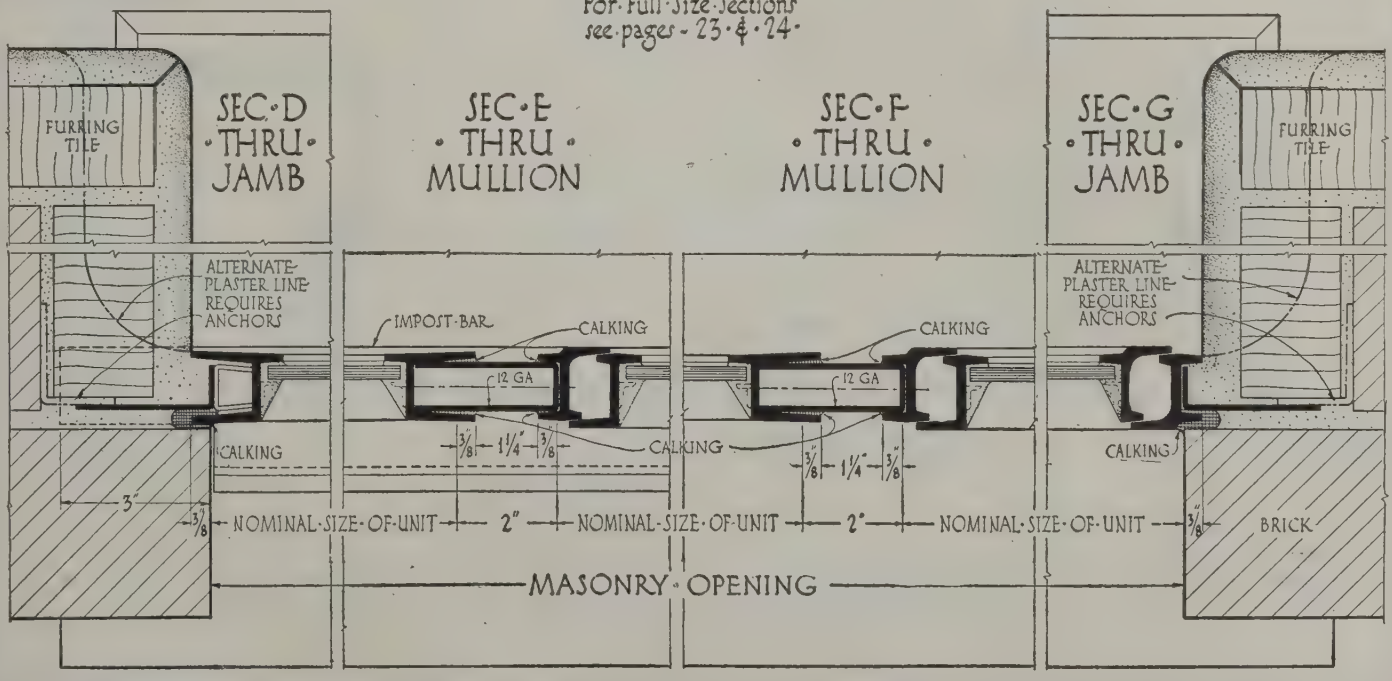


· NOTES ·

1- Several · Single · Projected · Casements · can · be · combined · in · one · opening · by · using · the · impost · and ~ mullion · details · shown · on · this · sheet ~ Fixed · units in · sizes · to · meet · the · requirements · of · the · design · are readily · furnished · altho · not · carried · in · stock.

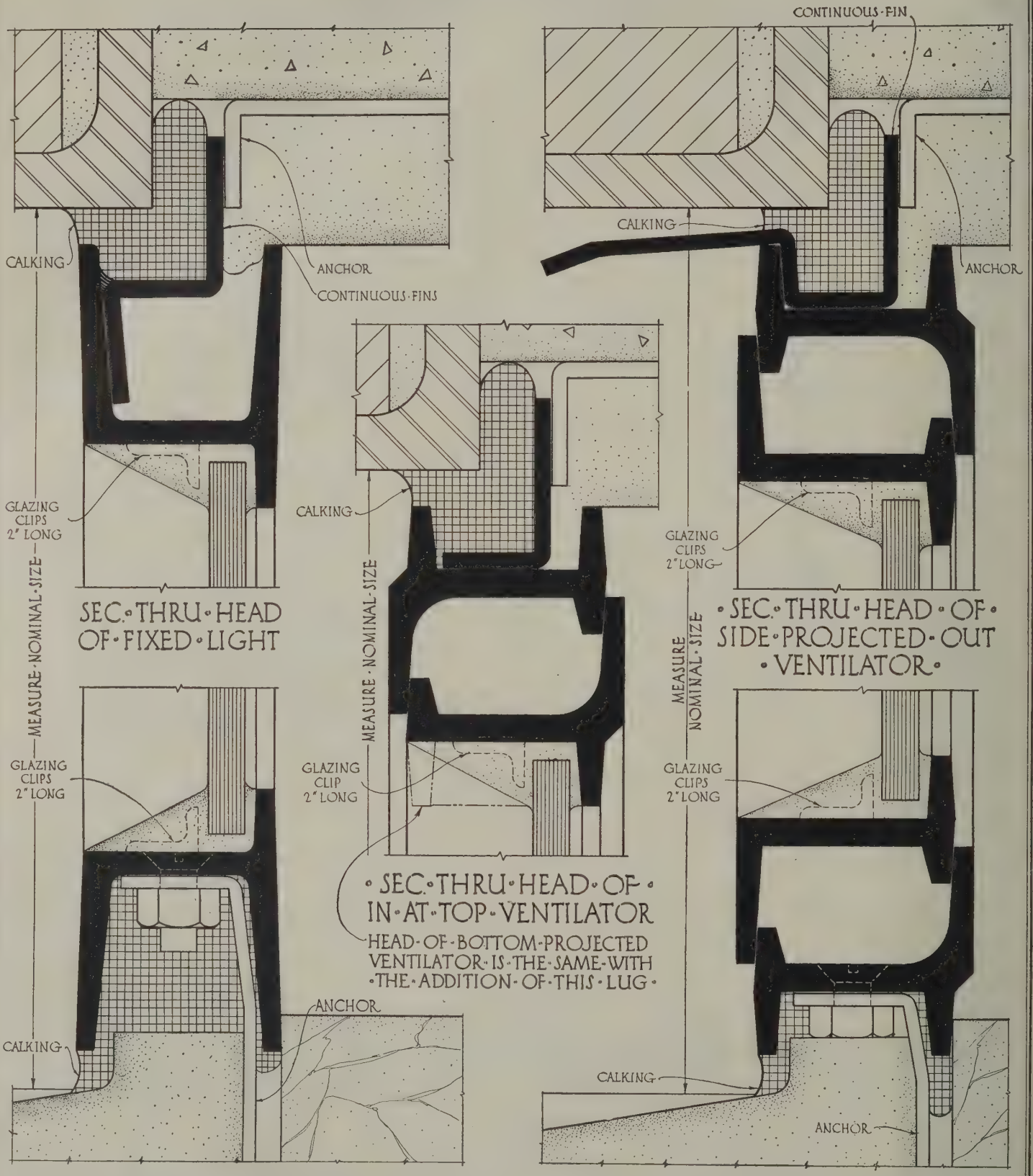
2- Out · at · bottom · ventilators · open · approximately 125° to · permit · cleaning · from · inside · the · building

For · Full · Size · Sections see · pages ~ 23 · & · 24 ·



Standard sizes cost less than specials

PROJECTED · CASEMENTS · FULL · SIZE · SECTIONS ·



SEC. · THRU · HEAD OF · FIXED · LIGHT

· SEC. · THRU · HEAD · OF · IN · AT · TOP · VENTILATOR

HEAD · OF · BOTTOM · PROJECTED VENTILATOR · IS · THE · SAME · WITH · THE · ADDITION · OF · THIS · LUG ·

· SEC. · THRU · HEAD · OF · SIDE · PROJECTED · OUT · VENTILATOR ·

SECTION · THRU · SILL · OF · FIXED · LIGHT · USED · IN · COMPOSITE · WINDOWS ·

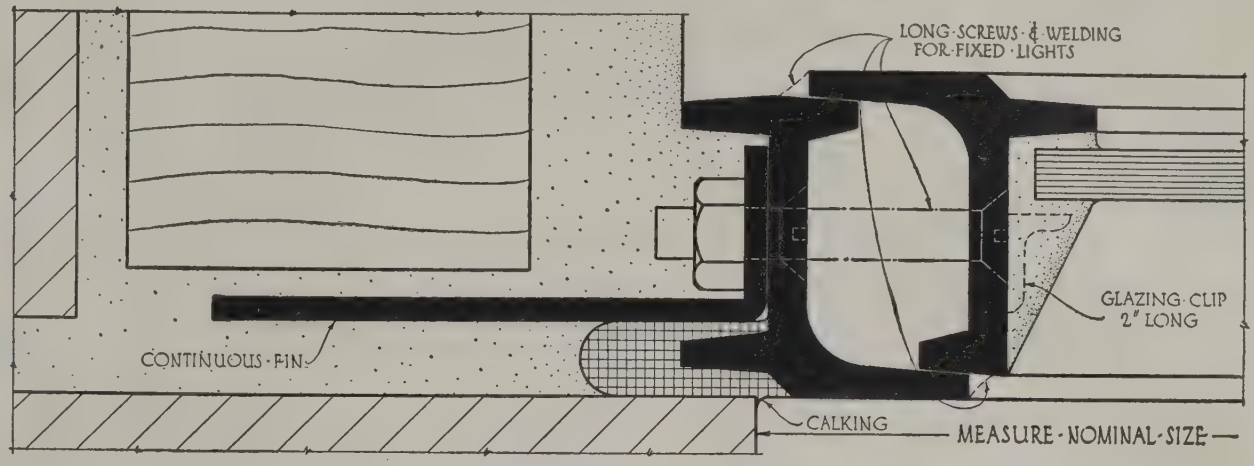
SECTION · THRU · SILL · FOR · ALL · TYPES · OF · PROJECTED · VENTILATORS

For quick deliveries, use standard sizes

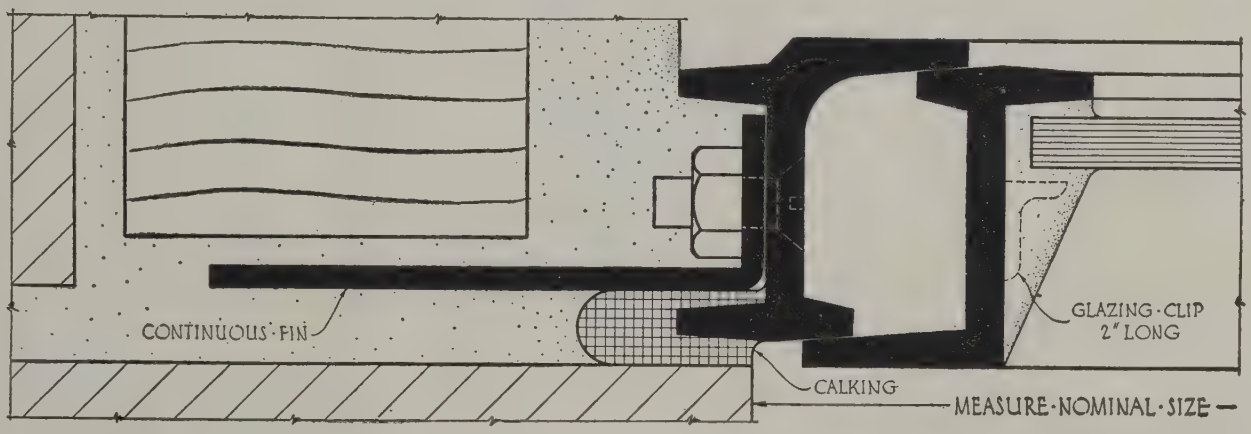
LUPTON PAGE 23

Continued on next page

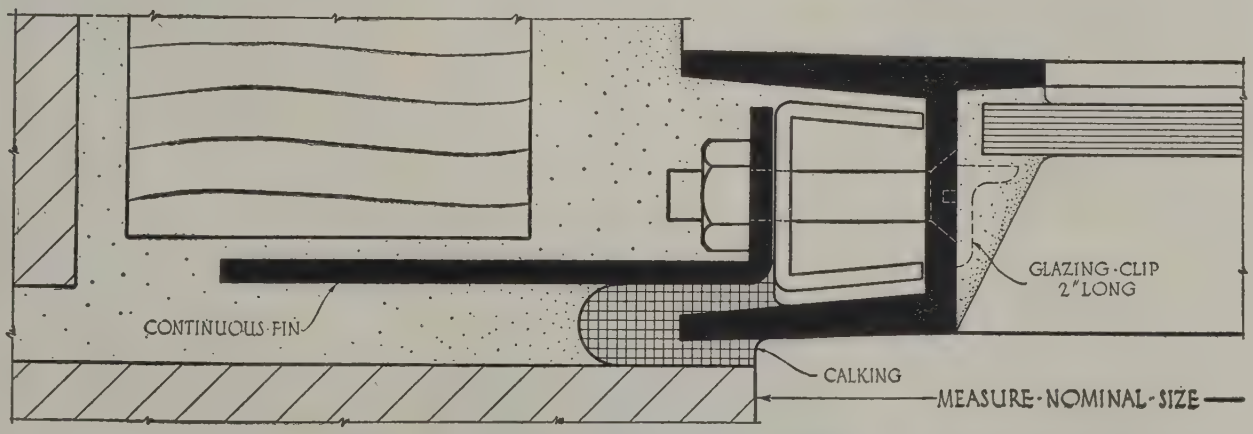
PROJECTED • CASEMENTS • FULL • SIZE • SECTIONS •



SEC. THRU JAMB OF IN AT TOP VENTILATOR • SIDE PROJECTED OUT VENTILATOR • OR FIXED LIGHT •



SECTION THRU JAMB OF SIDE PROJECTED OUT VENTILATORS OR BOTTOM PROJECTED OUT VENTILATOR



SECTION THRU JAMB OF FIXED LIGHT USED IN COMPOSITE WINDOWS.

For lower costs use standard sizes

LUPTON PAGE 24

Continued on next page

LUPTON ARCHITECTURAL PROJECTED WINDOWS

(Outside Glazed)

Some buildings, or parts of buildings, because of limits in cost or because of other restrictions will not permit the use of the windows previously described. In such cases, Lupton Architectural Projected Windows, made of lighter sections, will often fill the requirements of good ventilation and lighting with entire satisfaction.

SPECIFICATION FOR LUPTON ARCHITECTURAL PROJECTED WINDOWS

(Outside Glazed)

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Architectural Projected Windows (outside putty glazed), manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Architectural Projected Windows should be accurately listed and located either in schedules on plans or in specifications. If more than one type of window be desired, each type should be separately listed and located, or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate, for the architect's approval, complete shop and installation drawings. These shall show scaled sections of window and frame members, details of construction, hardware, anchoring, etc.

Materials

3. Frame members shall be heavy, specially designed, solid steel channel section.

4. Ventilator members shall be specially designed, solid steel angle sections.

5. Muntins shall be specially designed, solid steel cruciform section 1⅜ in. deep.

6. Vertical mullions shall be specially designed solid steel H section.

Note: Structural steel members forming Imposts are not furnished by the window manufacturer.

Construction

7. All Architectural Projected Windows shall be designed for outside glazing.

8. Both Frames and Ventilators shall be assembled by tenoned, riveted and welded joints at the corners. Continuous, two-point, flat contact weathering shall be provided between ventilators and frames.

9. Muntin Bars shall be attached to frame members by tenoned, riveted joints and shall be so interlocked at their intersections that the strength and rigidity at the intersection is increased.

10. Vertical Mullions and bolts for attachment shall be provided when two or more windows are placed side by side.

11. Fins of 12 gauge steel for head and 14 gauge steel for jamb shall be furnished and attached in factory.

12. Anchor Clips of 14 gauge steel for jamb, sill and head shall be furnished and applied in field.

13. Each ventilator shall be accurately pivoted on two ventilator arms of solid steel. The connections between the ventilator arms and the window frames shall be made by steel arm blocks.

14. Each ventilator shall be equipped with two brass friction shoes, sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Each shoe shall be equipped with a rustproofed, flat steel spring attached to the ventilator to insure constant pressure at the jambs.

15. Universal Clip shall be an angle clip 1⅝"x1"x2" long riveted to the ventilator frame to provide for attaching cam handle.

Hardware

16. All handles shall be bronze with natural bronzed finish.

17. All bronze hardware (listed below) shall be shipped unattached, carefully packed to prevent damage until applied for use.

Note: The following hardware is standard:

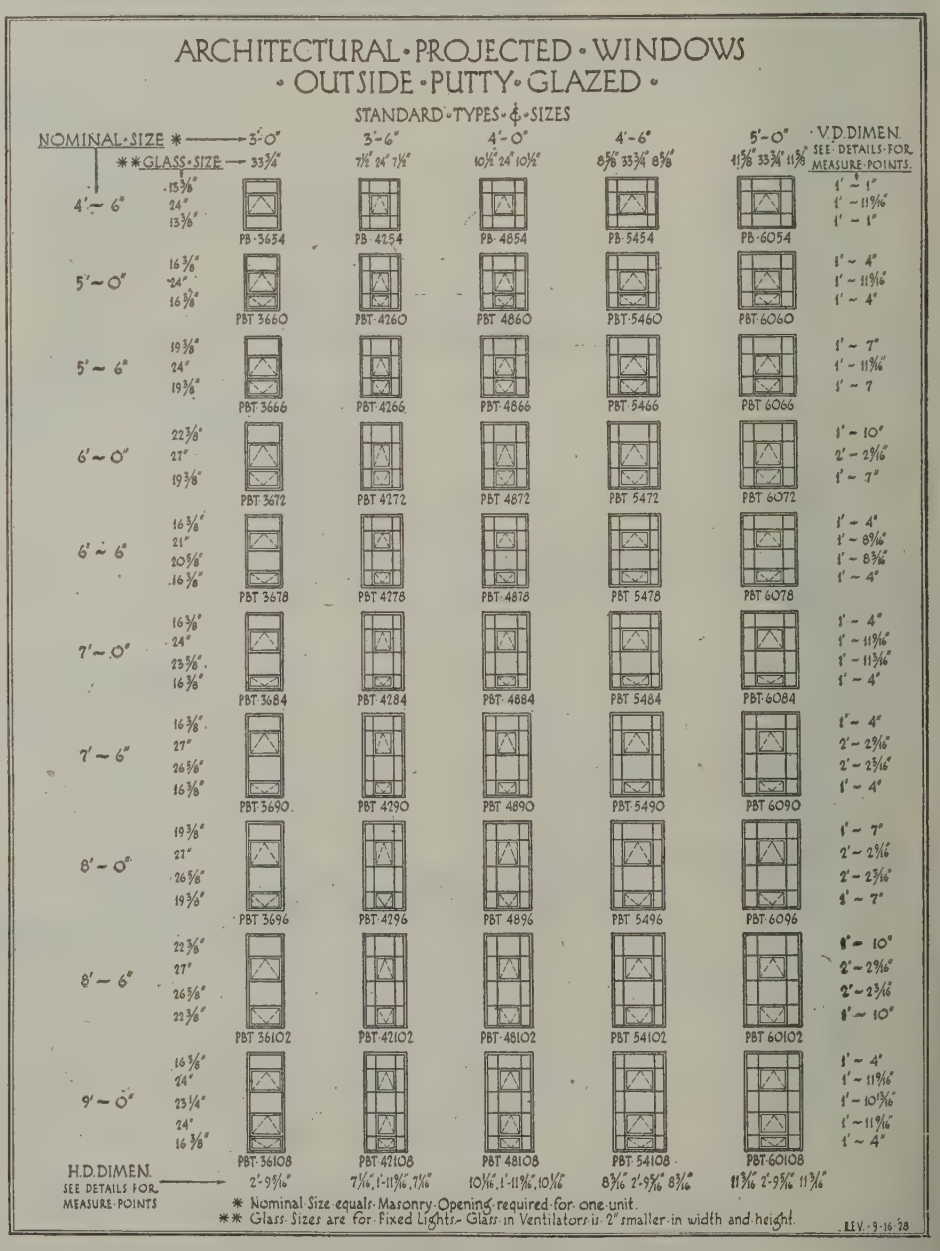
For Bottom-Projected-Out Ventilators

Bronze Cam Handle—when handle is within reach from floor.

Bronze Ring Type Cam Handle and Bronze Pull Down Ring—when handle is beyond reach from floor.

For Projected-In-at-Top Ventilators

Bronze Cam Handle.



Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

Continued on next page

Calking Cement

18. The window manufacturer shall furnish non-staining elastic calking cement for mullions as shown in window manufacturer's standard details.

Note: See note at end of specification.

Erection

19. All Architectural Projected Windows (outside glazed) shall be erected in prepared openings by the window contractor unless otherwise specified.

20. All Architectural Projected Windows (outside glazed) shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions shall be bolted securely to Frames. Calking cement shall be neatly applied at mullions as shown on window manufacturer's standard details.

Note: See note at end of specification.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Architectural Projected Windows (outside glazed). Note that when the continuous fins are built in the masonry, the placing of the furring tile at the Jambs must be delayed until after the windows are set. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Painting

21. All Architectural Projected Windows shall receive one shop coat of window manufacturer's standard dark gray paint, oven-dried.

Note: The following should be provided for in the paint specification: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required. It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the windows in order that it may not be painted over and cause imperfect contact.

Glass and Glazing

Note: Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify a high-grade steel window putty (ordinary wood sash putty must not be used.)

(c) Specify that Lupton Architectural Projected Windows shall be glazed from the outside; that the glass shall be set in a bed of putty and secured by Lupton standard glazing wedges; and that the putty shall be applied in a neat clean manner.

NOTE

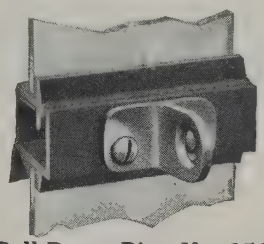
Calking furnished at added cost.

1. When specified non-staining elastic calking cement will be furnished for calking.

2. Erectors will apply this calking cement at time of erection at the points indicated in the standard details, only when such application is specified.

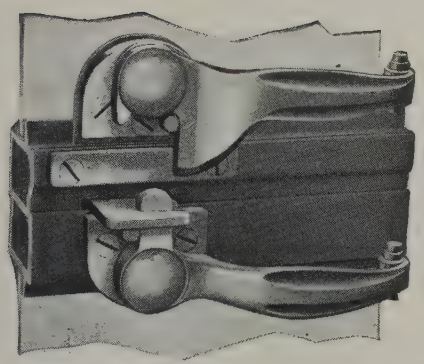
HARDWARE FOR LUPTON ARCHITECTURAL PROJECTED WINDOWS

Handles and Pull-down Rings Are Bronze with Natural Bronze Finish



Pull-Down Ring No. 251

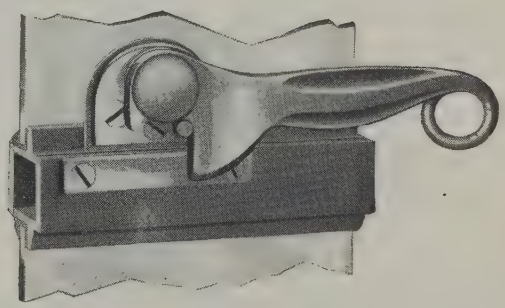
Used on Bottom-Projected-Out ventilators. For pole operation



Cam Handle No. 268

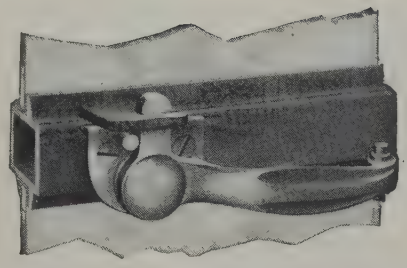
(at top)

Used on Bottom-Projected-Out ventilators within reach from floor. Mounted on Universal Clip riveted to frame of ventilator. Lever handle No. 266 shown in combination with No. 268 and illustrates its application at meeting rail condition



Ring Type Cam Handle No. 328

Used at center of Bottom-Projected-Out ventilators beyond reach from floor. For pole operation, mounted on universal clip riveted to frame of ventilator



Right Hand Cam Handle No. 266

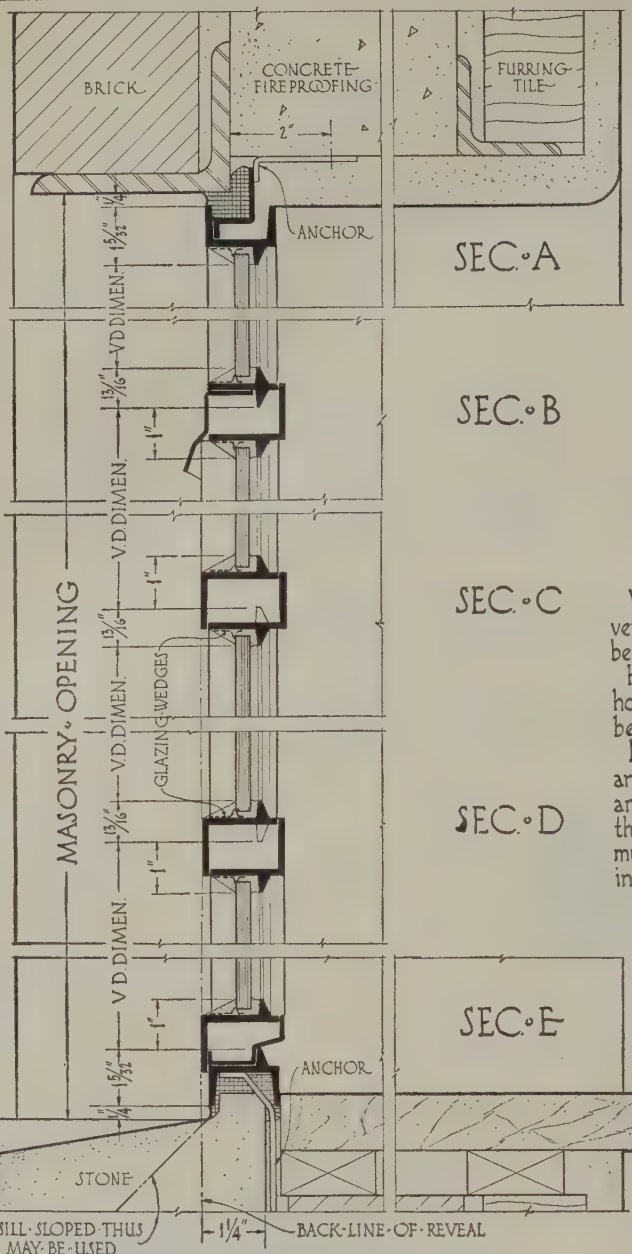
Used on Projected-In-at-Top ventilators. Steel keeper welded to frame

A special is an odd size between two less expensive standards

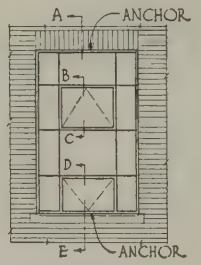
Continued on next page

ARCHITECTURAL • PROJECTED • WINDOWS • OUTSIDE • PUTTY • GLAZED

SCALE • FOR • DETAILS – 3" = 1'-0"



• NOTE •
Ventilators open to positions indicated by dotted lines to permit cleaning from inside the building

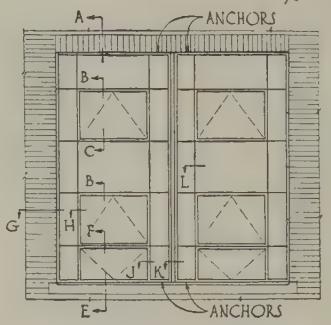


• ELEVATION •
VENTILATORS CLOSED

• SECTION •
VENTILATORS OPEN

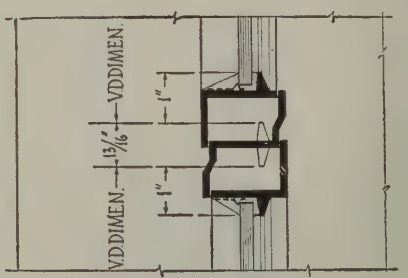
V.D. Dimens. are the vertical distances – between sight lines.
H.D. Dimens. are the horizontal Distances between sight lines.
Dimensions given are for fixed lights and are measured to the flanges of the muntin bars as shown in details.

SCALE 1/8" = 1'-0"

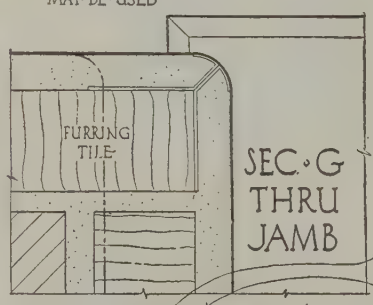


• ELEVATION •
VENTILATORS CLOSED

• SECTION •
VENTILATORS OPEN



SEC. F • THRU MEETING • RAIL

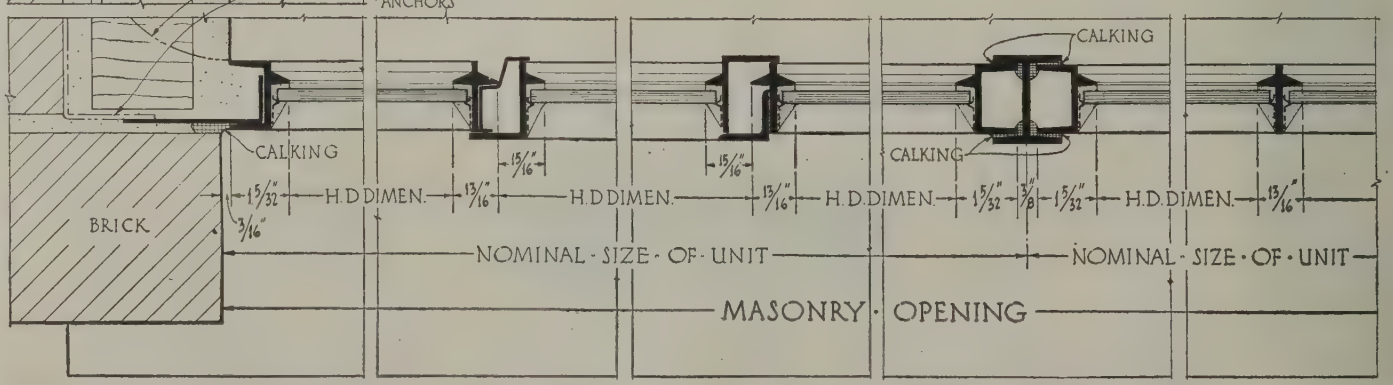


SEC. H

SEC. J

SEC. K • THRU MULLION

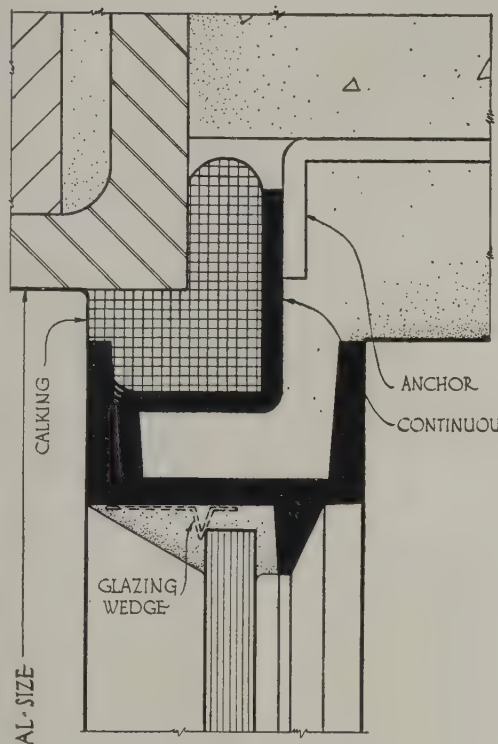
SEC. L • THRU MUNTIN



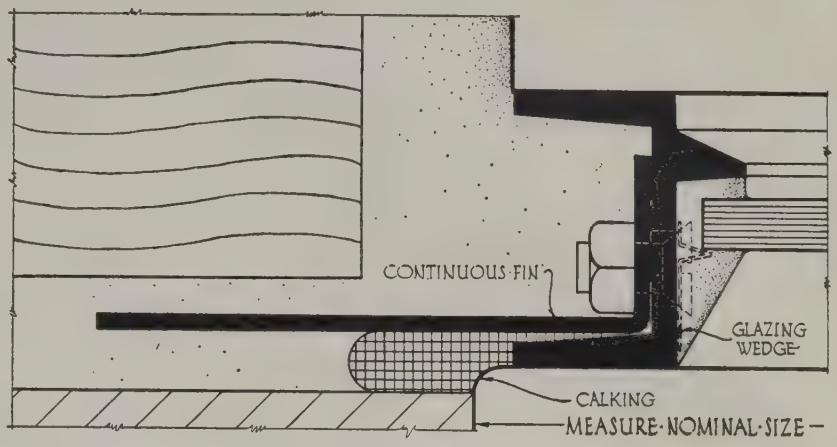
Standard and special sizes look alike in the walls. Save the difference in costs

Continued on next page

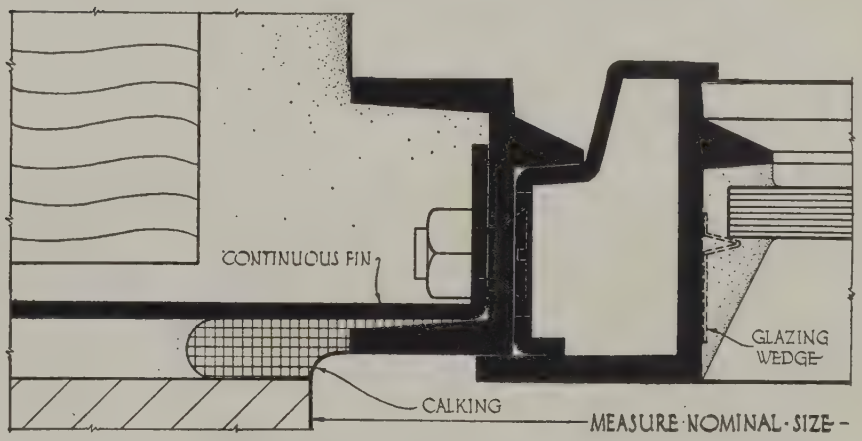
ARCHITECTURAL • PROJECTED • WINDOWS • OUTSIDE • PUTTY • GLAZED • • FULL • SIZE • SECTIONS •



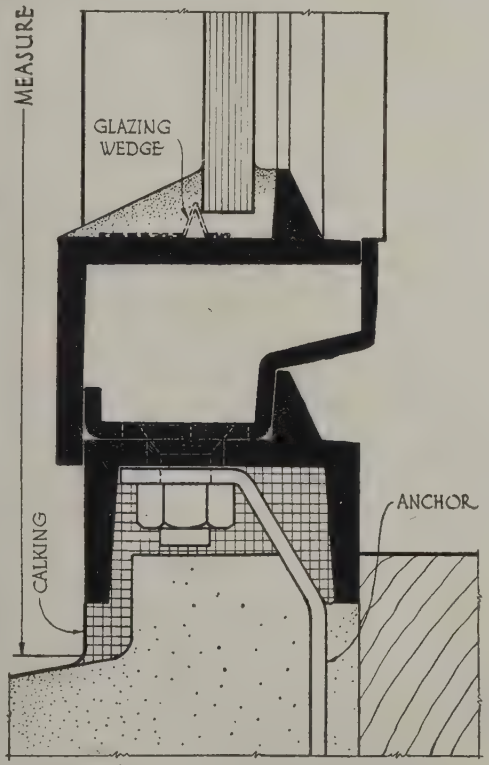
SEC. • THRU • HEAD



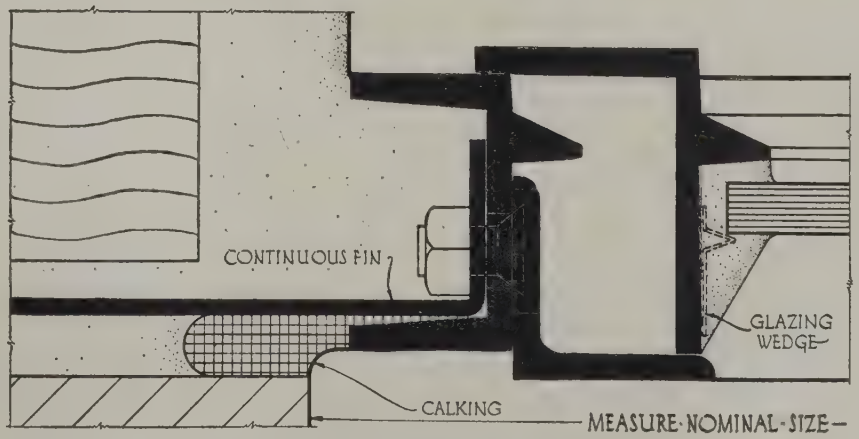
SECTION • THRU • JAMB OF • FIXED • LIGHT



SECTION • THRU • JAMB • OF BOTTOM • PROJECTED • OUT • VENTILATOR



SECTION • THRU • SILL • OF IN • AT • TOP • VENTILATOR



SECTION • THRU • JAMB OF • IN • AT • TOP • VENTILATOR

Use standard sizes for quicker deliveries—lower costs
LUPTON PAGE 28

Continued on next page

LUPTON DOUBLE HUNG WINDOWS

These windows are so designed as to permit the sash to slide up and down easily and at the same time to prevent excessive air infiltration. The frames and sash are made of zinc-coated steel plate. They are furnished with or without muntins. Standard practice includes weather-stripping at jambs but we furnish, at extra cost, additional weather-stripping at head, sill and meeting rail when it is so specified. There are two types, E and F, each in fifty sizes.

Windows without muntins are standard. With muntins arranged as shown on page 30 the window is a "listed special." Muntins arranged any other way make the window special.

SPECIFICATION FOR LUPTON DOUBLE HUNG WINDOWS (Types E and F)

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Double Hung Windows manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Double Hung Windows should be accurately listed and located either in schedules on plans or in specifications. If more than one type of window, or more than one type of hardware be desired, each type should be separately listed and located or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate, for the architect's approval, complete shop and installation drawings. These shall show scaled sections of window and frame members, details of construction, hardware, anchoring, etc.

Materials

3. Sash members shall be of 14 gauge on windows up to 4 ft. 0 in. wide, and 12 gauge on windows over 4 ft. 0 in. wide. Glazing strips shall be 14 gauge for all rails except bottom rail. The glazing strip for the bottom rail shall be 12 gauge. All sash members shall be cold galvanized strip steel.

4. Frame members (E Type)—Head, head cover, jamb box and removable jamb piece shall be made of 20 gauge and the sill of 16 gauge. All frame members shall be hot galvanized, dull-coated steel sheets.

5. Frame members (F Type)—The head shall be made of 16 gauge, the head cover of 16 gauge, the sill of 12 gauge, the jamb box proper of 14 gauge and the removable jamb piece of 16 gauge. All frame members shall be hot galvanized, dull-coated steel sheets.

6. Parting Strips shall be made of 16 gauge cold galvanized strip steel.

7. Muntin Bars shall be made of 16 gauge cold galvanized strip steel.

8. Muntin Glazing Strips shall be made of 14 gauge cold galvanized strip steel.

Construction

9. Sash members shall be designed with flanges to enter groove in head and jamb boxes. The bottom rail of the lower sash shall form a double contact with the sill member. The meeting rail shall interlock. The sash members shall be mitered and arc welded at all corners.

10. Frame members—The head (exclusive of cover) and sill shall each be made of one piece of steel. The jamb box shall consist of three parts: (1) the box proper, (2) a removable piece for access to weights, (3) a parting strip. The removable piece and the parting strip shall each be in two sections with the joint at the level of the meeting rail. The sash weights shall be separated by a division strip. The frame members shall be coped to fit each other at corners and arc welded.

11. Muntin bars shall be spotwelded to sash members.

12. Muntin Glazing Strips are attached to muntins with low round-head machine screws.

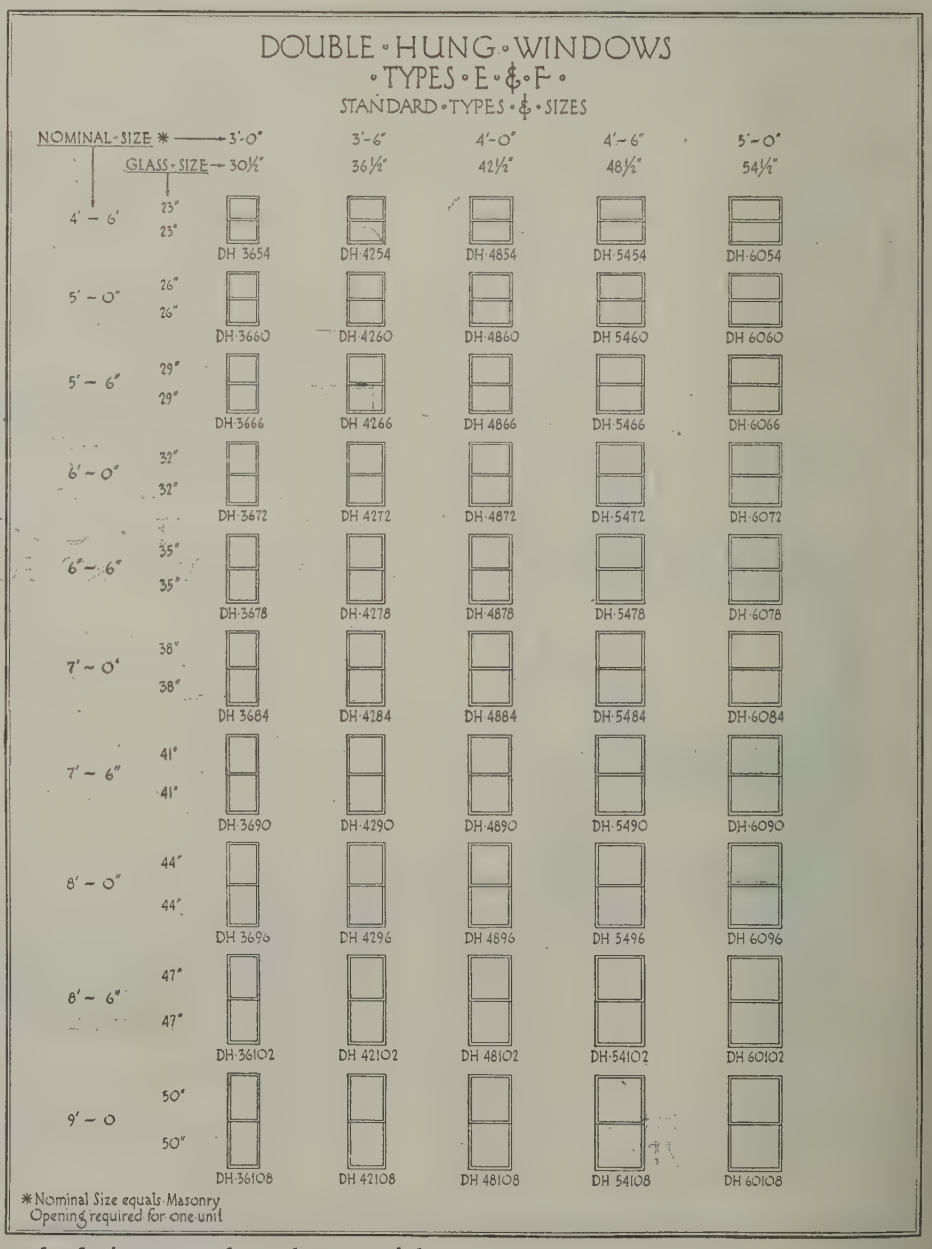
13. Weather Stripping of 22 gauge steel, galvanized, shall be furnished for the jambs.

Note: Additional spring bronze weathering at head, meeting rail and sill, is furnished when specified at slight added cost.

Attached Hardware

14. Each window shall be equipped with two pulleys machined from cold-rolled steel. The pulleys shall have oilless bearings and shall be set in a 12 gauge steel pulley pan. The sash chain shall be American Chain Co. No. 130 Galvanized Sash Chain.

15. The Glazing Strip for the bottom rail of the lower sash shall act as a continuous lift.



Standard sizes cost less than specials

Continued on next page

Unattached Hardware

16. The following hardware shall be shipped unattached and carefully packed to prevent damage until applied for use.

17. Meeting Rail Locks shall have cam action and shall be malleable iron with cold galvanized Lupton No. 70 finish.

18. Pull-Down Handle shall be malleable iron, cold galvanized Lupton No. 70 finish, for attaching to lower rail of top sash.

19. Pull-Down Socket shall be malleable iron, cold galvanized Lupton No. 70 finish, for attaching to upper rail of top sash for pole operation.

Calking

Note: Calking is not done by Lupton, but, when specified, non-staining elastic calking cement is furnished by Lupton at added cost.

Erection

Note: Lupton Double Hung Windows (Types E and F) are shipped assembled with the sash raised and wired to the head. The chain is wired tight inside the jamb box, and the sash weights are shipped unattached.

20. All Lupton Double Hung Windows shall be erected in prepared openings by the window contractor, unless otherwise specified. They shall be set plumb and true, securely fastened in place and properly adjusted before glazing.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Double Hung Windows, and that all mortar, grouting, pointing, etc., shall be done by the mason contractor after windows have been erected.

Painting

21. All windows shall receive one coat of window manufacturers standard gray galvanized metal primer in the factory.

Note: The following should be provided in the paint specifications: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied.

Glass and Glazing

Note: Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that all Lupton Steel Double Hung Windows shall be glazed from the inside; that all glass shall be set in a bed of putty and secured by 14 gauge glazing strips which in turn are secured by low round-head machine screws; and that the putty shall be finished in a neat, clean manner.

REQUIREMENTS FOR UNDERWRITERS' LABELS

1. Both Types E and F Windows may be labeled.

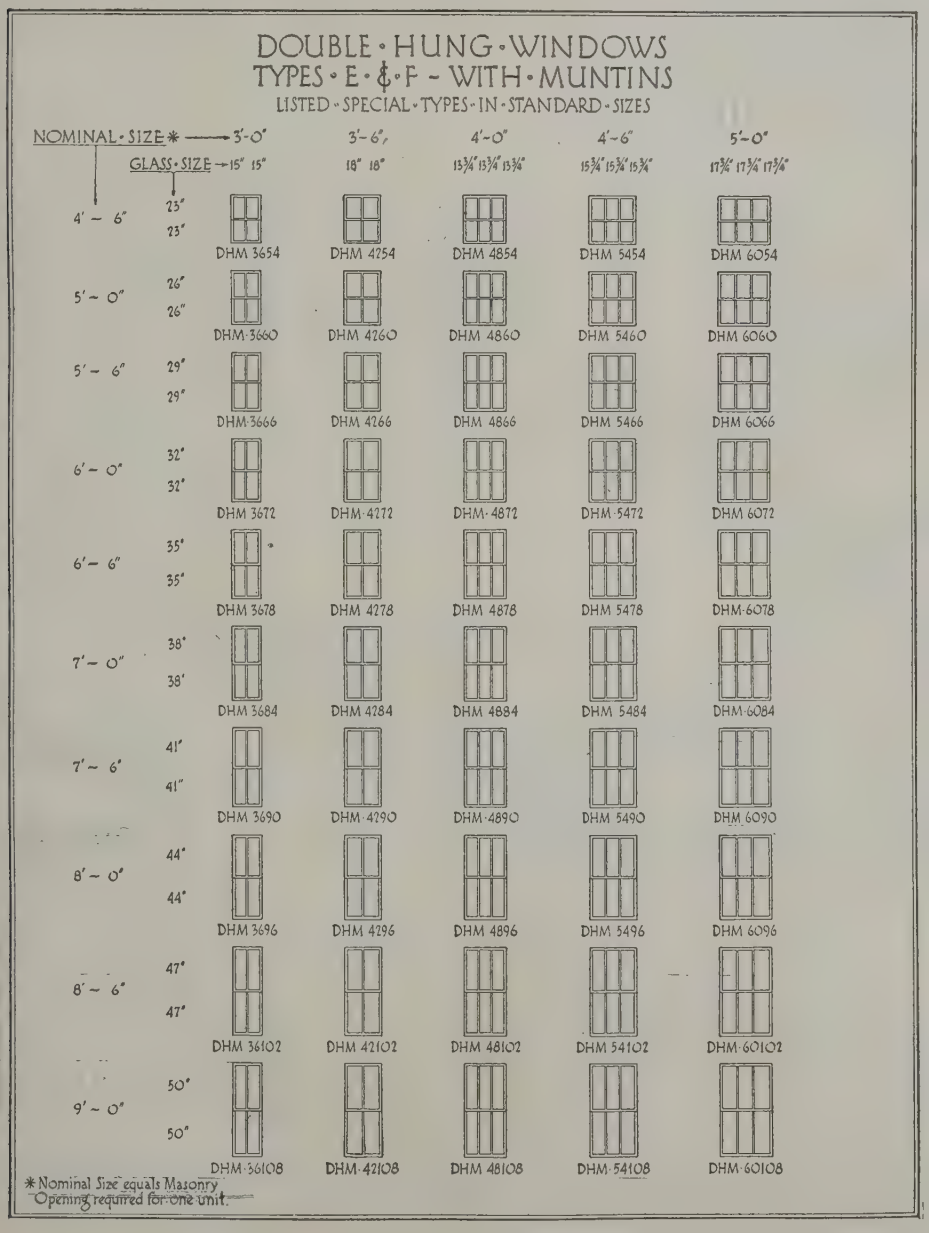
2. Maximum size of unit is 6 ft. 0 in. wide and 10 ft. 0 in. high.

3. Multiple unit openings require mullions anchored at head and sill.

4. The maximum exposed glass area is 720 sq. in., with a maximum horizontal dimension of 48 in. and a maximum vertical dimension of 54 in.

5. Sash locks must be malleable iron.

6. Weather-stripping at head, meeting rail, and sill is optional.



GAUGES OF METAL USED IN TYPES E AND F WINDOWS

Frames

	Type E	Type F
Head	20 Gauge	16 Gauge
Head Cover	20 Gauge	18 Gauge
Jamb Box	20 Gauge	14 Gauge
Removable Jamb Piece	20 Gauge	16 Gauge
Sill	16 Gauge	12 Gauge

Material—Hot galvanized dull-coated steel sheets.

Sash

Sash Members up to 4'0" wide	14 Gauge	14 Gauge
Sash Members over 4'0" wide	12 Gauge	12 Gauge
Glazing Strips, except bottom rail	14 Gauge	14 Gauge
Glazing Strip for bottom rail	12 Gauge	12 Gauge

Material—Cold galvanized strip steel.

Parting Strips

	16 Gauge	16 Gauge

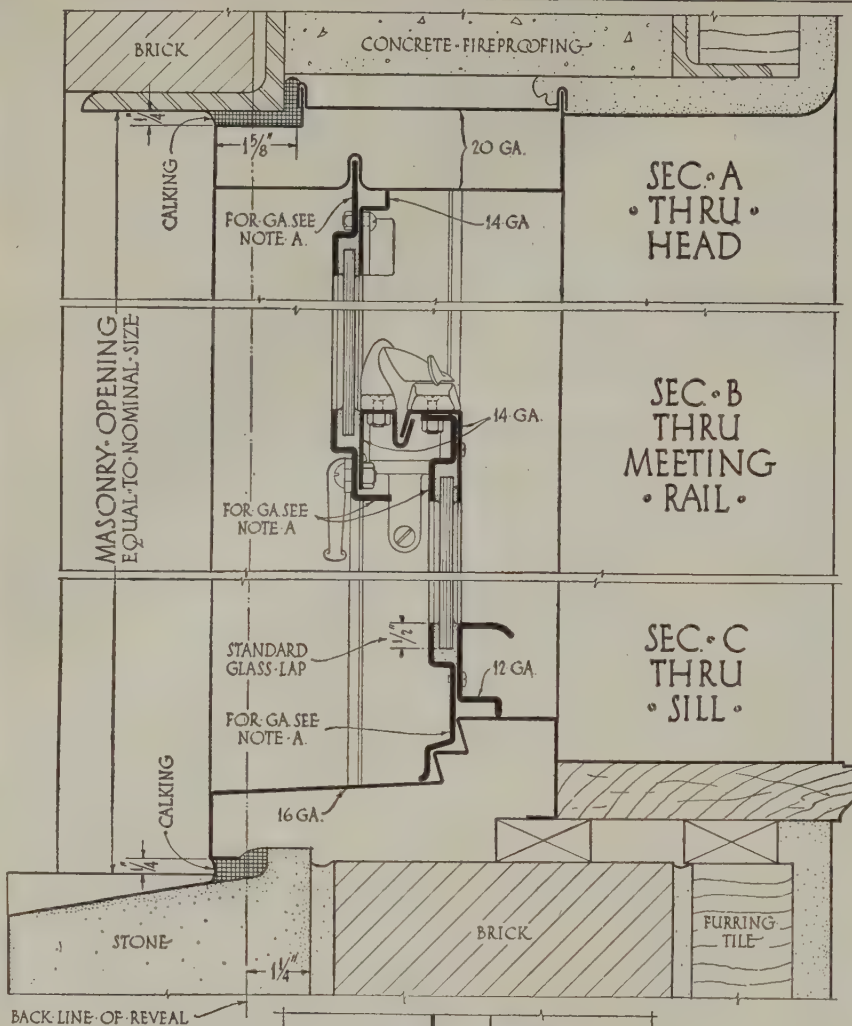
Material—Cold galvanized strip steel.

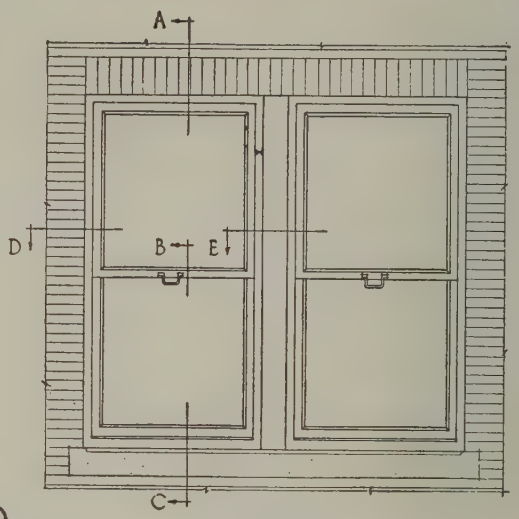
For quick deliveries, use standard sizes

Continued on next page

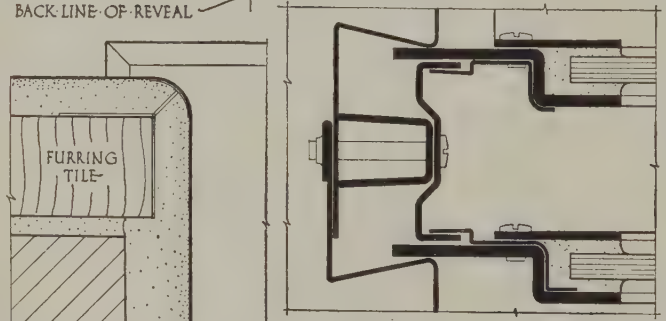
DOUBLE-HUNG-WINDOWS DETAILS ~ TYPE-E

SCALE-FOR-DETAILS ~ 3"=1'-0"





ELEVATION
SCALE ~ ¼"=1'-0"



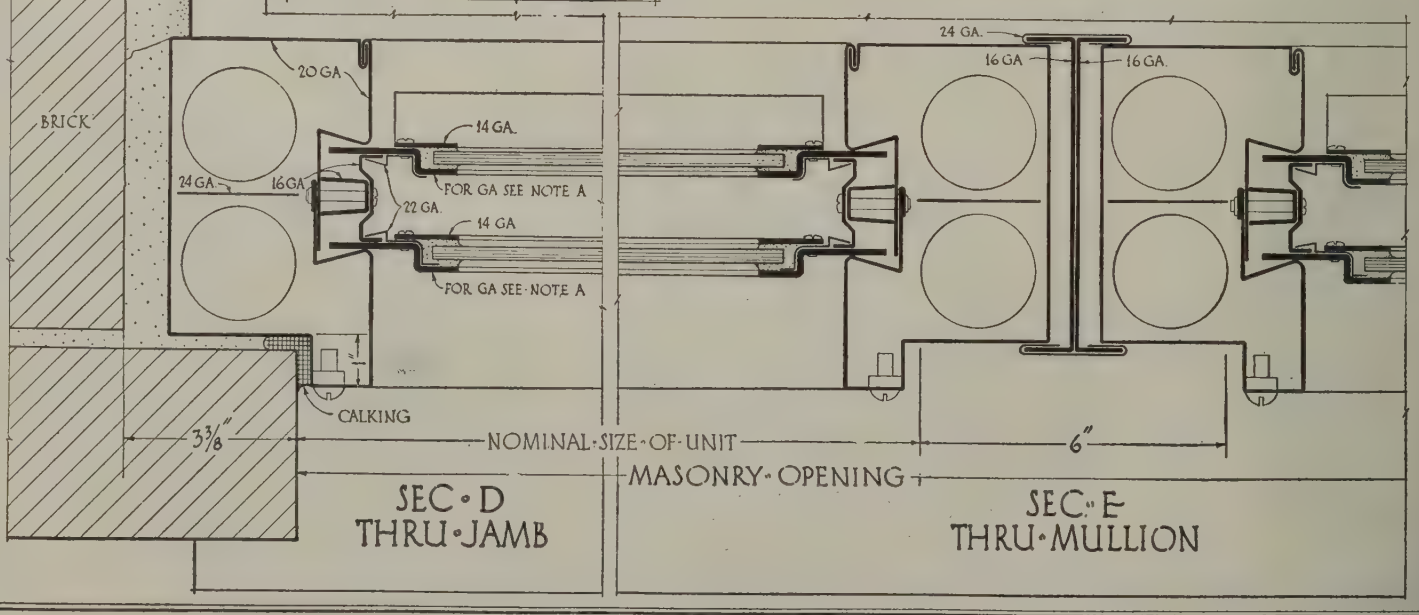
HALF-SIZE-DETAIL SHOWING WEATHERING AT-JAMB

NOTES

A-Sash-rails-are-14 Ga.-on-windows-up-to-and-including-those-4'-0" wide.
Sash-rails-are-12 Ga.-on-windows-over-4'-0" wide.

B-Extras-furnished-on-both-E & F-windows-at-an ~ additional-cost

1-Solid-bronze-hardware-Lupton* 34 finish-polished-and-lacquered.
2-Spring-bronze-weathering-at-head, meeting-rail-and-sill.
3-Solid-bronze-sash-lift.
4-12 Ga. Stool-Extension.
5-Non-staining, elastic calking-cement.
6-Muntins.
7-Window-cleaning anchors.
8-Columbia-shade-roller-bracket (nickel-finish).
9-Underwriters Label ~ Requirements-for-Labeled-Windows-are-listed on-Lupton-page-30.



For lower costs use standard sizes

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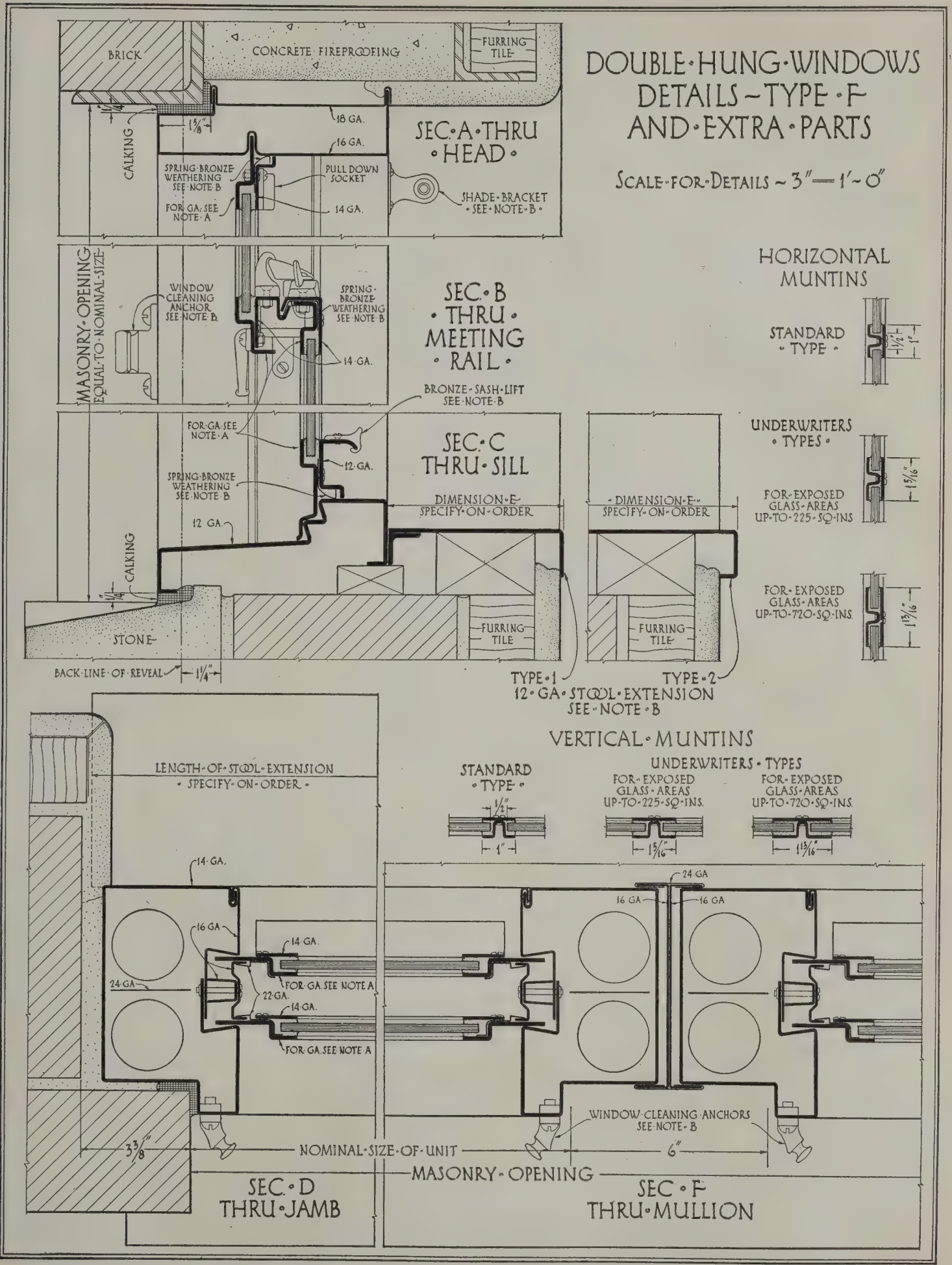


Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

Continued on next page

LUPTON RESIDENCE CASEMENTS
of Copper-Bearing Steel

Designed for all types of residences, apartment houses and similar buildings, Lupton Residence Casements possess many superior features in design and construction.

New type malleable iron friction hinges are furnished as standard but upon special request we will furnish non-friction hinges and sill hardware at extra cost.

SPECIFICATION FOR LUPTON RESIDENCE CASEMENTS OF COPPER-BEARING STEEL

Work Included

1. Furnish where shown on drawings, Lupton Residence Casements of copper-bearing steel as manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Residence Casements should be accurately listed and located either in schedules on plans, or in specifications. If more than one type of Residence Casement or more than one type of hardware be desired, each type should be separately listed and located or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show scaled sections of frame members, hardware, anchoring, etc.

Materials

3. Ventilator and frame members shall be made of specially rolled, copper-bearing, rust-resisting, steel sections.

4. Muntins shall be specially designed, copper-bearing, rust-resisting, steel T bar sections.

5. Mullions shall be 14 gauge steel plate, formed.

6. Imposts shall be 12 gauge steel plate, formed.

Construction

7. All casements shall be designed for outside glazing.

8. All casements shall be straight and true with members in alignment and surfaces in a plane.

9. Ventilator and frame members shall be mitered at corners and butt welded. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

10. Muntin Bars shall be continuous from top to bottom, and from side to side between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked at their intersections as not to decrease their ultimate strength.

11. Mullions and bolts for attachment shall be provided whenever two or more units are placed side by side in an opening.

12. Imposts and bolts for attachment shall be provided whenever two or more units are placed one directly above the other in an opening.

13. Weather bars of 16 gauge hot galvanized steel plate shall be furnished for ventilators that extend to the head.

Note: (a) Continuous anchors should be specified here if wanted. See List of Extras at end of specification.

(b) Sill and jamb anchor clips of steel should be specified here if wanted.

Hardware

14. All hardware, except hinges, shall be shipped unattached; carefully packed to prevent damage. Top-hinged ventilators shall be equipped with close-up friction hinges and shall have malleable iron transom latches supplied for locking. Side-hinged ventilators shall be equipped with extended friction hinges and shall have malleable iron handles supplied for locking.

Note: If non-friction hinges under screen operators, or alternate hardware is desired, the above specification should be changed accordingly. See List of Extras at end of specification.

Solid bronze handles illustrated on page 10 are furnished at added cost when specified. When specified and at added cost ventilators will be equipped with non-friction hinges and adjusters.

Calking Cement

15. The window manufacturer shall furnish non-staining elastic calking cement in quantities sufficient for application as shown on window manufacturer's standard details.

Erection

16. All casements shall be erected by (state by whom). They shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and imposts (and continuous anchors if specified) shall be bolted securely to frames. A 16-gauge weather bar shall be placed over ventilators extending to the head. Calking cement shall be neatly applied at points indicated on window manufacturer's standard details.

Note: Malleable iron hardware should be attached before painting. Bronze hardware should be attached after plastering and painting are finished.

Painting

17. All casements shall receive one shop coat of casement manufacturer's standard dark gray paint, oven dried.

Note: (a) The following should be provided for in the paint specifications: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied.

(b) It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the ventilators and frames, in order that it may not be painted over and cause imperfect contact.

Glass and Glazing

Note: Specify glass and glazing under proper heading elsewhere in general specifications of other trades.

(a) Do not specify single thickness glass.

(b) Specify a high grade steel casement putty (ordinary wood sash putty must not be used).

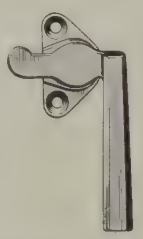
(c) Specify that all residence casements shall be glazed from the outside and that all glass shall be set in a bed of putty and secured by the Lupton standard wire glazing clips.

LIST OF EXTRAS

The following are alternates and extras furnished when specified at added cost.

1. Weather bars of 16 gauge hot galvanized steel plate used over ventilators extending to the head.
2. Continuous anchors of 16 gauge galvanized steel with corner fillers of 18 gauge galvanized steel for use at head and jamb.
3. Under screen operator. (Used with non-friction hinges.)
4. Bronze handles and bronze transom latch.

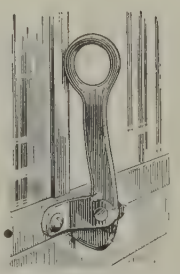
HARDWARE



Standard Handle

Right hand No. 134 shown —Left hand No. 135

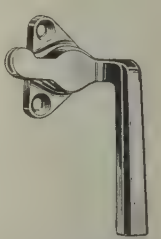
This handle made of malleable iron is the one regularly furnished on all side-hinged ventilators



Transom Latch for Top-hinged Ventilators

Malleable iron latch No. 348 is standard and is furnished on all top-hinged ventilators.

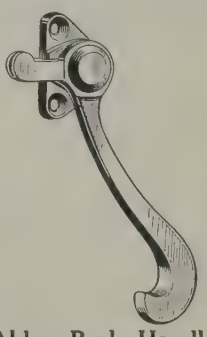
Bronze latch No. 349 of similar design can be furnished as an alternate when specified



Bronze Handle

Right hand No. 234 shown —Left hand No. 235

This bronze handle is similar in design to the No. 134 handle and can be furnished as an alternate when specified



Alden Park Handle

Right hand No. 270 shown— Left hand No. 271

This bronze handle is an alternate furnished only when specified

Sheraton Handle

Right hand No. 272 shown— Left hand No. 273

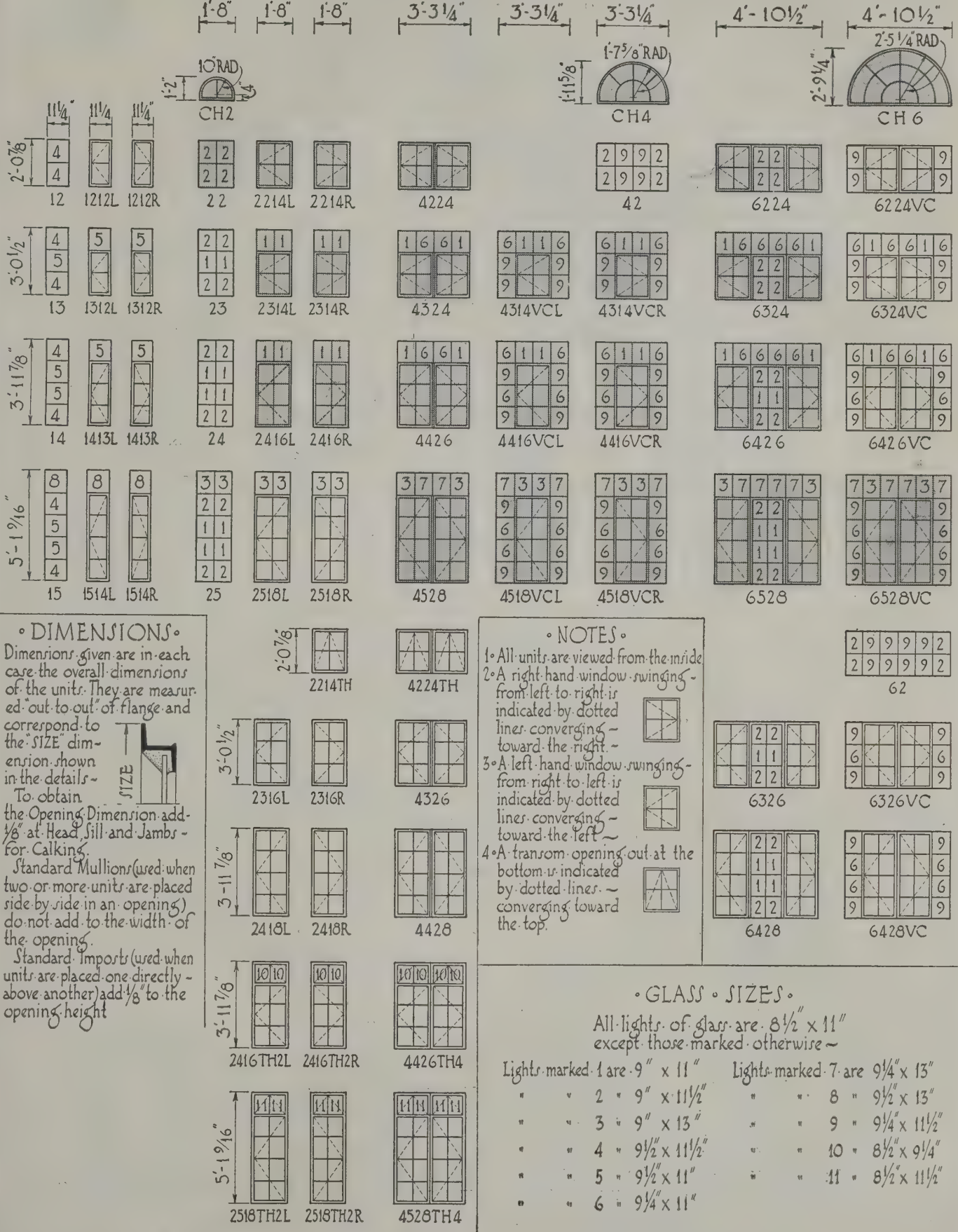
This bronze handle is an alternate furnished only when specified

Continued on next page

• RESIDENCE • CASEMENTS •

• STANDARD • TYPES • AND • SIZES •

• UNITS • SHADED • ARE • CARRIED • IN • STOCK •



• DIMENSIONS •

Dimensions given are in each case the overall dimensions of the units. They are measured "out to out" of flange and correspond to the "SIZE" dimension shown in the details.

To obtain the Opening Dimension add 1/8" at Head, Sill and Jambs for Calking.

Standard Mullions (used when two or more units are placed side by side in an opening) do not add to the width of the opening.

Standard Imposts (used when units are placed one directly above another) add 1/8" to the opening height

• NOTES •

1. All units are viewed from the inside
2. A right hand window swinging from left to right is indicated by dotted liners converging toward the right.
3. A left hand window swinging from right to left is indicated by dotted lines converging toward the left.
4. A transom opening out at the bottom is indicated by dotted lines converging toward the top.

• GLASS • SIZES •

All lights of glass are 8 1/2" x 11" except those marked otherwise.

Lights marked 1 are	9" x 11"	Lights marked 7 are	9 1/4" x 13"
" " 2 "	9" x 11 1/2"	" " 8 "	9 1/2" x 13"
" " 3 "	9" x 13"	" " 9 "	9 1/4" x 11 1/2"
" " 4 "	9 1/2" x 11 1/2"	" " 10 "	8 1/2" x 9 1/4"
" " 5 "	9 1/2" x 11"	" " 11 "	8 1/2" x 11 1/2"
" " 6 "	9 1/4" x 11"		

A special is an odd size between two less expensive standards

Continued on next page

RESIDENCE · CASEMENTS

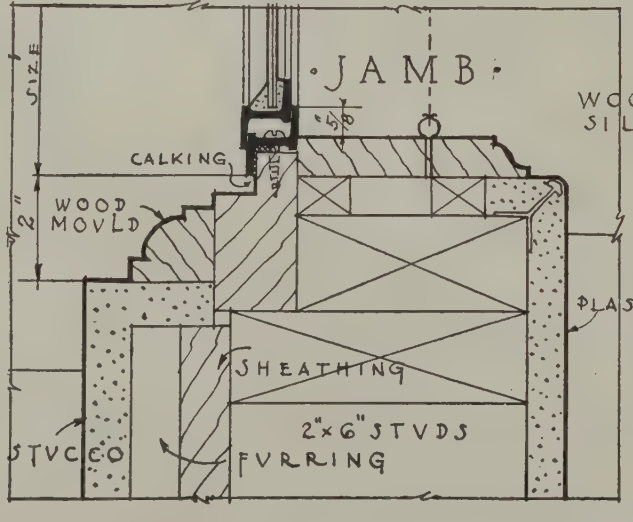
· DETAILS · OF · INSTALLATION · ~ ·

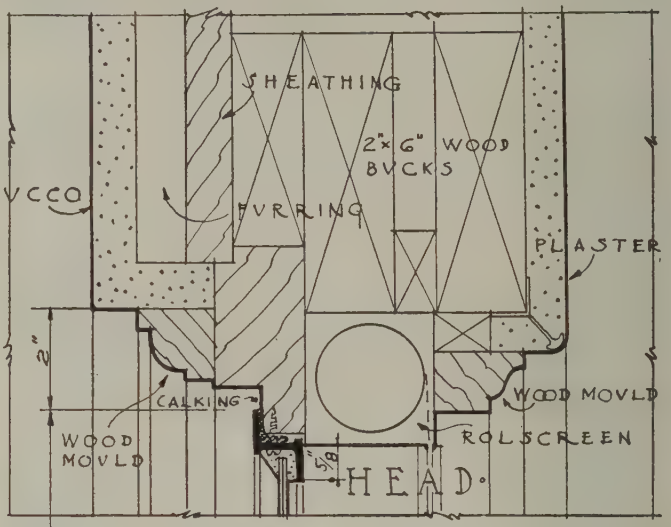
· SECOND · STORY · WINDOW · SCALE FOR DETAILS - 3" = 1'-0"

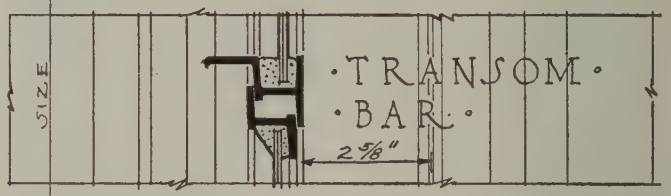
RESIDENCE · OF · MR · R · W · McKINNON · EVANSTON · ILLINOIS

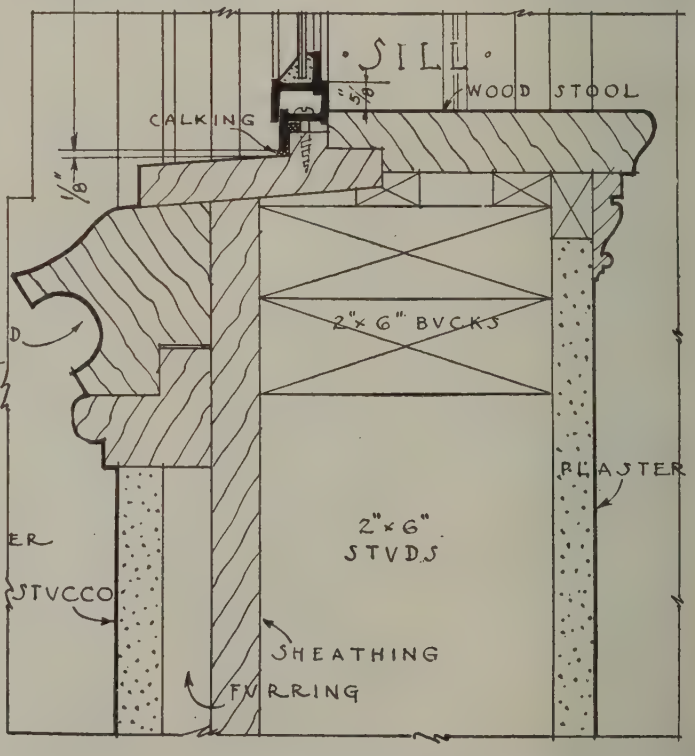
· ERNEST · MAYO & MAYO · ARCHITECTS

· ELEVATION ·
SCALE 1/4 INCH = 1 FOOT







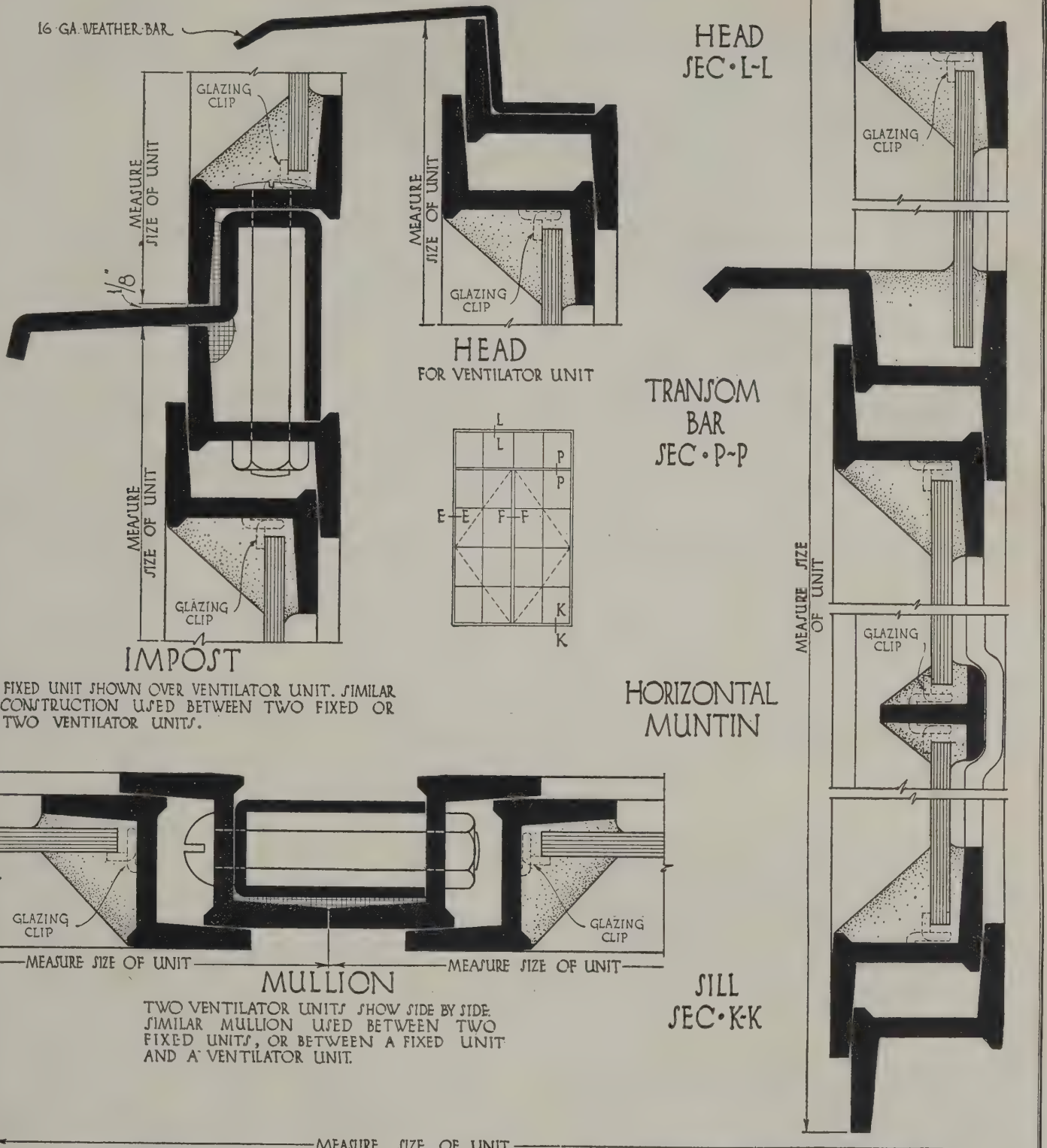


Standard and special sizes look alike in the walls. Save the difference in costs

LUPTON PAGE 35

Continued on next page

RESIDENCE · CASEMENTS · FULL · SIZE · SECTIONS ·



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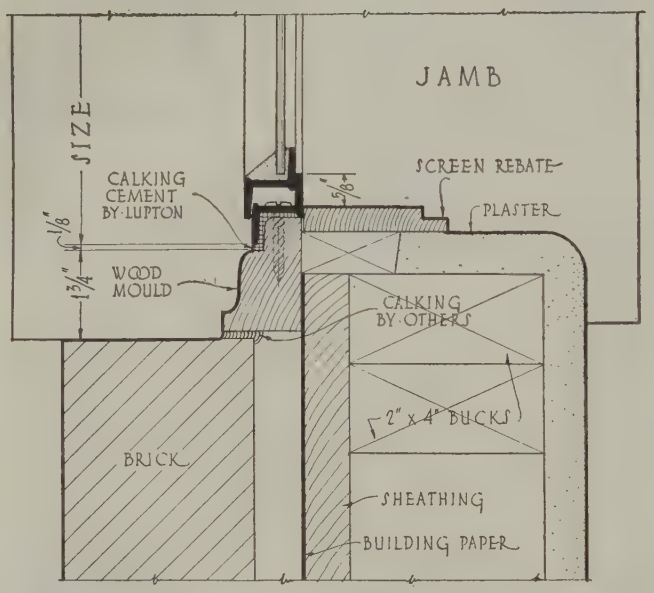
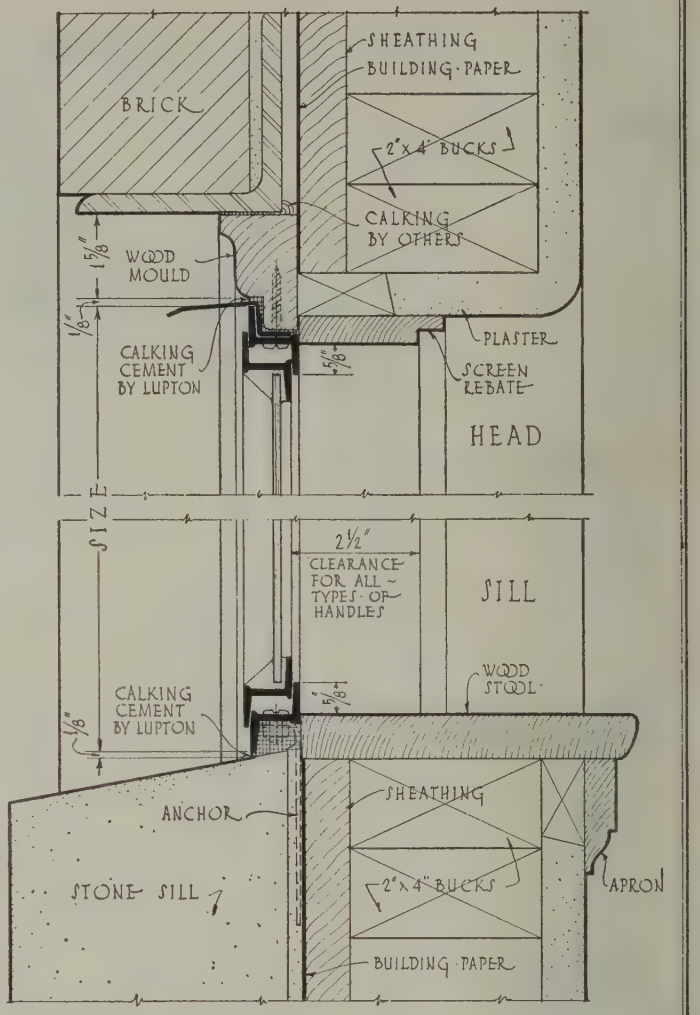
RESIDENCE · CASEMENTS

DETAILS · OF · INSTALLATION · SHOWING AN · EFFECTIVE · AND · INEXPENSIVE METHOD OF · INSTALLATION · USING · A · WOOD · MOULD DESIGNED · FOR · STEEL CASEMENTS

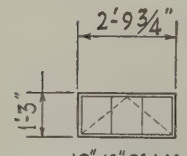
SCALE · FOR · DETAILS · 3" = 1'-0"



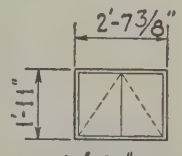


Lupton Basement Windows

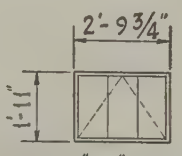
Lupton Basement windows are made of the same copper bearing rust resisting sections as Lupton Residence Casements. The members are mitered at the corners and solidly welded. The bottom rail of the ventilator is specially shaped to form a weathertight drip. Ventilators are easily removed by taking out the split pin in the hinge.



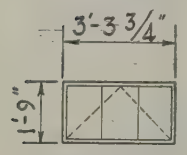
10"x12" GLASS
Code (Basalt)



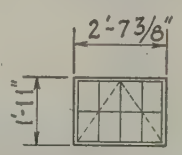
14"x 20" GLASS
Code (Basina)



10"x20" GLASS
Code (Baster)

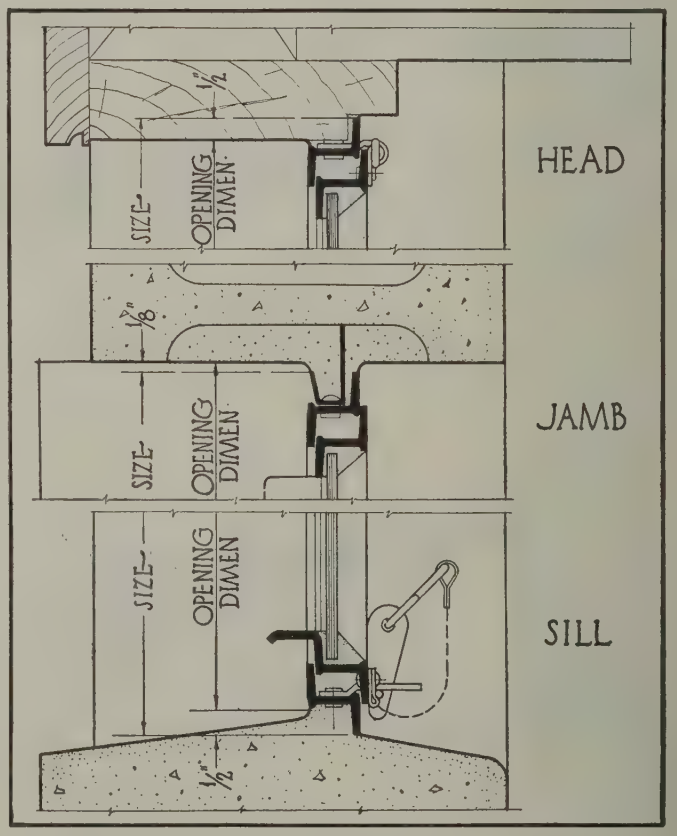


12"x18" GLASS
Code (Basely)



6 13/16" x 9 13/16" GLASS
Code (Security)

• NOTE •
• Dimensions given correspond to SIZE dimensions shown in details.
Opening dimensions are 1/4" greater in width and 1" smaller in height.



Detail of Basement Window in Concrete Block
Scale 3" = 1' 0"

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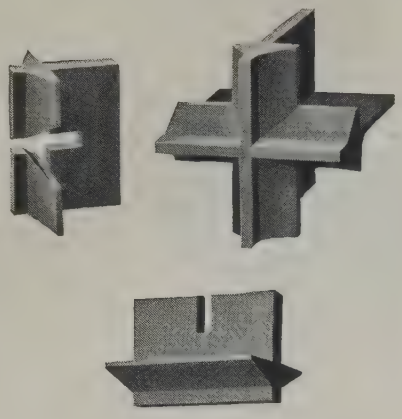
LUPTON STEEL PIVOTED WINDOWS

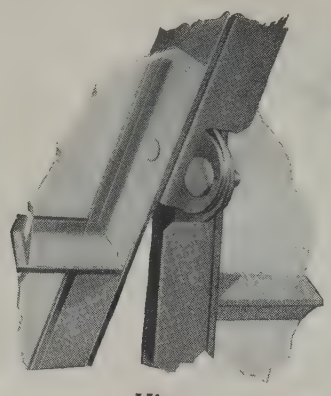
For Sidewalls of Industrial Buildings

Usually less expensive than corresponding areas of masonry wall, Lupton Pivoted Windows offer a satisfactory method of natural ventilating and daylighting of industrial buildings.

Types, sizes and designs presented in the following pages represent the standard practices of the steel window industry relative to this product. The sizes and ventilator arrangements listed are those which have been found to fill all of the ordinary requirements of building construction. Departures from standard practice should be avoided as they increase the cost and delay shipment.



Muntin Joint



Hinge

Two Points of Superiority of Lupton Pivoted Windows:

1. The design of the Lupton interlocking muntin joint combines most effective placing of metal with the least possible deformation. The greater the external pressure, the tighter is the lock of the intersecting members. This joint gives less opportunity for moisture to enter and cause corrosion.

2. The Lupton Hinge is integral with the weathering members, and is reinforced with steel plates riveted to the weathering members. There are no spacers, hence the hinge pins cannot sag.

SPECIFICATION FOR LUPTON STEEL PIVOTED WINDOWS

Work Included

1. Furnish where shown on drawings Lupton Steel Pivoted Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Lupton Pivoted Windows should be accurately listed and located either in schedules on plans or in specification. If more than one type of window, or more than one type of hardware be desired each type should be separately listed and located, or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop and installation drawings. These shall show scaled sections of windows and frame members, details of construction, hardware, anchoring, etc.

Materials

3. Sections shall be specially designed, hot-rolled, solid steel.

4. Frame members shall be angle sections, Lupton Standard shape.

5. Muntins shall be special cruciform section 1⅜" deep.

6. Vertical Mullions shall be hot-rolled, solid T-Bar section.

Note: Structural Steel Members forming Imposts are not furnished by the window manufacturer.

Construction

7. All Steel Pivoted Windows shall be designed for inside glazing.

8. Both Frames and Ventilators shall be assembled by tenoned, riveted joints at the corners. Continuous, two-point, flat contact weathering shall be provided between Ventilators and Frames.

9. Muntin Bars shall be continuous from top to bottom, and from side to side, between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked as not to decrease their ultimate strength at the intersection.

10. Vertical Mullions shall be provided with bolts for frame attachment where two or more windows are placed side by side in the same opening.

11. Structural Steel Clips shall be furnished to attach window to steel structure in types and lengths to cover all possible conditions.

12. Sill Anchor Clips shall be furnished. At least one clip shall be used for each two lights in the width of a unit.

13. All Ventilators shall be horizontally pivoted. Ventilator pivot shall be integral with weathering to insure permanent alignment. The pivot shall be located 2" above center. Ventilators shall be held in place at the pivots with 5/16" flat-head iron rivets and shall operate freely and easily.

Note: Pivot may be located at a different point if so specified. The window then becomes "special."

14. Universal Clips—An angle clip 1 5/16"x1"x2" long, shall be riveted to the ventilator frame.

Note: The Universal Clip allows any type of Lupton Pivoted Window hardware to be attached to the ventilator before or after glazing.

Hardware

15. All hardware (listed below) shall be shipped unattached, carefully packed to prevent damage until applied for use.

16. Provide steel clip to hold either stay bar or spring catch chain.

17. Provide steel stay bar where Ventilators are within reach from floor.

18. Provide steel spring catch, chain and chain roller guide where Ventilators are beyond reach from floor.

Mechanical Operators

Note: Mechanical operators are covered in a separate specification.

Erection

19. All Steel Pivoted Windows shall be erected by (state by whom), in prepared openings, unless otherwise specified.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Steel Pivoted Windows. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

20. Lupton Steel Pivoted Windows shall be set plumb and true, properly aligned and securely anchored before glazing. All Ventilators shall be properly adjusted before glazing.

21. All hardware shall be applied under window manufacturer's directions.

Painting

22. All windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven-dried.

Note: The following should be provided for in the paint specification: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required. It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the windows in order that it may not be painted over and cause imperfect contact.

Glass and Glazing

23. Furnish standard wire glazing clips, four to each light.

Note: Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

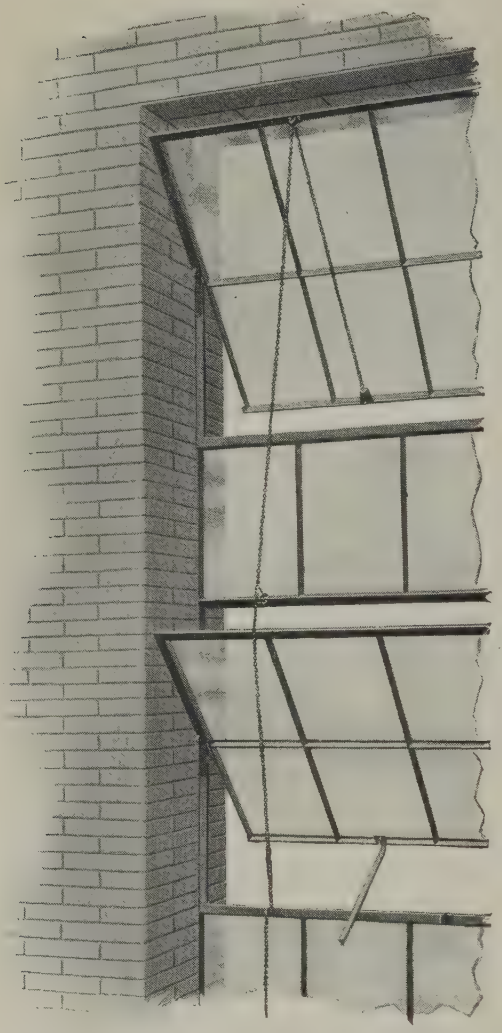
(c) Specify that Lupton Steel Pivoted Windows shall be glazed from the inside; that the glass shall be set in a bed of putty and secured by Lupton standard wire glazing clips, four to each light; and that the putty shall be applied in a neat, clean manner.

Note: Do not paint until putty has set. See paragraph headed Painting.

Use standard sizes for quicker deliveries—lower costs

Continued on next page

HARDWARE FOR LUPTON PIVOTED WINDOWS

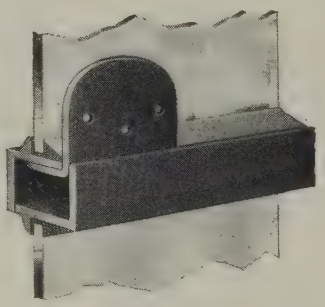


View Showing Two Ventilators in a Unit, One Above the Other

The lower ventilator is operated by Lupton Stay Bar, the upper by Spring Catch and Chain

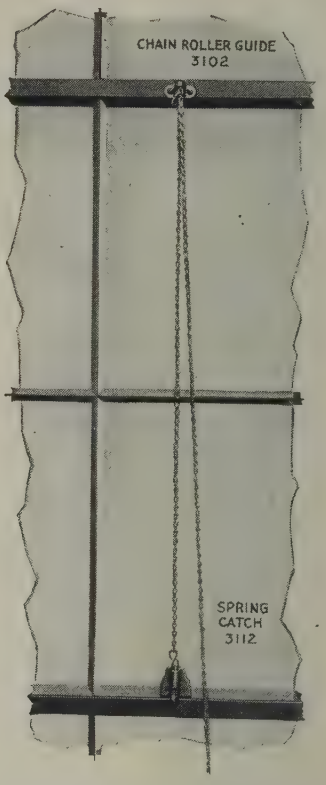
Clip No. 3018

Holds either Stay Bar or Chain



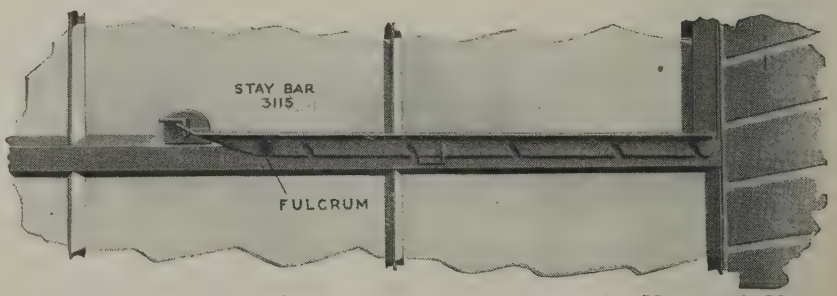
Universal Clip No. 3105

All Lupton Pivoted Windows are now equipped with the Universal Clip riveted to the ventilator. This clip permits the attaching of hardware after the windows are glazed



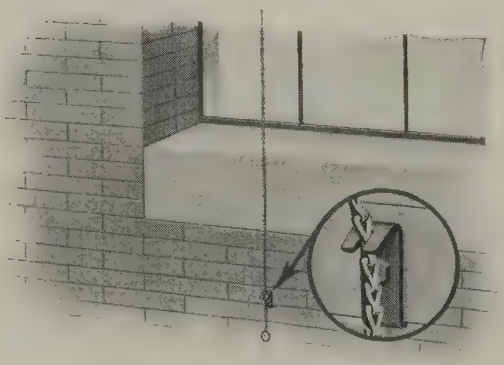
A Ventilator Operated by Lupton Spring Catch and Chain

View shows Chain Roller Guide attached to top member of ventilator and Spring Catch to bottom member. Spring Catch is mounted on the Universal Clip



Lupton Stay Bar in Closed Position Mounted on the Universal Clip

Near its attached end the Stay Bar is pressed out to form a fulcrum. The fulcrum causes the ventilator to be drawn up tightly against the frame and locked when the Stay Bar is inserted in the clip provided to hold it. Five notches are provided for holding the ventilator at various degrees of opening



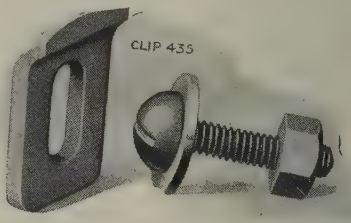
Wall Clip No. 2365

Used as alternate to Stay and Chain Holder No. 3018

Standard Lupton Wall Tie No. 2472

Used for anchoring windows at the sill in brick or concrete construction. It is shipped fastened flat against the frame of the window and is bent down at time of erection. It is approximately 4 in. long when bent.

Strap anchors for steel construction can be furnished in any length when conditions are known or length in flat is specified



Standard Lupton Clip No. 435

For attaching Section 308 to steel framing or to walls with anchor bolts

Continued on next page

Hardware

Where sill height is not specified, we supply Lupton Stay Bars with all single ventilators. A stay-bar is furnished with the lower ventilator of a unit having two ventilators. A Spring Catch and 12 ft. of Chain are furnished for the upper ventilator. Where sill height is specified we furnish Spring Catch and Chain operation only for ventilators whose bottom edges are more than 6 ft. above the floor. In this case or when specified a special clip No. 2365 is furnished to fasten the chain to the wall below the window. If for any reason Stay Bars are wanted on high windows or Spring Catches and Chains on low windows, that fact must be noted in the order. See illustrations, page 39.

Window Cleaners' Anchors: Where window cleaners' anchors are ordered, those made by the R. J. Dickey Window Cleaning Device Co., Columbus, Indiana, will be furnished, unless others are specified.

Ordering Standard Pivoted Windows

Standard and stock types and sizes are shown on page 41; details are shown on pages 44 and 45.

All windows departing in any particular from the sizes, types, details and specifications given here are special, require more time for delivery and cost more.

Underwriters' labeled windows in standard types and sizes are not special. See page 46 for Underwriter's requirements.

Orders for Dealer Stock Windows (shown shaded in diagram on page 41) can be filled immediately if we are given *complete* information.

Information required with order:

1. *Shipping date* desired (on non-stock sizes time must be allowed for assembling).

2. *Glass sizes.* (All Standard Windows including Dealer Stock are 12x18 in. and 14x20 in. glass sizes only.)

3. *Sizes of windows,* in number of lights wide and high. Always specify width (in number of lights) first. Use symbols given on page 41.

4. *Number of ventilators in each window,* also their size and location. Use symbols given on page 41.

5. *Number of window units in each opening.* This tells us how many mullions are required. See pages 41 and 42 for quick method of listing.

6. *Size of openings,* as a check on glass and window sizes. See table, page 43.

7. *Height of sill from floor.* This gives us the proper length of chains when chains are required, and tells us whether the lower ventilator should be operated by Chain or Stay Bar. See Hardware on page 39.

8. *Kind of wall fastenings required.* This depends on the construction of the walls—whether brick, concrete or steel; also on the method of attaching windows. It is necessary to give attachments in detail. To do this refer to page 44 and specify by the numbers in circles the details at head, jambs and sill which will be used.

Unless otherwise specified Wall Tie No. 2472 (shown on page 39) is furnished for anchoring at sill only.

The quantities of these wall fastenings supplied are as follows:

	For units 3 or 4 lights wide	For units 5 or 6 lights wide
At head	2 per unit	3 per unit
At sill	2 per unit	3 per unit

	For unit 1 light high	For unit 2, 3 or 4 lights high	For unit 5 or 6 lights high	For unit 7 lights high
At each jamb	1	2	3	4

When detail 79 is specified, and the steel contractor punches holes for No. 435 Clips, a clip is provided for each hole, otherwise clips are provided on approximately 2-ft. centers.

Special Windows

Although special windows are not recommended, it is sometimes necessary to use them. To order special windows use the same system of symbols as used for standard windows (explanation on page 41). Be sure to give the correct glass size as a check on the window dimension.

Window dimensions for Special Glass using angle frame member section 308 are figured as follows:

For single units, add 3/8 in. to the glass size (width or height as required) of each light. Multiply by the number of lights and add 7/8 in.

It is recommended that ventilators not exceeding four lights in width and two lights in height be used.

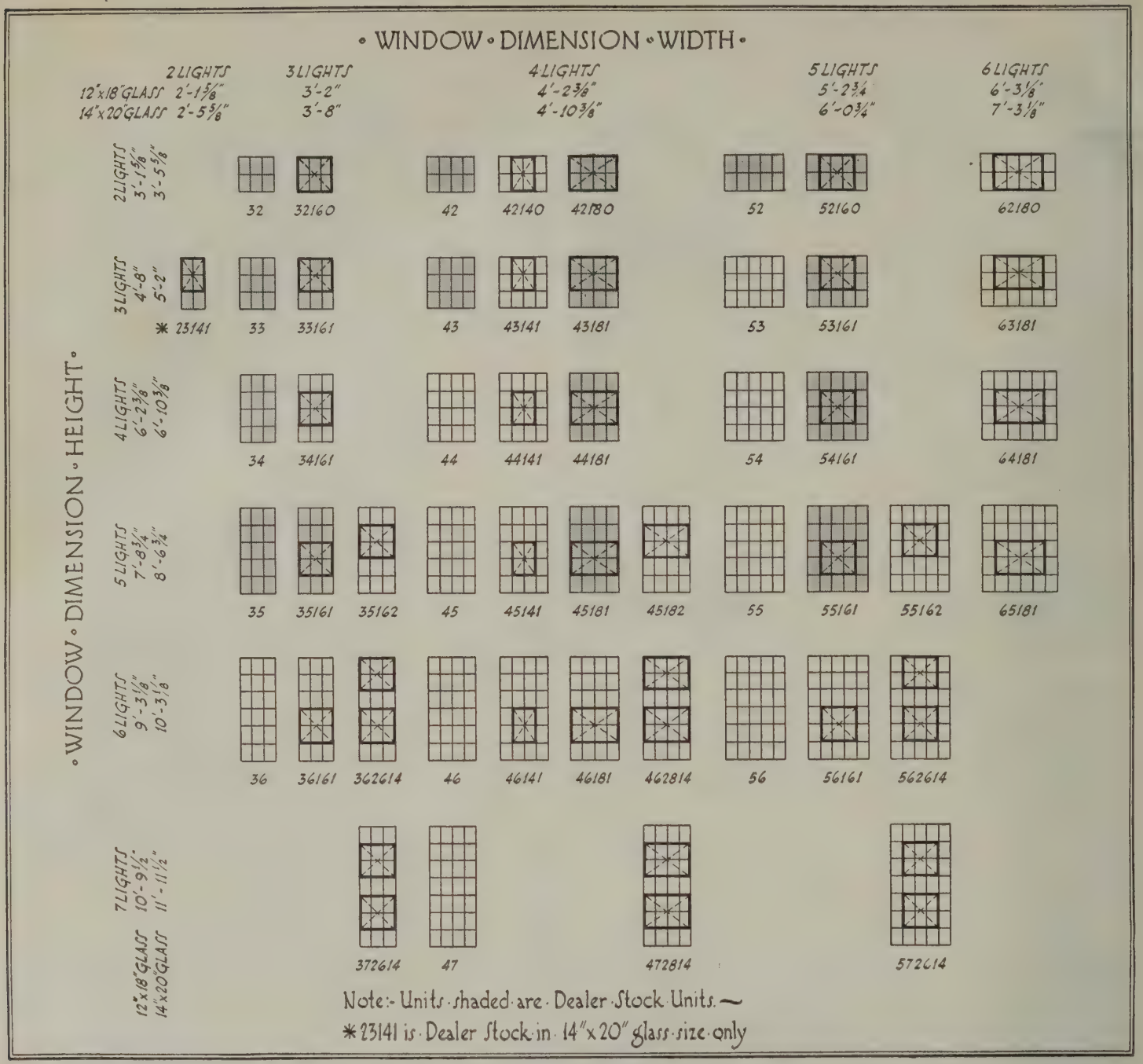
Single ventilators should not exceed 5 ft. 0 in. in width or 3 ft. 6 in. in height.

Use glass sizes for stationary lights when figuring opening sizes. Glass in border lights of ventilators is reduced 1 in. in height or width or both to allow for space taken by the weathering.

Erection

When Pivoted Windows are not erected by Lupton, the foreman in charge of erection should be thoroughly familiar with the correct method of installation. A booklet giving necessary erection data is furnished free.

Continued on next page



Standard Types and Sizes Lupton Pivoted Windows
Units shaded are dealer stock

Dealer Stock Windows

Dealer Stock Windows are the most used sizes of Lupton stationary and pivoted windows in 12 in. x 18 in. and 14 in. x 20 in. glass sizes. They are strictly standard in construction and are carried completely assembled and ready for shipment by Lupton sales representatives throughout the country.

Lupton Dealer Stock Windows should always be used where possible in preference to Standard, but non-stock sizes. They cost no more and can be delivered immediately from factory or warehouses.

Lupton Standard Windows include all those sizes and ventilator arrangements in common use. They are not assembled in advance nor kept in stock in warehouses, but large stocks of the cut bars are always carried in our factory ready for quick assembly.

Explanation of Symbol Numbers

The following information is given you so that you can intelligently order Lupton Pivoted Windows by following layouts shown on this and the next page.

Numerals of nomenclature indicate the following:
First numeral—number of lights wide.
Second numeral—number of lights high.
Third numeral—number of ventilators.
Fourth numeral—number of lights per ventilator.
Fifth numeral—number of stationary lights high between bottom of window and bottom of ventilator.
Sixth numeral—number of lights high between bottom or window and bottom of upper ventilator.

Use of Symbol Numbers in Ordering

The symbol number must always be preceded by the glass size. Standard glass sizes are 12 in. x 18 in. and 14 in. x 20 in. All others are special.

In addition to the glass size and the symbol required, the number of mullions, if any are required, must be indicated.

Examples: 14 in. x 20 in.—56 indicates a unit taking 14 in. x 20. in glass, 5 lights and 6 lights high stationary.

14 in. x 20 in.—45181 indicates a unit taking 14 in. x 20 in. glass, 4 lights wide and 5 lights high, having one 8 light ventilator with one light between the bottom of the ventilator and the sill.

12 in. x 18 in.—562614 indicates a unit taking 12 in. x 18 in. glass, 5 lights wide, 6 lights high, 2 six light ventilators, the lower ventilator one light above the sill and the upper ventilator 4 lights above the sill.

Units for multiple openings are ordered thus: 2 openings 3—12x18—46181 means that for each of 2 openings there is

For quick deliveries, use standard sizes

Continued on next page

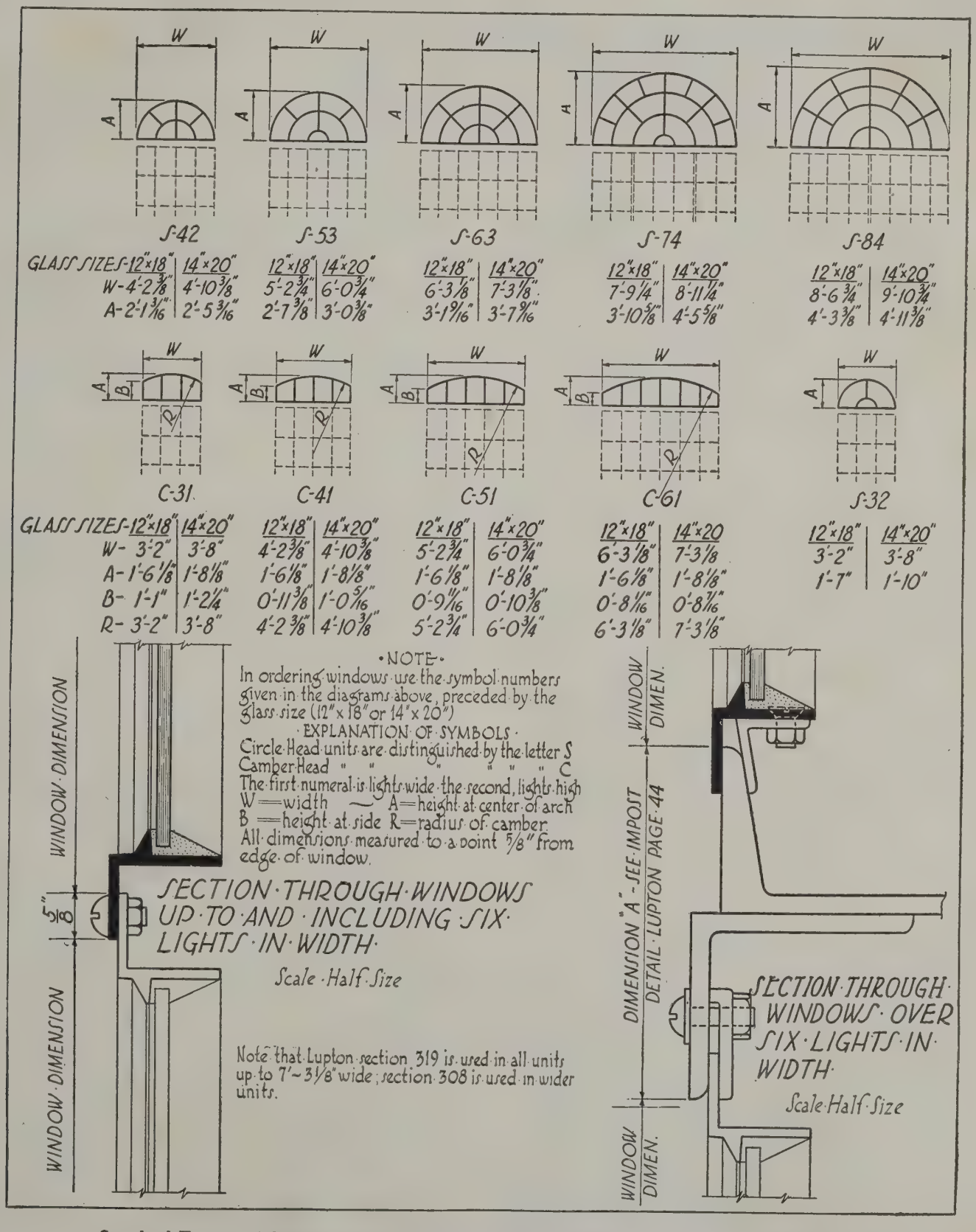
required 3 units taking 12 in. x 18 in. glass and having the window symbol 46181, this indicates that 2 mullion bars are required for each opening.

If more than one type of unit is required for a multiple opening, they must be listed separately, thus: One opening 2—12x18—36: 2—12x18—56181: 1—12x18—46183.

Camber and Circle Head Units

Standard Camber and Circle Head units shown below are made to fit above standard square head units taking 12 in. x 18 in. or 14 in. x 20 in. glass. Units other than those shown are special, require a longer time for fabrication and are higher priced. Units up to and including those 6 lights wide are bolted directly to the single square head unit below. Holes are punched in the flanges of the camber and circle head units for this purpose, but are not punched in the square head unit unless specified. Units over 6 lights wide are used above combinations of two or three square head units as indicated by the dash lines in the diagram and the impost detail for multiple unit openings shown on page 44 must be used.

In ordering always specify glass size (12 in. x 18 in. or 14 in. x 20 in.) as well as the number of the unit.



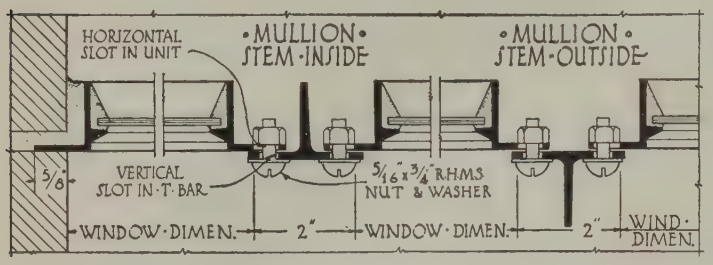
Standard Types and Sizes of Circle and Camber Head Units and Half Size Detail of Imposts

LUPTON PAGE 42

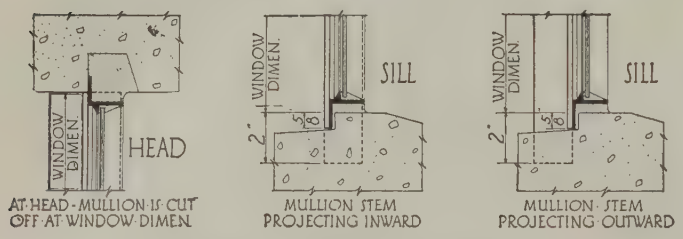
Continued on next page

Opening Dimensions

Window dimensions given in the diagram of sizes on page 41 are 1¼ in. less than overall dimensions of the unit and are measured to the points indicated in the details on page 44.



Details of Mullions



Details of Mullion Installation

Widths of Openings

The width of the opening for a single unit is identical with the window dimension of the unit.

The width of the opening for a multiple unit window is equal to the sum of the window-dimension-widths of the units plus 2 in. for each mullion. See detail on this page.

The table on this page gives opening dimensions obtainable with the various combinations of units. A handy celluloid slide scale for figuring heights and widths of window openings will be sent free on request.

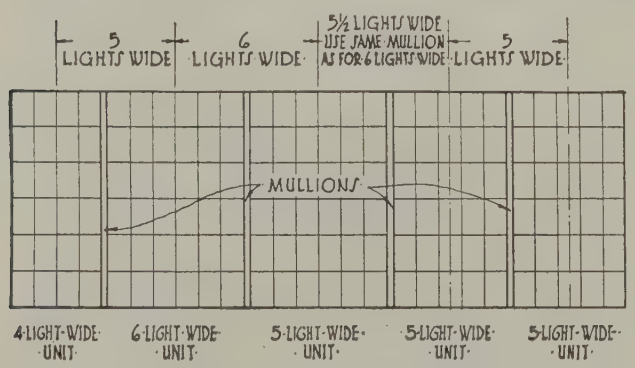
Limits of Heights of T Bar Mullions

I Up to { 5 lights wide x 4 lights high / or / 6 lights wide x 3 lights high } use { Section #121 with Stem Inside }

II Up to { 5 lights wide x 5 lights high / or / 6 lights wide x 4 lights high } use { Section #121 with Stem Outside }

III Up to 6 lights wide x 5 lights high use { Section #339 with Stem Inside }

IV Up to { 5 lights wide x 7 lights high / or / 6 lights wide x 6 lights high } use { Section #339 with Stem Outside }



Note: "Lights Wide" as used in the table above is considered as one-half the lights in the unit on the left of the mullion plus one-half the lights in the unit on the right of the mullion.

Mullions

Mullions are T bars, section 121 or 339 (see page 45). Flanges are always placed on the outside, but stems may project inside or outside as required for strength. See details and table on this page. Steel sills require that the stem always be placed outside.

Mullion is always cut off flush with the window dimension at the lintel. At the sill the standard cut is as shown in the drawing on this page. The flange stops flush with the bottom of the unit but the stem enters brick, concrete, tile and precast concrete sills to the depth of 1⅜ in. (2 in. from measuring point of window dimension).

When specified, the mullion stem can be cut off flush with the bottom of the window if it projects outside or, if the stem projects inside, it can be notched to clear the inside sill. It is advisable to cut mullions this way if the sill is of wood, or where it is not desired to provide grooves in cut stone sills for the mullion stems to enter.

Combinations of Standard Sizes Widths of Openings

12" x 18" Glass WIDTHS OF OPENINGS	Total Number of Units	NO. OF LIGHTS PER UNIT Position of each number indicates position of unit in opening	Total Number of Lights	Total Number of Mullions	14" x 20" Glass WIDTHS OF OPENINGS
2′ 1⅝″	1	2	2	None	2′ 5⅝″
3′ 2″	1	3	3	"	3′ 8″
4′ 2⅜″	1	4	4	"	4′ 10⅜″
5′ 2¾″	1	5	5	"	6′ 0¾″
6′ 3⅛″	1	6	6	"	7′ 3⅛″
6′ 6″	2	3, 3	6	1	7′ 6″
8′ 6¾″	2	4, 4	8	1	9′ 10¾″
9′ 10″	3	3, 3, 3	9	2	11′ 4″
10′ 7½″	2	5, 5	10	1	12′ 3½″
10′ 10⅜″	3	3, 4, 3	10	2	12′ 6⅜″
11′ 10¾″	3	3, 5, 3	11	2	13′ 8¾″
11′ 10¾″	3	4, 3, 4	11	2	13′ 8¾″
12′ 8¼″	2	6, 6	12	1	14′ 8¼″
12′ 11⅛″	3	4, 4, 4	12	2	14′ 11⅛″
13′ 11½″	3	4, 5, 4	13	2	16′ 1½″
13′ 11½″	3	5, 3, 5	13	2	16′ 1½″
14′ 11⅞″	3	4, 6, 4	14	2	17′ 3⅛″
14′ 11⅞″	3	5, 4, 5	14	2	17′ 3⅛″
15′ 2¾″	4	3, 4, 4, 3	14	3	17′ 6¾″
16′ 0¼″	3	5, 5, 5	15	2	18′ 6¼″
16′ 0¼″	3	6, 3, 6	15	2	18′ 6¼″
17′ 0⅝″	3	5, 6, 5	16	2	19′ 8⅝″
17′ 0⅝″	3	6, 4, 6	16	2	19′ 8⅝″
17′ 3½″	4	4, 4, 4, 4	16	3	19′ 11½″
18′ 1″	3	6, 5, 6	17	2	20′ 11″
19′ 1⅜″	3	6, 6, 6	18	2	22′ 1⅜″
19′ 4¼″	4	3, 6, 6, 3	18	3	22′ 4¼″
19′ 4¼″	4	4, 5, 5, 4	18	3	22′ 4¼″
20′ 7½″	5	5, 3, 3, 3, 5	19	4	23′ 9½″
21′ 5″	4	5, 5, 5, 5	20	3	24′ 9″
21′ 5″	4	4, 6, 6, 4	20	3	24′ 9″
21′ 7⅞″	5	4, 4, 4, 4, 4	20	4	24′ 11⅞″
22′ 8¼″	5	4, 4, 5, 4, 4	21	4	26′ 2¼″
22′ 8¼″	5	3, 5, 5, 5, 3	21	4	26′ 2¼″
23′ 5¾″	4	5, 6, 6, 5	22	3	27′ 1¾″
23′ 8⅝″	5	5, 4, 4, 4, 5	22	4	27′ 4⅝″
23′ 11½″	6	3, 4, 4, 4, 4, 3	22	5	27′ 7½″
24′ 9″	5	4, 5, 5, 5, 4	23	4	28′ 7″
25′ 6½″	4	6, 6, 6, 6	24	3	29′ 6½″
25′ 9⅜″	5	3, 6, 6, 6, 3	24	4	29′ 9⅜″
26′ 0¼″	6	4, 4, 4, 4, 4, 4	24	5	30′ 0¼″
26′ 9¾″	5	5, 5, 5, 5, 5	25	4	30′ 11¾″
27′ 10⅛″	5	5, 5, 6, 5, 5	26	4	32′ 2⅛″
28′ 1″	6	5, 4, 4, 4, 4, 5	26	5	32′ 5″
28′ 1″	6	3, 5, 5, 5, 5, 3	26	5	32′ 5″
28′ 10½″	5	6, 5, 5, 5, 6	27	4	33′ 4½″
29′ 10⅞″	5	5, 6, 6, 6, 5	28	4	34′ 6⅞″
30′ 1¾″	6	4, 5, 5, 5, 5, 4	28	5	34′ 9¾″
30′ 11¼″	5	6, 6, 5, 6, 6	29	4	35′ 9¼″

Heights of Openings

12" x 18" Glass Lights High	Height of Openings	14" x 20" Glass Lights High	Height of Openings
1	1′ 7¼″	1	1′ 9¼″
2	3′ 1⅝″	2	3′ 5⅝″
3	4′ 8″	3	5′ 2″
4	6′ 2⅜″	4	6′ 10⅜″
5	7′ 8¾″	5	8′ 6¾″
6	9′ 3⅛″	6	10′ 3⅛″
7	10′ 9½″	7	11′ 11½″

Continued on next page

Heights of Openings

The height of the opening required for a unit is considered as identical with the window dimension height. The outside face of the sill member, however, must be left uncovered as shown in details so that water may drain away from the window.

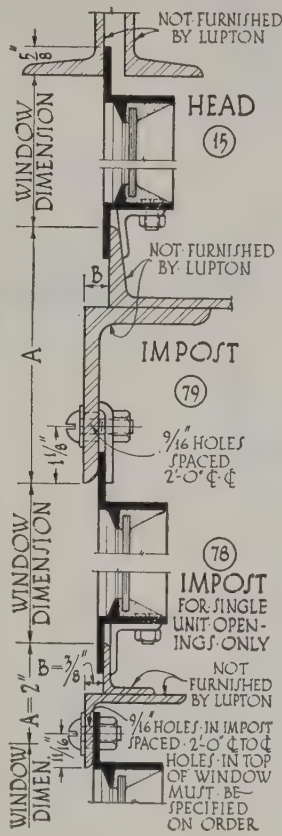
Imposts

Where units are placed one above the other imposts of structural steel, not furnished by Lupton, are to be used. Designs are given on this page.

Where circle head or camber head units are placed above regular units, structural steel imposts are not required unless the window is over 6 lights wide.

12"x18" GLASS No. OF LIGHTS WIDE	DESIGN OF IMPOST	A DIM.	B DIM.	14"x20" GLASS No. OF LIGHTS WIDE
USED FOR SINGLE UNIT OPENINGS ONLY				
3 TO 6	TWO ANGLES ONE 2"x1½"x3/16" ONE 1"x1"x⅛"	2"	⅜"	3 TO 6
USED FOR BOTH SINGLE & MULTIPLE UNIT OPGS.				
3 TO 9	TWO ANGLES 2½"x2½"x3/16"	5"	⅜"	3 TO 8
10 TO 13	TWO ANGLES 2½"x2½"x3/16" ONE 6"x¼" PLATE —OR— ONE 4" CHANNEL ONE ANGLE— 3½"x2½"x¼"	5¼"	⅜"	9 TO 11
		5¼"	½"	
14 TO 18	TWO ANGLES 3"x3"x5/16" ONE 6"x¼" PLATE —OR— ONE 6" CHANNEL ONE ANGLE— 4"x3"x5/16"	6⅛"	½"	12 TO 16
		6⅛"	½"	

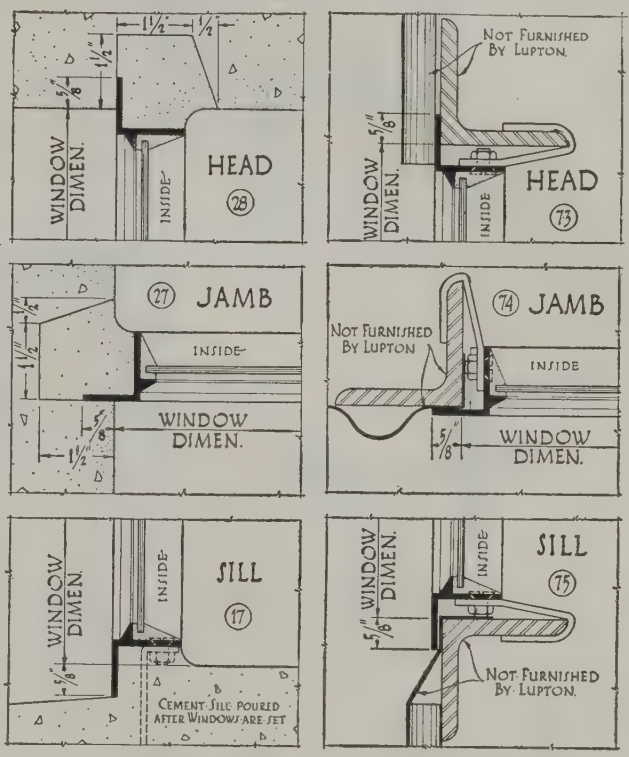
DEAD LOAD OF WINDOW & IMPOST TO BE SUPPORTED BY TIE RODS HUNG FROM BUILDING LINTEL AND ATTACHED TO IMPOST AT MULLION POINTS. TIE RODS NOT FURNISHED BY LUPTON.

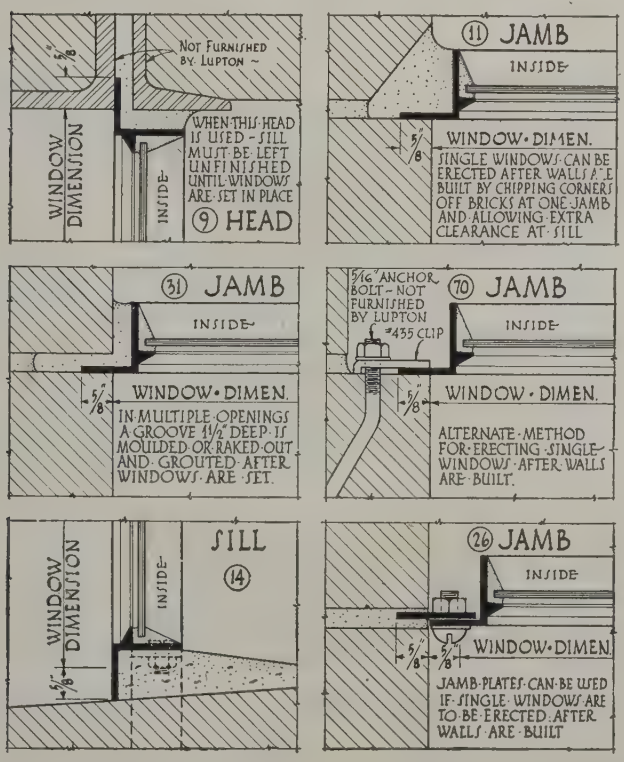


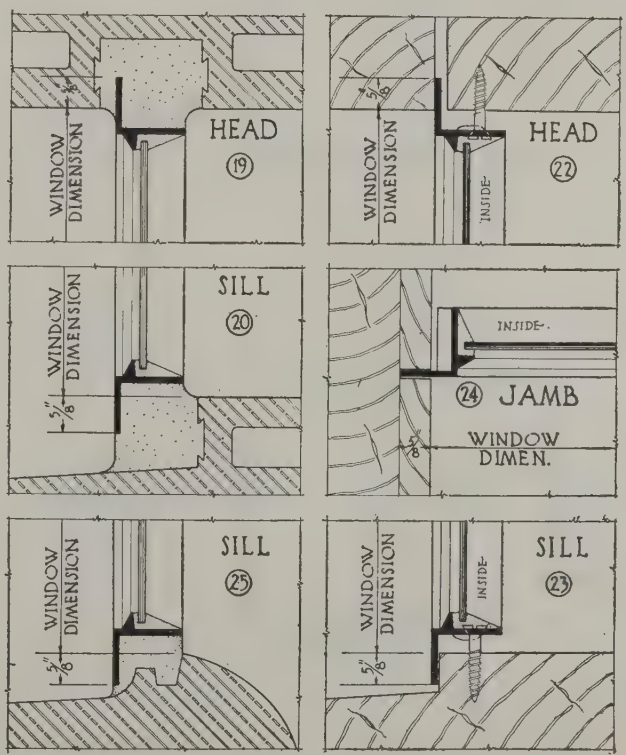
Glass Sizes

Lights in stationary sections of Standard Window and Dealer Stock units are the full 12 in. x 18 in. or 14 in. x 20 in. size. The outside lights of all ventilators whether standard or special, are reduced 1 in. in width or height, or both, to allow for the space taken by the weathering around the ventilators. The diagram at right is typical of a unit using 14 in. x 20 in. glass, and shows the reduction in glass size in the ventilator. Other glass sizes are reduced in a similar way.

14/20	14/20	14/20	14/20	14/20
14/20	13/19	14/19	13/19	14/20
14/20	13/19	14/19	13/19	14/20
14/20	14/20	14/20	14/20	14/20







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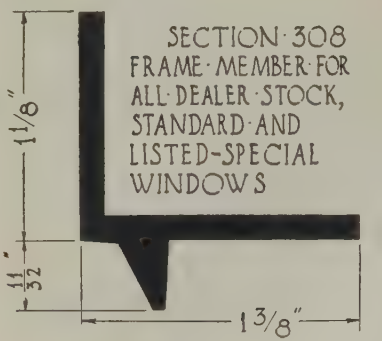
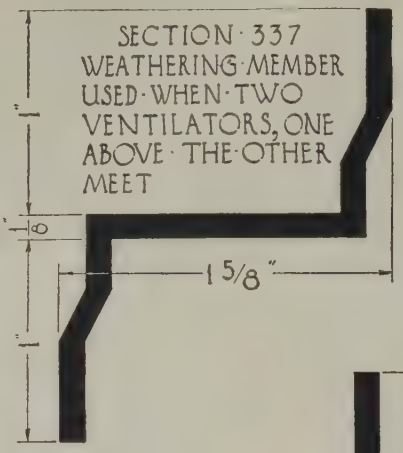
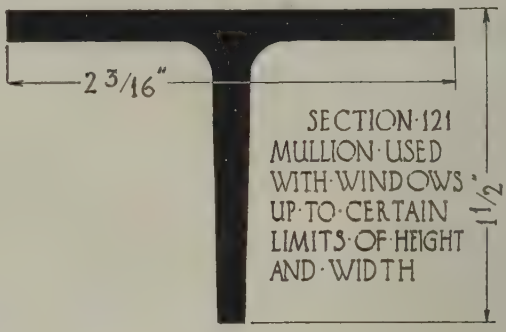
LUPTON · PIVOTED · WINDOWS
· FULL · SIZE · SECTIONS ·



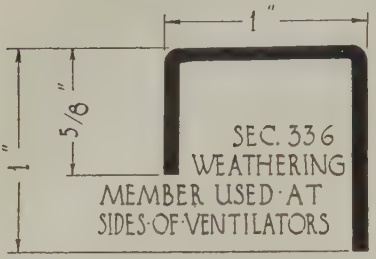
SECTION · 308
FRAME · MEMBER · FOR ALL · DEALER · STOCK, STANDARD · AND LISTED-SPECIAL WINDOWS



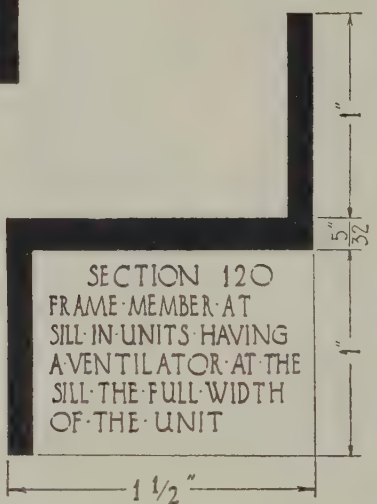
SECTION · 337
WEATHERING · MEMBER USED · WHEN · TWO VENTILATORS, ONE ABOVE · THE · OTHER MEET



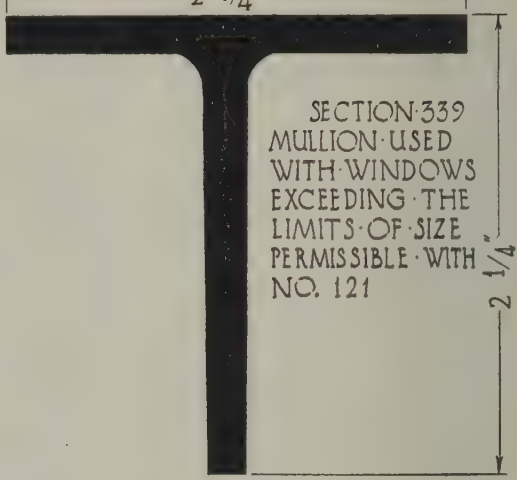
SECTION · 121
MULLION · USED WITH · WINDOWS · UP · TO · CERTAIN LIMITS · OF · HEIGHT AND · WIDTH



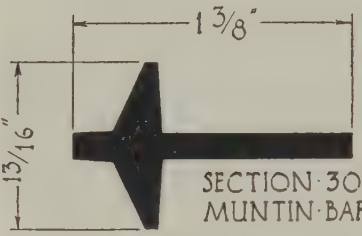
SEC. 336
WEATHERING MEMBER USED · AT SIDES · OF · VENTILATORS



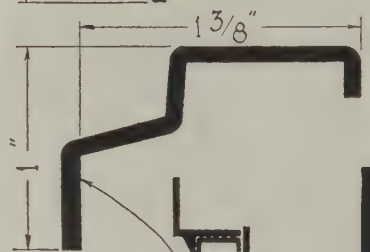
SECTION 120
FRAME · MEMBER · AT SILL · IN · UNITS · HAVING A · VENTILATOR · AT · THE SILL · THE · FULL · WIDTH OF · THE · UNIT



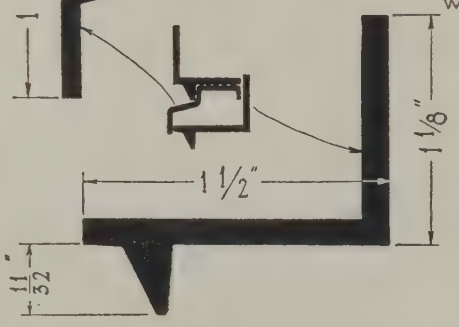
SECTION · 339
MULLION · USED WITH · WINDOWS EXCEEDING · THE LIMITS · OF · SIZE PERMISSIBLE · WITH NO. 121



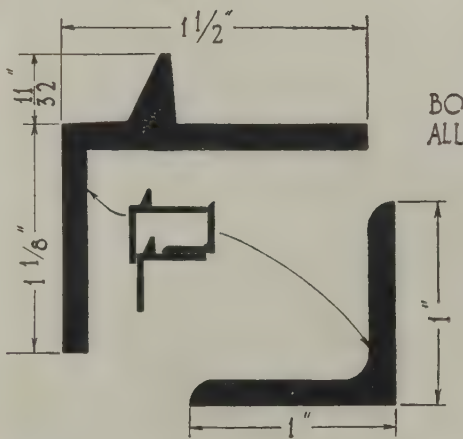
SECTION · 300
MUNTIN · BAR



SECTION · 335
WEATHERING · MEMBER USED · WHEN · VENTILATOR OCCURS · AT · TOP · OF WINDOW



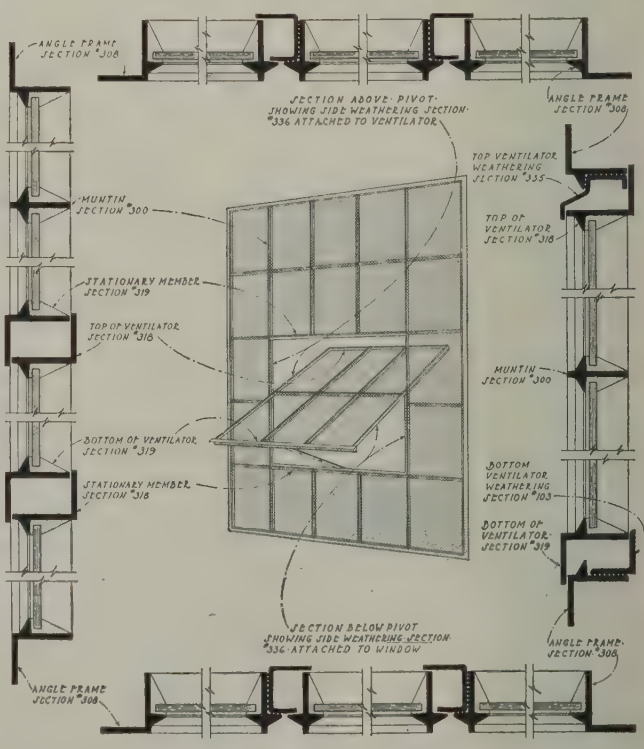
SECTION · 318
TOP · RAIL · OF · ALL VENTILATORS



SECTION · 319
BOTTOM · RAIL · OF ALL · VENTILATORS

SECTION · 103
WEATHERING · MEMBER USED · WHEN · VENTILATOR OCCURS · AT · BOTTOM OF · WINDOW

CONSTRUCTION · OF · WINDOW



For lower costs use standard sizes

LUPTON PAGE 45

Continued on next page

LUPTON UNDERWRITERS' PIVOTED WINDOWS

Lupton PHILADELPHIA UNDERWRITERS LABORATORIES, INC. INSPECTED FIRE WINDOW FRAME NO.S. A 100

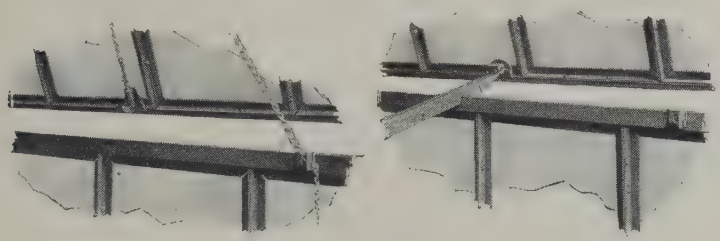
Important: Lupton Underwriters' Pivoted Windows are furnished only when specified in bid and mentioned in contract

Wherever wire glass is used for fire protection it is advisable to specify Underwriters' Windows and have the Underwriters' Label. This insures that the full measure of safety intended is actually secured.

Lupton Dealer Stock and Standard Windows of prescribed sizes may be converted into Underwriters' Windows by the addition of glazing angles and the special hardware illustrated on this page.

As all the members are standard, orders for Lupton Underwriters' Windows can be filled from bars in factory stock, subject only to the delay for adding the hardware and glazing angles. This is the most economical way to buy Underwriters' Windows. Such orders can usually be filled promptly after receipt of complete information.

Where immediate delivery is essential, Dealer Stock Windows can be altered at our Philadelphia, Cleveland and Chicago Warehouses, at a slight extra cost, to receive the special glazing angles and hardware before shipment. *Windows cannot be altered to receive Underwriters' Label after shipment.*



Spring Catch and Stay Bar

Former has fusible link in chain. Latter may be used instead of Catch and Chain, subject to approval of local inspection boards

It is important that the following information be given with the order:

1. Groupings of units in masonry openings. By this is meant the number and size of units in each masonry opening.

2. Detail of head, sill and jamb conditions on single unit openings as well as multiple openings.

The grouping of units is necessary as the allowable width of unit is less in a multiple opening than in a single opening.

The details at head, sill and jamb are necessary so that proper connections of window and mullions to the opening can be furnished.

This information is demanded by the Underwriters and the labeling of windows is held up by the inspector until this information is given to him.

The Underwriters' Requirements

Following are the Underwriters' Laboratories' specifications, in condensed form, so far as they apply to pivoted windows:

1. Single Window units cannot exceed 84 sq. ft. in area, with neither dimension exceeding 12 ft. When mullions are used, each window unit cannot exceed 7 ft. in width or 12 ft. in height.

2. The exposed glass area must not exceed 350 sq. in. in any light, measured from toe to toe of the glazing angles. (Standard sizes are less than this.) One-quarter in. wire glass is always required.

3. In addition to putty, the lights are held by steel glazing angles measuring ½ in. x $\frac{9}{16}$ in.: the long leg bears against the glass. The angles are held by steel screws.

4. Not more than two ventilators may be used in any window unit.

5. The hinge is of standard Lupton design and construction.

6. Spring catches are of standard Lupton construction. The catch is at the bottom of the ventilator, so that its own weight tends to engage it if the spring fails. The chain passes over a standard roller at the top of the ventilator.

7. The chain must contain a fusible link. When the link fuses, the ventilator closes and locks automatically.

8. With the approval of the local inspection board, stay bars for manual operation may be used instead of spring catches and fusible links.

9. Mullions must be Lupton Section 339 and must be anchored at head and sill, either by projecting into the masonry, or by angle clips furnished to suit the construction of the building.

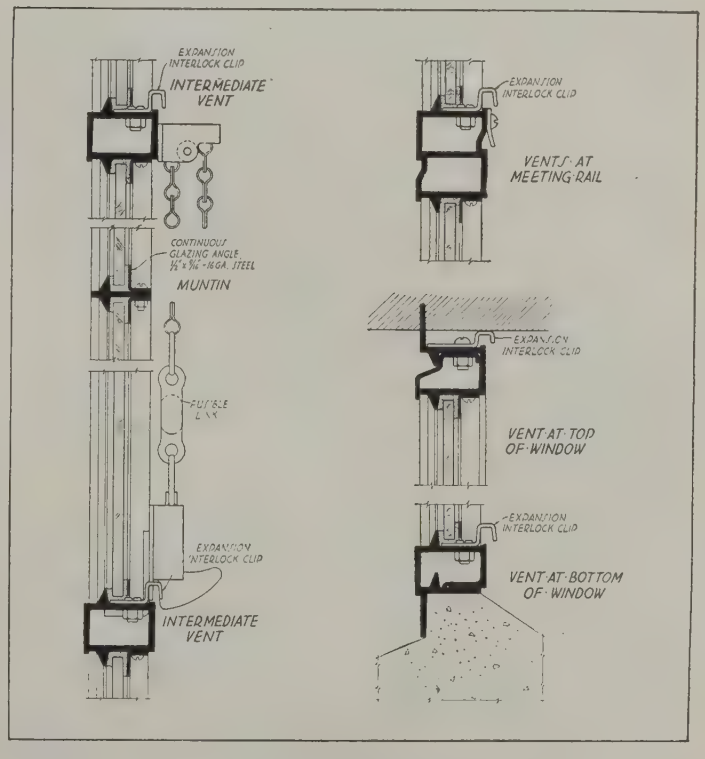
10. Lupton Wall Ties No. 2472, or other wall ties not less than 4 in. long are required at brick and concrete sills.

11. Expansion clips must be used at the top and bottom rails of all ventilators. These clips serve as an additional locking feature in case of fire.

12. One stop lug per ventilator must be used to limit opening of ventilator to 135°. (On Lupton windows this lug is made integral with the filler plate at the pivot.)

13. Curved or splayed head units cannot be labeled.

Note: *There is no restriction on the over-all width of an opening, provided the mullions and window units conform to the above specifications.*



Details Showing Expansion Clips and Fusible Links for Underwriters' Pivoted Windows

Scale 3" = 1' 0"

Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

Continued on next page

LUPTON COMMERCIAL PROJECTED WINDOWS

For Sidewalls of Industrial Buildings

Commercial Projected Windows in construction and application are essentially the same as Lupton Pivoted Windows. The ventilators, however, have the Lupton Projected movement. The ventilators are balanced by means of friction shoes to swing out at bottom and remain open in any reasonable position, without the use of stay bar or adjuster. Some of the standard units shown on page 48 have a small ventilator at the sill opening in-at-top and acting as a windshield when open. All wall details, mullion details and impost details as well as wall opening sizes are same as for pivoted windows.

SPECIFICATION FOR LUPTON COMMERCIAL PROJECTED WINDOWS

Work Included

1. Furnish and install where shown on drawings Lupton Commercial Projected Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Note: All Lupton Commercial Projected Windows should be accurately listed and located either in schedules on plans or in specification. If more than one type of window or more than one type of hardware be desired, each type should be separately listed and located, or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop and installation drawings. These shall show scaled sections of windows and frame members, details of construction, hardware, anchoring, etc.

Materials

3. Sections shall be of specially designed, hot rolled, solid steel.

4. Frame Members shall be angle sections, Lupton Standard shape.

5. Muntins shall be special cruciform section 1⅜ in. deep.

6. Vertical mullions shall be hot-rolled, solid T-Bar section.

Note: Structural Steel members forming imposts are not furnished by the window manufacturer.

Construction

7. All Commercial Projected Windows shall be designed for inside glazing.

8. Both frames and ventilators shall be assembled by tenoned, riveted joints at the corners. Two corners of the ventilator shall be welded. Continuous, two point flat contact weathering shall be provided between ventilators and frames.

9. Muntin bars shall be continuous from top to bottom, and from side to side, between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked as not to decrease their ultimate strength at the intersection.

10. Vertical mullions shall be provided with bolts for frame attachment where two or more windows are placed side by side in the same opening.

11. Structural Steel Clips shall be furnished to attach window to steel structure in types to cover all possible conditions.

12. Sill anchor clips shall be furnished. At least one clip shall be used for each two lights in the width of a unit.

13. Each Ventilator shall be accurately pivoted on two Ventilator Arms of solid steel. The connections between the Ventilator Arms and the Window Frames shall be made by steel arm blocks.

14. Each Ventilator shall be equipped with two brass friction shoes, sliding vertically in the Ventilator Jambs to guide the Ventilator and prevent rattling. Each shoe shall be equipped with a rust-proofed, flat steel spring attached to the Ventilator to insure constant pressure at the Jambs.

15. Universal Clips—An angle clip 1⅛ in. x 1 in. x 2 in. long shall be riveted to the ventilator frame.

Note: The Universal Clip allows any type of Lupton Commercial Projected Window hardware to be attached to the ventilator before or after glazing.

Hardware

16. All hardware (listed below) shall be of malleable iron and shall be shipped unattached, carefully packed to prevent damage until applied for use.

17. Provide the following hardware:

For open out ventilators—Ring Type Cam Handle and Pull Down Ring.

For open in ventilators—within reach from floor—Cam Handle with straight grip.

For open in ventilators—beyond reach from floor—Spring catch.

Erection

18. All Commercial Projected Windows shall be erected by window contractor in prepared openings, unless otherwise specified.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Commercial Projected Windows. All grouting, pointing, etc. should be done by the mason contractor after the windows are set.

19. Lupton Commercial Projected Windows shall be set plumb and true, properly aligned and securely anchored before glazing. All ventilators shall be properly adjusted before glazing.

20. All hardware shall be applied under manufacturer's directions.

Painting

21. All windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven-dried.

Note: The following should be provided for in the paint specification: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing, to allow putty to set. One or more additional coats may then be applied as required. It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the windows in order that it may not be painted over and cause imperfect contact.

Glass and Glazing

22. Furnish standard wire glazing clips, four to each light.

Note: Specify glass and glazing under proper heading elsewhere in specification.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

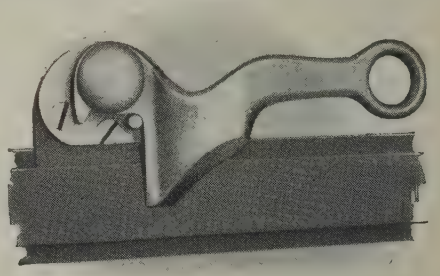
(c) Specify that Lupton Commercial Projected Windows shall be glazed from the inside; that the glass shall be set in a bed of putty and secured by Lupton standard wire glazing clips, four to each light, and that the putty shall be applied in a neat, clean manner.

Note: Do not paint until putty has set. See paragraph headed Painting.

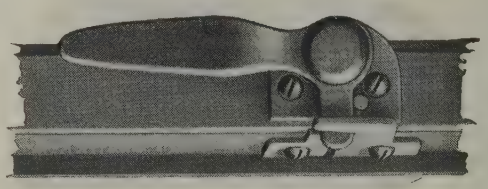
STANDARD HARDWARE

The following standard hardware of malleable iron, galvanized finish, will be furnished unless otherwise specified.

Pull-down Ring No. 151
Used at top of all Bottom-projected-out Ventilators



Ring Type Cam Handle No. 141
Used at bottom of all Bottom-projected-out Ventilators, mounted on universal clip



Right Hand Cam Handle No. 308
Used at top of Projected-in-at-top Ventilators

Hardware Alternates

Furnished only when specified. Numbers given are for malleable iron, galvanized.

Continued on next page

For Projected-In-at-Top Ventilators beyond reach from floor—Spring Catch No. 5, Keeper No. 7.

For Bottom-Projected-Out Ventilators beyond reach from floor—Spring Catch No. 3.

For Bottom-Projected-Out Ventilators beyond reach from floor—Chain roller guides No. 152 and No. 153 used with Spring Catch No. 3, instead of a Pull-down Ring.

Bronze hardware in standard or alternate types can be furnished at added cost when specified.

STANDARD SIZES

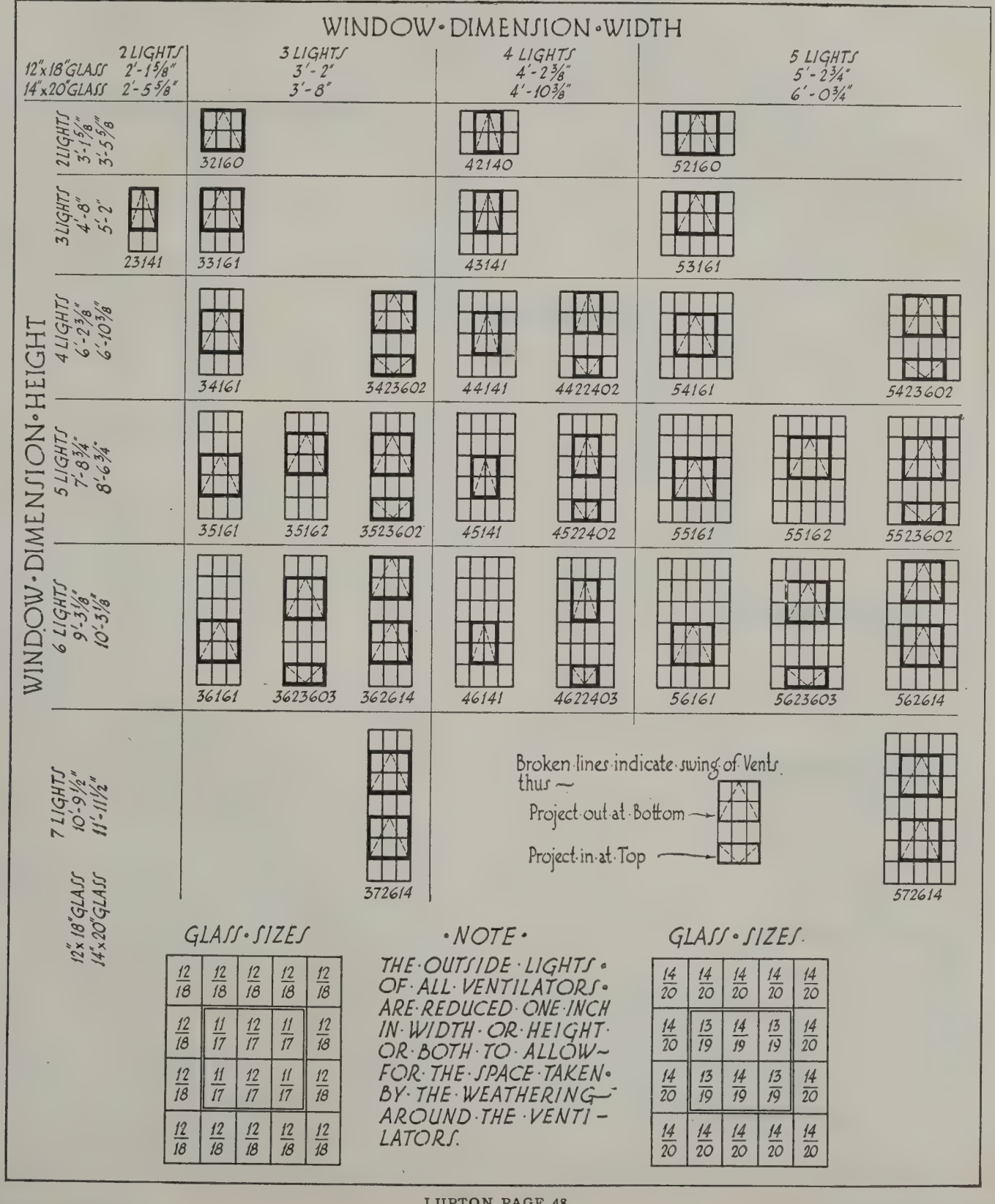
Dimensions for Commercial Projected Windows conform to dimensions for Pivoted Windows of the same glass size and number of lights.

In ordering always give the glass size (12 in. x 18 in. or 14 in. x 20 in.) followed by the symbol number which appears under the unit in the diagram below.

Explanation of Symbol Numbers and their *Use in Ordering* are given on Lupton page 41.

Note: The symbol numbers are the same as for Pivoted Windows except in the case of a unit having two ventilators of different sizes an extra numeral is inserted after the fourth numeral to indicate the number of lights in the upper ventilator.

For example—4522402 would indicate a unit having: 4 lights wide, 5 lights high, 2 ventilators, 2 lights in the lower vent, 4 lights in the upper vent, lower vent at sill, upper vent 2 lights from sill.



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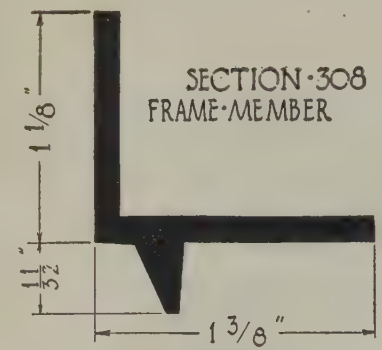
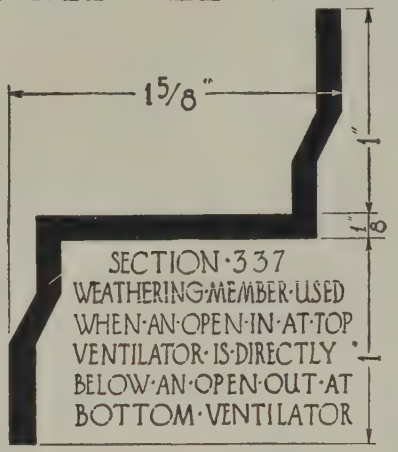
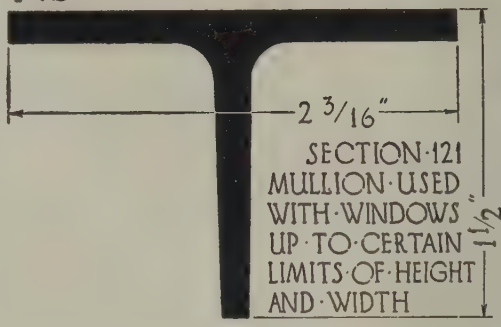
COMMERCIAL · PROJECTED · WINDOWS · FULL · SIZE · SECTIONS ·



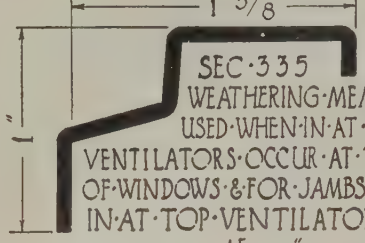
SECTION · 308
FRAME · MEMBER



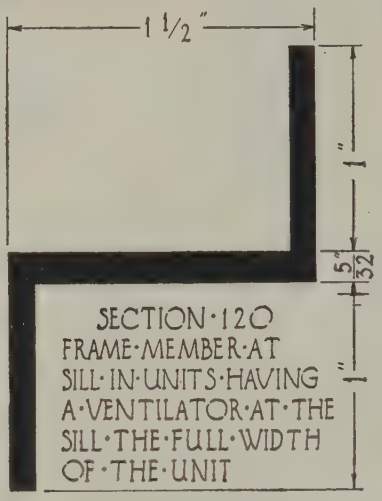
SECTION · 337
WEATHERING · MEMBER · USED WHEN · AN · OPEN · IN · AT · TOP VENTILATOR · IS · DIRECTLY BELOW · AN · OPEN · OUT · AT BOTTOM · VENTILATOR



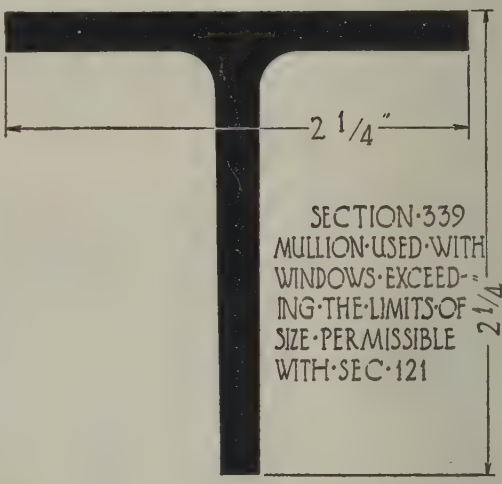
SECTION · 121
MULLION · USED WITH · WINDOWS UP · TO · CERTAIN LIMITS · OF · HEIGHT AND · WIDTH



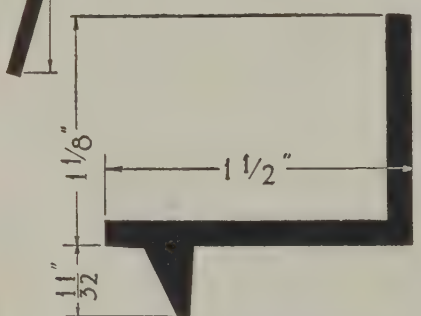
SEC · 335
WEATHERING · MEMBER USED · WHEN · IN · AT · TOP VENTILATORS · OCCUR · AT · TOP OF · WINDOWS · & FOR · JAMBS · OF IN · AT · TOP · VENTILATORS



SECTION · 120
FRAME · MEMBER · AT SILL · IN · UNITS · HAVING A · VENTILATOR · AT · THE SILL · THE · FULL · WIDTH OF · THE · UNIT

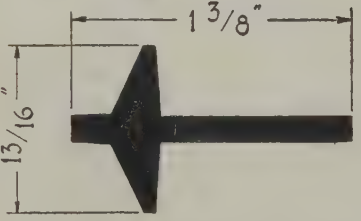


SECTION · 339
MULLION · USED · WITH WINDOWS · EXCEED- ING · THE · LIMITS · OF SIZE · PERMISSIBLE WITH · SEC · 121

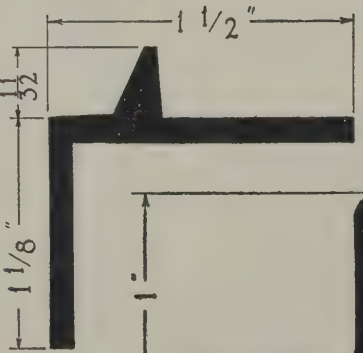


SECTION · 375
WEATHERING · MEMBER USED · AT · TOP · OF · ALL OUT · AT · BOTTOM VENTILATORS

SECTION · 318
TOP · RAIL · OF · ALL VENTILATORS



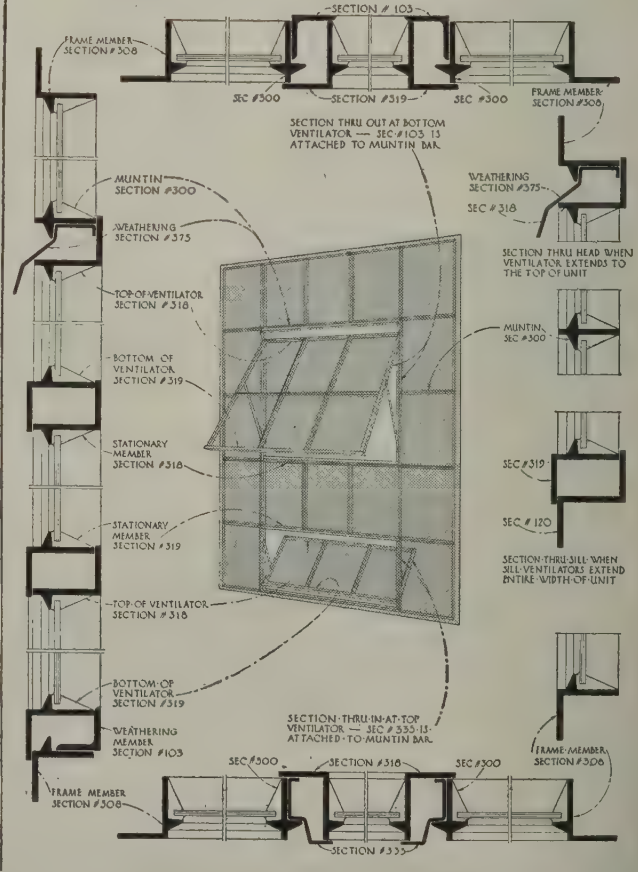
SECTION · 300
MUNTIN · BAR



SECTION · 319
BOTTOM · RAIL · OF ALL · VENTILATORS

SECTION · 103
WEATHERING · MEMBER FOR · ALL · VENTILATORS OCCURING · AT · BOTTOM OF · WINDOWS · AND · FOR JAMB · WEATHERING · OF ALL · OUT · AT · BOTTOM VENTILATORS

· CONSTRUCTION · OF · WINDOW ·



A special is an odd size between two less expensive standards

Continued on next page

LUPTON OPERATING DEVICE

Lupton Operating Device is a high grade type of torsion operator in which the inherent weaknesses of the torsion type have been eliminated.

Designed for the operation of center pivoted side wall steel windows.

It can be applied as satisfactorily to existing windows as to a new installation. Operation is by hand chain or by hand wheel, the latter being used where several tiers of ventilators are to be operated from one station.

SPECIFICATION FOR LUPTON PIVOTED WINDOW OPERATOR—TORSION TYPE

Work Included

1. Furnish and install where shown on drawings Lupton Operating Device, manufactured by David Lupton's Sons Company, Philadelphia, Pa.

Note: Lupton Operating Device should be accurately listed and located either on schedules on plans or in specifications. If more than one type be desired each type should be listed separately or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show scaled details of construction, etc.

Materials and Construction

3. Power shall be a machine cut steel worm operating a gray cast iron segment worm gear assembled with a gray cast iron yoke and mounted on a malleable iron supporting bracket adapted to rigid attachment to building construction, or, by means of extension clips, to window mullion. The hub of the segment gear shall be drilled to fit the power transmission line and shall be tightly secured to it with set screws so as to rotate the line on the gear axis.

Note: There are two types of power shaft; 1 in. and ½ in. The larger will operate runs up to 40 ft. on each side of power, and not more than 12 average size ventilators. The smaller will operate runs up to 10 ft. on either side of power and no more than 4 average size ventilators.

4. Power shaft shall be standard black wrought iron pipe joined into a continuous line by standard threaded pipe couplings, screwed tight and secured by two ¼ in. steel pins.

5. Shaft shall be supported by malleable iron brackets attached to the window mullions or to the building construction.

6. Steel operating arms (one to each ventilator) shall be rigidly clamped to the shaft.

7. Connection between the operating arm and the ventilator shall be made by a steel vent rod and a malleable iron bracket mounted on the ventilator. Pivot pins at both ends of the vent rod shall be bronze.

Note: Specify operation by chain or by vertical steel shaft.

8. Chain Operation—Power shall be operated by No. 9 Register hand chain, operating over a chain wheel and guided by a guard. Both wheel and guard shall be gray iron castings. Wheel shall be accurately drilled, mounted in worm shaft and securely held by a set screw. Chain shall terminate approximately two feet above the floor.

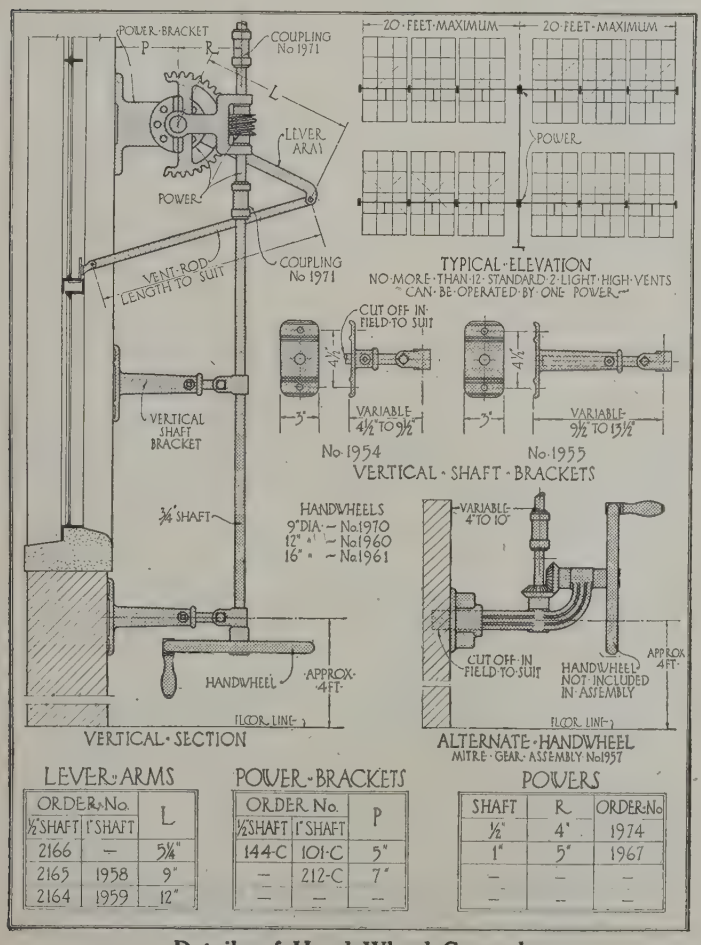
Note: Where building construction makes it impractical to hang the chain directly vertical from the power (as in monitor window installations) single and double chain idlers may be specified (at added cost).

9. Steel Shaft Operation—Power shall be operated by a vertical ¾ in. round, cold rolled steel shaft, coupled directly to the worm shaft with a malleable iron coupling. The shaft shall be supported by adjustable malleable iron brackets spaced not over 6 feet apart, one bracket always being placed at the lower end of the shaft, approximately 4 feet above the floor.

Note: Lower end of shaft may be terminated in either one of two ways, specify which.

10. Wheel in horizontal plane. A gray iron hand wheel and handle shall be mounted on the lower end of the shaft.

11. Wheel in vertical plane. The shaft shall be directly

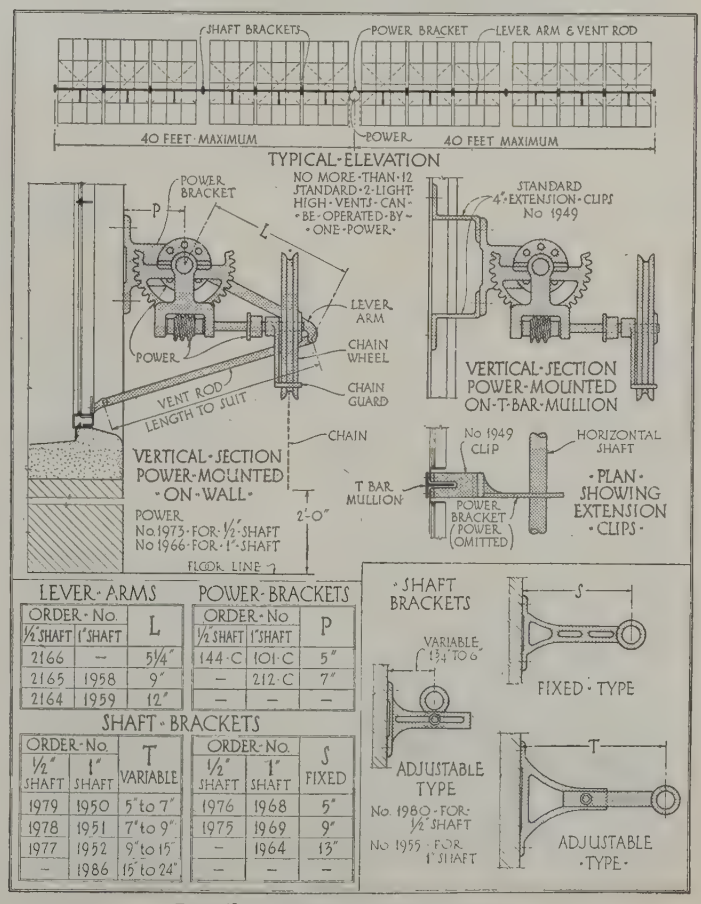


LEVER ARMS		
ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	L
2166	—	5¼"
2165	1958	9"
2164	1959	12"

POWER BRACKETS		
ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	P
144-C	101-C	5"
—	212-C	7"
—	—	—

POWERS		
SHAFT	R	ORDER No
½"	4"	1974
1"	5"	1967
—	—	—
—	—	—

Details of Hand Wheel Control
Scale ¾ in. = 1 ft. 0 in.



LEVER ARMS		
ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	L
2166	—	5¼"
2165	1958	9"
2164	1959	12"

POWER BRACKETS		
ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	P
144-C	101-C	5"
—	212-C	7"
—	—	—

SHAFT BRACKETS					
ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	T VARIABLE	ORDER No. ½" SHAFT	ORDER No. 1" SHAFT	S FIXED
1979	1950	5" to 7"	1976	1968	5"
1978	1951	7" to 9"	1975	1969	9"
1977	1952	9" to 15"	—	1964	13"
—	1986	15" to 24"	—	—	—

Details of Hand Chain Control
Scale ¾ in. = 1 ft. 0 in.

Continued on next page

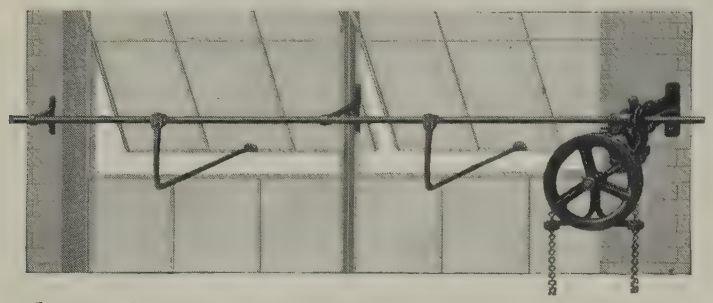
connected by a malleable iron coupling to a pair of miter gears of cut machine steel assembled with a gray iron hand wheel and handle on an adjustable malleable iron bracket.

Note: When specified a gray cast iron housing is furnished for the miter gears at added cost.

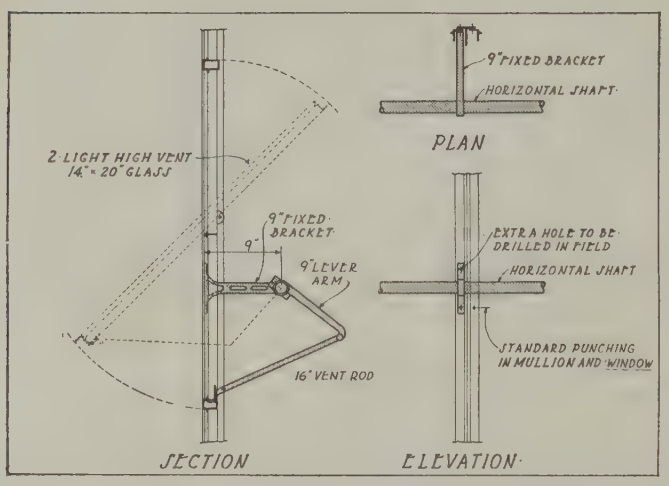
Note: Where building construction makes it necessary, universal joints for the vertical shaft may be specified (at added cost). The angle between two adjacent lengths of shaft must not be less than 135°.

Erection

12. All operating devices shall be erected and adjusted to proper working order by the window contractor.



Lupton Operating Device—Hand Chain Type Applied to Steel Pivoted Windows



Application to Center Pivoted Steel Windows
Scale ½ in. = 1 ft. 0 in.

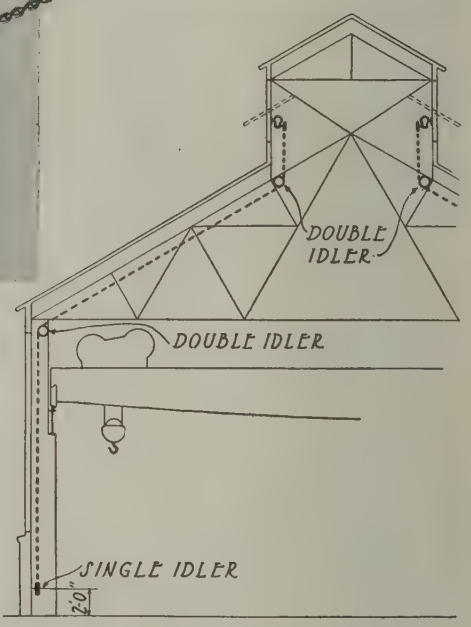
Painting

13. All operating devices shall have one coat of manufacturer's standard, dark gray paint, oven dried and applied before shipment.

Note: The following should be provided for in the paint specifications—One coat of red lead and oil should be applied after erection followed by one or more coats of finishing paint as required.

Application of Chain Operator to Monitor Windows

This arrangement of chain and idlers is also used for the Pond Operating Device described on page 57.

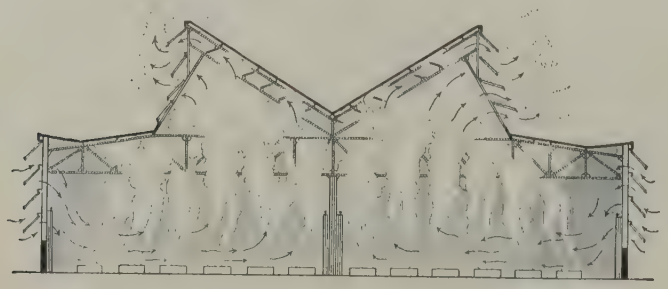


POND ROOF DESIGN

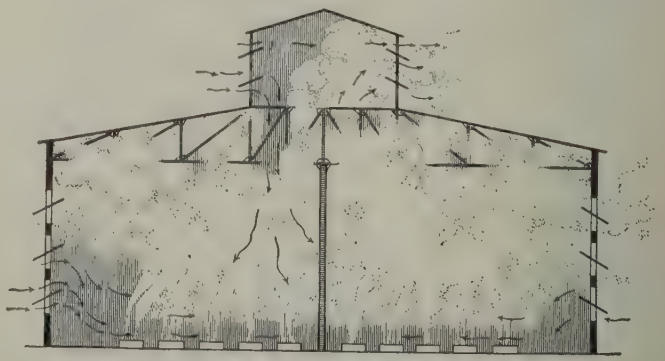
The Pond Roof Design was evolved to supply needed ventilation and daylight to foundries and similar buildings in which heat and gases are produced as a by-product of manufacturing processes. It corrects the faults of other roof designs, in that it quickly and thoroughly clears any size building of heat, foul air, or smoke. It provides large outlets arranged to receive the ascending air and heat currents with minimum lateral draft. There is no place anywhere within the steep planes of the V-shaped portion for stale air to be pocketed.

While ventilation and lighting are the primary functions of the Pond Roof, it gives maximum weather protection, because it incorporates the use of top hung continuous windows which are in themselves a weather protecting element.

The remarkable efficiency of the Pond Roof Design,



Cross-section of Typical Pond Truss Foundry Showing Ventilation Features



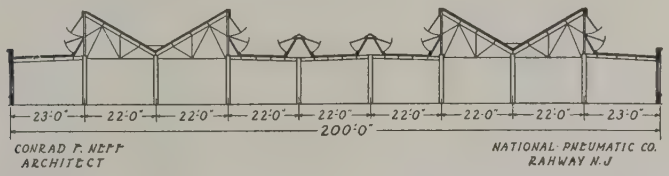
Cross-section of Typical Old Style Foundry

Continued on next page

Pond Roof Design—Continued

both in ventilation and light distribution, has led to its adoption in many manufacturing buildings in various industries, regardless of size. These include automobile, rubber, glass and airplane factories in addition to a great number of foundries and buildings devoted to the metal manufacturing industries.

The Ventilation Features—The old style monitor type roof proved faulty in several ways. Its outlets are too small for free discharge of individual heat streams. The center pivoted monitor windows allow rain and snow to blow over them, and cross winds to enter, chilling the warm monitor and causing down drafts. Consequently the windows needed much closing and opening and had no ventilating value except under the most favorable conditions.

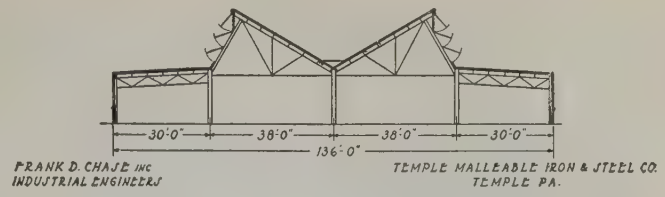


Cross-section Showing Two Pond Trusses with Pond A-Frames Between Them. The A-Frames Provide Inlets for Fresh Air in Wide Buildings

Pond Roof Design gives complete ventilation where the monitor failed. It provides for proper relation of fresh air inflow to stale air elimination. Buildings of unusual width are satisfactorily ventilated by the use of several Pond Trusses with a Pond A-Frame located between them. The lower the roof, in a heat producing building, the better. A Pond Roof need not be higher than is required for crane clearance.

The Lighting Features—The superiority in the lighting features of the Pond Roof Design is the result of carefully planned construction. The continuous windows in the sides of the truss permit lighting through a wider angle than other roof construction. A portion of light strikes the slopes of the roof, which results in a breaking up of light rays and a more widely spread diffusion of light. The combination of crossing rays produce an even lighting throughout the entire building.

There is no necessity of locating the building or its roof design in a theoretical position for interior lighting,



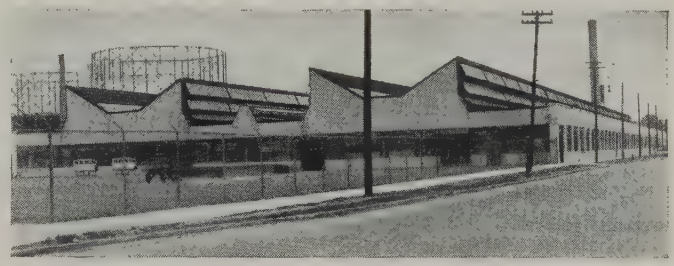
Cross Section Showing Pond Truss

for the lighting is from practically all sides, hard shadows are absent and workers can see clearly even when facing the window because of the light from behind.

Owing to the light distribution, a Pond Roof requires less glass area than a saw-tooth roof for equally effective lighting, thus saving fuel. Investigations show that added cost of steel for a Pond Roof will be more than offset by a few years' fuel saving.

Fuel losses can be reduced and the average summer temperature decreased by the use of a suitable insulation between the roof slab and weather-proof covering. Exposed cement tile should be avoided.

Pond Roof Design is not a stock design. For its correct and most efficient use, the proportions of Pond Trusses and A-Frames should be worked out for each particular case. Lupton Engineering service is available, to study your problem without obligation, and give our recommendations to insure a better lighted and ventilated building.



Ford Motor Company, Lincoln Division, Detroit, Mich.
ALBERT KAHN, Architect. WALBRIDGE, ALDINGER Co., Contractors

Two large Pond roof designs with an A-frame between them. All hung with Pond Continuous Windows. Each line of window is 842 ft. long and controlled by a single Pond operating device, motor driven. Lupton has equipped Ford plants in Jacksonville, Fla.; Norfolk, Va.; Dallas, Texas; Los Angeles, Cal. and Louisville, Ky.

POND CONTINUOUS WINDOWS

These windows are designed for lighting and natural ventilation in roofs of all buildings and for sidewalls of industrial buildings where mass control of ventilation is necessary and desirable. Units can be joined end to end, by means of weatherproof expansion joints, to form a continuous window for openings as long as 1000 feet. Long runs such as this can be operated by a single motor driven Pond Operating Device described on pages 57-59. When the windows are opened, there is formed over the opening a continuous awning of glass and steel that effectively prevents the entrance of rain, thus permitting ventilation in stormy weather. Storm panels are provided at the ends of runs to keep the rain out at these points.

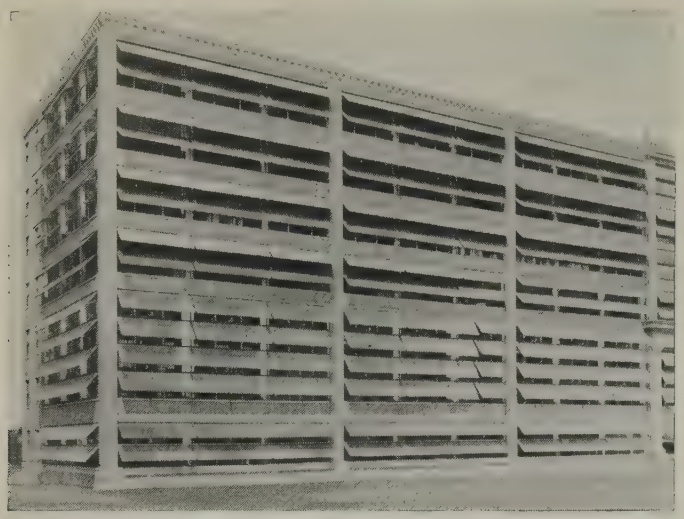
In Roofs—Their most effective use is in the Pond Roof construction described on page 51, for industrial buildings with heat processes. The Pond "A" Frame is the most inexpensive, practical ventilating skylight for roof lighting of other types of buildings. When furnished with Pond Continuous Windows, sawtooth and monitor roofs give the best results of which they are capable.

Pond A-Frame in Roof, with Two Lines of Pond Continuous Windows in the Sides

This is one of several uses for this type window

Continued on next page

In Sidewalls—They can be used either in short lengths between pilasters or in long runs hung outside the wall columns.

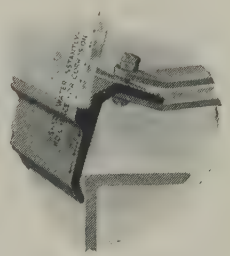


Firestone Tire & Rubber Co., Akron, Ohio, Mechanical Building
OSBORN ENGINEERING CO., Engineers

By using Pond Continuous Windows it is possible to work close to the windows without need of shutting them in case of rain. Every third column breaks the lines of windows. Other columns are spaced on 20 ft. centers and are set inside windows. Upper and lower lines of windows, each 56 ft. long, are connected in pairs and opened simultaneously by Pond Operating Device with hand chains

Operation—Is by Pond Operating Device either hand or motor power. See pages 57-59 for description and details.

Members—Are solid one piece rolled steel sections. The sill member (section 360) is especially designed to shed water even when the window is open. Full size sections are shown on page 56.



Sill Member Section 360

Welded Assembly—At the joints the members are coped and solidly oxy-acetylene welded along the entire length of contact. In this way the maximum strength of each member is utilized and the unit becomes a single rigid piece. There is no possibility of loosening joints with resultant cracked putty and broken glass.

Expansion Joints—Expansion joints are provided between units to allow for unavoidable inaccuracies in building construction and variations in length due to temperature. A section through an expansion joint is shown on page 54. The frame member of one unit (section 326) overlaps the frame member (section 350) of the adjacent unit. The units are held together by an "expansion plate" and bolted as shown.

Sizes of Units and Openings—There are four standard heights of units: 3 ft., 4 ft., 5 ft. and 6 ft. These are overall dimensions. Clear heights of openings, from head girt to sill girt for any unit, are 1½ in. less than the overall height of unit. These heights must be carefully maintained in placing steel work, see details page 54.

Standard units are 20 ft. long with muntins approximately 2 ft. 0 in. center to center. Shorter length units, 10 ft., 12 ft., 14 ft., 16 ft., 18 ft. long, are used at the ends of runs as needed to suit the openings.

Storm and End Panels—In roofs, combination storm panels are recommended for use with operated lines; with stationary lines short end panels are used. Either type of panel extends 2 ft. beyond the end unit, usually to the approximate center line of a truss.

Dimensions from out to out of these panels are always even feet; no odd feet nor inches. To these even feet dimensions must be added not less than 1½ in. at each end (more if desired) for clearance and end flashings. Thus opening lengths are expressed as 84 ft. 3 in., 136 ft. 3 in., etc. Clearances exceeding 1½ in. at each end must be filled out with additional flashing.

In the Side Walls—Between pilasters, special width units and glass are sometimes necessary. The end rails of formed plate (section 326) overlap special plate weathering furnished by us, see details page 54. Width of opening is specified by architect. Weathering is of standard overall width (5½ in.) and is located to project from the masonry from 1½ to 3½ in. This gives an allowable variation of 4 in. in width of unit and saves needless glass cutting.

Weathering is set in pilasters by general contractor before the face brick or concrete is applied. We furnish a sketch showing its location and that of the two holes to be punched by the general contractor in the head girt angle to carry it.

Standard Glass Sizes—Standard glass heights are 3 in. less than the standard or overall heights of the units, i. e.:

No. 3 Unit 3 ft. high.....33 in. glass
No. 4 Unit 4 ft. high.....45 in. glass
No. 5 Unit 5 ft. high.....57 in. glass
No. 6 Unit 6 ft. high.....69 in. glass

Standard lights are 23 and 24 in. wide, these widths being combined as needed to make the desired length of unit.

In ordering glass for replacement, the width and height for each light must be specified.

In ordering new units, only the nominal length of the units need be specified.

Steel Work Required—Structural Steel Work required for the installation of Pond Continuous Windows and Continuous Window Operators, described in the Specifications and shown in the details for these products, is not furnished by Lupton. We furnish drawings showing punching in girt angles for attaching hinges, but the punching is done by the steel contractor.

Clearances Required—Clearances for hinges, overlap at sill, and operators must be strictly maintained. They must be kept free of rivets and other obstructions. All structural steel supporting windows must be straight and true, and must be directly attached to steel columns to avoid faulty alignment due to use of brick walls for support.

All estimates are based on our standard construction as shown in details. Extras will be charged for any special construction necessitated by departure from dimensions and clearances here indicated.

Flashings—All joints in sill and intermediate girt angles, all combination storm panels for operated windows, and short end panels for stationary windows, require flashings as shown by details on pages 54-55.

We do not furnish these flashings; they should be supplied by the sheet metal contractor. We will not be responsible for the weatherproofness of Pond Continuous Windows where flashings are omitted.

Windows between pilasters require special end weathering in jambs which we furnish. See Detail on page 54 for dimensions needed, covering both window and weathering.

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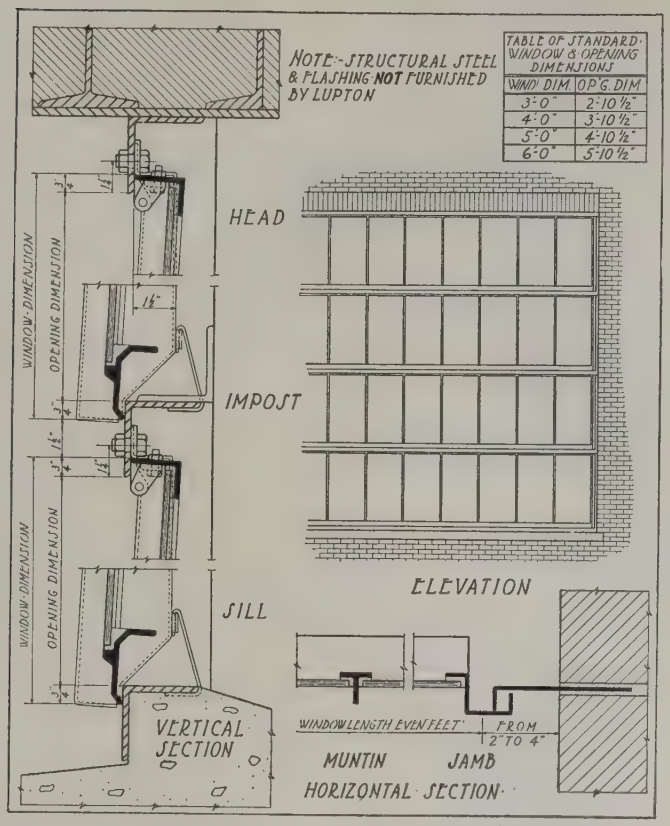
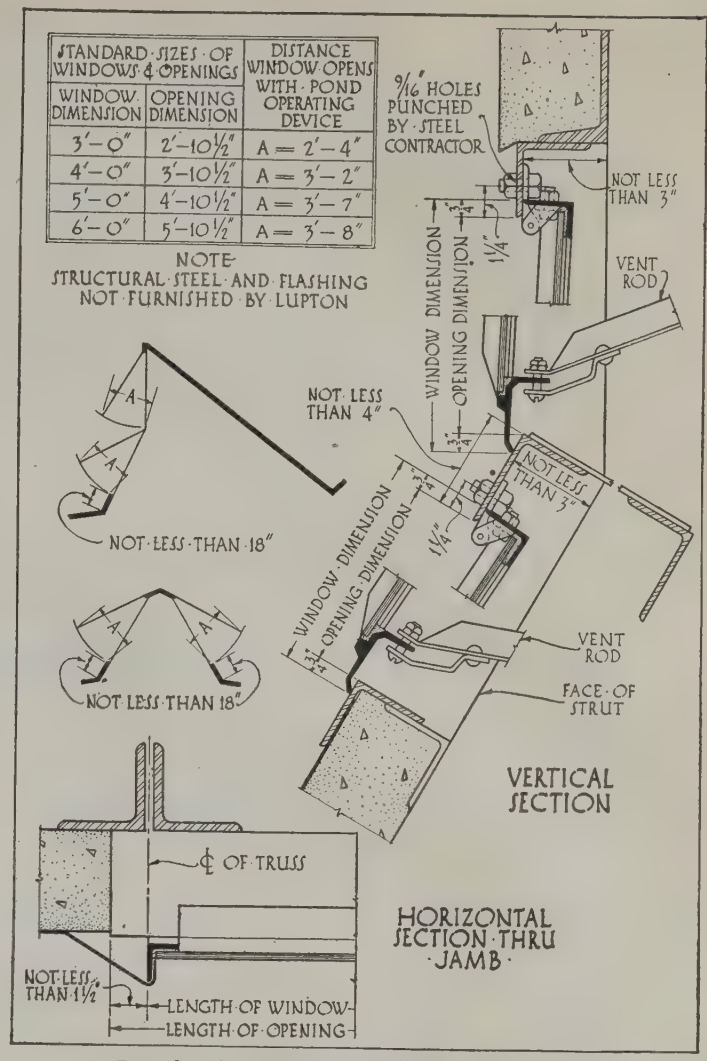
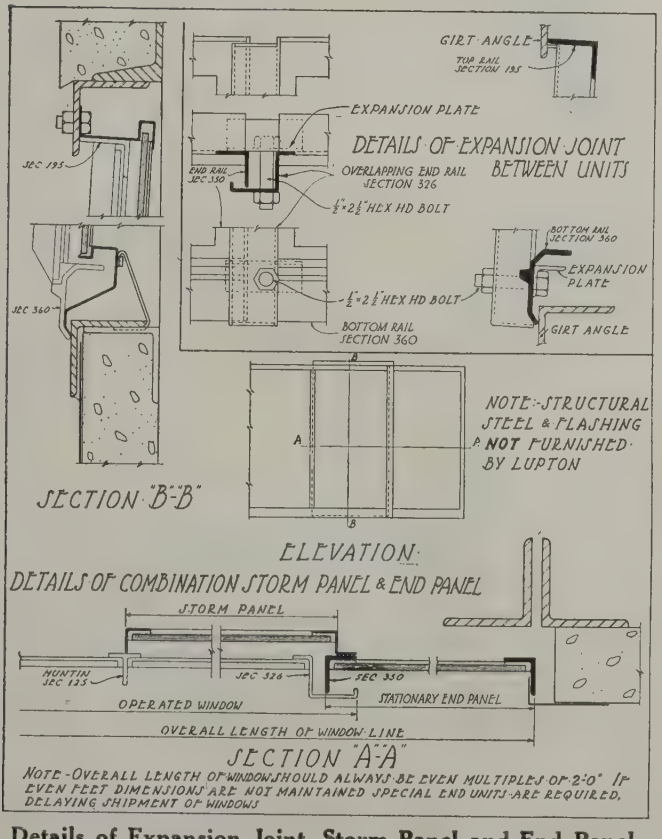


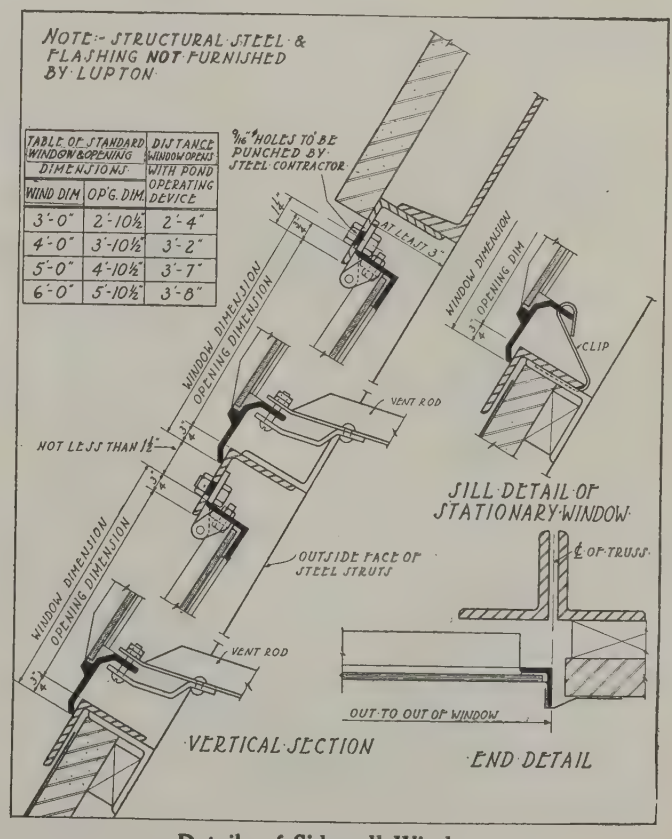
Details of Sloping Windows
Scale 1½" = 1' 0"



Details of Vertical and Sloping Windows
Scale 1½" = 1' 0"



Details of Expansion Joint, Storm Panel and End Panel
Scale 1½" = 1' 0"



Details of Sidewall Windows
Scale 1½" = 1' 0"

Continued on next page

SPECIFICATION FOR POND CONTINUOUS WINDOWS

Work Included

1. Furnish and install where shown on drawings, Pond Continuous Windows, manufactured by David Lupton's Sons Co., Philadephia, Pa.

Note: All Pond Continuous Windows should be accurately listed and located either in schedules on plans or in specifications. If more than one type of window be desired, each type should be separately listed and located or otherwise clearly designated. These details insure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show scaled sections of window and frame members details of construction, anchoring, etc.

Materials

3. Frame Members.

Note: Structural steel members forming frame are not furnished by window contractor. They should be specified under the proper heading elsewhere in the specifications of other trades. The members required are shown on the details and are as follows:

(a) A continuous girt angle at the head, to which the hinges are bolted. This angle should not be smaller than 3 in. x 3 in., ¼ in. to ⅜ in. thick. (Punching for hinges is not done by window contractor.)

(b) A continuous member at the sill. The face of this girt (usually an angle or a channel) should be in the same plane as the face of the girt angle at the head.

(c) A continuous girt angle between upper and lower lines of windows where one line is placed directly above the other. This member should be the same size as girt angle at head when windows above and below are both vertical or both sloping, but when windows above are vertical and windows below are sloping, the leg to which hinges for lower windows are bolted, should be at least 4 in. long.

4. Window Sections—Top rail, bottom rail and end rail shall be special hot rolled solid steel sections. Bottom rail shall be patented sill section No. 360.

Overlapping end rail shall be 12 gauge steel plate, formed.

5. Muntins shall be special hot rolled steel T section.

6. Jamb weathering of 12 gauge steel plate, formed, shall be furnished (but not installed) by the window contractor where the window extends between pilasters.

7. Flashings.

Note: Under proper heading elsewhere in specifications of other trades, specify sheet metal flashing at joints of and over gaps between girts, and condensation gutters (where required). These are not furnished by the window manufacturer.

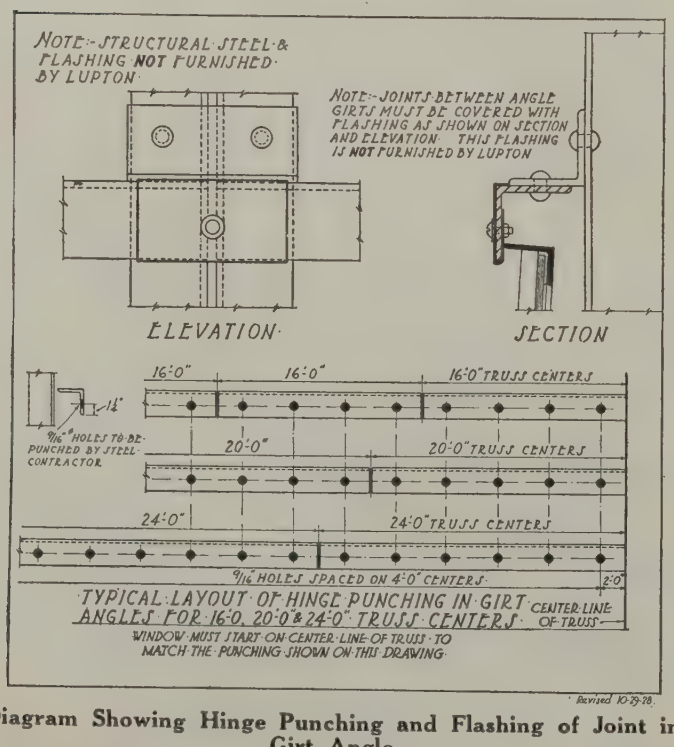


Diagram Showing Hinge Punching and Flashing of Joint in Girt Angle

8. Steel Clips shall be furnished for storm panels and stationary windows.

9. Glazing wedges shall be of galvanized pressed steel.

Construction

10. All Pond Continuous Windows shall be designed for outside glazing.

11. All windows shall be straight and true with members in alignment and surfaces in a plane. All joints shall be rigid and tight. Members shall be coped, fitted together and oxy-acetylene welded along their entire length of contact so that their ultimate strength at the juncture will not be decreased.

12. The windows shall be hung on malleable iron hinges with heavy bronze pins.

13. Muntins shall be continuous from top to bottom of window. Joints at top and bottom rails shall be oxy-acetylene welded.

Mechanical Operators

Note: Pond Operating Device for Pond Continuous Windows is covered in another specification.

Erection

14. All Pond Continuous Windows shall be erected in prepared openings by the window contractor. They shall be set plumb and true, properly aligned, securely attached to structural members and properly adjusted before glazing.

Note: (a) Include under the proper heading elsewhere the specifications in other trades, that all structural steel members that come in contact with Pond Continuous Windows shall form straight parallel lines and shall be located, punched and flashed in accordance with the Pond Continuous Window details. Where there is a deflection, structural members shall be straightened in the field by the structural steel contractor before windows are erected.

(b) Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the Pond Continuous Window details and that all mortar grouting, pointing, etc., shall be done by the mason contractor after windows have been erected.

Painting

15. All Pond Continuous Windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven dried.

Note: The following should be provided for in the paint specifications. One additional coat of paint should be applied after erection, before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Glass and Glazing

Note: Glass and Glazing should be included under the proper heading elsewhere in the specifications of other trades.

(a) Specify vertical ribbed glass ¼ in. thick. (Ribs to be placed on the side least exposed to dust.)

(b) Specify special P. C. W. putty (obtainable from Lupton Representatives). Ordinary wood or steel sash putty should not be used.

(c) Specify that glass shall be set in a bed of putty and secured by steel glazing wedges supplied by the window manufacturer. Four wedges per light shall be used on windows 3 or 4 ft. high and six wedges per light shall be used on windows 5 or 6 ft. high.

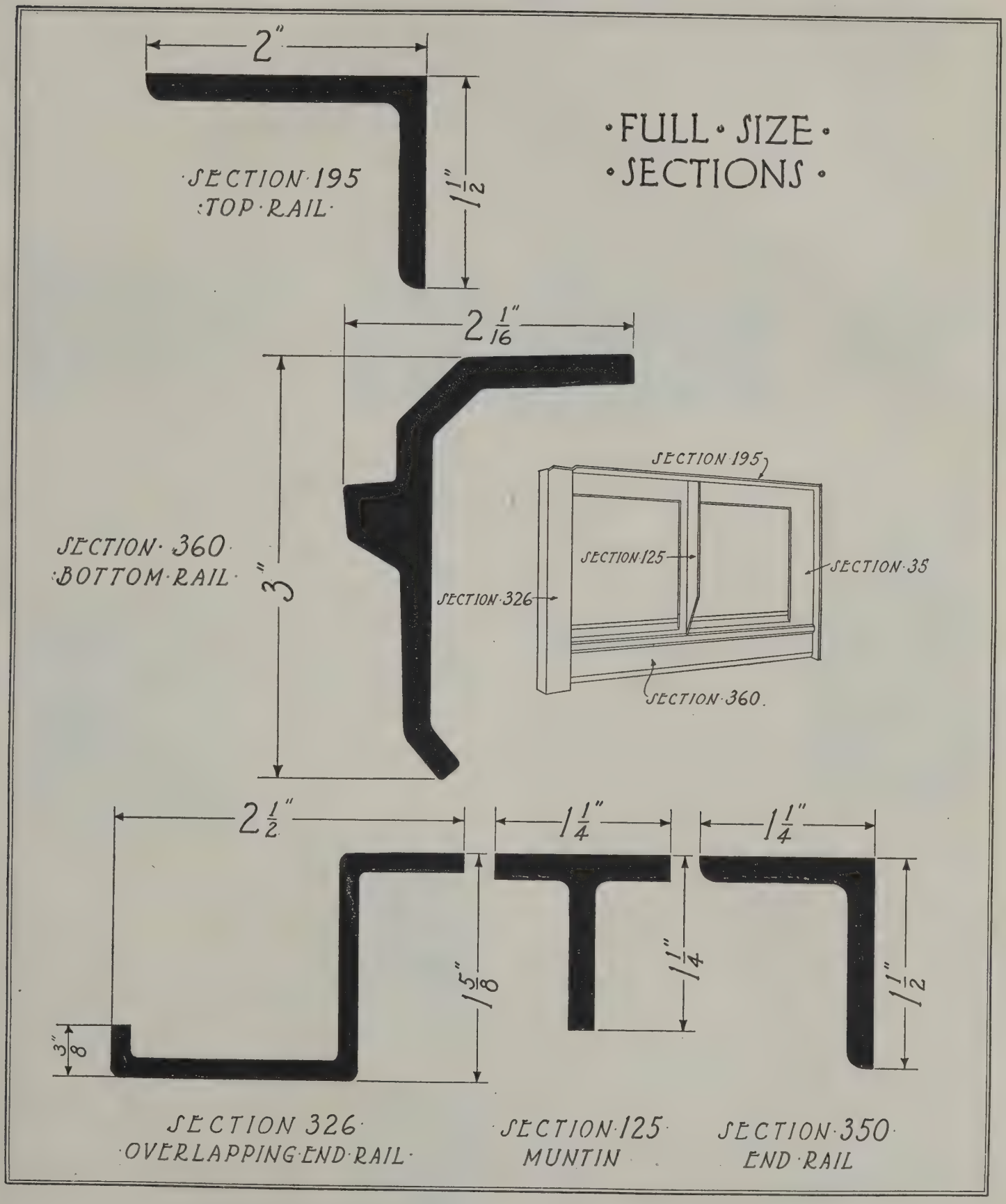
Power House Type Windows

Power House Type Windows are made of the same sections as the regular Pond Continuous Windows. The units, however, are shorter than generally used for Pond Continuous Windows and are set one above the other in as many tiers as required for the needed height. The structural steel frame in which the units are set is furnished by Lupton. Glass is held securely by glazing angles, which are continuous along the muntins and vertical side rails.

Both the window and operator usually have to be designed to meet special conditions and therefore a Lupton representative should be consulted for details.

Continued on next page

POND CONTINUOUS WINDOW SECTIONS



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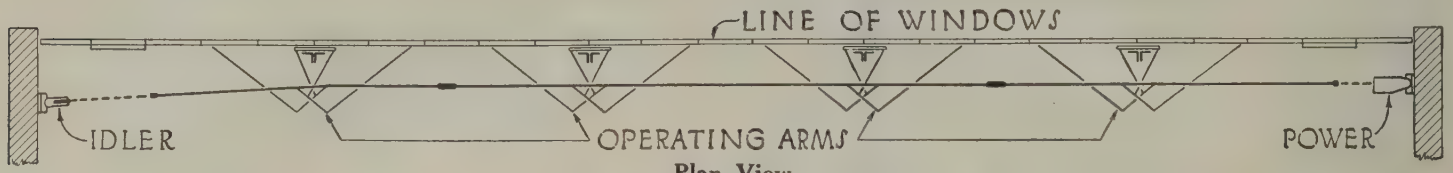
POND OPERATING DEVICE

Continuous Window Operator—Tension Type

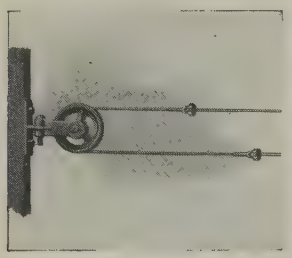
Pond Operating Device is designed on the tension principle of power transmission and is intended primarily to operate long lines of top-hung Pond Continuous Windows.

It is recommended also for simultaneous operation of pivoted windows in installations where the requirements exceed the limit of the Lupton Operating Device described on pages 50-51.

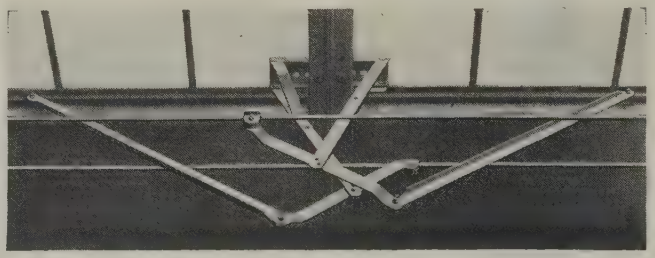
Pond Operating Device can be hand operated or motor driven.



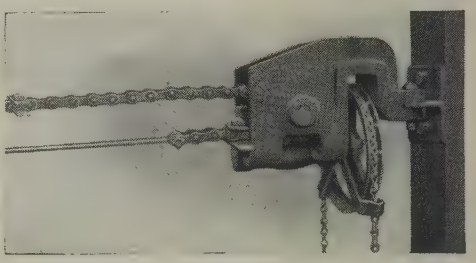
Plan View



Idler

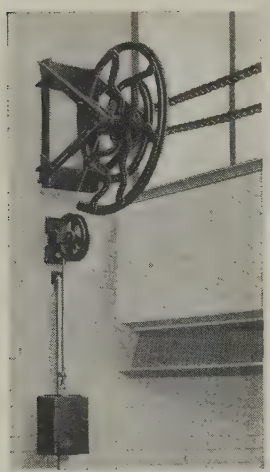


Operating Arms (Window in Closed Position)



Hand Operated Power

Idlers and Spirals



Spiral and Counterweight

The idler pulley is intended for use with hand-operated runs of from 150 to 300 ft. in vertical openings, depending on the height of the unit (150 ft. for 6 ft. units, 300 ft. for 3 ft. units). Such runs on the standard slope of 30 degrees, may be from 100 to 200 ft. long.

The length of these runs can be approximately doubled by using Spirals and Counterweights, and the number of operating powers reduced one-half.

For these long runs, the Spiral is used in place of the idler. The Counterweight is hung on a steel cable which winds on the Spiral. Thus a tension is applied to the transmission rods which balances, approximately one-half the load. A guide is included with the Spiral and Counterweight.

Motor-operated runs of Continuous Windows can also use Spirals and Counterweights. They make the motor load and speed substantially uniform, and prevent excessive overload on starting the motor with the window partly open. For very long motor-operated runs, they should always be used.

Spirals and Counterweights must be specified in bid and order if desired. They should be considered for use in any condition where additional power might be necessary. Spirals and Counterweights are an exclusive feature of Pond Operating Device.

Structural Work Required

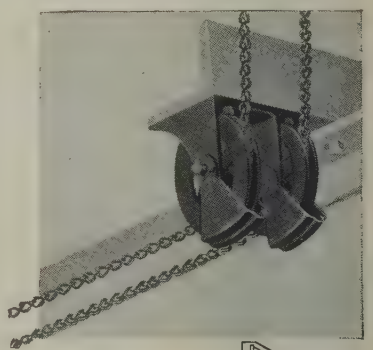
All structural supports for Pond Operating Device are furnished by the structural contractor. This includes supports for the power, and for the compound levers attached to the transmission rods. We furnish detail blueprints as needed.

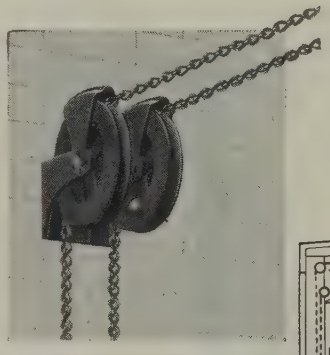
Width of Opening

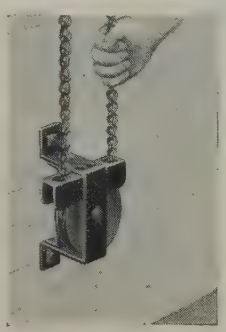
The table below gives openings of Pond Continuous Windows by Pond Operating Device:

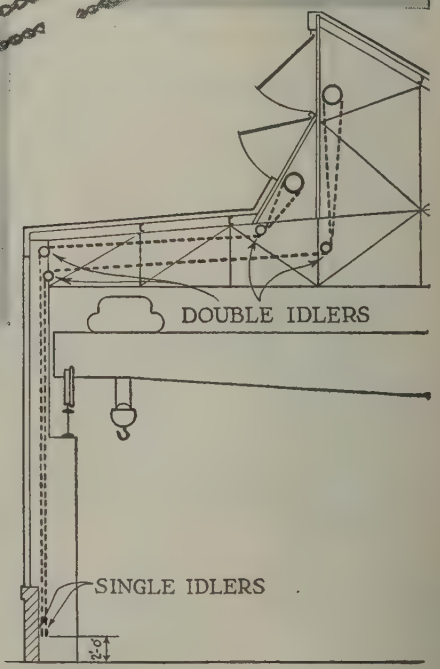
3 ft. high top-hung continuous windows 46° or 28 in.
4 ft. high top-hung continuous windows 47° or 38 in.
5 ft. high top-hung continuous windows 42° or 43 in.
6 ft. high top-hung continuous windows 36° or 44 in.

Single and Double Idlers Are Used Where Hand Chain Must Be Operated from a Position Not Directly Under the Power









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Motor Driven Power

Pond Operating Device, Motor Driven, ventilates the large industrial plant with the same precision and completeness as it does the small plant, by co-ordinated, uniform control.

The ideal ventilating result is obtained by operating all the windows by motors, with switches so located that both inlets and outlets may be regulated by the same person, preferably the foreman or shop superintendent. To control the air change or to open or close the windows for any reason then requires only the pushing of a button.

Thus it is possible to combine the efficient organization of the great industrial plant with even more than small-shop facility in ventilation control. If certain bays require separate control, their switchboards can be located accordingly. Sometimes the floor space is divided between different departments having different ventilating requirements. The molding floor, the core departments, and the cleaning floor of a foundry, for example if under one roof, should each have its own window control.

In ventilating large buildings, one of two general purposes obtains. These are:

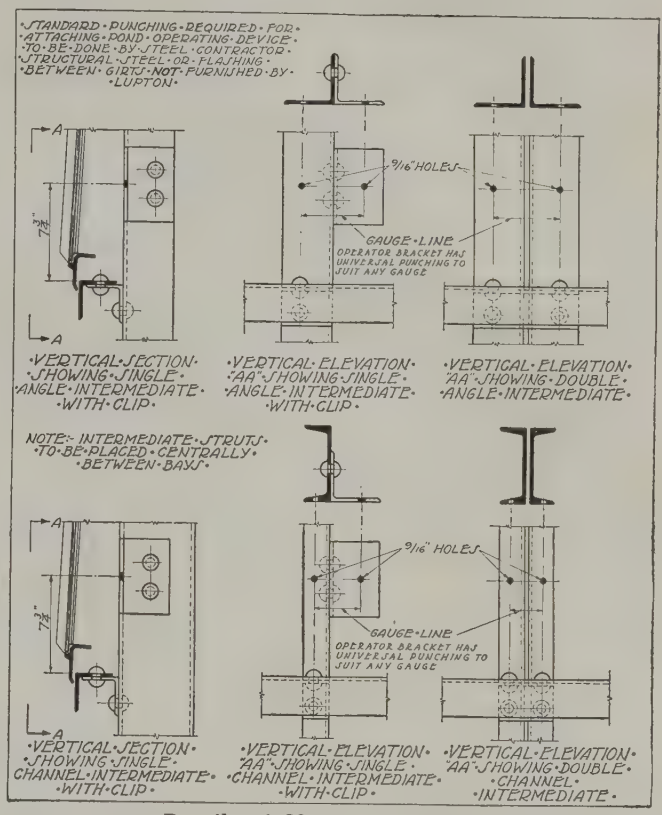
(1) To centralize and make easy the control of windows in buildings of unusual size, where the opening of short runs of windows by hand would take too long and possibly be neglected.

(2) To operate many windows quickly, as in a large foundry in winter, when it is desired to open them for a few minutes to get rid of the smoke without unnecessary loss of heat.

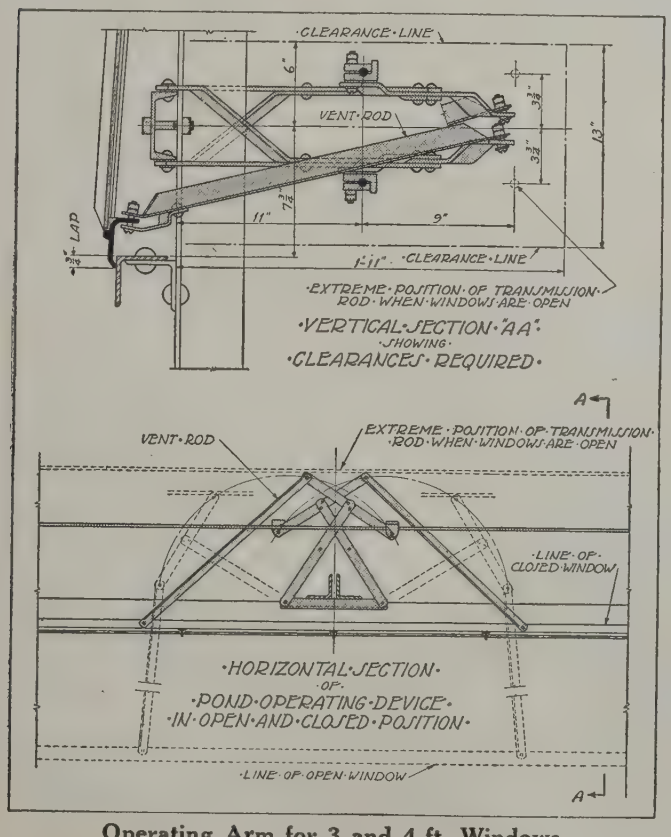
Both of these purposes are satisfactorily accomplished by Pond Operating Device, Motor Driven.

Explosion Type Operator

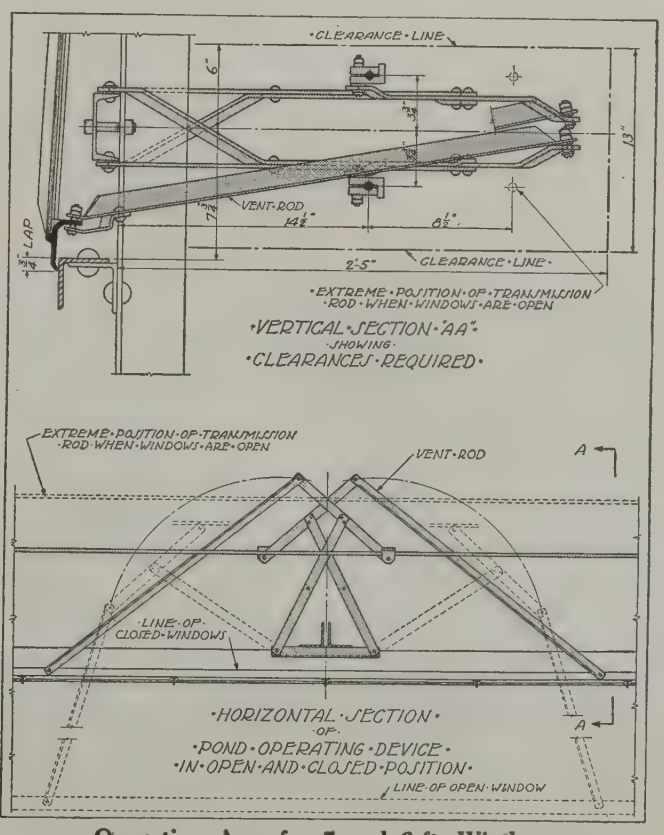
The explosion type operator is for use in chemical or rubber process buildings, granaries or other industrial buildings where explosion hazards are more or less unavoidable. The explosion operators are made in two types to operate Pond Continuous Windows. The counterweighted type can be adjusted to operate automatically at any desired atmospheric pressure. The pressure type operator requires the explosive pressure to open the windows. It is recommended for storage buildings where there are no workmen. Both operators continue to hold windows open after explosion has occurred, allow the poisonous gases and smoke to escape and insure a quick change of air.



Details of Clips and Punching
Scale ¾ in. = 1 ft. 0 in.



Operating Arm for 3 and 4-ft. Windows
Scale 1" = 1' 0"



Operating Arm for 5 and 6-ft. Windows
Scale 1" = 1' 0"

Continued on next page

SPECIFICATION FOR POND OPERATING DEVICE

Work Included

1. Furnish and install where shown on drawings Pond Operating Device, manufactured by David Lupton's Sons Company, Philadelphia, Pa.

Note: Pond Operating Device should be accurately listed and located either on schedules on plans or in specifications. If more than one type be desired each type should be listed separately or otherwise clearly designated.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show scaled details of construction, etc.

Material and Construction

Note: Structural Steel supports for Pond Operating Device are not furnished by the window contractor. These consist of uprights (angles, channels or tees) for attaching the operating arms.

For windows 5 or 6 feet high the center spacing of the supports should not be less than 7½ ft., nor more than 16 ft.; for windows 3 ft. or 4 ft. high, the spacing should not be less than 6½ ft. nor more than 15 ft. Trusses on 20 ft. centers, with one intermediate usually make the most economical arrangement for steel work.

3. **Power**—The operating power unit shall consist of a machine cut steel worm shaft mounted in ball-bearings operating a machine cut worm wheel. For manually operated powers the worm wheel shall be a steel casting made integrally with the sprocket wheel. For electrically operated powers the worm wheel shall have a bronze rim with cut teeth. Bearings shall be phosphor bronze. The power unit shall be assembled in a dust-proof, grease packed, cast steel case. The worm shall lock the window in any position.

4. **Power Brackets**—Power units shall be mounted on brackets made of structural steel angles, trussed to the building construction and designed to withstand the lateral stresses caused by operating the windows.

Transmission Line

5. Transmission line shall consist of 2 lines of solid round steel rods. (*Note:* Specify ½ in. or ¾ in. diameter as required by conditions.) Where joints occur rods shall have the ends hot headed and securely clamped in malleable iron couplings so as to develop the maximum tensile strength of the rods.

6. At the end of the run the two rods shall be connected by a sprocket chain passing over the sprocket wheel in the power unit.

7. Forged steel turnbuckles shall be furnished to adjust the transmission line.

8. The rods shall not be run through guides, rollers or other bearings.

Note: There are two ways of terminating the end of the run opposite the power.

(a) With an idler, (b) With a spiral and counter weight. Specify which one is desired.

9. (A) At the end of the run opposite the power unit the two rods shall be connected by a ⅜ in. steel wire cable passing over an idler wheel. Bearing in idler shall be phosphor bronze.

(B) At the end of the run opposite the power unit the two rods shall be connected by a sprocket chain passing over a sprocket wheel of steel cast integrally with a spiral. A weight shall be attached to the spiral by means of a steel wire cable in such a way that as the windows open the weight shall exert increasing force on the transmission line and balance a part of the load.

Operating Arms

10. Operating arms shall be mounted in pairs on a 4 in. channel bracket. Bracket shall be rigidly bolted to structural steel supports furnished by others. Arms shall be of flat steel specially constructed to form a rigid T shape and so arranged that all back thrust from the windows shall be transferred into tension in the transmission line.

The stem of the T shall be pivoted to the 4 in. channel bracket. Of the other two extremities of the T, one shall be pivoted to a malleable iron clamp, securely fastened to the transmission rod, and one shall be pivoted to a steel vent rod (of 1¼ in. x 1¼ in. x ⅛ in. angle) in turn pivoted to the flange of the bottom rail of the window. All bearings in the operating arms shall be phosphor bronze.

Note: Specify either manual or electrical operation.

Manual Operation

11. Manual Operation Power unit shall be operated by a No. 9 Register hand chain passing over a chain wheel mounted on the worm shaft and secured to it by a set screw. Chain shall be guided by a suitable guard.

Note: Where building construction makes it impractical to hang the chain directly vertical from the power (as in monitor window installations) single and double chain idlers may be specified (at added cost).

Electrical Operation

12. Electrical Operation Power shall be operated by an electrical power unit operating a sprocket and chain. Sprocket shall be mounted on the worm shaft secured to it by a steel key. Electrical Unit shall be located beneath the power unit and securely bolted to it.

Note: Immediately following this specification include specification for Electrical Equipment.

Erection

13. All operating devices shall be erected and adjusted to proper working order by the window contractor.

Painting

14. All operating devices shall have one coat of manufacturer's standard, dark gray paint, oven dried and applied before shipment.

Note: The following should be provided for in the paint specifications. One coat of red lead and oil should be applied after erection, followed by one or more coats of finishing paint as required.

SPECIFICATION FOR ELECTRICAL EQUIPMENT

Work Included

1. The Operating Device manufacturer shall furnish wiring diagram and complete electrical equipment for Pond Operating Device as hereinafter specified.

Note: All Pond Operating Devices electrically operated should be accurately listed and located either on schedules on plans or in specifications. If more than one type be desired each type should be listed separately or otherwise clearly designated.

Electrical Equipment

2. **Motors**—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: The motors for Pond Operating Device operate on A. C., 220 or 440 volts, 60 cycle, 3-phase, and are especially wound for high starting torque. They are furnished from stock, which avoids delay. Motors with other current characteristics require from four to six months to deliver.

3. **Power Connections**—Motors shall be connected to power by means of sprockets and silent chains.

4. **Reversing Switches**—Standard Magnetic Reversing Switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator either in opening or closing may be stopped or started at any point by manipulation of push buttons.

5. **Limit Switches**—Limit Switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

6. **Push Button Stations**—Push Button Stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidently operated.

Electrical Construction

Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the Electrical Equipment furnished by the Window Operator Manufacturer and that furnished by himself. All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled, approved by Underwriter's Laboratories, Inc. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, sightly manner, paralleled with structural features of the building and rigidly and neatly secured. Where walls are plastered conduit shall be concealed.

The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him developing during the above named period shall be promptly and satisfactorily made good at his expense.

Continued on next page

LUPTON COMMERCIAL STEEL DOORS

Lupton Commercial Steel Doors are designed for use in private and public garages, manufacturing plants and similar buildings, where inexpensive steel doors are desirable. Stiles and rails are made of 18 gauge steel plate with the corners welded. The lower panel is 16 gauge steel plate and the upper section is arranged for glazing. Two types of doors are available, hinged and sliding. Details and sizes are shown on pages 60-61.

Frames—Are furnished for hinged doors only and only when specified on order. Specify by mark number given in table.

Hardware—Hinges for hinged doors and tracks and hangers for sliding doors are furnished with the doors. All other hardware must be specified by number on order if wanted.

Drilling, etc.—Hinged doors are drilled for hinges and when mortised lock No. 97 is ordered the doors are mortised and drilled to receive it. All other drilling must be done in the field.

Shipping—Single doors with frames are shipped assembled in the frames. Double doors are shipped separately from frames.

Glass—Glass sizes are given in the table. Orders for doors do not include glass, but we furnish the necessary glazing members. Glazing should be done after the doors are erected.

When Ordering—Give the symbol numbers and quantities of units required and indicate whether hinged or sliding. If hinged doors are ordered indicate swing of door (see sketch on page 61). If frames are required give symbol number and quantities. Specify the symbol numbers of hardware required and we will furnish the proper quantity to fill out the order. See list and illustrations on this page. When ordering top and bottom bolts be sure that right keeper is selected.

Hardware List

Following is a list of hardware which can be furnished on order. See illustrations on this page. Specify items by the numbers.

For Hinged Doors

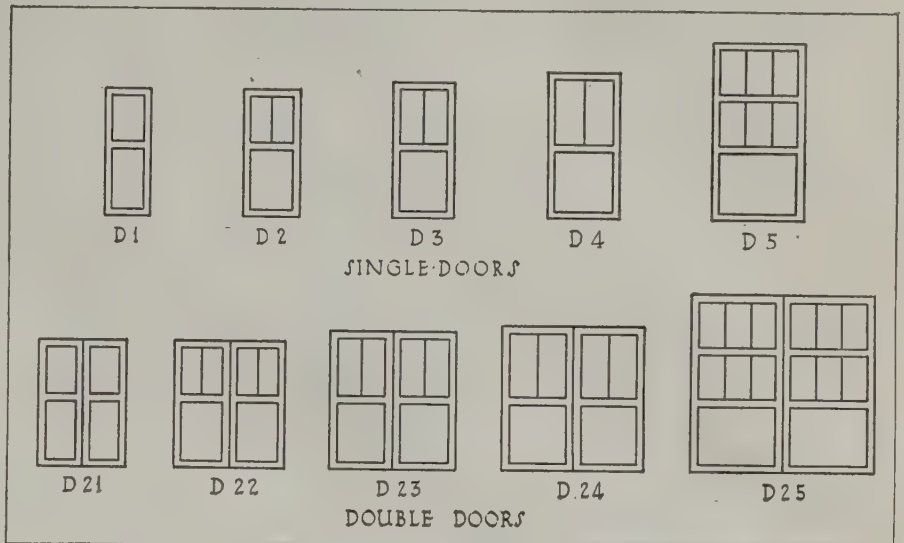
No. 97 Mortise Lock.
No. 98 Lever Latch and Padlock Bracket.
No. 99 Offset Hinge.
No. 100 Top and Bottom Bolt Assembly.
No. 101 Hook-Back and Ring Assembly.

For Sliding Doors

No. 102 Track Bracket.
No. 103 Track, 6′, 8′, or 10′ long.
No. 104 Trolley Bracket.
No. 105 Trolley.
No. 106 Stay Roller.
No. 107 Center Guide and Stop.
No. 108 Door Stop
No. 109 Inside Handle.
No. 110 Outside Handle.
No. 111 Hasp and Staple.

ASTRAGALS FOR EITHER TYPE DOOR

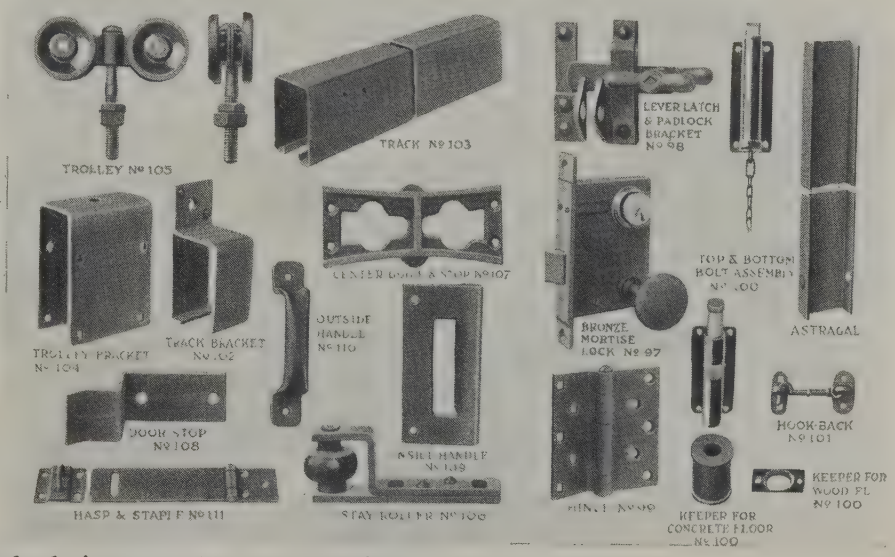
Hinged doors		Sliding doors	
Astragal number	Opening height	Astragal number	Opening height
2392	7′-0″	2414	6′-10½″
2393	7′-6″	2415	7′- 4½″
2394	8′-0″	2416	7′-10½″
2395	10′-0″	2417	9′-10½″



STANDARD SIZES

DOOR MARK	DOOR FRAME MARK	SLIDING TYPE OPENING HEIGHT	SLIDING TYPE OPENING WIDTH	SLIDING TYPE CATALOG NO. OF ASTRAGAL	HINGED TYPE OPENING HEIGHT	HINGED TYPE OPENING WIDTH	HINGED TYPE CATALOG NO. OF ASTRAGAL	BOTH TYPES GLASS SIZES
D-1	DF-1	6′-10½″	2′-3″		7′-0″	2′-6″		1 - 19⅞″ x 30½″
D-2	DF-2	6′-10½″	2′-9″		7′-0″	3′-0″		2 - 12⅝″ x 30½″
D-3	DF-3	7′- 4½″	3′-3″		7′-6″	3′-6″		2 - 15⅝″ x 36½″
D-4	DF-4	7′-10½″	3′-9″		8′-0″	4′-0″		2 - 18⅝″ x 42½″
D-5	DF-5	9′-10½″	4′-9″		10′-0″	5′-0″		6 - 16¼″ x 30¾″
D-21	DF-21	6′-10½″	4′-9″	#2414	7′-0″	5′-0″	#2392	2 - 19⅞″ x 30½″
D-22	DF-22	6′-10½″	5′-9″	#2414	7′-0″	6′-0″	#2392	4 - 12⅝″ x 30½″
D-23	DF-23	7′- 4½″	6′-9″	#2415	7′-6″	7′-0″	#2393	4 - 15⅝″ x 36½″
D-24	DF-24	7′-10½″	7′-9″	#2416	8′-0″	8′-0″	#2394	4 - 18⅝″ x 42½″
D-25	DF-25	9′-10½″	9′-9″	#2417	10′-0″	10′-0″	#2395	12 - 16¼″ x 30¾″

HARDWARE

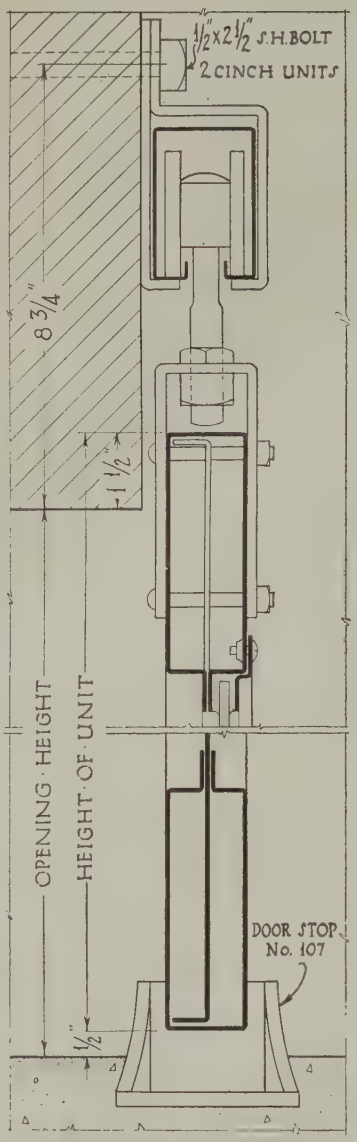


Standard sizes cost less than specials

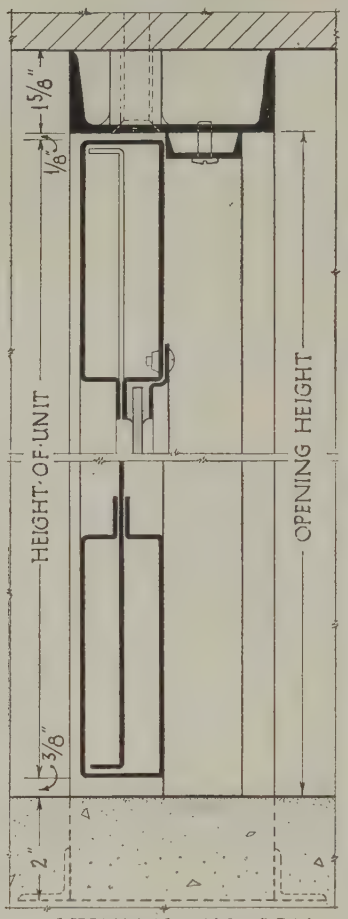
Continued on next page

• COMMERCIAL • DOORS •

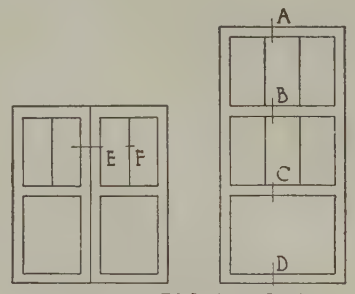
• SCALE • FOR • DETAILS • 3" = 1'-0" •



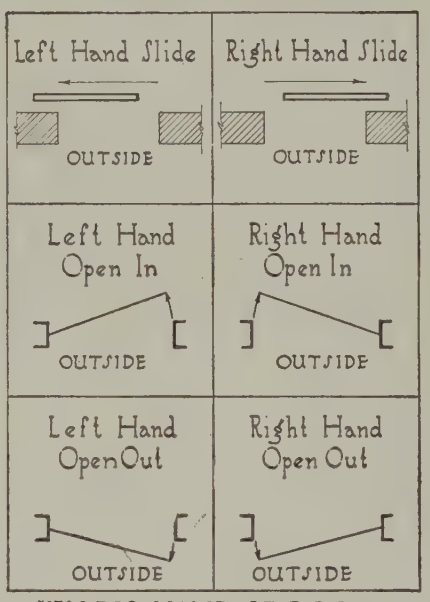
VERTICAL • SECTION
SLIDING • TYPE



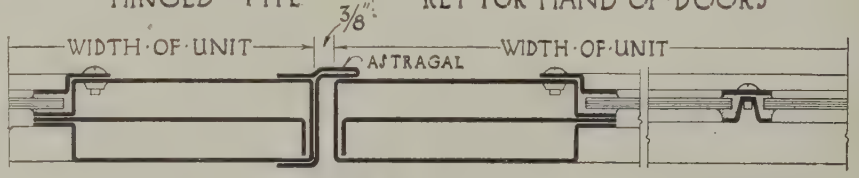
VERTICAL • SECTION
HINGED • TYPE



TYPICAL • ELEVATIONS

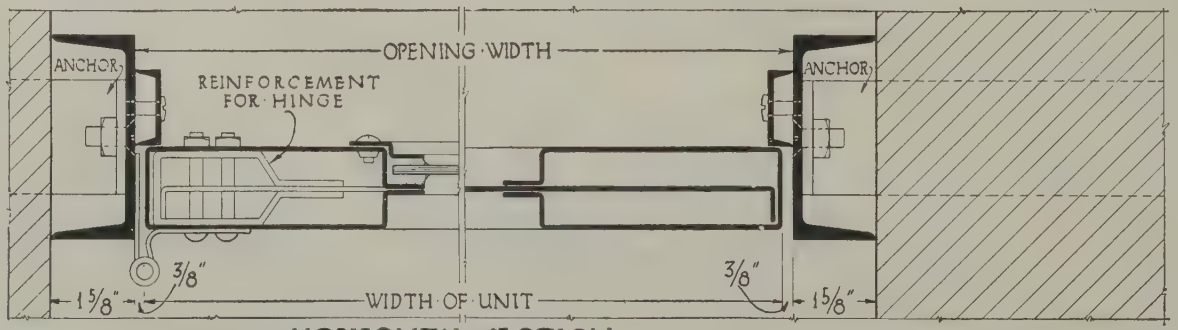


KEY • FOR • HAND • OF • DOORS

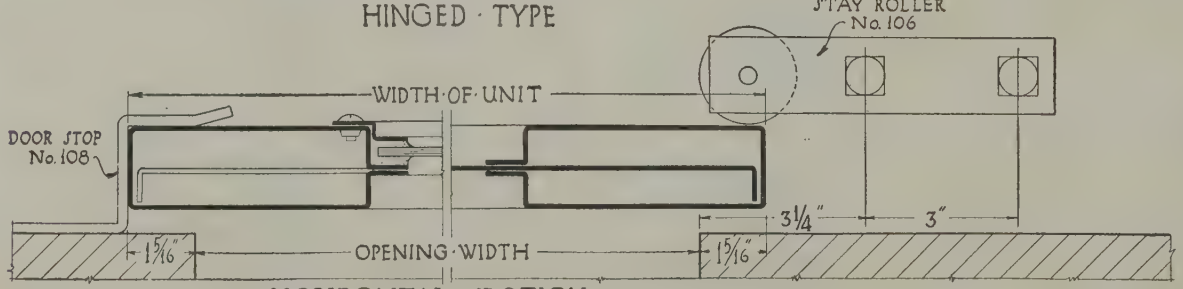


SECTION • E
MEETING • STILE

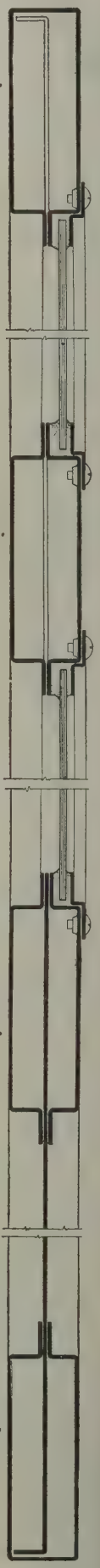
SECTION • F
MUNTIN



HORIZONTAL • SECTION
HINGED • TYPE



HORIZONTAL • SECTION
SLIDING • TYPE



For quick deliveries, use standard sizes

Continued on next page

LUPTON ROLLED STEEL SKYLIGHT

Lupton Rolled Steel Skylight is especially adapted to conditions of unusual severity such as vibration, wide range of temperatures, and inaccessibility for painting.

Its patented construction eliminates breakage of glass due to expansion and contraction, and to vibration. Leakage, due to drying of putty, rapid deterioration by corrosion and collection of dust by condensation gutters are all eliminated by the Lupton Skylight.

The glass is supported between flexible strands of specially saturated fibre. This permits free expansion and contraction, without leakage, since no putty is used.

Erection of Lupton Skylight involves no cutting and fitting. All members are cut to exact size, the bars and caps are offset at the factory, and all parts are shipped ready for assembling. Erection can be done by ordinary mechanics.

SPECIFICATION FOR LUPTON ROLLED STEEL SKYLIGHT

Work Included

1. Furnish and install where shown on drawings Lupton Rolled Steel Skylight manufactured by David Lupton's Sons Company, Philadelphia, Pa.

Note: Lupton Rolled Steel Skylight should be accurately listed and located either in schedules on plans or in specifications. If more than one type of Skylight be desired, each type should be separately listed and located or otherwise clearly designated. These details assure greater accuracy in estimates.

Shop Drawings

2. Submit in triplicate for the architect's approval complete shop drawings. These shall show scaled details of construction, anchoring, etc.

Materials

3. Skylight Bar shall be a specially rolled solid, one-piece, U-shaped steel section.

4. The cap shall be specially formed of 16 oz. cold rolled copper. Studs shall be of malleable iron passing through the cap to receive brass dome nuts.

5. Curb Aprons of 16 oz. cold rolled copper shall be furnished.

Note: Caps or curb aprons or both will be furnished in 24 gauge galvanized steel at a corresponding price when specified.

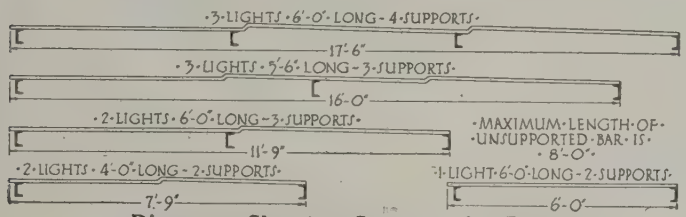
6. Clips, anchors, bolts and screws for attaching the skylight to the building construction shall be furnished as required.

Note: (a) Anchors are not set in the masonry by the skylight contractor.

(b) Structural steel is not furnished by the skylight manufacturer.

Construction

7. Skylight Bars and Caps shall be cut to the proper lengths ready for assembly in the field.



Diagrams Showing Supports for Bars
Maximum unsupported length of bar is 8' 0"

Erection

8. Lupton Rolled Steel Skylight shall be erected in prepared openings by the skylight contractor (unless otherwise specified) in accordance with the standard details for this product.

Note: (a) Include in the masonry specification that openings for skylights be prepared according to the standard details for Lupton Rolled Steel Skylight. Anchor clips must be imbedded in the masonry as shown in details.

(b) Include in the structural steel specification that all punching for clips, etc., required for the installation of Lupton Rolled Steel Skylight must be done by the Steel contractor.

9. The glass shall be supported longitudinally on saturated cords of specially treated fibre resting in the flanges of the skylight bars.

Where two sheets of glass overlap, they shall be separated by saturated cords. The caps shall be separated from the glass by saturated cord and held in place by the studs and cap nuts.

10. Curbs, hips and ridges shall be calked with roofing cement and flashing shall be applied at hips and ridges as indicated on the details for Lupton Rolled Steel Skylight.

Painting

11. All skylight bars shall receive one coat of red lead primer on the outside and one coat of asphaltum on the inside before shipment.

Glass

Note: Specify the following under the proper heading in Specifications of other trades.

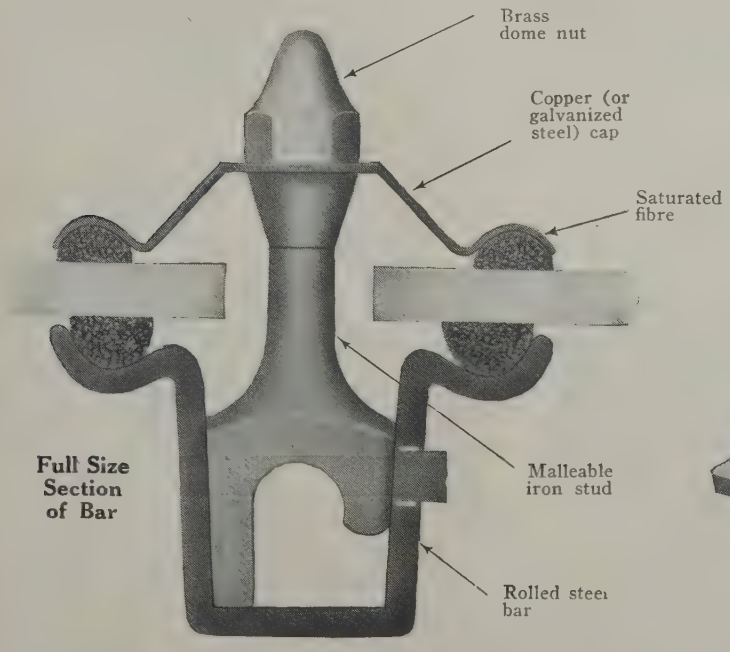
(a) ¼" thick ribbed wire glass or ¼" thick rough wire glass. No single sheet to exceed 6' in length.

LENGTHS OF BARS FOR VARIOUS LENGTHS OF GLASS

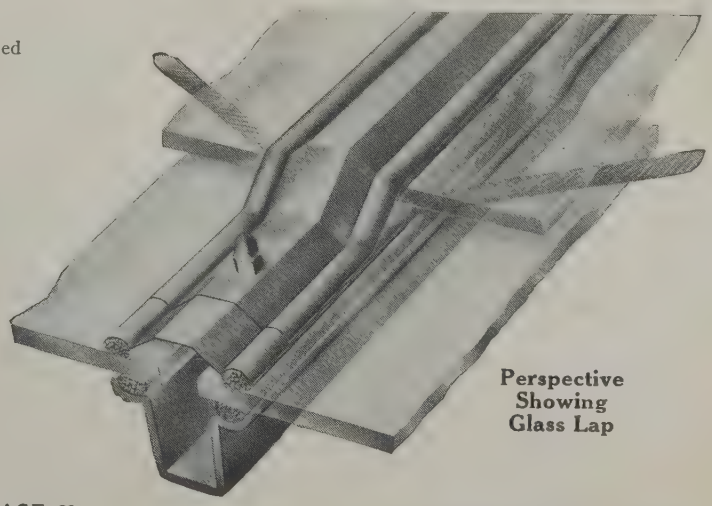
Length of glass, ft. in.	Lengths of bars					
	1 light, ft. in.	2 lights, ft. in.	3 lights, ft. in.	4 lights, ft. in.	5 lights, ft. in.	6 lights, ft. in.
3 0	3 0	5 9	8 6	11 3	14 0	16 9
3 6	3 6	6 9	10 0	13 3	16 6	19 9
4 0	4 0	7 9	11 6	15 3	19 0	22 9
4 6	4 6	8 9	13 0	17 3	21 6	25 9
5 0	5 0	9 9	14 6	19 3	24 0	28 9
5 6	5 6	10 9	16 0	21 3	26 6	31 9
6 0	6 0	11 9	17 6	23 3	29 0	34 9

Spacing of Bars for Various Widths of Glass

For 20-in. glass, bars are spaced 20¾-in. centers
For 21-in. glass, bars are spaced 21¾-in. centers
For 22-in. glass, bars are spaced 22¾-in. centers
For 23-in. glass, bars are spaced 23¾-in. centers
For 24-in. glass, bars are spaced 24¾-in. centers



Full Size Section of Bar



Perspective Showing Glass Lap

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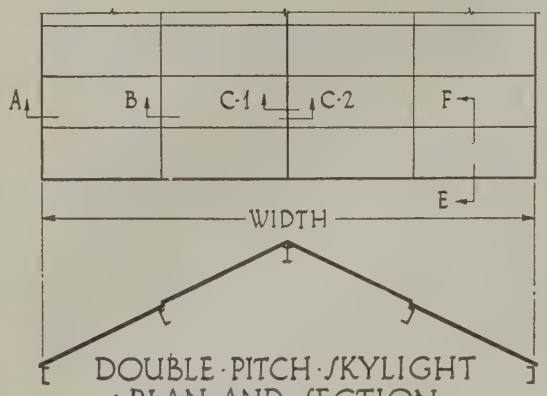
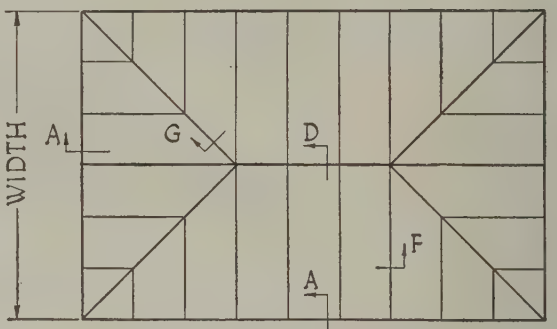
DETAILS FOR LUPTON ROLLED STEEL SKYLIGHT

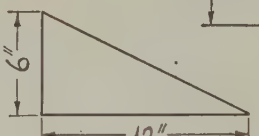
SCALE FOR DETAILS 3"=1'-0"



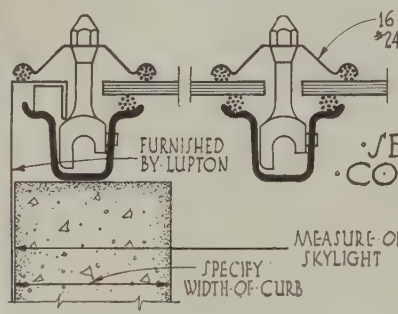
DOUBLE PITCH SKYLIGHT
PLAN AND SECTION



HIPPED SKYLIGHT
PLAN

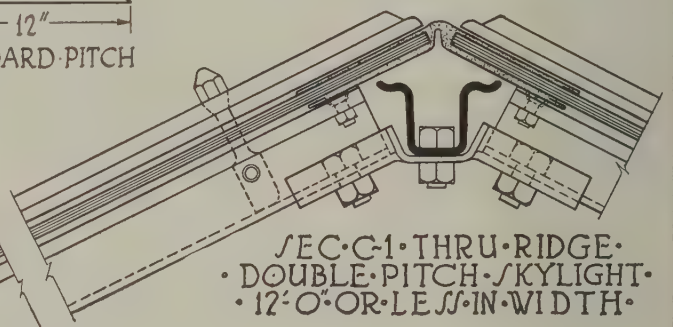


STANDARD PITCH

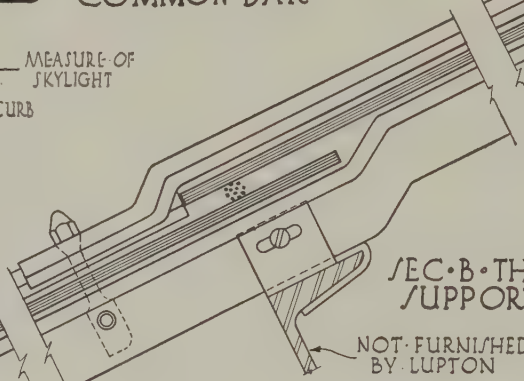


SEC F THRU COMMON BAR

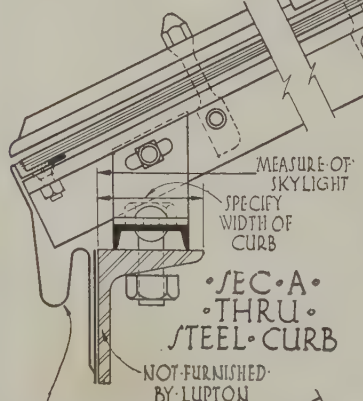
SEC E THRU CONCRETE SIDE CURB



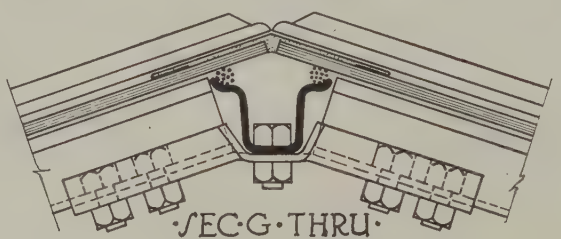
SEC C-1 THRU RIDGE
DOUBLE PITCH SKYLIGHT
12'-0" OR LESS IN WIDTH



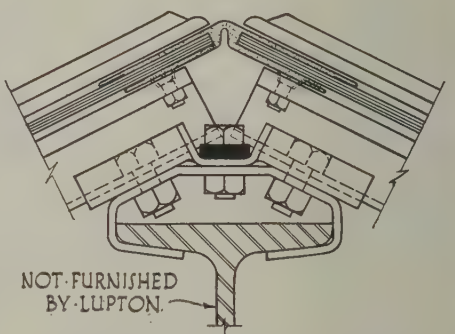
SEC B THRU SUPPORT



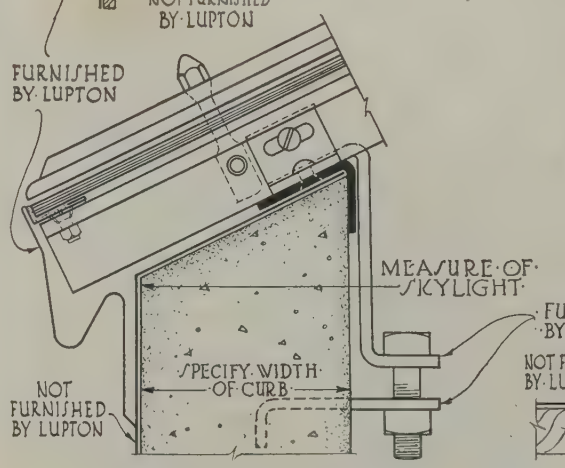
SEC A THRU STEEL CURB



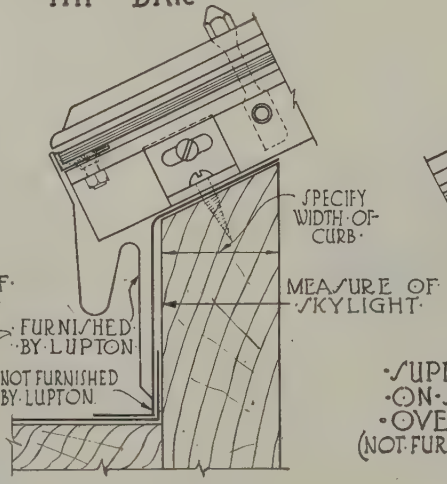
SEC G THRU HIP BAR



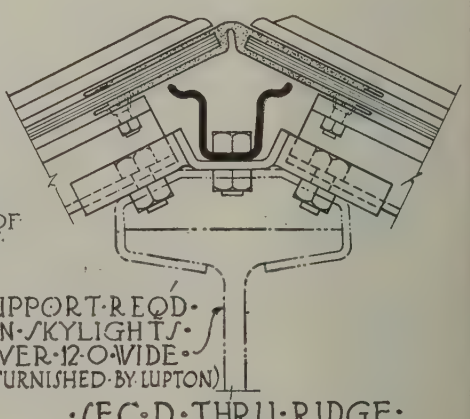
SEC C-2 THRU RIDGE
DOUBLE PITCH SKYLIGHT
OVER 12'-0" WIDE



CONCRETE CURB



WOOD CURB



SEC D THRU RIDGE OF HIPPED SKYLIGHT

ESTABLISHED 1912 INCORPORATED 1920

THE McCOY BRONZE COMPANY, INC.

Manufacturers of Pyramid Bronze Sash

FACTORY AND GENERAL OFFICES
Forsythe and Holden Streets
DETROIT, MICH.

Products

PYRAMID BRONZE SASH.

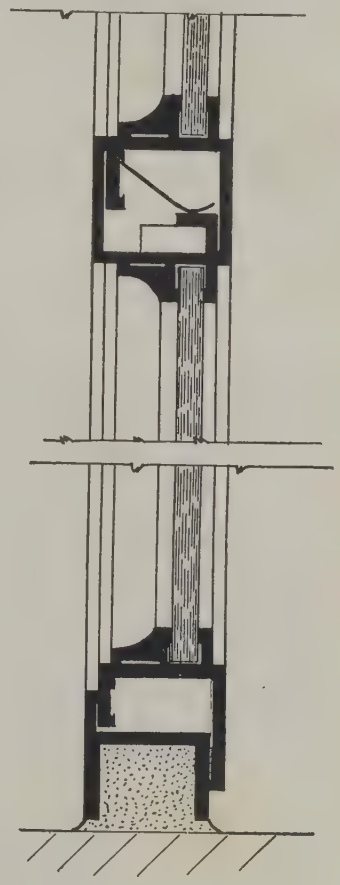
PYRAMID BRONZE CASEMENTS (patents pending).

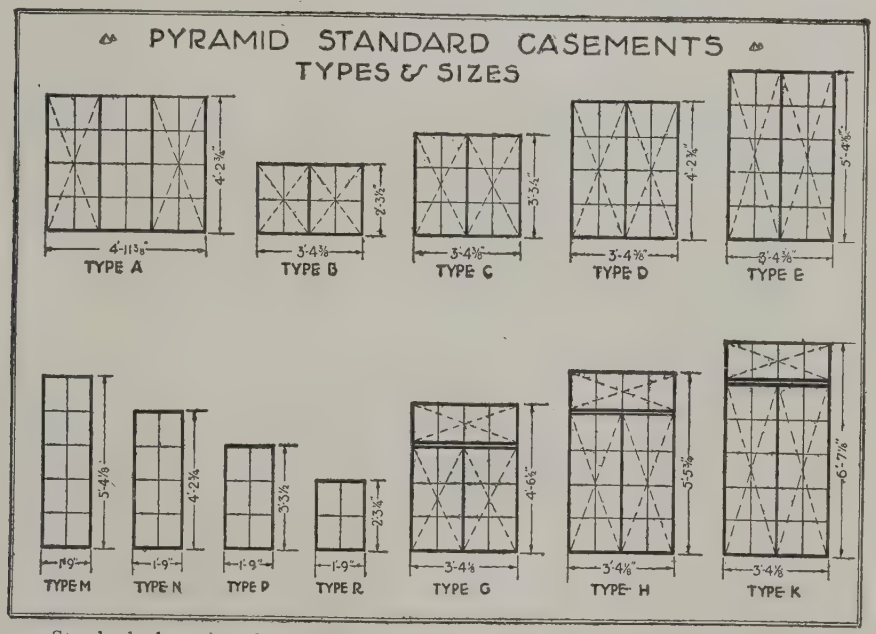
For Pyramid Bronze Doors, see pages A964-966.

Pyramid Bronze Sash

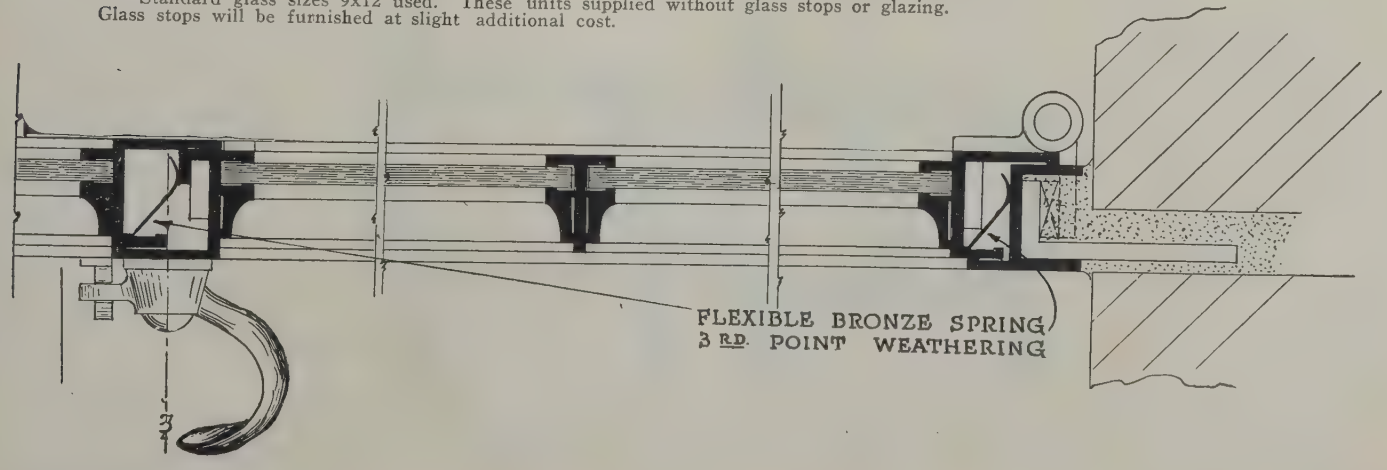
Pyramid Bronze Sash with its three points of weathering creates a new standard in casement sash. It is adaptable to all types of buildings. This construction, though new, has proven decidedly efficient. The third point of weathering must not be confused with ordinary added weatherstrip. It is a continuous flexible phosphor bronze spring member concealed and fastended in a dovetailed groove insuring absolute protection under all conditions. Pyramid Sash are assembled from our standard extruded bronze members from which we are able to build up many different styles and forms. This type of construction though very economical, creates a sash of unrivalled appearance with unbroken architectural lines both inside and weatherside.

The extruded members are of generous and sturdy cross section, interlocking to form an absolutely rigid sash that is really weatherproof and will remain so for an indefinite time. The glass mould and frame mould are applied in a novel manner, concealing and permanently retaining all putty, and corners are mortised and tenoned together, being automatically tightened and made waterproof by a concealed driven keyed taper. No nuts nor bolt or screw heads exposed. Prices and literature on application.





Standard glass sizes 9x12 used. These units supplied without glass stops or glazing. Glass stops will be furnished at slight additional cost.



LUNDELL-ECKBERG MANUFACTURING CO., INC.

Lemco Custom Built and Standard Steel Casements, Projected Sash and Doors

JAMESTOWN, N. Y.

REPRESENTATIVES

ATLANTA, GA., Steel Specialties Co., 606 Walton Building
BALTIMORE, MD., Consolidated Supply Co., 10 W. Chase Street
BUFFALO, N. Y., James M. Hawkins Co., 885-87 Ellicott Square
CHICAGO, ILL., Ralph E. Peck, 712 Bell Building
CINCINNATI, OHIO, Durbrow & Otte, 206 W. Court Street
CLEVELAND, OHIO, Diebold Safe & Lock Co., 1144 Prospect Avenue
COLUMBUS, OHIO, Alvan Tallmadge, 63 Parkwood Avenue
DALLAS, TEX., Metal Products Co., 406 Linz Building
DAYTON, OHIO, Durbrow & Otte, 266 Fourth Street Arcade
DES MOINES, IOWA, Tower Materials Co., Hubbell Building
DETROIT, MICH., E. H. Gunnison, 439 Penobscot Building
ERIE, PA., Erie Concrete & Steel Supply Co., 13th and Cranberry Streets
HARTFORD, CONN., Bidwell Hardware Co., 1293 Main Street
HUNTINGTON, W. VA., James J. Weiler & Sons, 202 Elm Street
INDIANAPOLIS, IND., C. B. Mayer, 2261 No. Meridian Street
LITTLE ROCK, ARK., Chas. S. Watts, P. O. Box 92, 709 Home Insurance Building
LOS ANGELES, CAL., Associated Material Co., 707 E. 61st Street
MIAMI, FLA., J. K. Brandt, 415 Miami Bank & Trust Building
MINNEAPOLIS, MINN., Hauenstein & Burmeister, 700 Builders Exchange Building
NEW YORK, N. Y., A. F. Nagle Co., Inc., 10 E. 43rd Street
NIAGARA FALLS, N. Y., James M. Hawkins Co., Gluck Building
PHILADELPHIA, PA., Wolfe & Adams, 224 Insurance Co. of North America Building, 1600 Arch Street
PITTSBURGH, PA., H. H. Frank, 207 Fulton Building
ROCHESTER, N. Y., Beardsley Glass & Glazing Co., 964 Chili Avenue
ST. PAUL, MINN., Hauenstein & Burmeister, 903 Builders Exchange Building
ST. LOUIS, MO., F. A. Camman Builders Service Co., 927 Century Building
SAN FRANCISCO, CAL., Price Teltz Co., 683 Howard Street
SCRANTON, PA., Frank E. Ryan, 317 Madison Avenue, P. O. Box 306
SEATTLE, WASH., W. P. Fairbairn, 520 Skinner Building
TOLEDO, OHIO, H. A. Sparks Co., 237 Michigan Street
TULSA, OKLA., Ray Trimble, 433 Kennedy Building
WASHINGTON, D. C., Consolidated Supply Co., 410 Bond Building
WICHITA, KAN., Lusco Brick & Stone Company

LEMCO HIGH GRADE STEEL CASEMENTS AND DOORS FOR EVERY PURPOSE

Types of Lemco Steel Casements and Doors

We specialize in high grade steel casements of any design or size. Our casements and doors may be divided into two general groups.

Strictly Custom Built Casements and Doors—These are made of No. 200 heavy three-point section and No. 600 heavy two-point section. They may be of any shape or size.

Standardized Steel Casements and Doors—The casements are made of No. 700 medium two-point section and No. 100 standard two-point section. The doors are made only of No. 600 two-point section.

Lemco Casements Produced on a Quality Basis

Our casements are produced to conform to a high standard of both workmanship and material. The sections, which are unusually heavy, are made from hot rolled steel bars and are carefully straightened. The corners are accurately mitered and electrically welded together, making strong and neatly finished casements.

They are made by expert mechanics and all work is subjected to rigid inspection for precision of contact parts and assembly. The hardware, including hinges and fasteners, is made of bronze and not of malleable iron.

Lemco Hardware All Solid Bronze

All hardware is solid bronze, even for the most inexpensive sash, and is made in our own foundry. Plate 1H-1 shows the design of the various parts.

Our patented safety cleaning friction hinge allows the outside of the glass to be cleaned from the room side and the friction feature does away with the use of a sill adjuster. The friction hinge is easily operated, yet it will hold the sash in any desired position.

How the Casements Are Finished

All steel is thoroughly cleaned and brushed before painting. All custom built jobs receive one coat of rust resisting paint and one coat of gray enamel, each coat baked on separately; standardized casements receive only one coat of gray enamel. However, painting specifications may vary to meet conditions or architect's specification.

LEMCO HIGH GRADE CUSTOM BUILT STEEL CASEMENTS AND DOORS

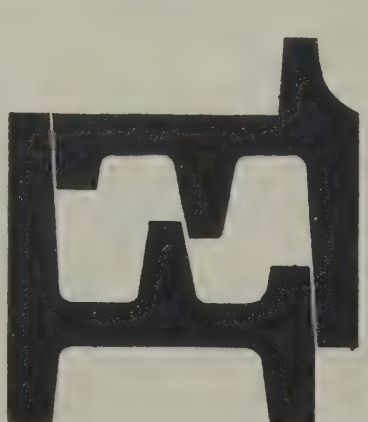
No. 200 Heavy Three-point Section

This section is for use where the heaviest, high grade casement having unusual strength is desired. It has two weathering points and an additional baffle rib in the center which breaks up any air currents which may pass the outer contact point. This baffle rib also adds to the strength of the frame and sash. This type section is suitable for the highest grade work as well as for very large sash and door.

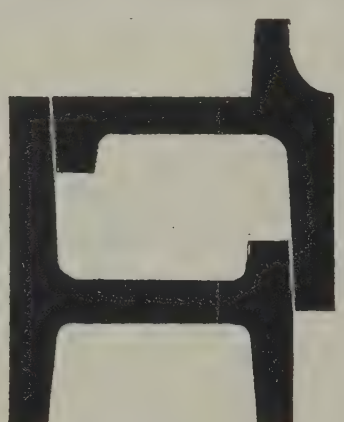
No. 600 Heavy Two-point section

For use where a high grade weathertight two-point casement is desired at a lower cost than the heavy three-point casement. This section is lighter than the No. 200 and there is no center baffle rib.

Sections 200 and 600 are only made in special sizes.



No. 200 Heavy Three-point Section
For finest work and for large windows



No. 600 Heavy Two-point Section
At a minimum cost

Special Custom Built Doors Opening In or Out

These can be made with either the No. 200 heavy three-point section or the No. 600 heavy two-point section. They can be of any shape or size and are made to architect's details.

Continued on next page

THE STANDARDIZED STEEL CASEMENTS AND DOORS

These are made in standard sizes but are unusually heavy for this size sash. They can be made to special size at a slightly higher price. They are of two types, No. 700 and No. 100. Both are made in the small standard sizes two lights wide as shown in the schedule on Plate 1D-1.

No. 700 Medium Two-point Section

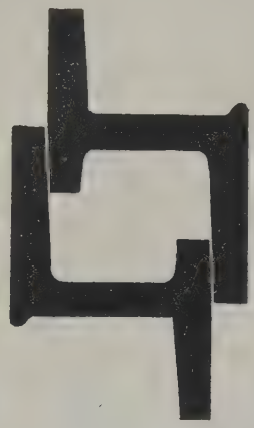
This type has the heavier frame section in that it has two legs of the same length which rest against the masonry opening. This gives a better chance to secure the frame to the masonry by means of expansion bolts or screws in lead sleeves, as it requires a deeper rabbet in the stone. This also lessens the danger of chipping the stone rabbet when being screwed into place.

Using this section prevents any twisting of the frame while installing on account of the extra weight of the frame section.

The No. 700 type section costs slightly more than the No. 100 type section on account of the difference in weight.

No. 700 Medium Two Point Section

A high grade sash made in standard sizes. Especially adapted for use with stone trim



No. 100 Standard Two Point Section

A heavy, inexpensive, cottage type casement made in standard sizes

No. 100 Standard Two-point Section

For use where a good substantial steel casement at a low price is desired. The casement is made in standard sizes still maintaining our high quality and workmanship.

Standardized Steel Doors

The frames for these doors have the No. 600 heavy two-point section described on preceding page. This makes a strong, rigid frame to withstand hard use and the deep rabbet provides ample room for securely anchoring the frame to the masonry.

When Leaded Glass Is Desired

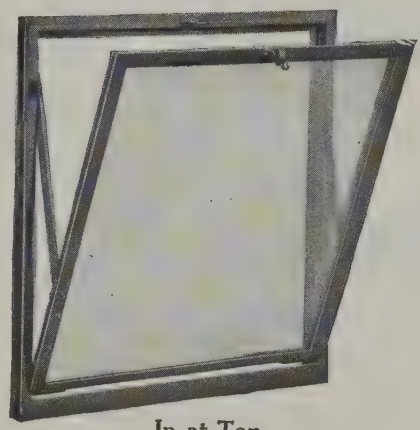
Any of our sash, either special or standard, can be supplied without steel muntin bars when it is desired to use leaded glass. On account of the extra weight and strength of our sections, they lend themselves very well to this method of glazing.

THE NEW LEMCO PROJECTED WINDOWS—IN AT TOP OR OUT AT BOTTOM

In the new Lemco Projected Sash we offer a projected sash of the very highest grade. It is made in the No. 600 two-point section and is stiff enough not to twist even in large sash. All the sections are carefully straightened, so as to produce a close contact and provide a weatherproof construction.

Made in Two Styles

The sash is made in two styles, to open in at the top or out at the bottom. Each of these have their own particular uses. They have the advantage of allowing a considerable amount of ventilation before the sash is really opened. This enables the user to secure ventilation and yet not let in the weather.



In at Top

Adjustable Bronze Friction Pivots and Hardware

All the hardware on the sash is of bronze to insure long life and easy action.

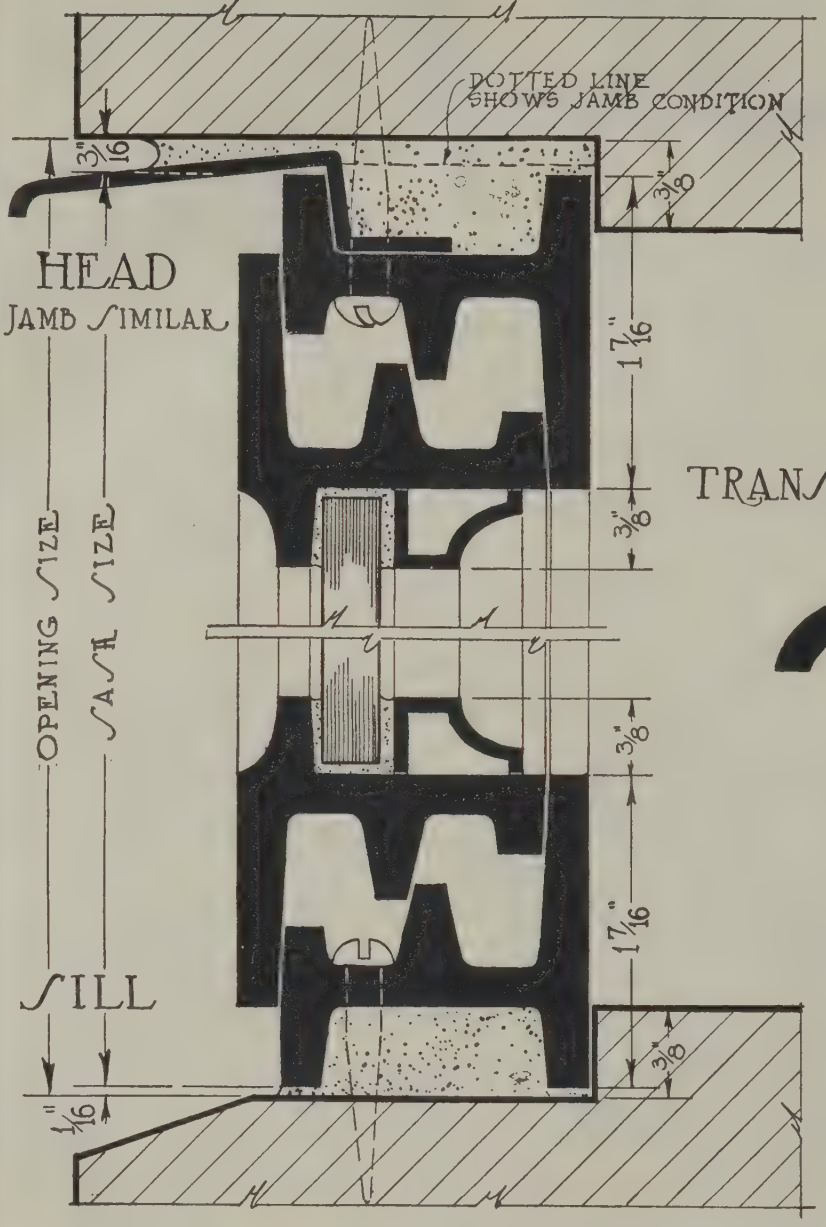
The pivot is so arranged that it is readily adjustable at any time to secure the proper amount of friction in order to operate the sash freely yet have enough friction to hold it in any position.

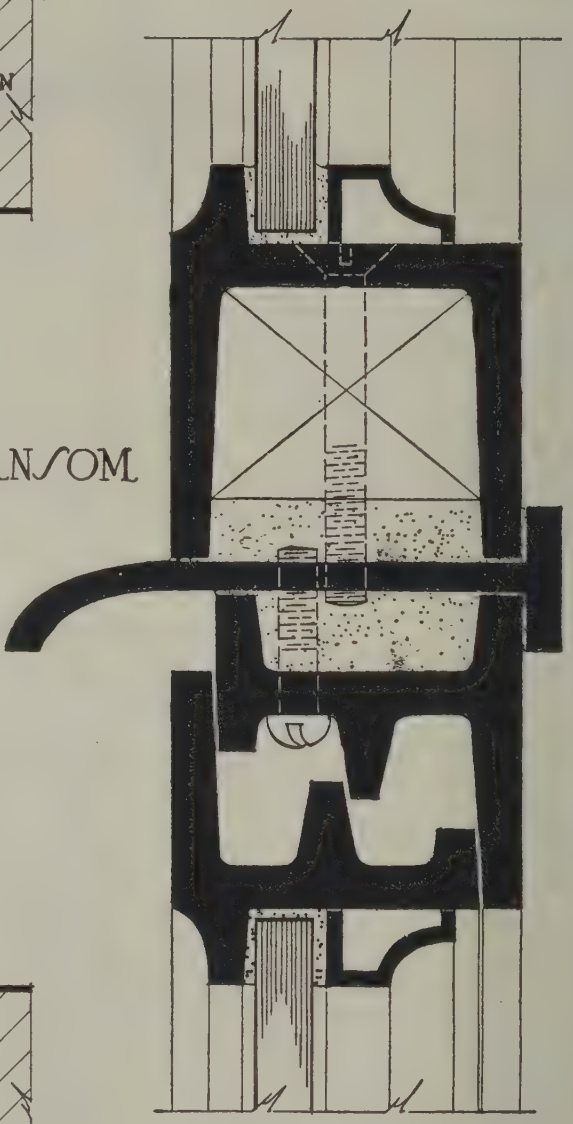
A FEW RECENT LEMCO INSTALLATIONS AND THE ARCHITECTS

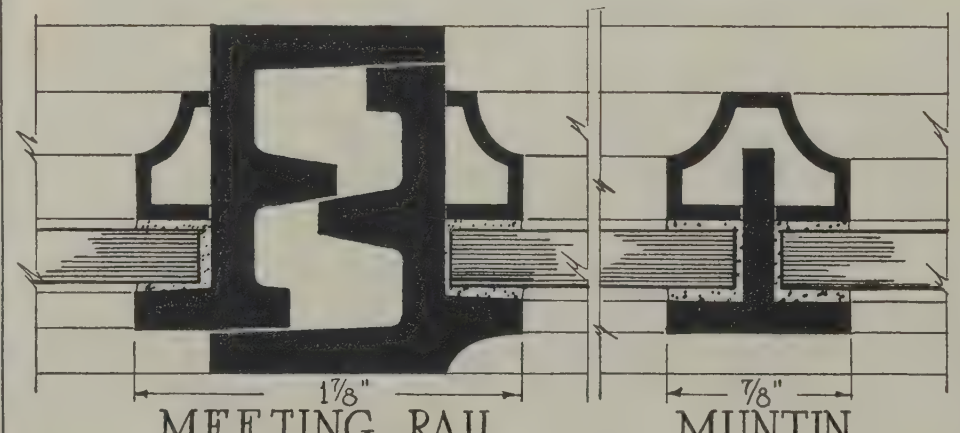
Yeshiva College of America, New York, N. Y., Charles B. Meyers
Bernard Residence, Pasadena, Cal., Morgan, Walls & Clements
Hurley Hospital, Flint, Mich., Thielbar & Fugard
Immanuel Baptist Church, Little Rock, Ark., Mann & Stern
Union County Courthouse, El Dorado, Ark., Mann & Stern
Friend's School, Baltimore, Md., Motter & White
Morewood Gardens Apartments, Pittsburgh, Pa., Marks & Cann
Physics Building, University of Washington, Seattle, Wash., John Graham
State and Elm Street Apartment Building, Chicago, Ill., B. Leo Steif
Casino Club, Chicago, Ill., Frazer & Raftery
Masonic Temple, Decatur, Ill., Holabird & Roche
Community House, New York, N. Y., Henry B. Herts
Extension to Irene Kaufman Settlement, Pittsburgh, Pa., Edward Stotz
David Stott Building, Detroit, Mich., Donaldson & Meyer
Franklin Baker Residence, Newton Township, Delaware County, Pa., Carl A. Ziegler
Harold Dickman Residence, Detroit, Mich., Alvin E. Harley
Lincoln Street M. E. Church, Shamokin, Pa., Bureau of Architecture of M. E. Church
Henry A. Page Residence, Toledo, Ohio, Mills, Rhines, Bellman & Nordhoff
St. Joseph's Cathedral Rectory, Buffalo, N. Y., Mortimer J. Murphy
J. H. McNabb Residence, Winnetka, Ill., S. S. Beman
Soldier's Field, Grant Park Stadium, Chicago, Ill., Holabird & Roche
River Forest State Bank, River Forest, Ill., Schneitler & Wenisch
Rockland State Hospital, Orangeburg, N. Y., New York State Architect
First National Bank, Amityville, N. Y., Morgan French Company
Public School No. 148, Borough of Queens, New York, N. Y., Wm. H. Gompert
Chicago Daily News Building, Chicago, Ill., Walter W. Ahlschlager
State Armory, Hempstead, N. Y., Wm. E. Haugaard
De Paul Educational Aid Society Building, Chicago, Ill., K. M. Vitzthum & Co., Inc.
Chicago Evening Post Building, Chicago, Ill., Holabird & Roche
Laramie State Bank, Chicago, Ill., Meyer & Cook
Bryn Mawr Country Club, Tessville, Ohio, B. Leo Steif & Co
Hess Residence, Wheeling, W. Va., Sidney F. Heckert
Title Insurance & Trust Building, Los Angeles, Cal., John & Donald Parkinson
Dayton-Biltmore Hotel, Dayton, Ohio, F. J. Hughes Co., Inc.
St. Benedict's Parish Building, Detroit, Mich., Donaldson & Meier
Crandon Avenue Apartment Building, Chicago, Ill., Quinn & Christiansen
Barbizon Apartments, New York, N. Y., Murgatroyd & Ogden
Public School No. 134, Borough of Queens, New York, N. Y., Wm. H. Gompert
Public School No. 104, Brooklyn, N. Y., Wm. H. Gompert
Museum of Natural Science, Buffalo, N. Y., Esenwein & Johnson
Orange County Courthouse, Orlando, Fla., Murry S. and James B. King

Continued on next page

NO. 200 LEMCO
HEAVY THREE POINT SECTION CASEMENT OPENING OUTWARD







MULLION SIMILAR TO THAT SHOWN ON PLATE NUMBER 2A-1.

SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING.

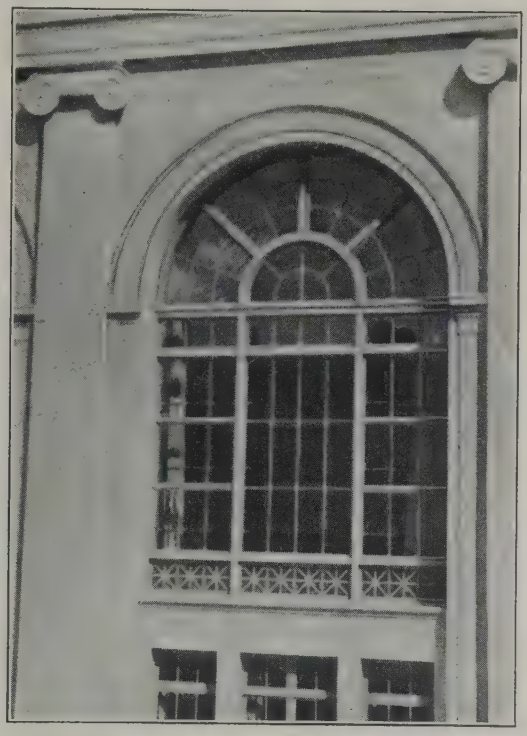
CLEARANCE FOR SETTING SHOULD BE INCREASED TO 1/8" FOR MASONRY & CAST IRON.

SCALE-FULL SIZE

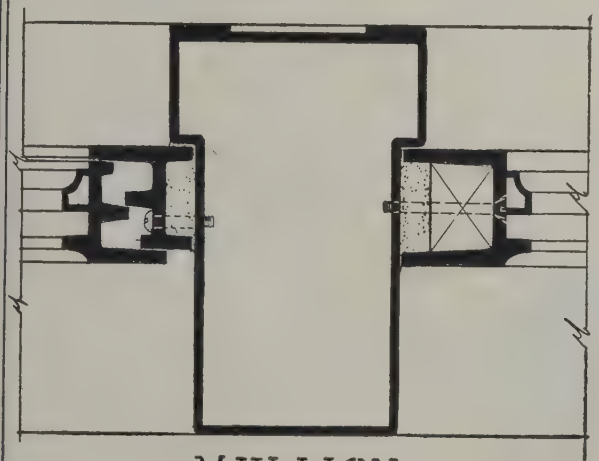
PLATE NO. 1A-1

Continued on next page

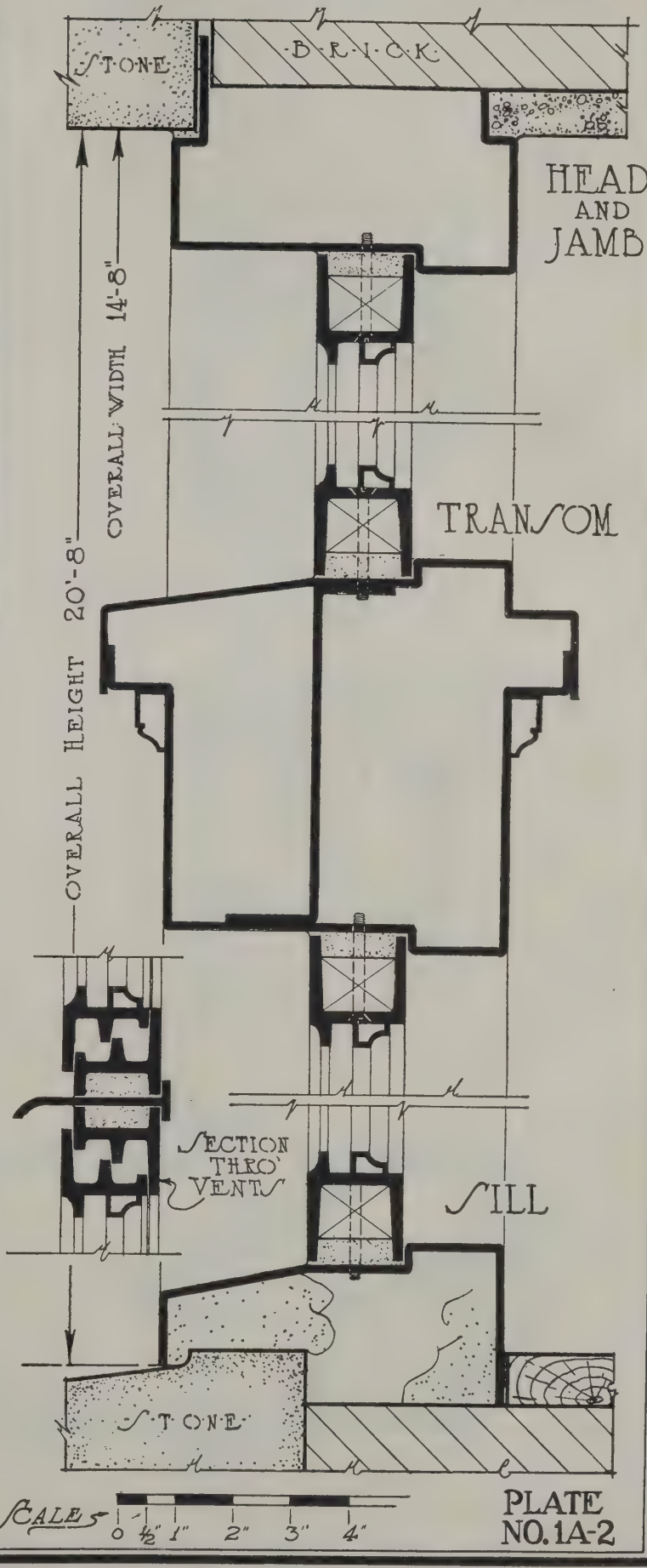
LEMCO THREE POINT SECTION SASH OPENING OUT SET TO LEMCO SUBFRAMES



SUB-FRAMES CONSTRUCTED OF No. TWELVE GUAGE STEEL.
VENTILATORS ARE HINGED AT TOP AND ARE CONTROLLED BY ROD GEARING.



MULLION



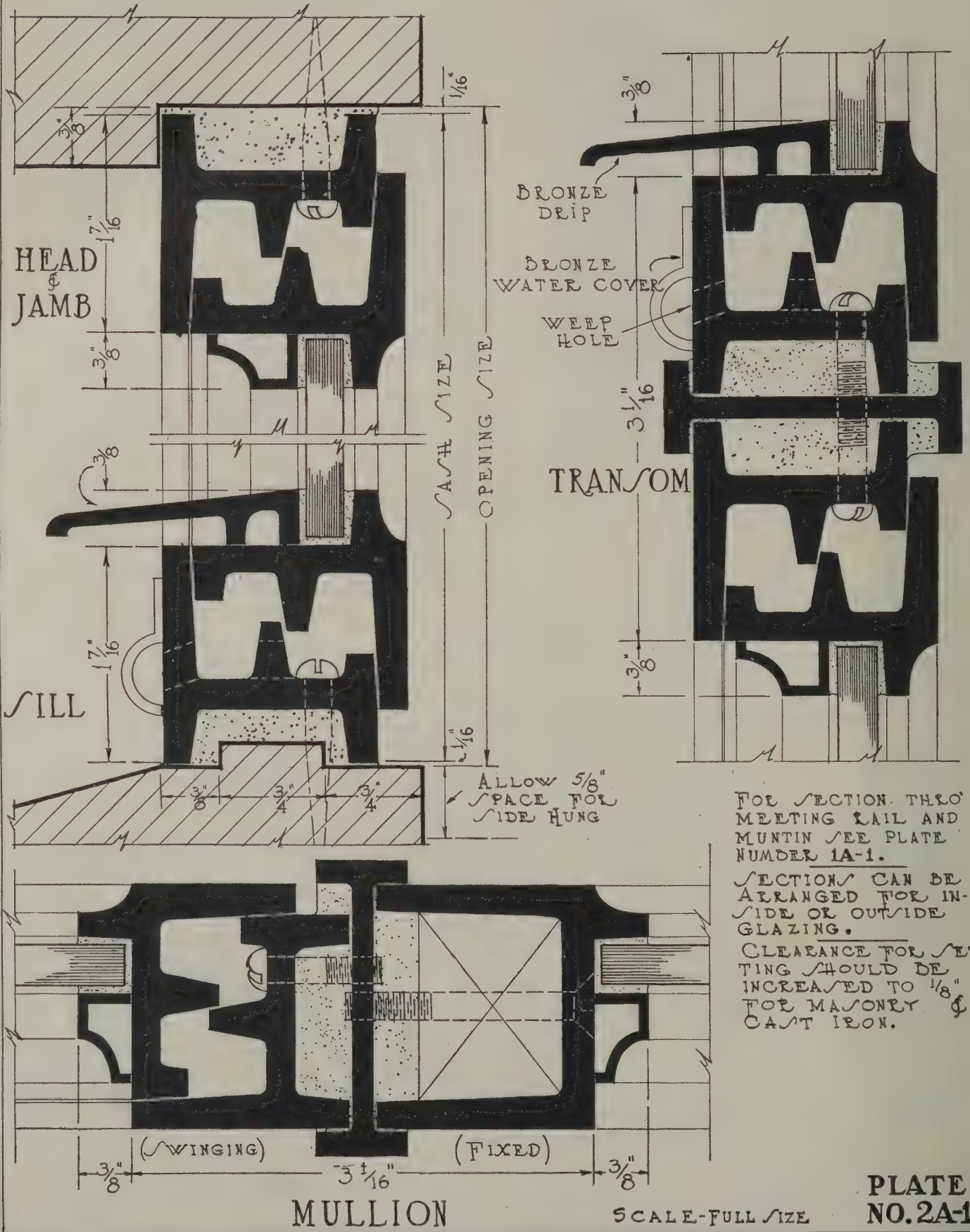
SCALE DETAIL
BAY RIDGE SAVINGS BANK
BROOKLYN, NEW YORK
HALSEY, MC CORMACK & HELMER
ARCHITECTS

PLATE NO. 1A-2

Continued on next page

NO. 200 LEMCO

HEAVY THREE POINT SECTION CASEMENT OPENING INWARD



FOR SECTION THRO' MEETING RAIL AND MUNTIN SEE PLATE NUMBER 1A-1.

SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING.

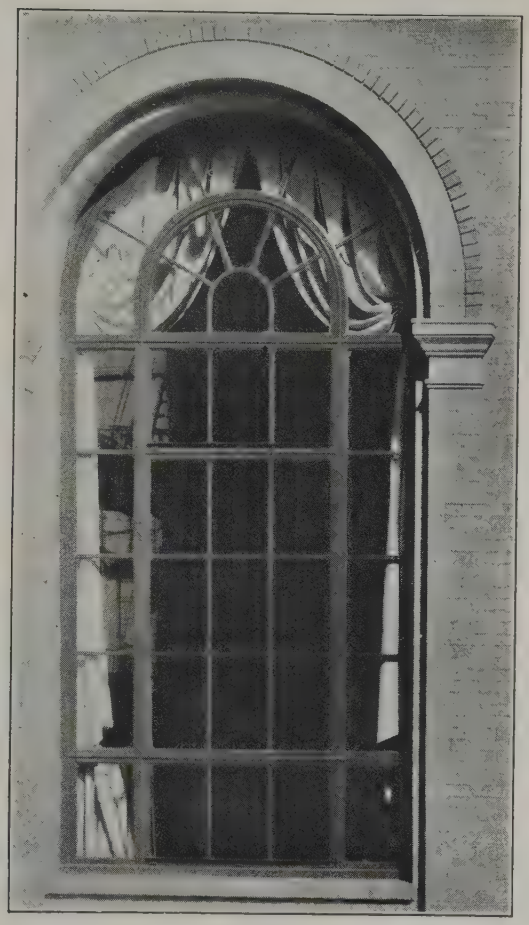
CLEARANCE FOR SETTING SHOULD BE INCREASED TO 1/8" FOR MASONRY & CAST IRON.

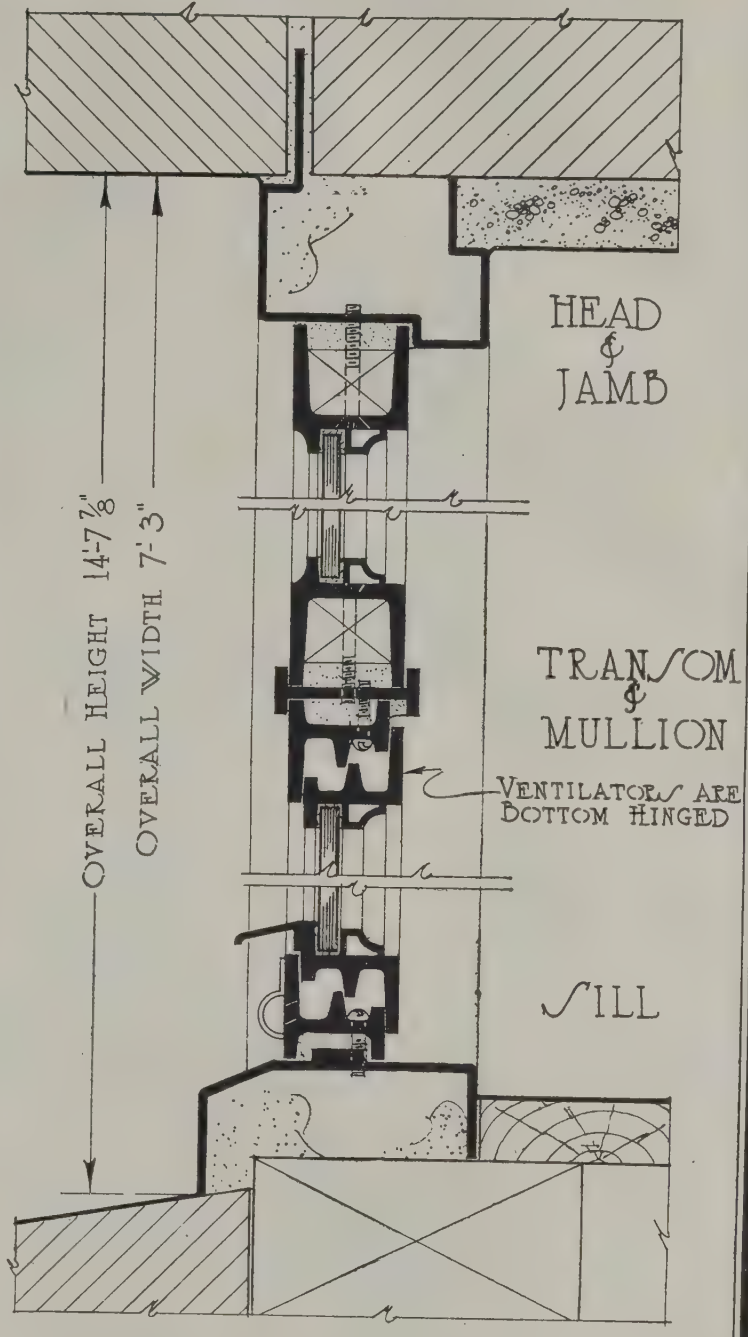
SCALE-FULL SIZE

PLATE NO. 2A-1

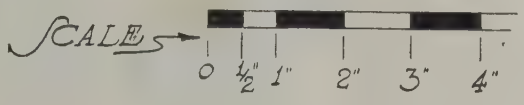
Continued on next page

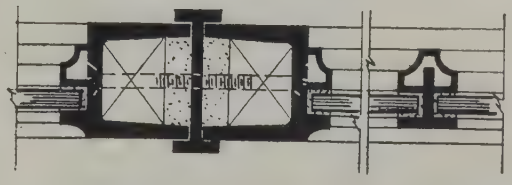
LEMCO THREE POINT SECTION SASH OPENING IN SET TO LEMCO SUBFRAMES





SUB-FRAMES CONSTRUCTED OF № TWELVE GUAGE STEEL.
UPPER VENTILATORS OPERATED FROM FLOOR WITH CORDS. BRONZE CORD CLEAT PLACED ON MULLION A CONVENIENT DISTANCE FROM FLOOR.
LOWER VENTILATORS OPERATED WITH BRONZE SPRING CATCH AND BRONZE FOLDING SIDE ARMS.





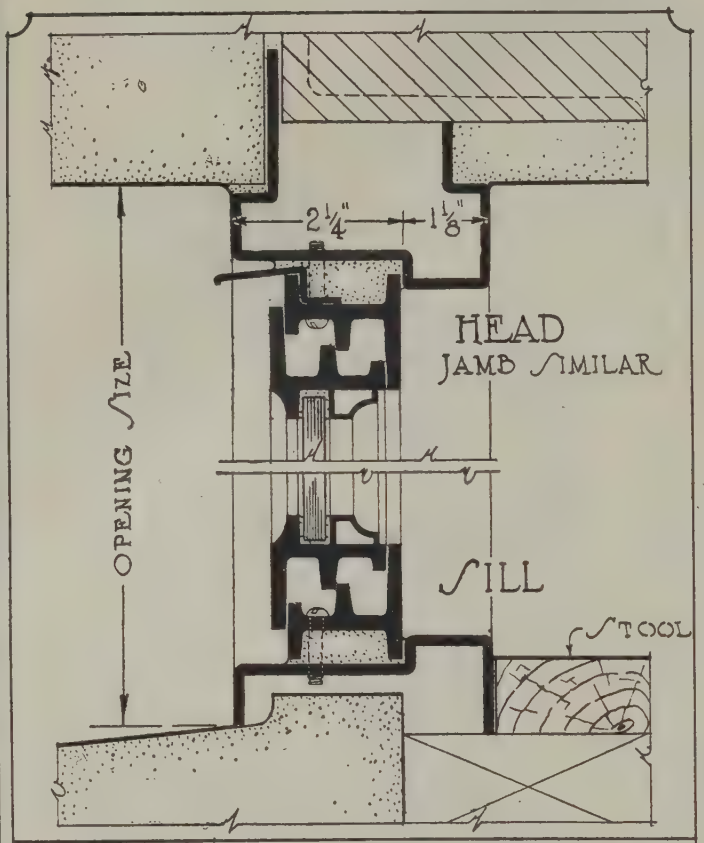
MULLION MUNTIN

SCALE DETAILS
WOODCLIFF TRUST COMPANY
NORTH BERGEN, NEW JERSEY
WALTER L UHL — ARCHITECT

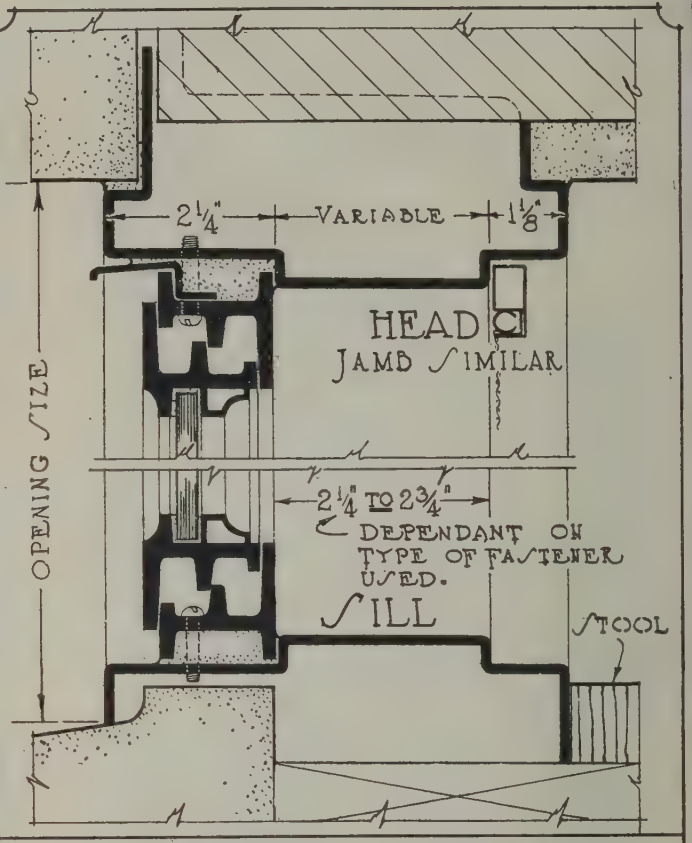
PLATE NO. 2A-2

Continued on next page

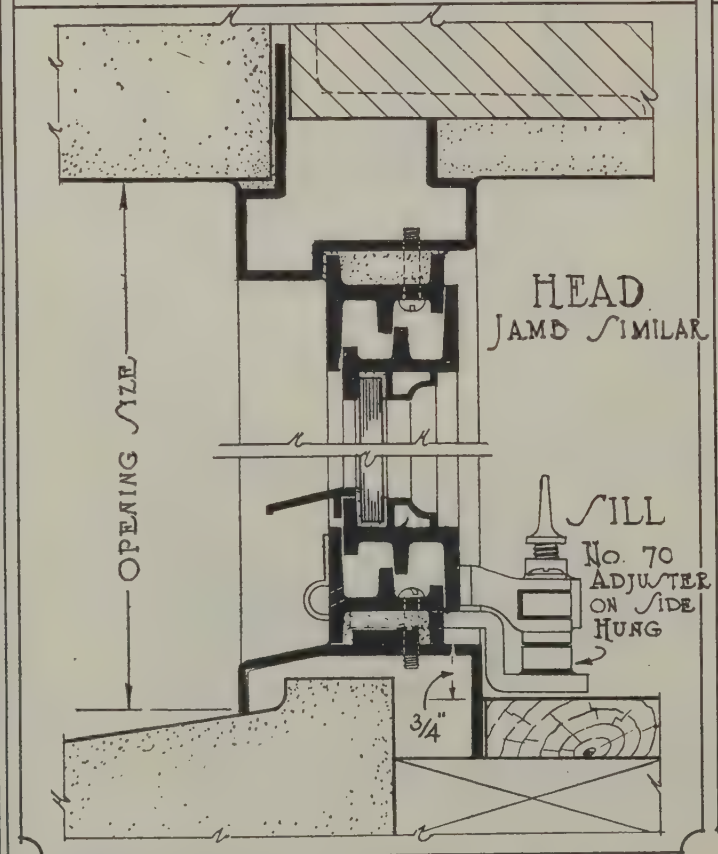
LEMCO BUILTIN SUBFRAMES
APPLICATION DETAILS

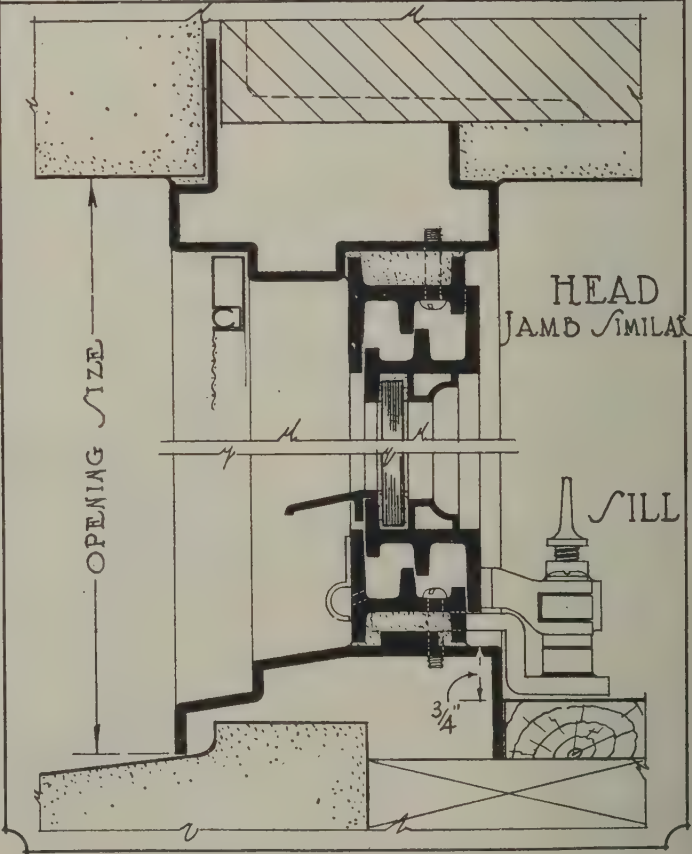


SINGLE RABBETTED SUBFRAMES
OUTWARD AND INWARD OPENING CASEMENTS



DOUBLE RABBETTED SUBFRAMES
OUTWARD AND INWARD OPENING CASEMENTS



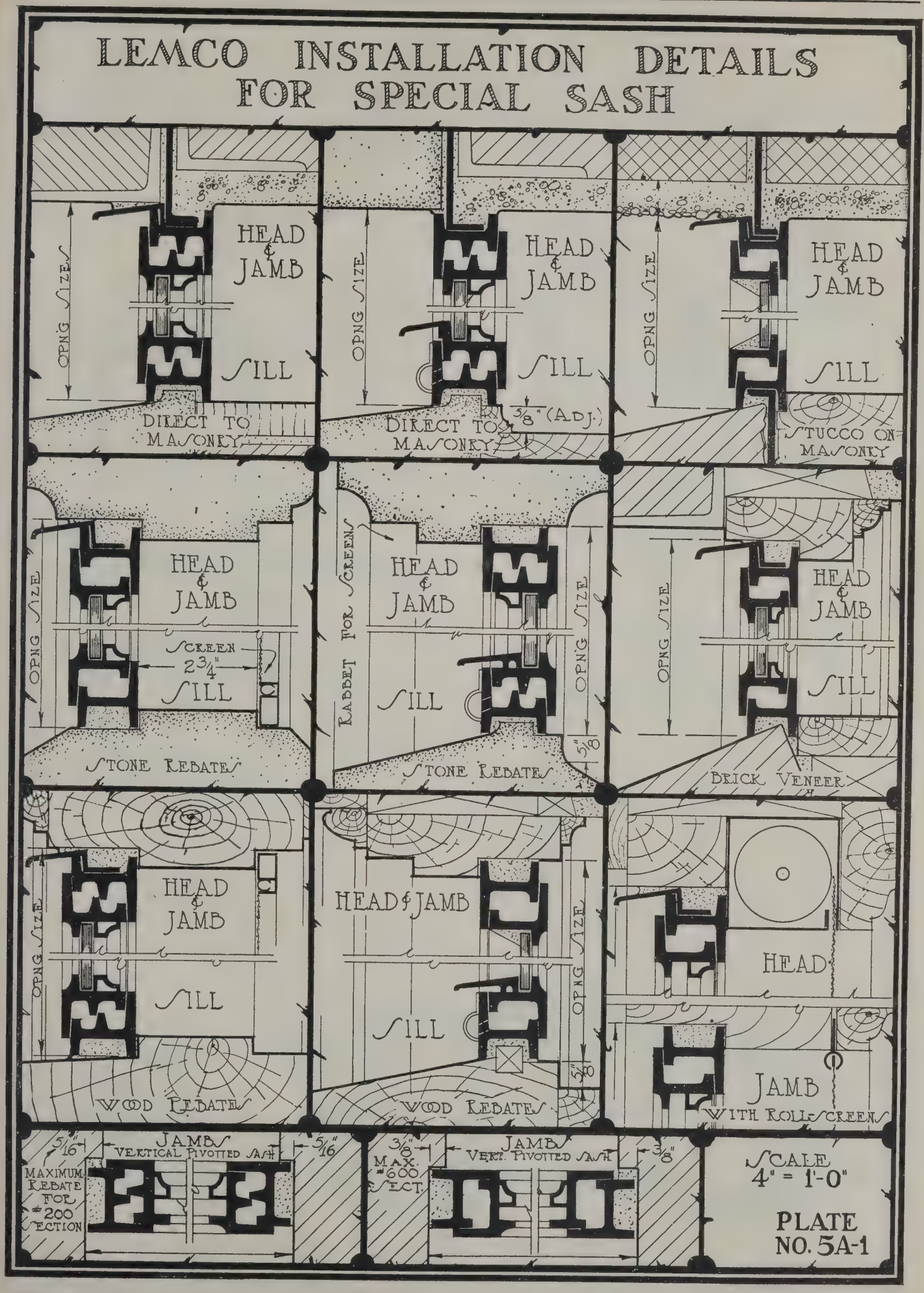


SUBFRAMES ARE BUILT INTO MASONRY BY MASON CONTRACTOR. CASEMENTS ARE SET AFTER ALL ROUGH TRADES HAVE BEEN COMPLETED. ALL FRAMES ARE RIGIDLY CONSTRUCTED OF No. 12 GUAGE STEEL. MADE TO ARCH'T'S DETAILS.

PLATE NO. 4A-1

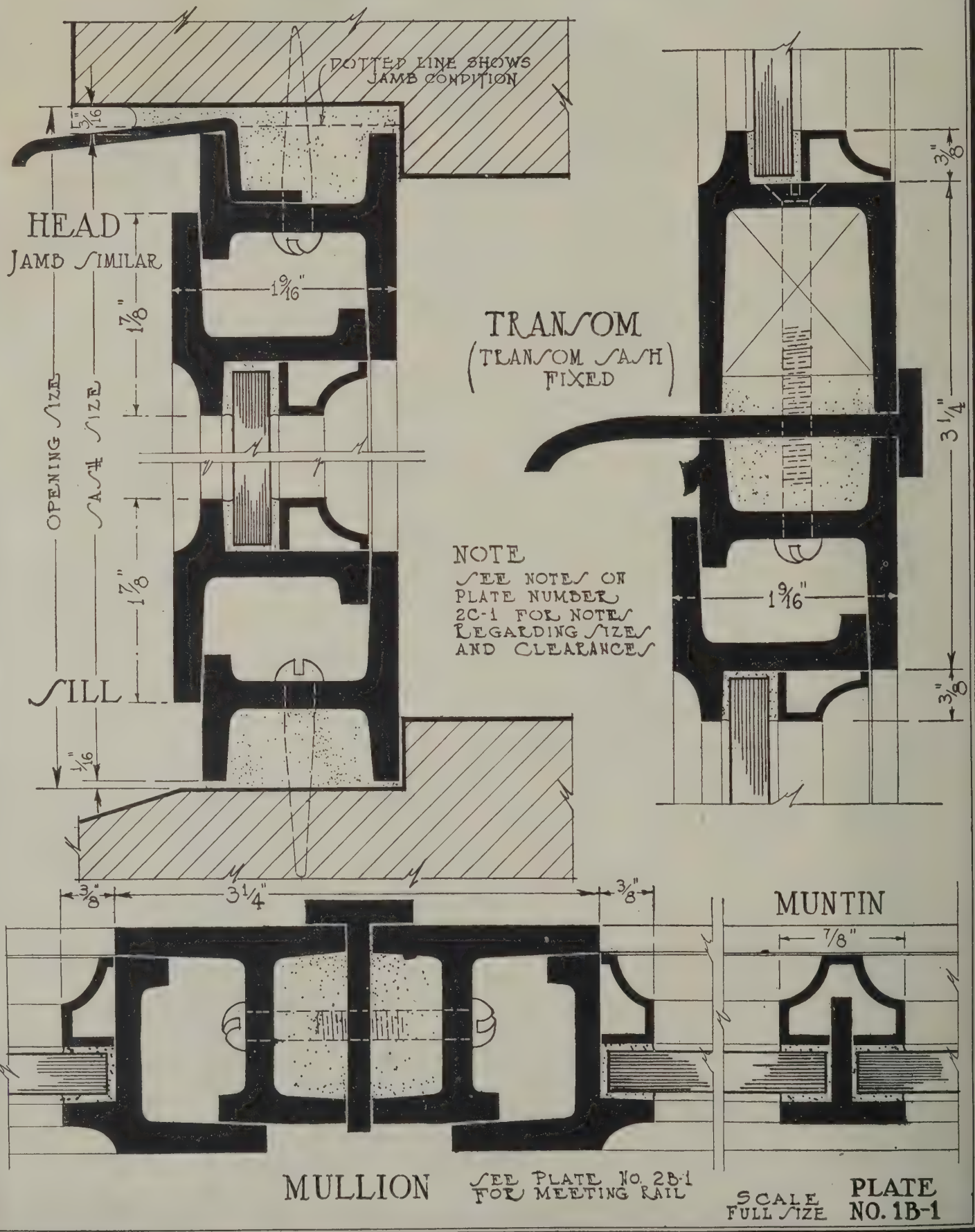
Continued on next page

LEMCO INSTALLATION DETAILS FOR SPECIAL SASH



Continued on next page

NO. 600 LEMCO
HEAVY TWO POINT SECTION CASEMENT
OPENING OUTWARD

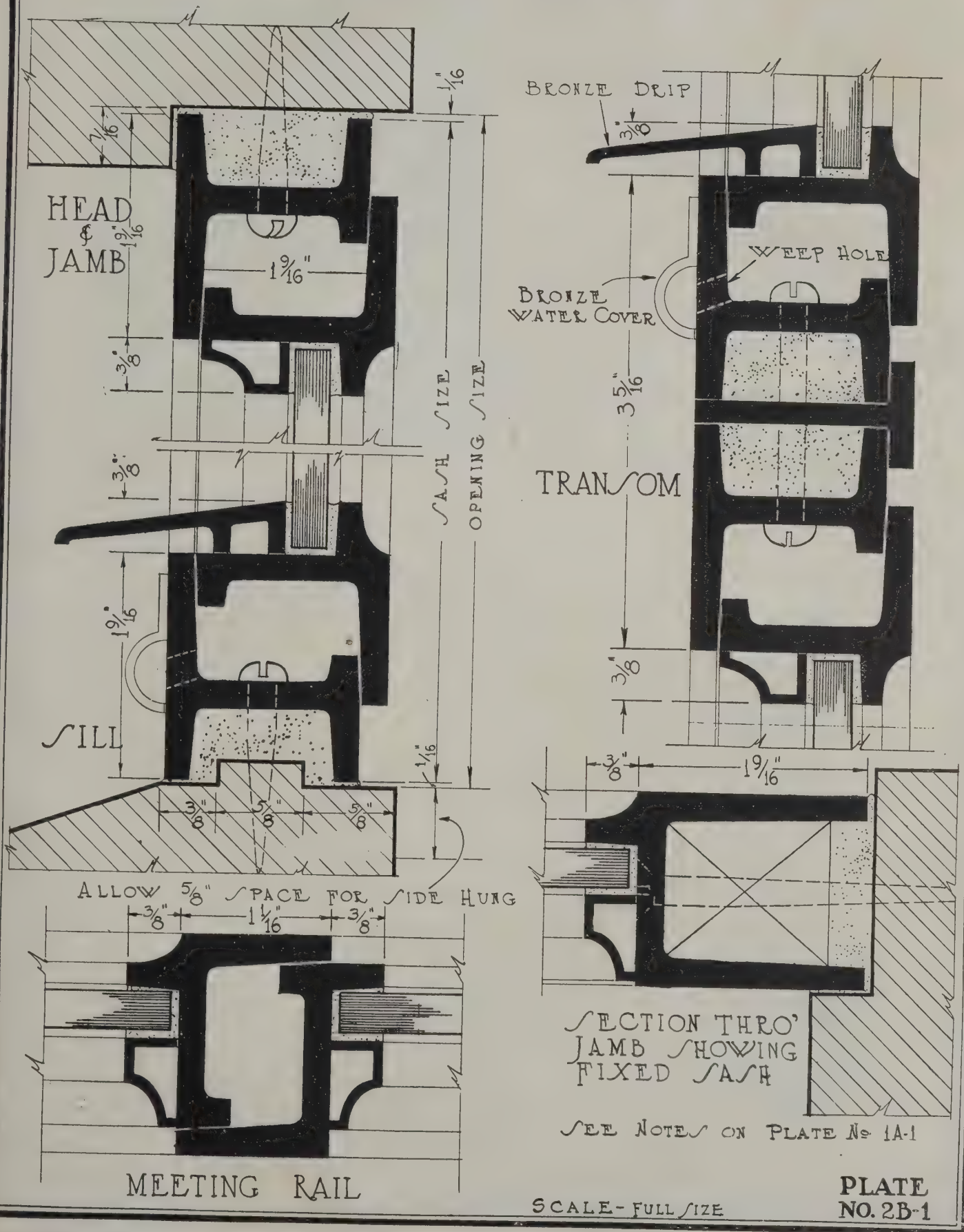


SCALE FULL SIZE

PLATE NO. 1B-1

Continued on next page

NO. 600 LEMCO
HEAVY TWO POINT SECTION CASEMENT
OPENING INWARD



SEE NOTES ON PLATE No. 1A-1

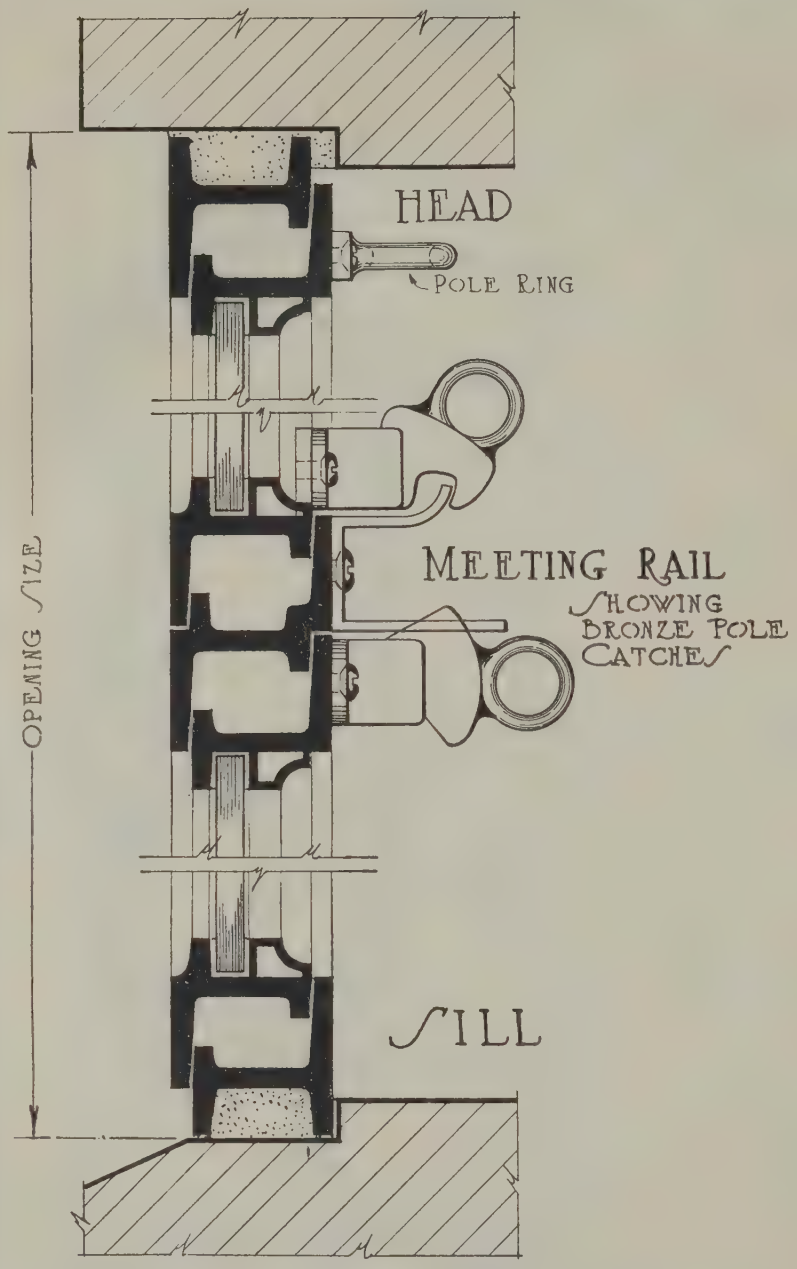
SCALE - FULL SIZE

PLATE NO. 2B-1

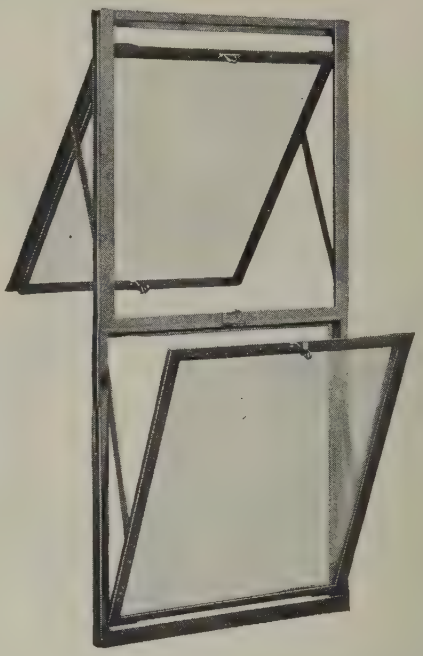
Continued on next page

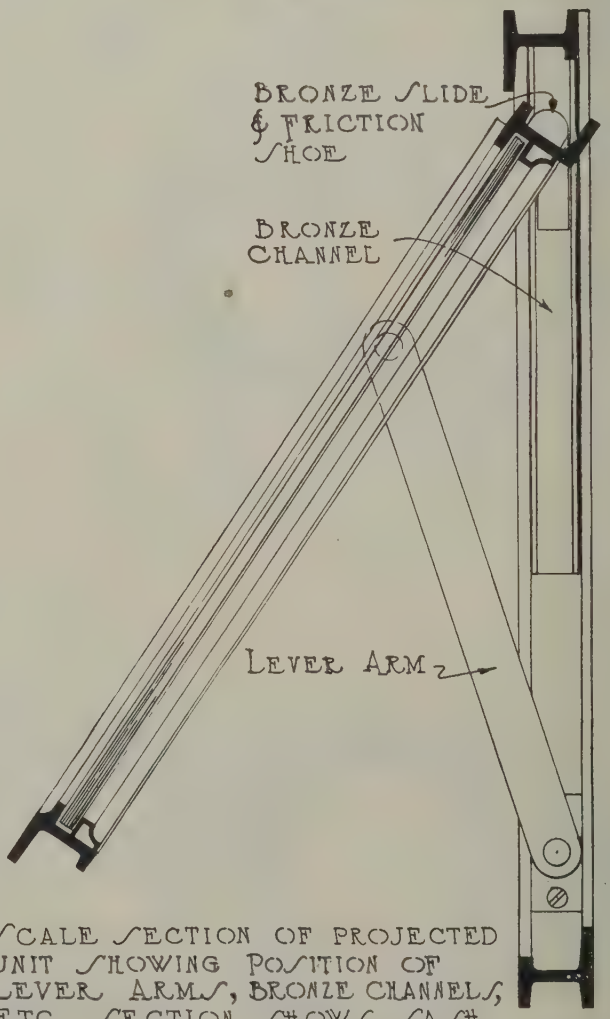
LEMCO PROJECTED TYPE SASH

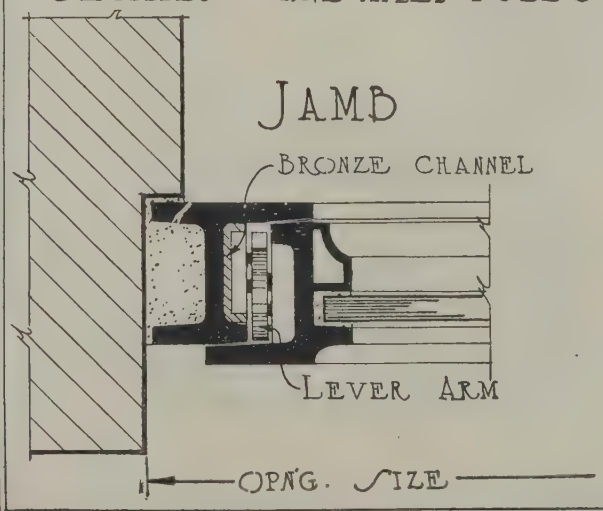
HEAVY TWO POINT SECTION—SEE PLATE NO. 1B-1



DETAILS—ONE HALF FULL SIZE





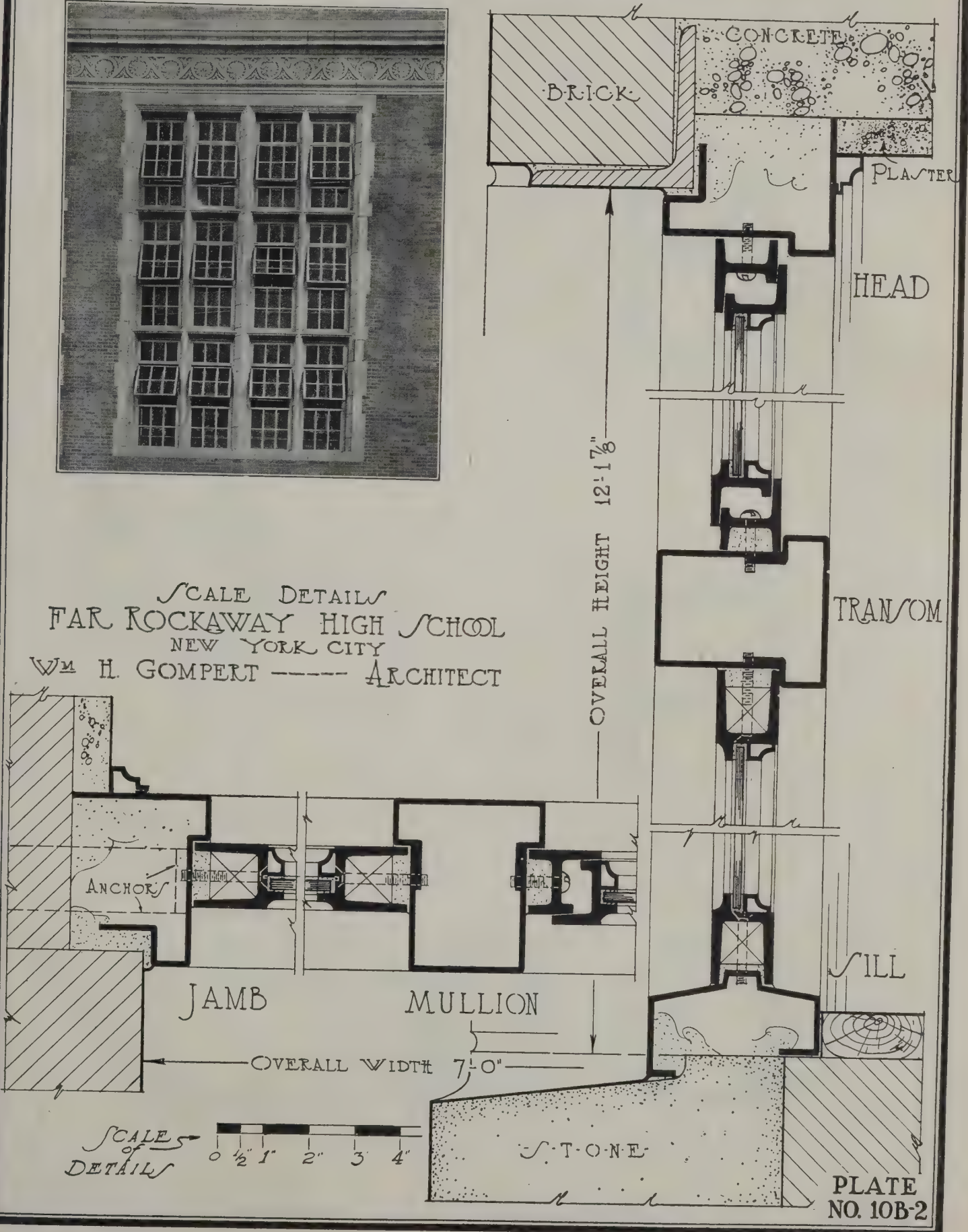


SCALE SECTION OF PROJECTED UNIT SHOWING POSITION OF LEVER ARMS, BRONZE CHANNELS, ETC.. SECTION SHOWS SASH PARTLY OPEN.

PLATE NO. 10B-1

Continued on next page

LEMCO PROJECTED TYPE SASH SET TO SUBFRAMES

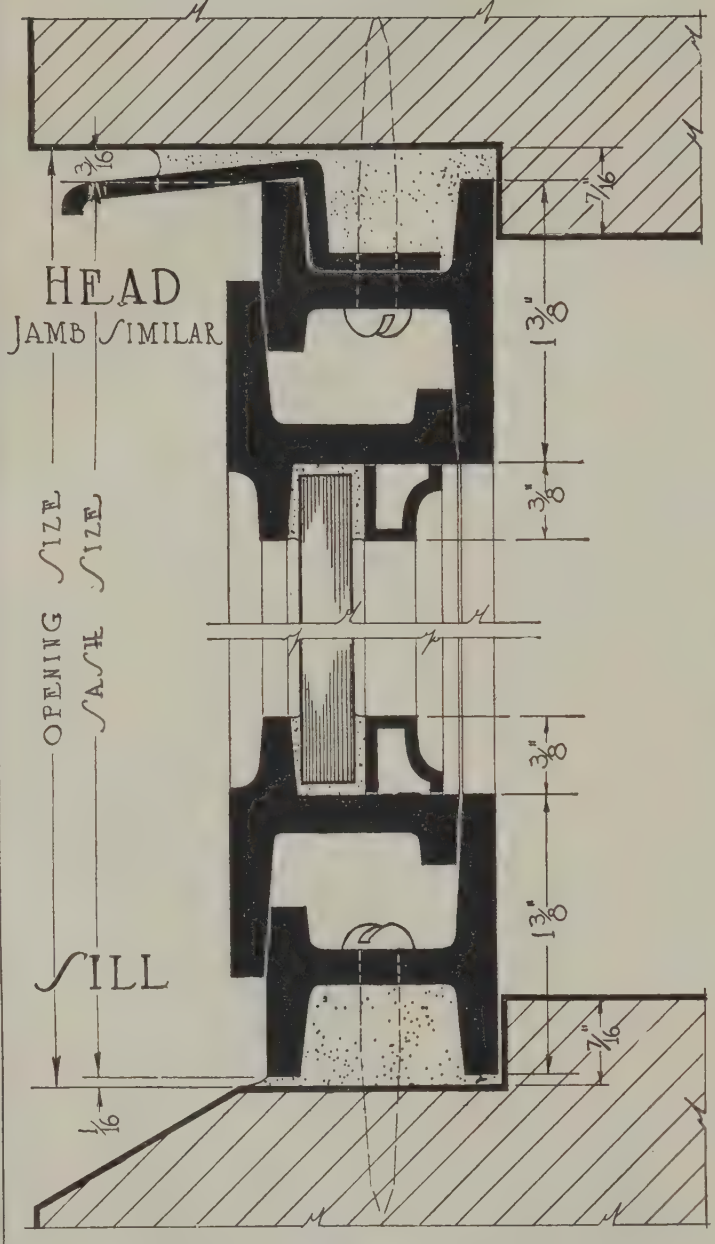


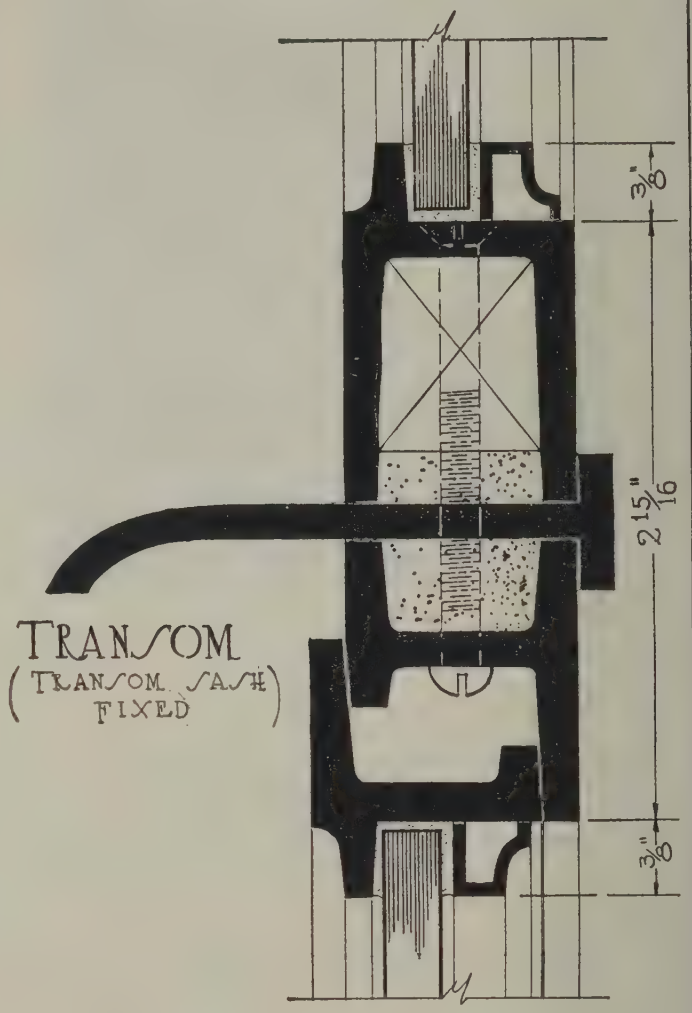
SCALE DETAILS
FAR ROCKAWAY HIGH SCHOOL
NEW YORK CITY
WM H. GOMPERT ——— ARCHITECT

PLATE NO. 10B-2

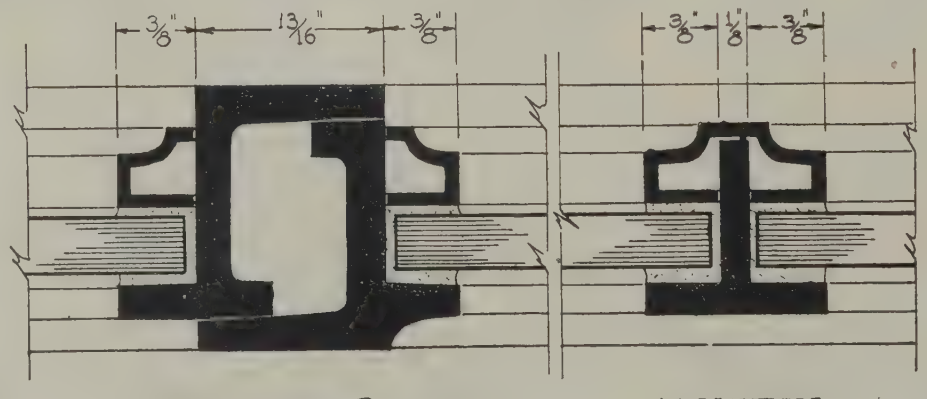
Continued on next page

NO. 700 LEMCO
MEDIUM TWO POINT SECTION CASEMENT
OPENING OUTWARD





MULLION SIMILAR TO THAT SHOWN ON PLATE NUMBER 2C-1.
SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING. CLEARANCE FOR SETTING SHOULD BE INCREASED TO 1/8" FOR MASONRY & CAST IRON.



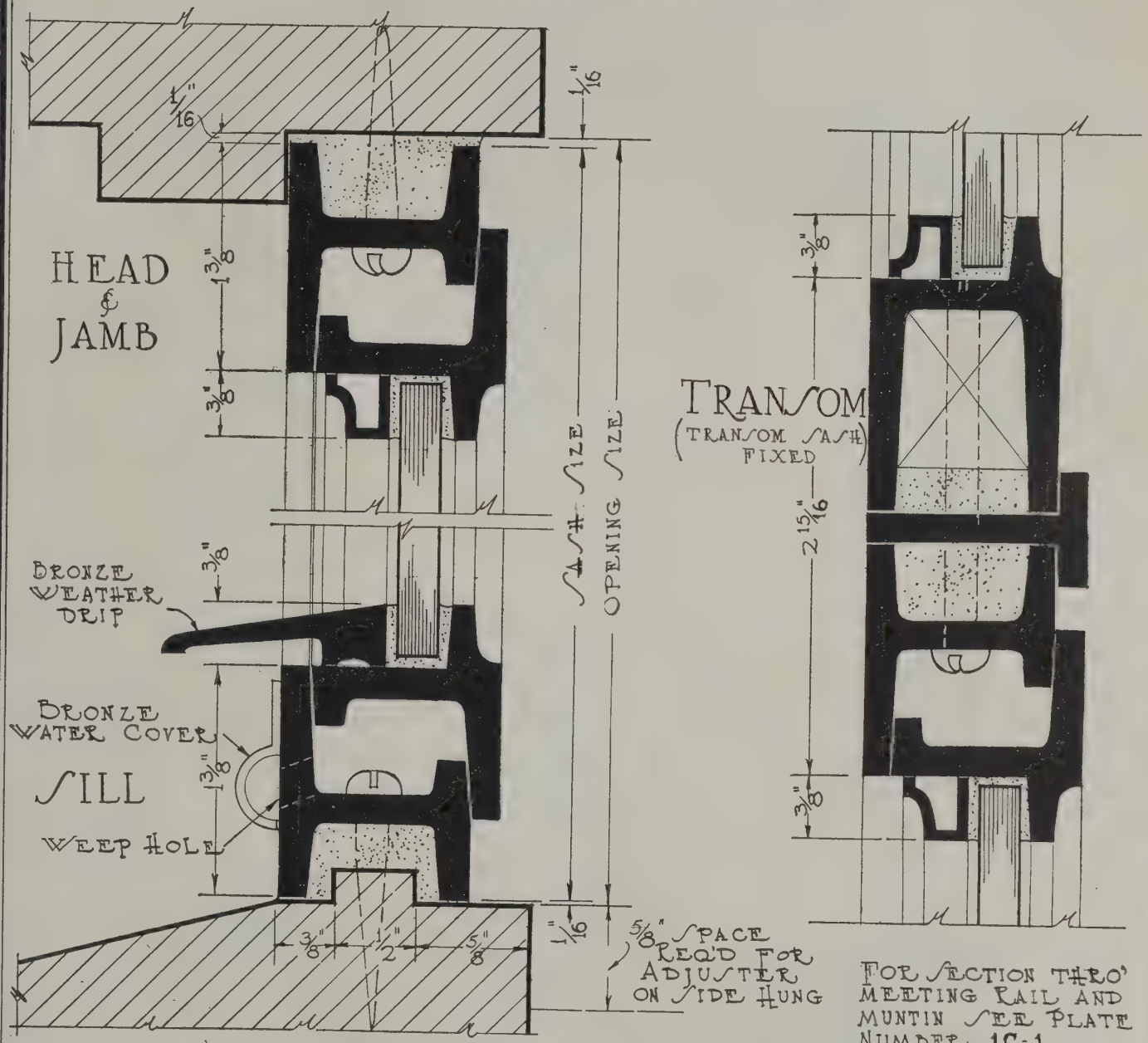
MEETING RAIL MUNTIN

SCALE FULL SIZE

PLATE NO. 1C-1

Continued on next page

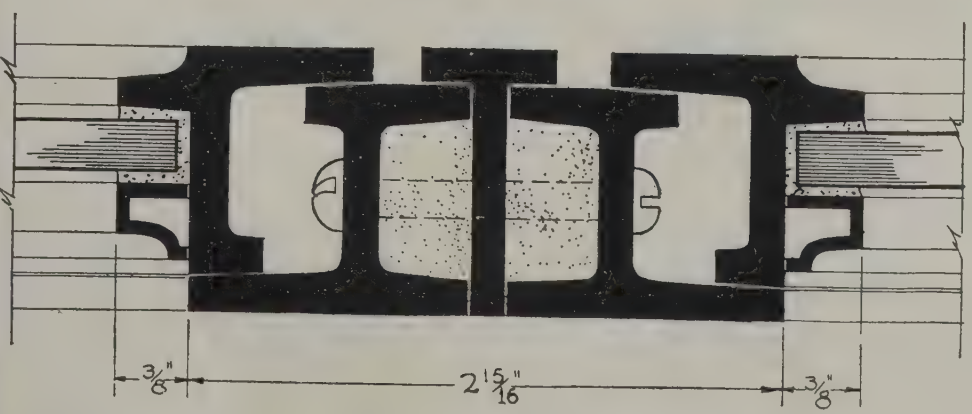
NO. 700 LEMCO
MEDIUM TWO POINT SECTION CASEMENT
OPENING INWARD



FOR SECTION THRO' MEETING RAIL AND MUNTIN SEE PLATE NUMBER 1C-1.

SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING.

CLEARANCE SHOULD BE INCREASED TO 1/8" FOR SASH SETTING TO MASONRY AND CAST IRON.



MULLION

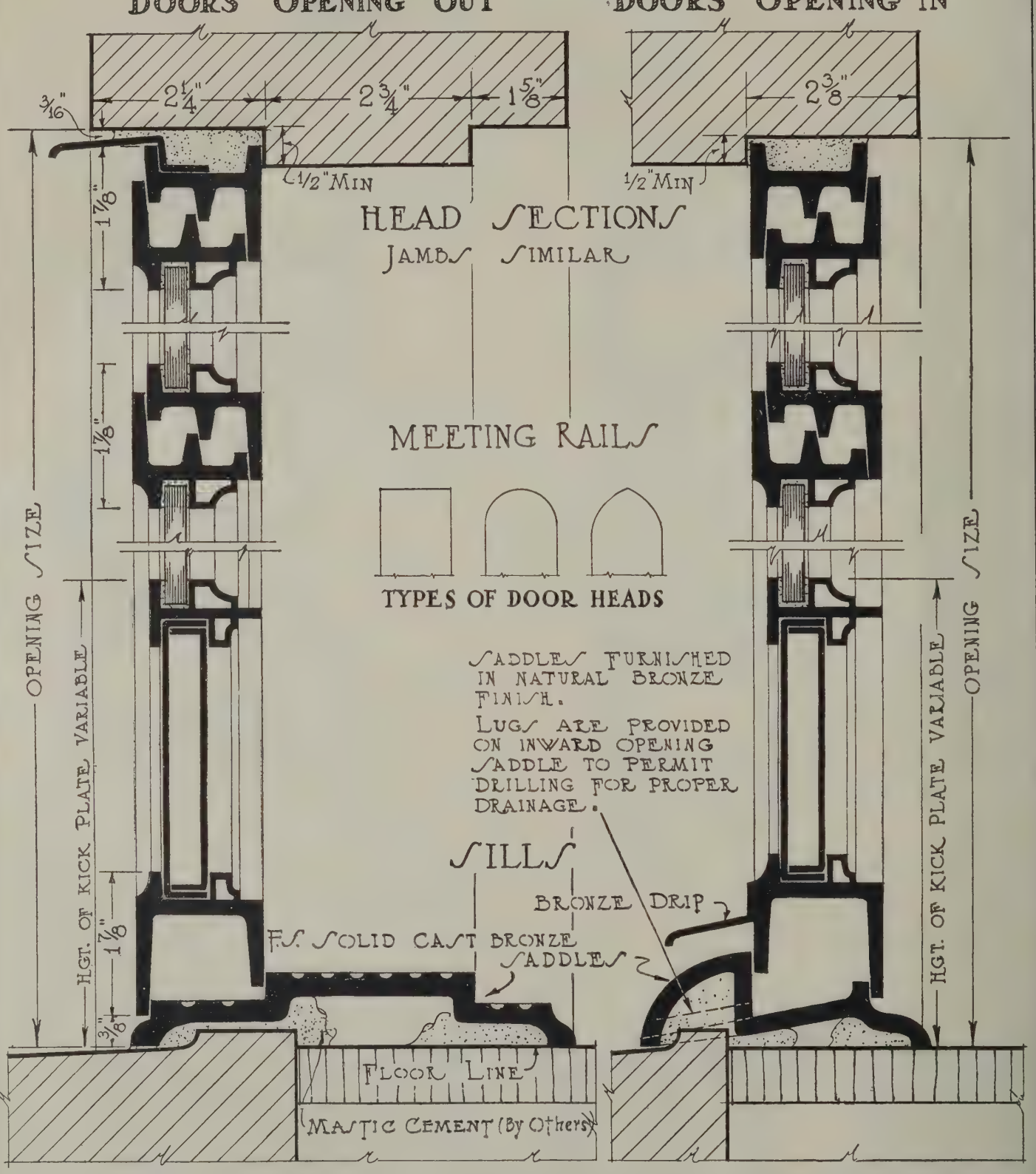
SCALE-FULL SIZE

PLATE NO. 2C-1

Continued on next page

LEMCO DOUBLE FOLDING DOORS

HEAVY THREE POINT SECTION — SEE PLATE NO. 1A-1



NOTE — OUTWARD OPENING DOOR SHOWN WITH DOUBLE RABBETTED SADDLE AND INWARD OPENING DOOR SHOWN WITH SINGLE RABBETTED SADDLE. EITHER TYPE OF SADDLE CAN BE FURNISHED FOR BOTH OUTWARD AND INWARD OPENING DOORS. SCALE-ONE-HALF FULL SIZE

PLATE NO. 3A-1

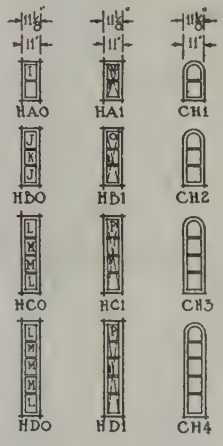
Continued on next page

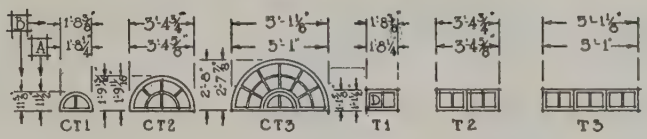
LEMCO
STANDARDIZED STEEL CASEMENTS

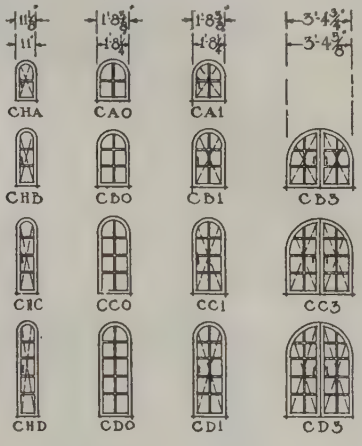
In the manufacture of our Standardized Cottage Casements we have had in mind quality rather than price We recognize that windows which lack sturdiness and rigidity are a source of continuous annoyance and dissatisfaction. To that end our sections No. 100 and No. 700 have been designed sufficiently heavy to sustain the weight of glass

which cheaper and lighter casements fail to do They are equipped with our substantial patented solid bronze cleaning hinge which prevents sagging and insures weather tightness.

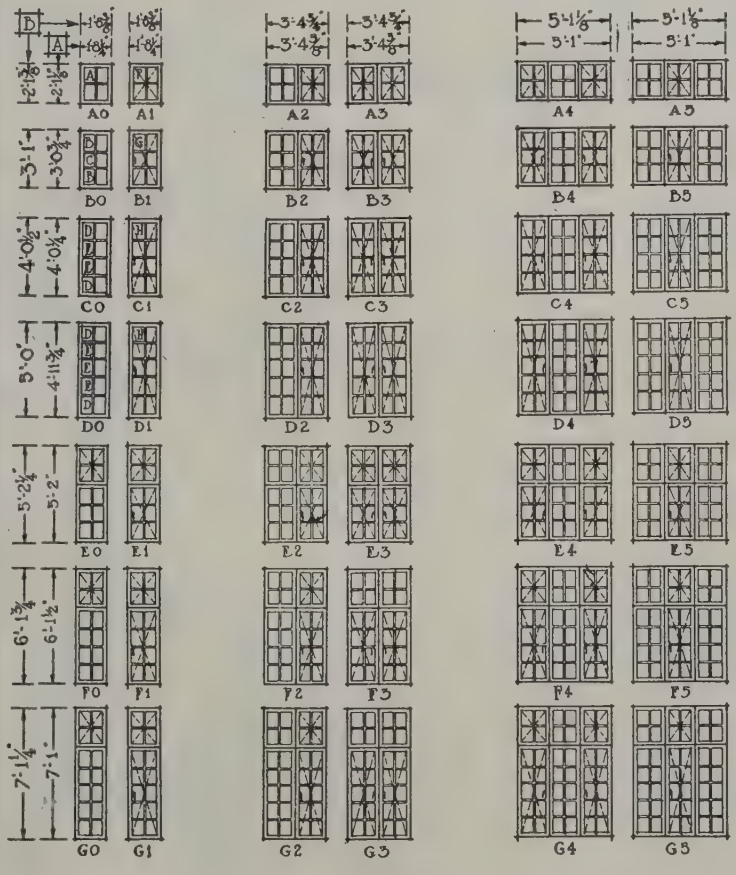
The same standard of workmanship and quality of material are required in the fabrication of our cottage casements as in our custom work. They combine permanent serviceability with ornamental value.







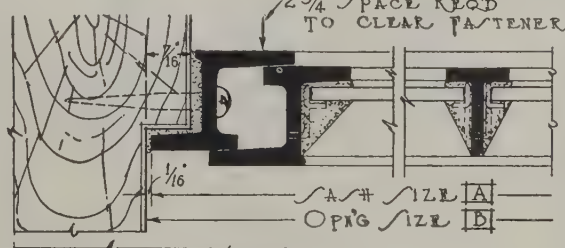
Narrow and Curved Head Standard Steel Casements



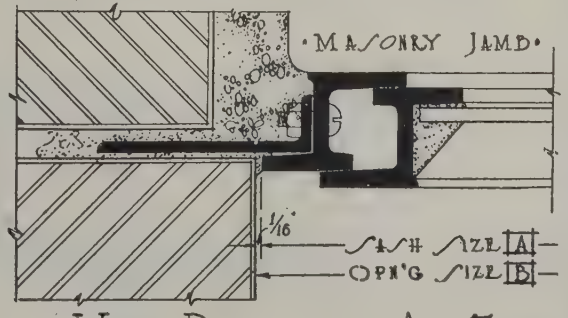
Schedule of Tight Glass Sizes
Make allowances for easy fitting
Sizes not guaranteed to be exact

Casements				Door	
Pane	Size	Pane	Size	Pane	Size
A	9 3/8" x 11 13/16"	I	9 5/8" x 11 13/16"	Q	9 3/4" x 11 1/8"
B	9 3/8" x 11 13/16"	J	9 5/8" x 11 13/16"	R	9 3/4" x 11 1/4"
C	9 3/8" x 11 3/16"	K	9 5/8" x 11 3/16"	S	9 3/4" x 11 3/16"
D	9 3/8" x 12"	L	9 3/8" x 12"		
E	9 3/8" x 11 1/4"	M	9 5/8" x 11 1/4"		
F	8 9/16" x 11"	N	8" x 11"		
G	8 9/16" x 11 3/16"	O	8" x 11 3/16"		
H	8 9/16" x 11 1/4"	P	8" x 11 1/4"		

Wood Jamb.



Masonry Jamb.



Points Where Dimensions Are Taken

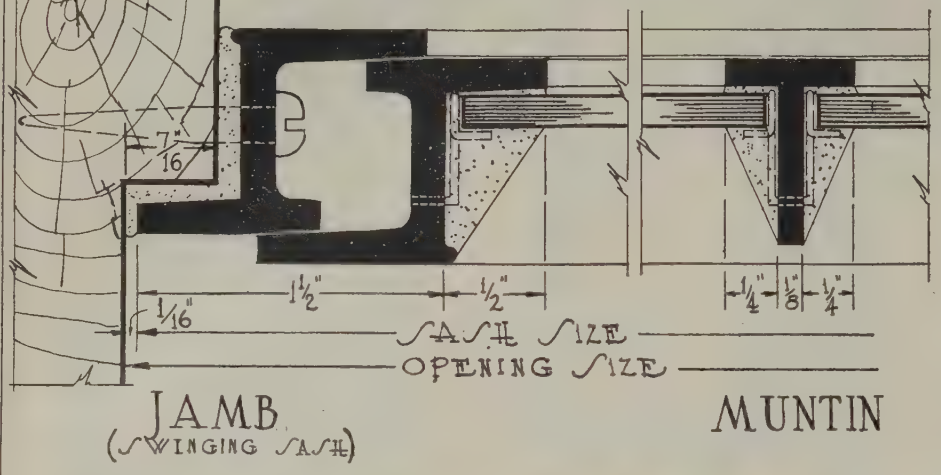
Sizes of Lemco Standard Steel Casements

PLATE NO. 1D-1

Continued on next page

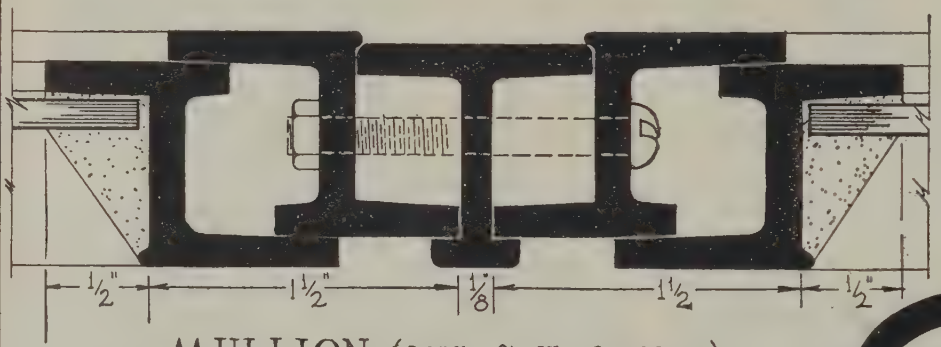
NO. 100 LEMCO
STANDARDIZED CASEMENT SECTIONS
OPENING OUTWARD

FOR INWARD OPENING CASEMENTS SIMILAR TO THIS TYPE — SEE PLATE NO. 2C-1

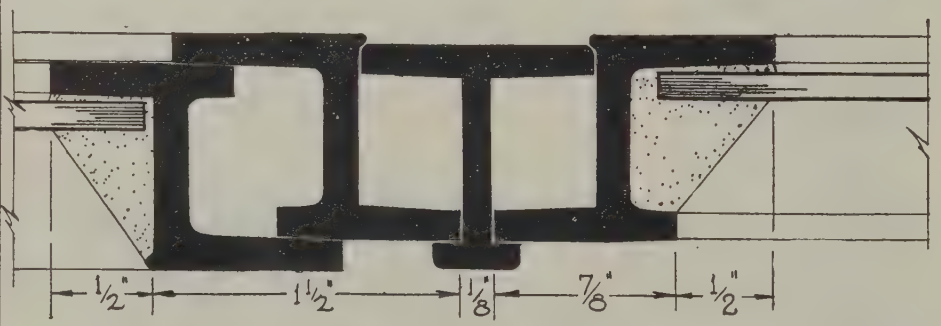


JAMB (SWINGING SASH)

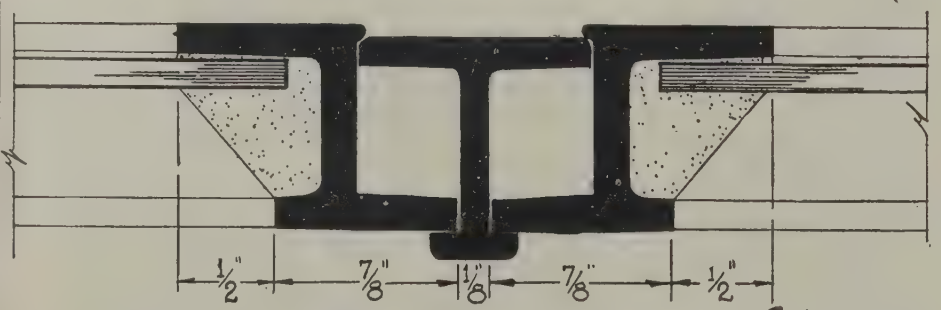
MUNTIN



MULLION (BOTH SASH SWINGING)



MULLION (SWINGING & FIXED SASH)



MULLION (BOTH SASH FIXED)

SCALE FULL SIZE

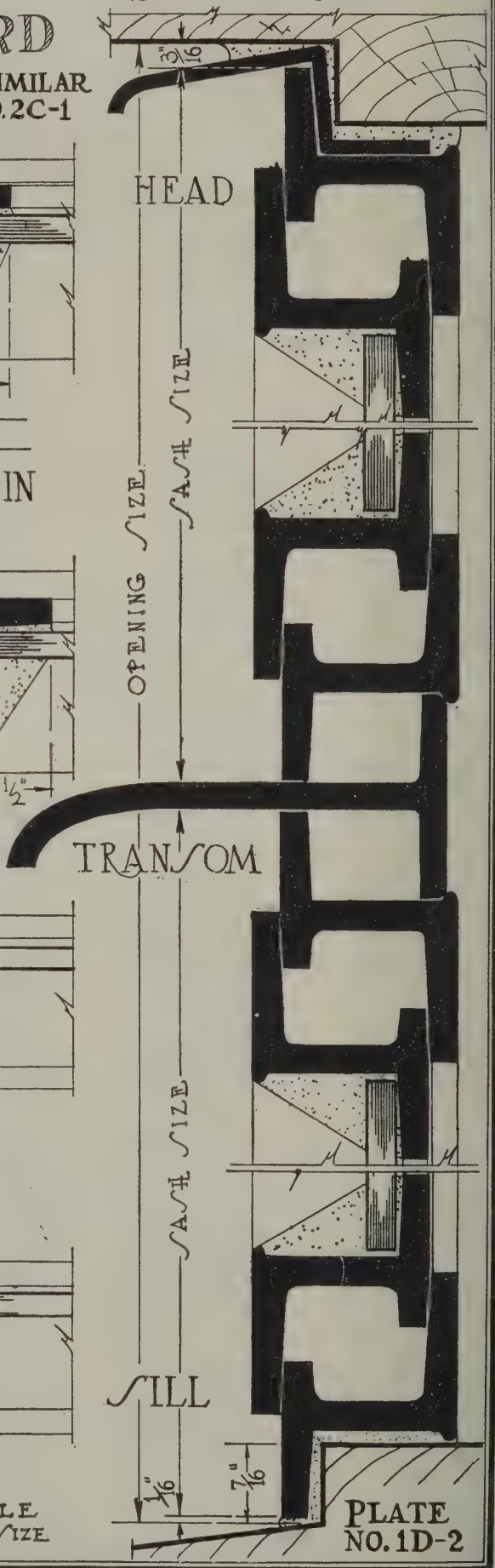
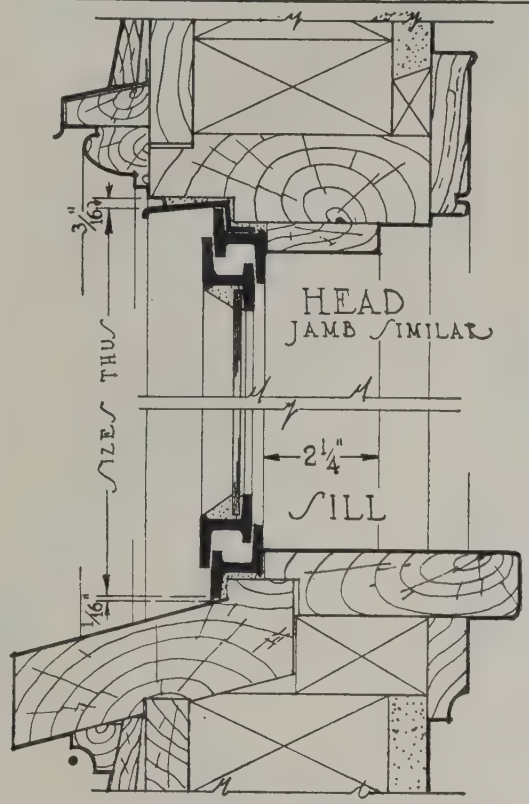


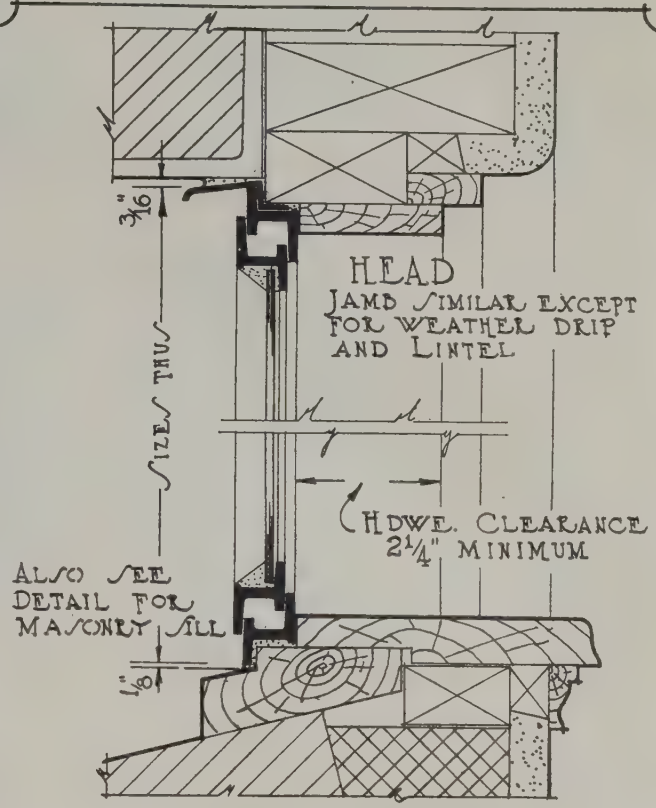
PLATE NO. 1D-2

Continued on next page

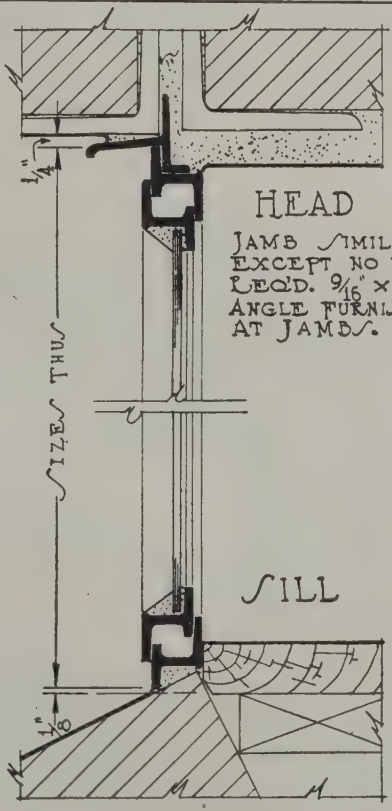
LEMCO STANDARDIZED STEEL CASEMENT INSTALLATION DETAILS



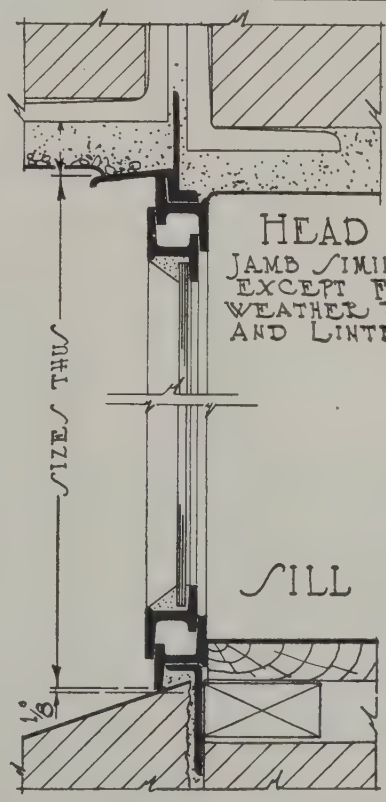
WOOD FRAME CONSTRUCTION



BRICK VENEER



DIRECT TO MASONRY



DIRECT TO STUCCO

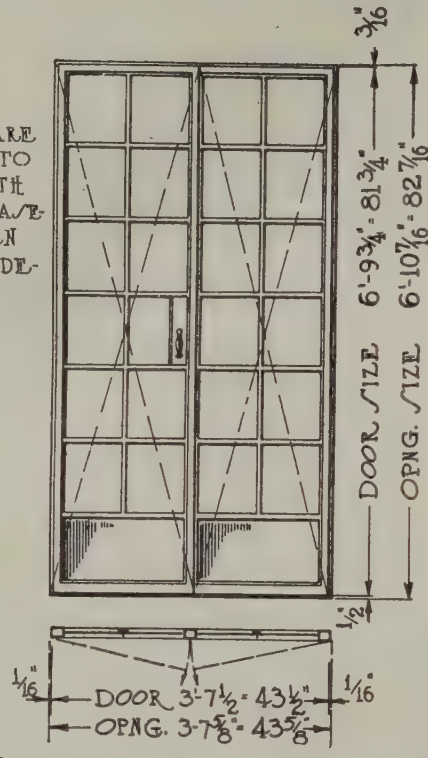
PLATE NO. 1D-3

Continued on next page

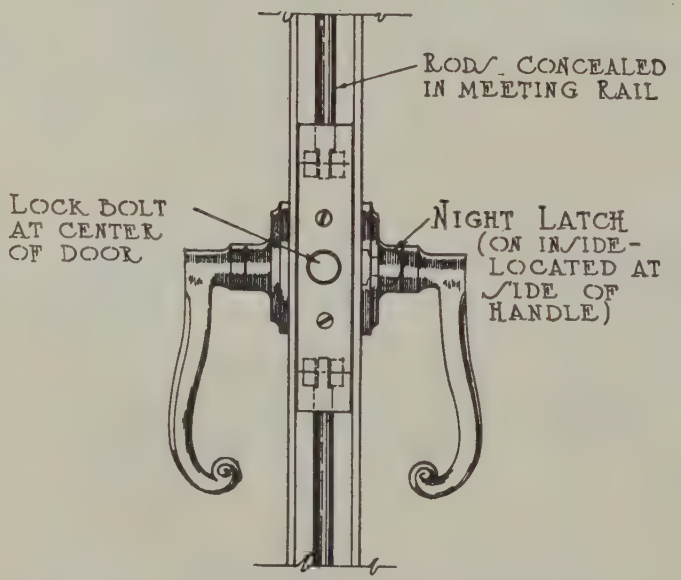
LEMCO STANDARD DOUBLE FOLDING DOOR OPENING OUTWARD

HEAVY TWO POINT SECTION — SEE PLATE NO. 1B-1

NOTE—
MUNTINS ARE ARRANGED TO LINE UP WITH STANDARD CASEMENTS WHEN USED AS SIDE-LIGHTS.



ELEVATION SCALE 3/8"=1'-0"



DETAIL OF ACTIVE LEAF OF MEETING RAIL SHOWING CONCEALED LOCK RODS.

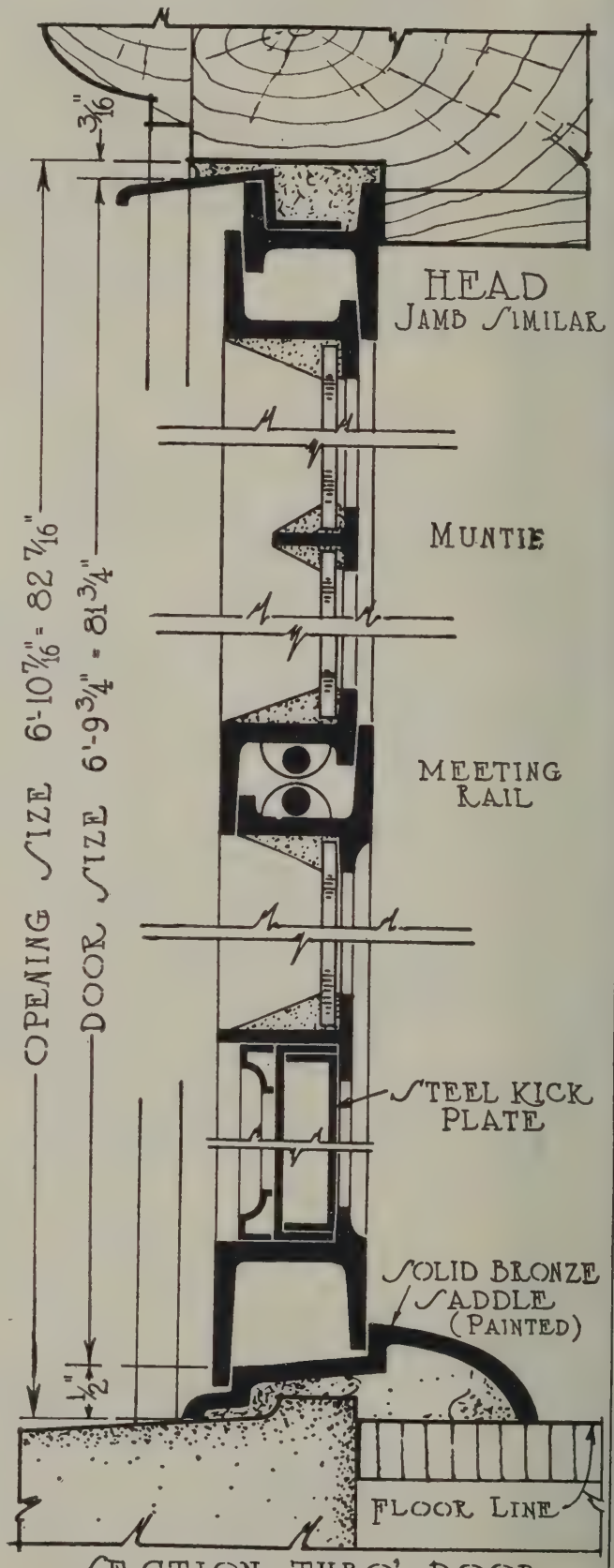
HARDWARE

EACH LEAF HUNG ON THREE 3" BRONZE BUTTS.

RIGHT HAND LEAF FITTED WITH ALUMINUM LOCK BOX AND BRONZE LEVER HANDLES OPERATING CONCEALED RODS THAT LOCK DOORS TIGHT AT HEAD AND SILL. DOORS ALSO LOCKED AT CENTER.

LEFT HAND LEAF FITTED WITH CONCEALED BOLTS AT TOP AND BOTTOM.

FRICTION ADJUSTERS ALSO FURNISHED AT HEAD OF EACH LEAF.

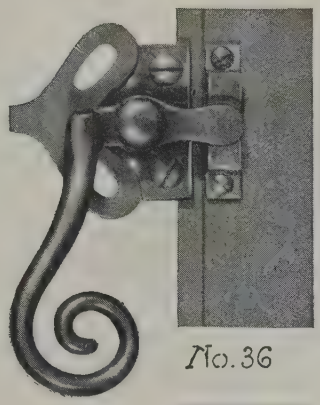


SECTION THRO' DOOR
SCALE
ONE HALF FULL SIZE

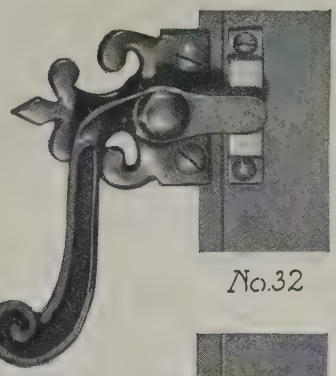
PLATE NO. 2D-1

Continued on next page

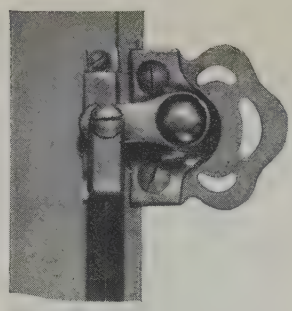
LEMCO SOLID BRONZE CASEMENT HARDWARE

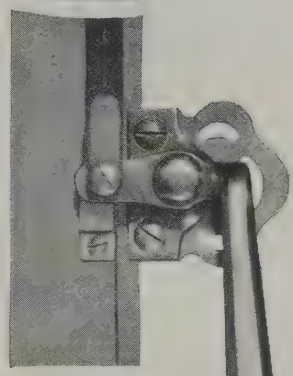


No. 36



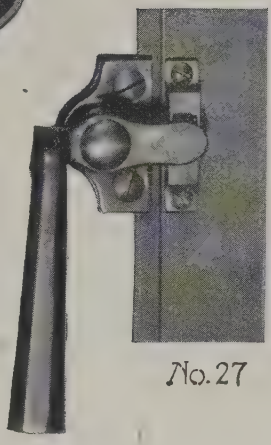
No. 32





No. 27
DOUBLE GRIP FOR WINDOWS OVER 60 IN.

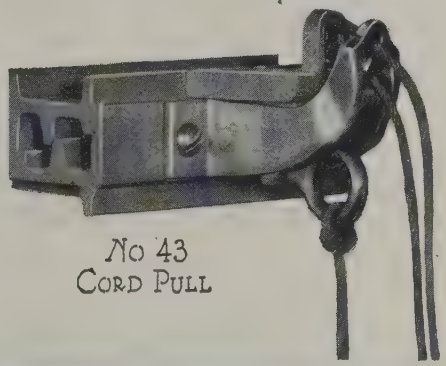
No. 26



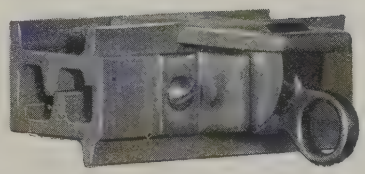
No. 27

FASTENERS

TRANSOM CATCHES



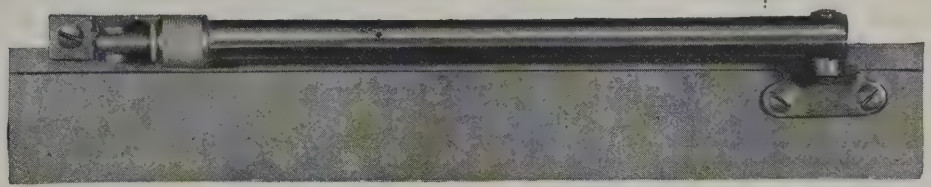
No 43
CORD PULL



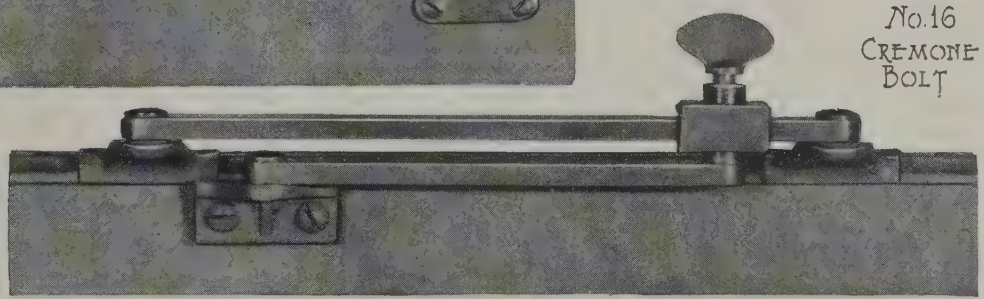
No. 41
POLE TYPE

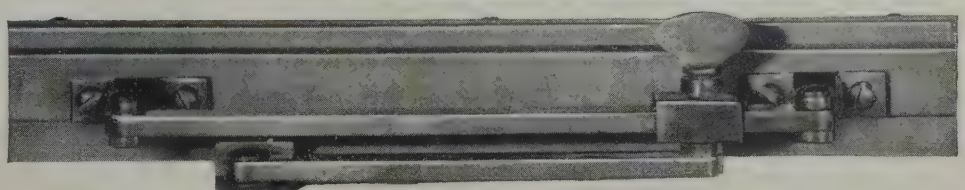
No. 16
CREMONE BOLT

ADJUSTERS



No 78
FOR DOORS





No. 70 FOR WINDOWS OPENING-IN

No. 70
FOR WINDOWS OPENING-OUT

PLATE NO. 1H-1

MESKER BROTHERS IRON COMPANY

Manufacturers of Solid Steel Sash
Solid Metal and Hollow Metal Windows
ST. LOUIS, MO.

Products

SOLID SECTION STEEL SASH:
- Cruciform and Tee Bar
- Top or Center Pivoted
- Reversible Ventilators
- Labeled or Non-labeled
- Solid Steel Monitor Sash
- Mechanical Operators

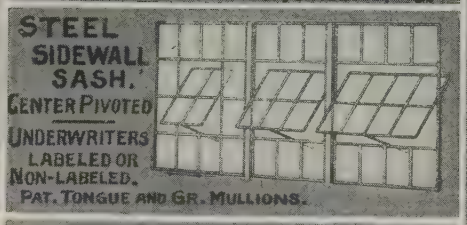
SPECIAL KINDS STEEL SASH:
- Steel Casement Windows
- Steel Basement Windows
- Continuous Top Hung Sash
- Steel Garage Windows
- Dalite Coal Windows

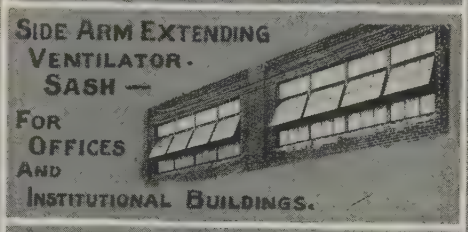
SOLID ROLLED METAL WINDOWS:
- Double Hung
- Counterbalanced
- Labeled or Non-labeled

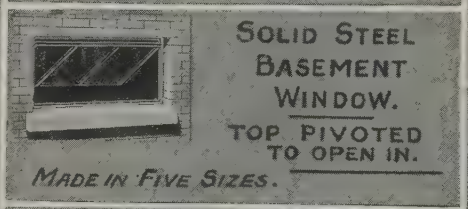
HOLLOW METAL WINDOWS:
- Double Hung
- Counterbalanced
- Pivoted
- Casement
- Stationary
- Labeled or Non-labeled

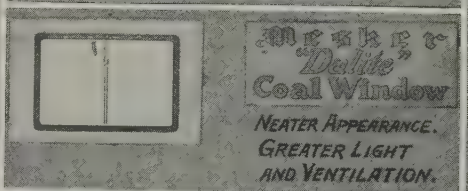
DOORS:
- Solid Steel
- Kalamein
- Metal Covered

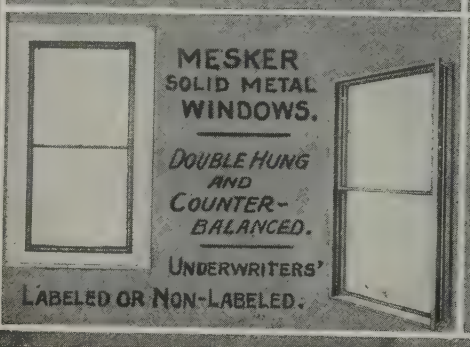
STAIRS:
- Steel and Concrete
- Spiral Stairs
- Fire Escapes
- Fire Slides
- For Combination Steel and Concrete Stairs, see page A742.

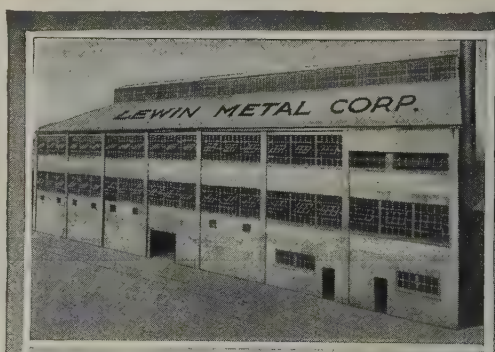


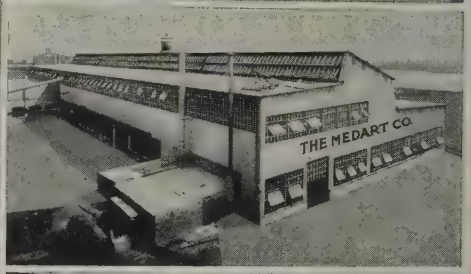




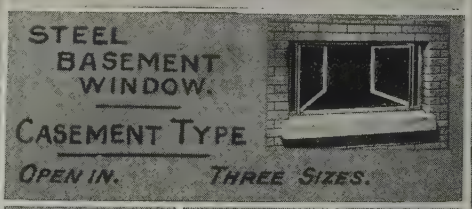








ST. LOUIS UNIVERSITY HIGH SCHOOL BLDG.



Continued on next page

Solid Section Steel Sash, Cruciform Industrial, Center Pivoted Type

Construction—The heavy Cruciform Sash bar weighs in excess of 1 lb. per ft. It is of ⅛-in. stock and 1 in. wide by 1½ in. deep.

Welding—Every joint of the Mesker Sash is arc-welded. Muntin bars running the shorter dimension of the Sash are in one piece—no cut outs. This gives maximum strength and stiffness to the sash.

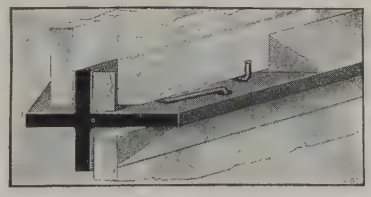
Weathering—A ⅜-in. continuous flat surface weathering contact is maintained on four sides of the ventilator opening. Double contact or metal weather-stripping is furnished when required.

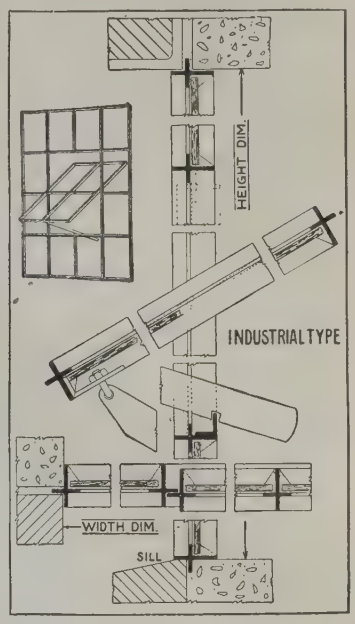
Standard Pivots—Are simple in construction. Highest satisfaction has marked the many years of their use.

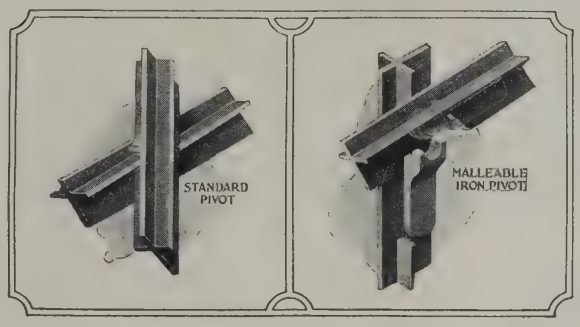
Malleable Iron Pivots—Are furnished when required. These are similar in action to the standard pivot. Both kinds permit the ventilators to be removed for glazing or cleaning.

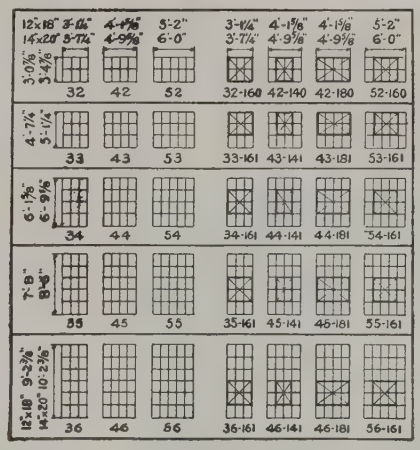
Glazing—The Cruciform type bar permits outside or inside glazing or both. With outside glazing the metal is protected from the weather by the putty, and frequent painting is unnecessary.

Underwriters' Labeled—Labeled sash is furnished in above construction, plus steel glazing angles for holding the glass.









Standard Sizes and Details Industrial Sash

Solid Section Steel Sash, Cruciform Architectural, Reversible Extending Type

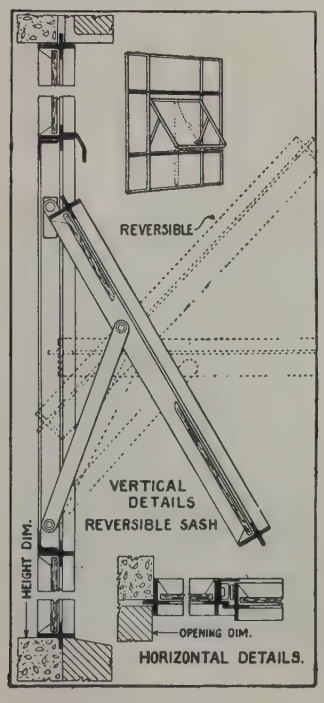
Utility—Adapted especially for schools, offices, hotels, hospitals and apartments. The ventilator in this type of window is balanced upon two pivoted arms. It extends out at the bottom and is completely reversible. When tilted at a given angle the ventilator serves as an awning and may be kept open through light winds or rain; while admitting air, it protects the interior of the room.

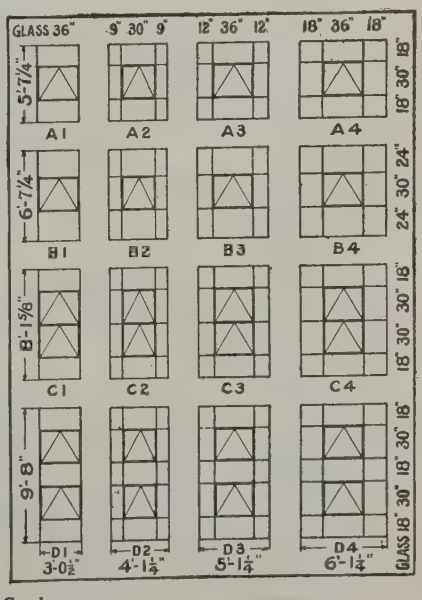
Brick Raggle—The raggle or brick groove in the window jamb is entirely covered by the wide surface of the Cruciform frame bar. It eliminates the necessity of pointing, in most cases.

Double Contact Weathering—Double contact weathering is employed in extending type windows on all sides of the ventilator opening.

Weatherstrips—Patent spring bronze weatherstrip is furnished only when specified. It assures absolute tightness, is wind and dustproof, and prevents rattle.

Welding—As in the industrial type, the extending type sash are electrically welded. There are no cut outs to weaken the sash at intersections of muntin bars and the full strength of the sections is retained in the sash.





Details, Installation and Sizes of Architectural Reversible Sash

Continued on next page

Hollow Metal Windows

Are made in all types including Double Hung, Counter-balanced, Pivoted, Casement and Stationary. Approved by the National Board of Fire Underwriters and suitable for new or old buildings. Designed along the same lines and contain the same glass area as wood windows. Frames and sash of No. 24 gauge, galvanized steel or 20-oz. copper. Concreting of subsills must be done at building. Underwriters' label is a guarantee that windows comply with every requirement, and are accepted everywhere by rating bureaus as standard.

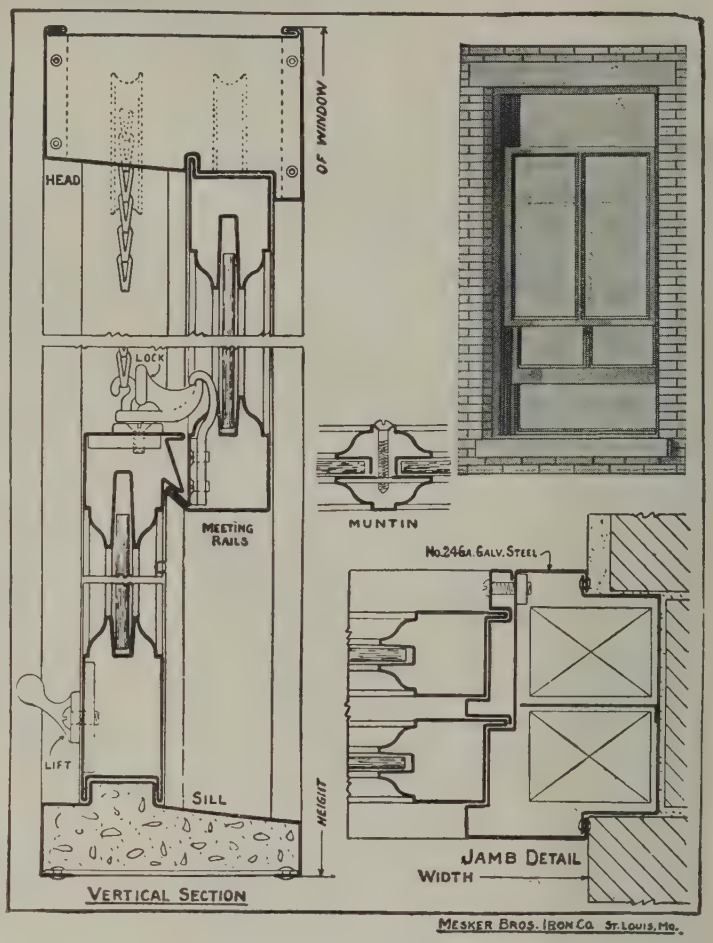
The hanging or the removal of the sash is accomplished as easily as in wood windows; an important factor in cost.

Glass must not exceed 720 sq. in. exposed area per light, and no longer than 54 in., except for windows in street elevations where such light is limited to 2916 sq. in. These windows may be made single or in multiples of two or more, to accommodate large lighting areas.

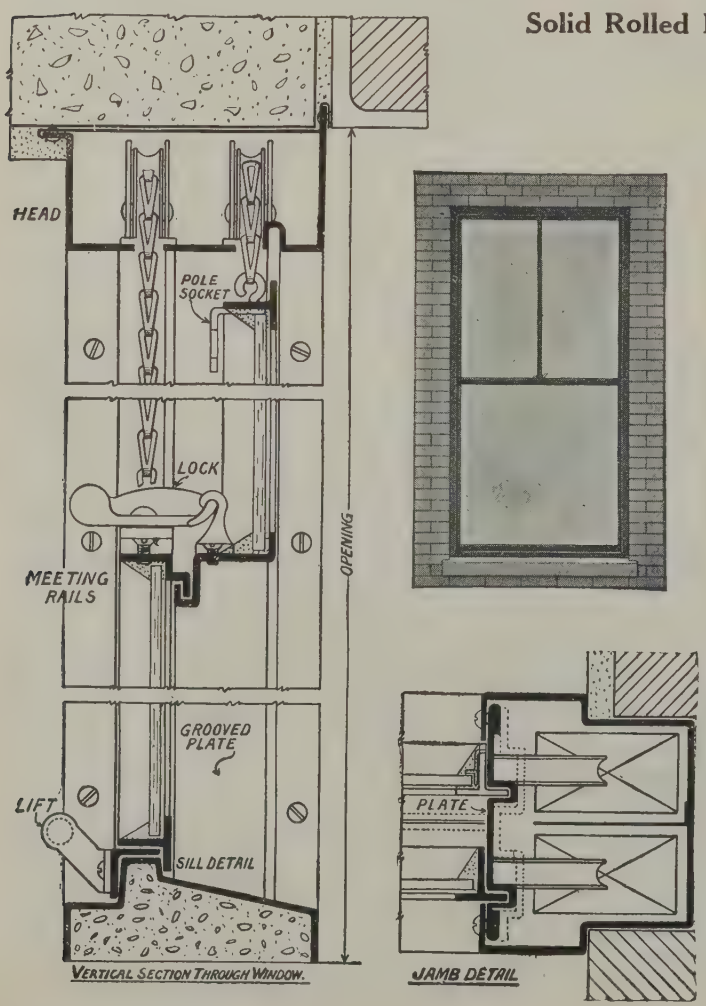
Transoms may be used over all windows or multiples either hinged, pivoted or stationary.

Transom bars are all sheet metal for windows 10 ft. high or under.

Foswin Arms Hotel, Chicago, Ill.
Midland Construction Co., Contractor



Solid Rolled Metal Windows



Double Hung—Frames are made of No. 16 gauge or heavier, blue annealed steel, or No. 24 galvanized steel, or from 18 to 48-oz. copper.

Sash are of solid rolled steel or bronze of No. 10 gauge.

They are suspended to heavy metal chains which pass over pulleys in the window head and fastened to weights in the jambs.

Access to weight box is obtained by removing the lower grooved plates in the jambs.

Large lights of glass is permitted in non-labeled windows secured in place by steel glazing clips and putty.

Underwriters' Labeled Windows—Have frames not lighter than No. 15 gauge blue annealed, or No. 24 gauge galvanized, steel.

Sash are of No. 10 solid rolled steel. The glass is held by special steel glazing angles.

Counterbalanced Windows—Are made of same material as double hung. They have no sash weights but the two sash are balanced and supported by chains running over pulleys in the window head. The sash opens at the head and sill simultaneously.

They are absolutely waterproof.

Burch Hotel, Breckenridge, Tex.
David S. Castle, Architect
S. E. Douthit, Contractor

ESTABLISHED 1884

THE PHILADELPHIA SUPPLIES CO., INC.

SUCCESSORS TO P. DEISSLER & BRO.

All-metal Window Frames and Pivoted Window Ventilators

1741 North Sixth Street
PHILADELPHIA, PA.

Products

Sole manufacturers of the P. Deissler & Bro. patented PIVOTED VENTILATORS.

METAL FRAMES for church windows and the leaded glass trade.

BASEMENT WINDOW VENTILATORS for masonry or wood construction.

Also Skylights, Domes, and all other kinds of wrought iron work used in the leaded glass trade.

Improved Type All-metal Built-in Window Frames

Frames are made of steel or wrought iron as desired. They are built in as the building is in course of construction and make a rigid and everlasting weatherproof job. They are made in all styles—square, round or gothic top, and in any size or weight material desired. Used for leaded, plate, wire, ribbed or prism glass. Finish is either painted or galvanized.

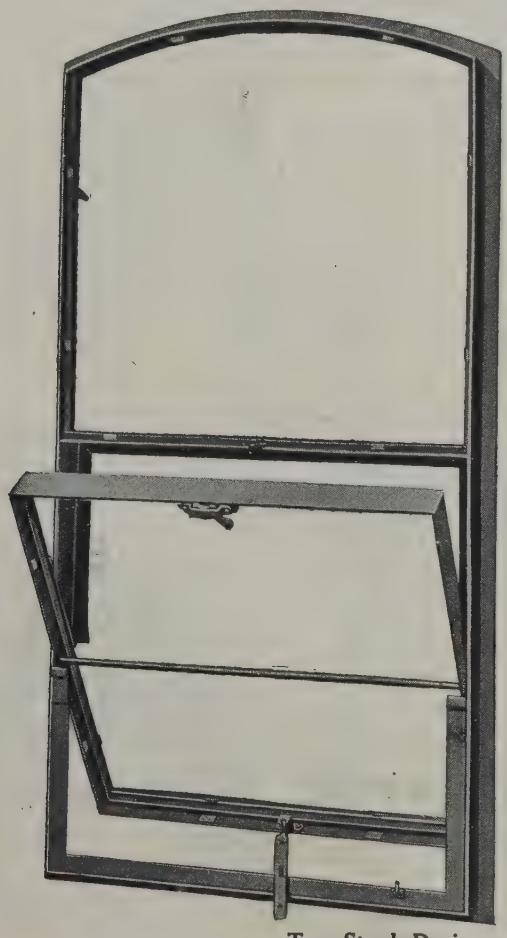
Frames are made for storm glass outside and leaded glass inside or for single glazing.

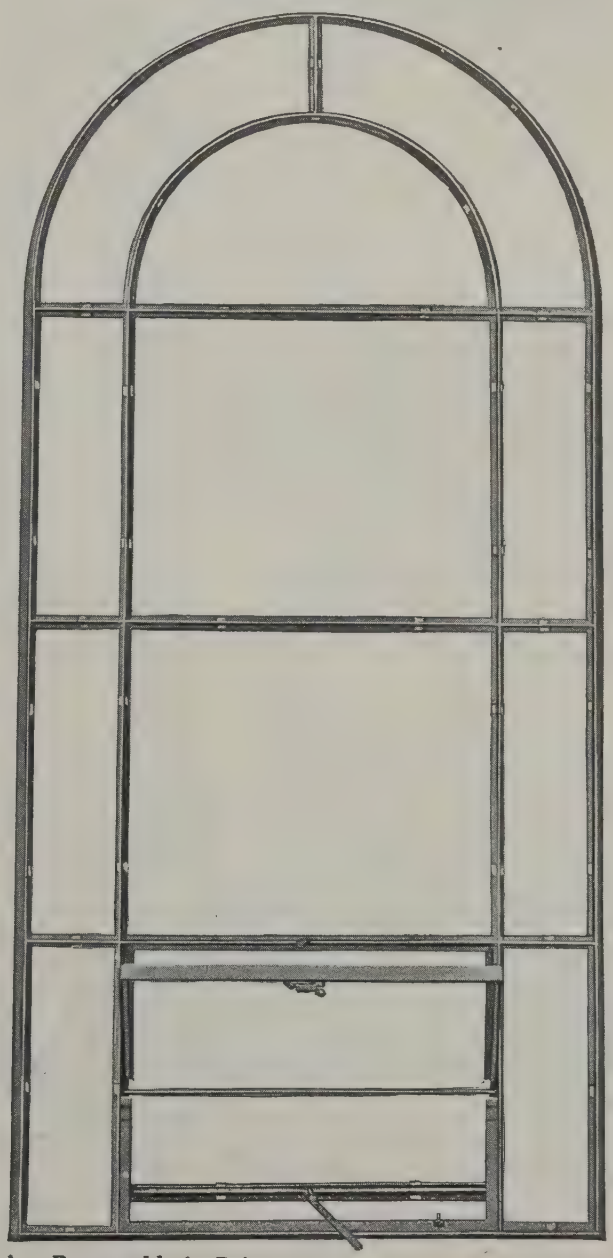
Ventilators can be put in the top, center or bottom of frames, and the inside swinging frames can be removed for glazing.

"Deissler" Improved Pivoted Ventilators

These ventilators have been specified for over 40 years as the standard church window ventilator. They are made of steel or wrought iron angles for single or double glazing and can be used for leaded, plate, wire, ribbed or prism glass. The inside frame of ventilators can be taken out and bars put in to suit the design. Finish is either painted or galvanized.

Where ventilators are in reach they are provided with spring lock at the top and lug at the bottom with strap for adjusting extent of opening. Ventilators out of reach should be specified with bottom heavy, self-closing; these are for the intermediate and bottom sections of windows. They are equipped with lock, pulley, bracket and chain fastener attached to the ventilator and are operated from the side with a chain. This eliminates the objection of cords or chains obstructing the design or view of the window.





Two Stock Designs of Frames That Are Reasonable in Price

We also make special designed metal frames—any style, size or weight material desired

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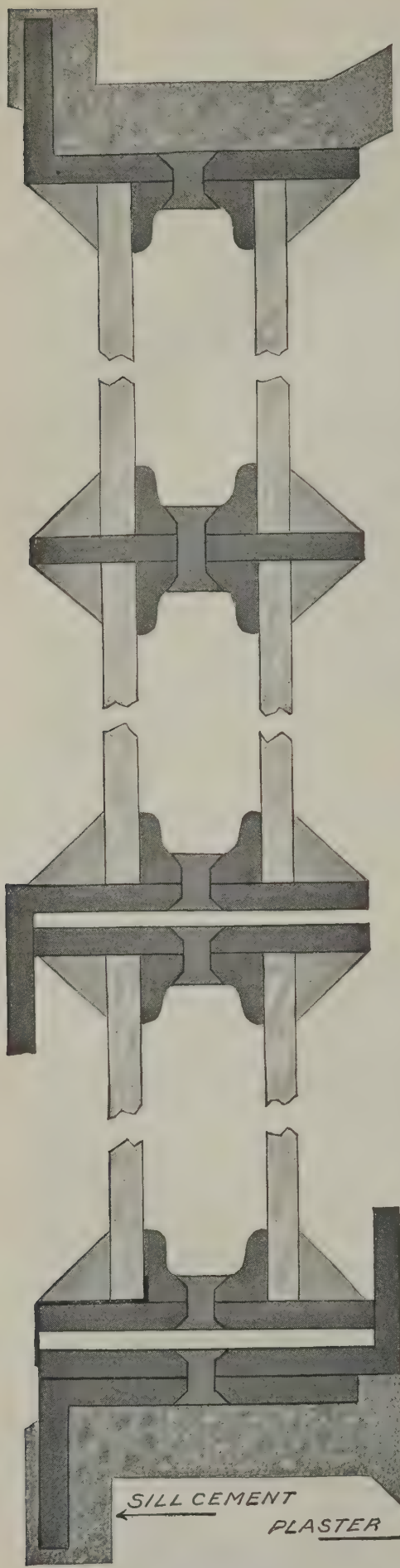


Fig. 1—Sectional View
(Full size)

Fig. 1. Sectional View (Full Size)

Illustrates a section of a metal frame for outside storm sash and inside leaded glass glazing. The double, double bottom ventilator shown is pivoted in the center to swing in at the top. Specify Catalogue No. 10 for double bottom ventilators where operation of sash is by spring lock at top and adjusting lug at the bottom; for the bottom heavy self-closing type adjusted by chain at the side specify Catalogue No. 38.

Fig. 2. Sectional View (Full Size)

Illustrates a section of a Te-iron metal frame for single glazing. Type illustrated is for building into masonry openings but it can be made with angle iron all around and screwed into rough wood openings. Can also be used where wooden frames have a rabbet in which case the angle iron on the outside is not required as the frames have turned ends on the mullion bars which can be screwed direct to the wood.

The ventilator is also for single glazing and pivoted in the center to swing in at the top.

Specify Catalogue No. 1 ventilator for the bottom; No. 2 for the middle, and No. 3 for the top. Hardware can be furnished the same as described for the Nos. 10 and 38 Double, Double Bottom Ventilators described above.

Information Required for Estimates

All-metal Window Frames—Send blue prints and specifications with list of bidders. Any charge for these will be gladly remitted.

Pivoted Window Ventilators—The quality of ventilators and style wanted; and if for leaded glass, give bar sizes.

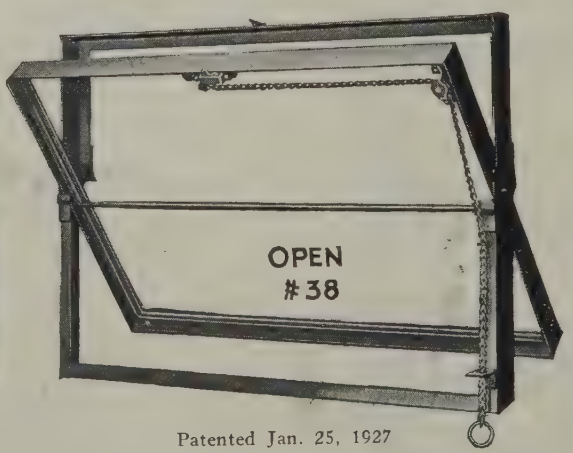
The sizes should be taken from the outside of angle iron, giving the width first, then the height. For rabbeted work, sizes should be taken full size.

In grooved mullions or jambs, the sizes should be taken daylight size.

State if ventilators are to be placed in top, middle or bottom of window, and if they fit in wood all around; and, also, if they are to be painted or galvanized.

For domes, skylights or iron work, send sketches.

Sizes, shapes and quantities vary so considerably, that it is impossible for us to issue a reliable price list. We will be glad to prepare a special estimate on receipt of specifications and quantities.



Patented Jan. 25, 1927

No. 38 Bottom Heavy Self-closing Ventilator

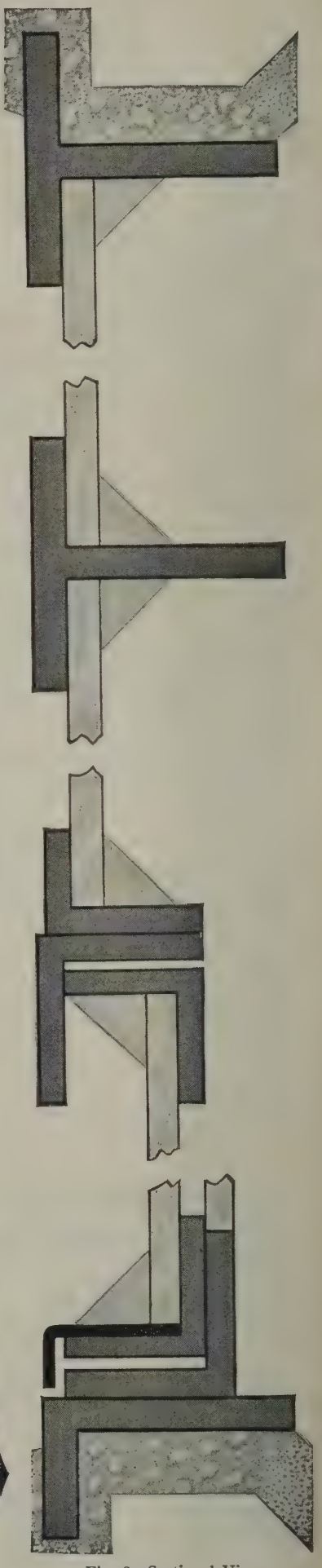


Fig. 2—Sectional View
(Full size)

Details of P. Deissler & Bro. Pivoted Ventilators and Metal Frames

Continued on next page

Fully Weatherproof, All-metal Basement Window Ventilators for Masonry and Wood Construction

These ventilators have many advantages over the old style as they make a permanent, weatherproof job and have no hinges to get out of order. They have a spring snap catch at the top and pivot at the bottom (see sectional views).

These ventilators are made for single or double glazing and pane glazing.

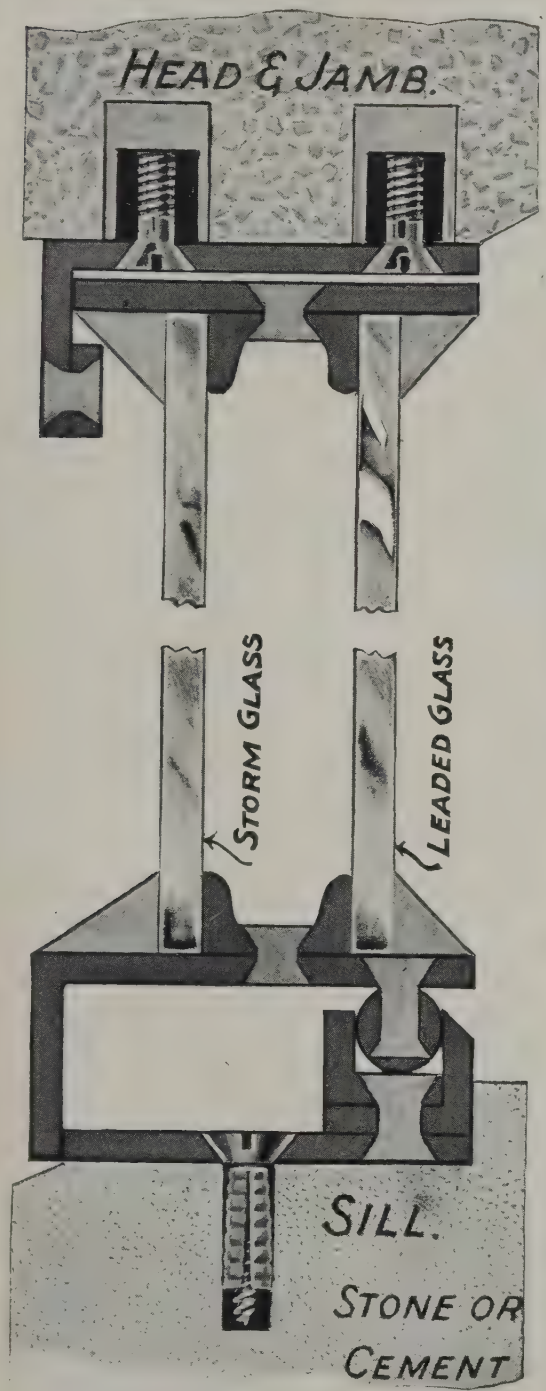
When specifying steel basement windows notify us, sending us the necessary blue prints, specifications, and list of bidders and we will remit any set charge for same.

No. 36 Basement Window Ventilator—Substantially made with horizontal stiffening bars. Extension arms which hold ventilators open ride through slotted frame, and when ventilator is closed they fit snugly into the frame.

Equipped with brass lock and made for leaded glass.

No. 37 Basement Window Ventilator—This frame is constructed on the same principle as the No. 36 for opening and closing and is made for pane glazing.

Made for single or double glazing as shown in the sectional views below. Frames painted or galvanized.

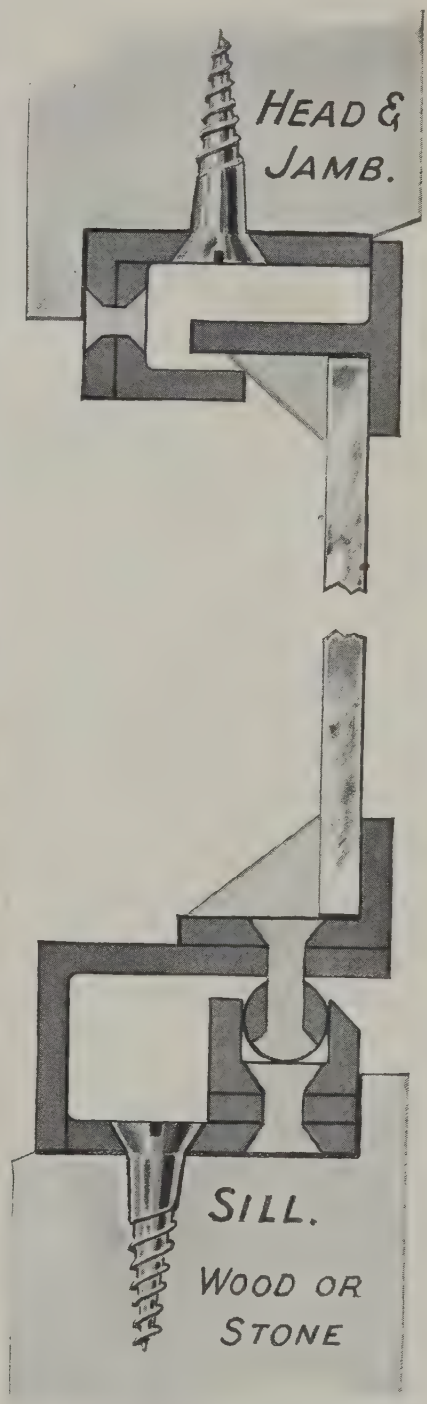


Full Size Sectional View Style No. 55

For Nos. 36 or 37 ventilators. For double glazing set in groove. Made for masonry construction only

No. 37 Ventilator for Pane Glazing

No. 36 has horizontal stiffening bars only and is made for leaded glass



Full Size Sectional View Style No. 54

For Nos. 36 or 37 ventilators. For leaded glass. Single glazing made to set in wood or stone.

For basement window for pane glazing, specify No. 53

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Pivoted Sash, Casement, Double Hung and Stationary Bronze Windows

CINCINNATI, OHIO

BRANCHES

CHICAGO, ILL. NEW YORK, N. Y. ST. LOUIS, MO.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

BRONZE CASEMENT WINDOWS.
BRONZE DOUBLE HUNG WINDOWS.
BRONZE PIVOTED-SASH WINDOWS.
BRONZE STATIONARY WINDOWS.

For Ornamental Brass, Bronze, Steel and Ironwork see pages A894-895.

For Cast, Extruded, Kalamein and Hollow Bronze and Steel Doors, see pages A972-975.

For Bronze Store Fronts and Awning Bars, see pages B2227a-2227f.

Newman Bronze Windows

Architects all over the country are realizing more clearly the fact that bronze windows represent real economy because of their permanence. Newman Bronze Windows are being specified to a greater extent than ever before because they incorporate many distinctive advantages.

Outstanding Features of Newman Bronze Windows

(1) Absolute permanence.

(2) Watertight and airtight construction—reduces fuel costs.

(3) Require no maintenance attention—are foolproof and wearproof, completely eliminating upkeep cost.

(4) Possess beauty and dignity not matched by many kinds of material.

(5) Parting strips are removable over entire length, facilitating adjustment of sash or sash weights.

(6) Meeting rails are of two-point contact design.

(7) Ingenious construction permits inside setting, eliminating the necessity for scaffolding.

(8) Have no visible outside screws; all glazing is done from the inside.

Hardware

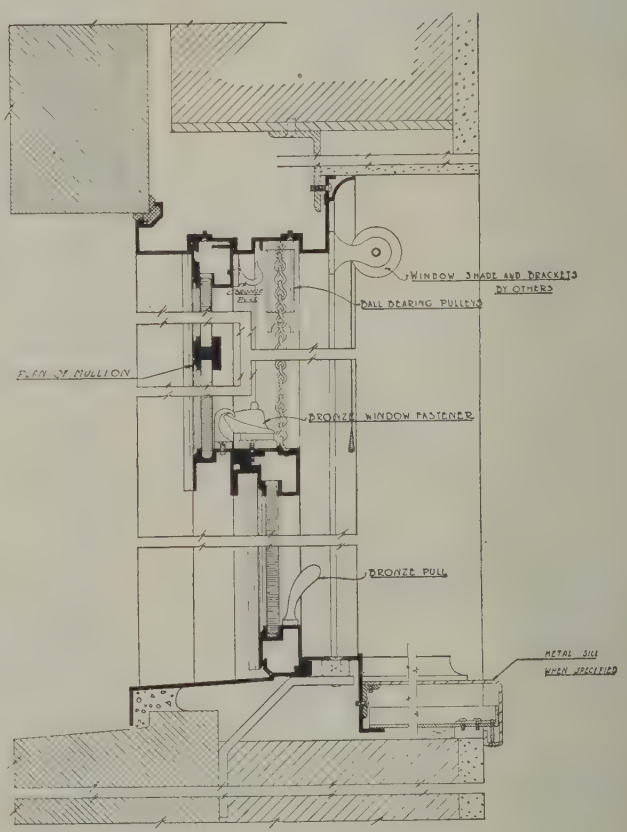
Standard types of cast bronze hardware are suitable for all window types.

Accessories

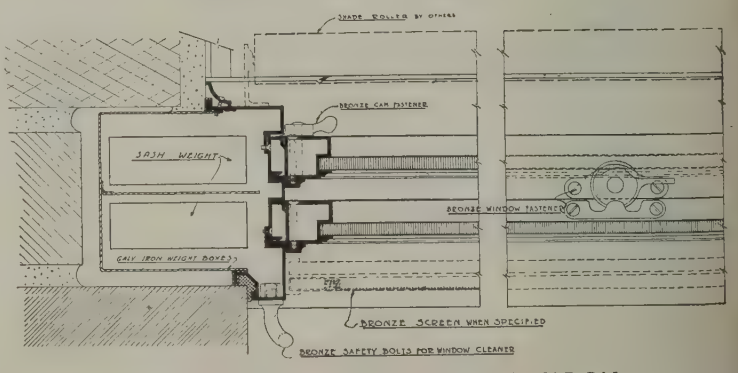
Windshields, heat screens and fly screens can be supplied on request.

Uses

Newman Bronze Windows are specifically designed for banks, public buildings, residences, churches, universities, office buildings, clubs, hospitals, theatres, etc.



VERTICAL SECTION



SECTIONAL PLAN OF WINDOW

Details of Sections

Patent Applied for

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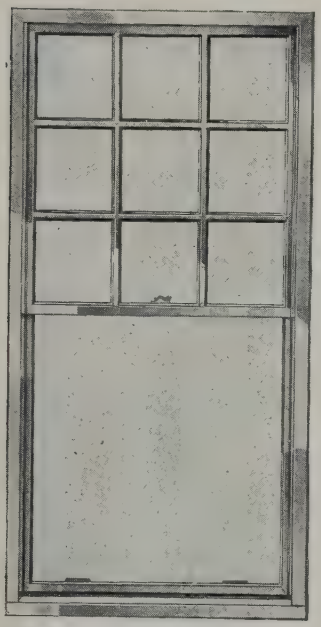
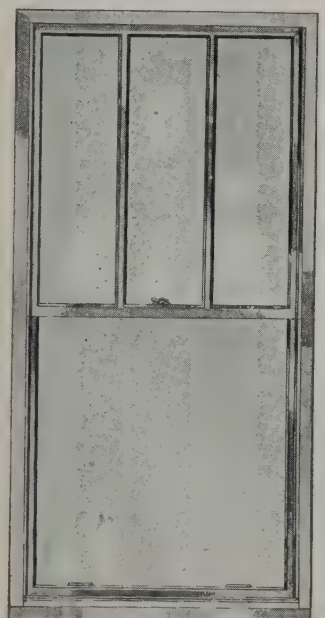
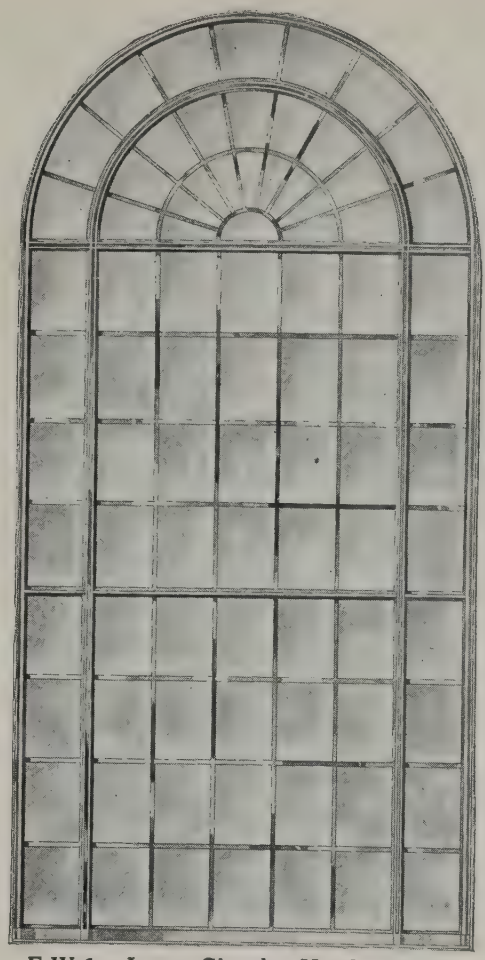
D-H-2. Double Hung Window



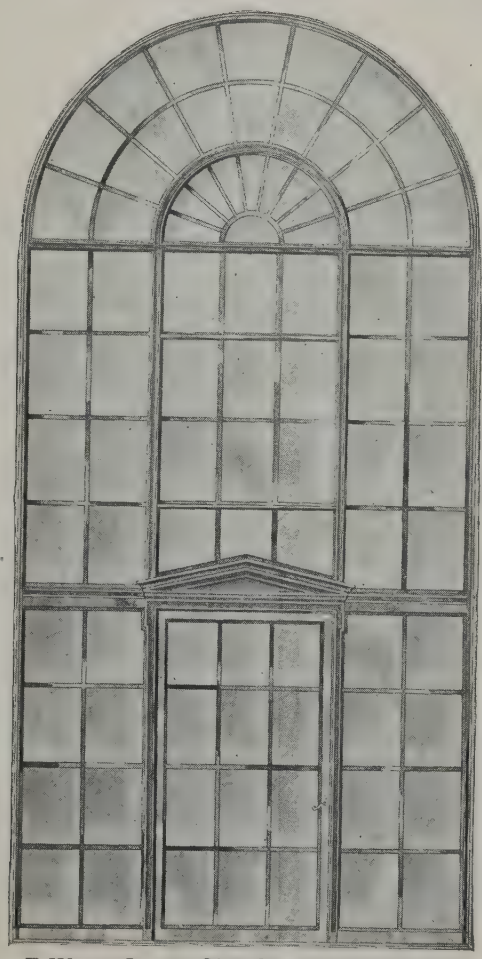
D-H-1. Double Hung Window



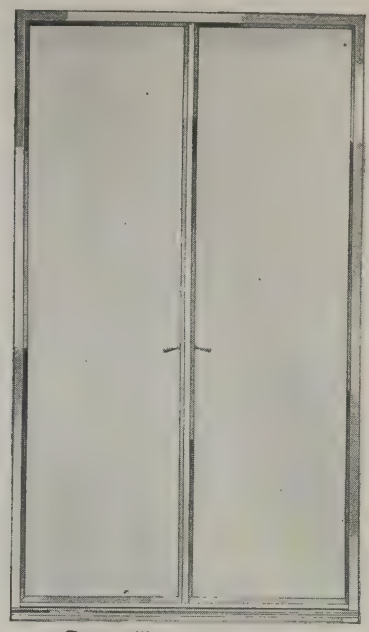
D-H-3. Double Hung Window



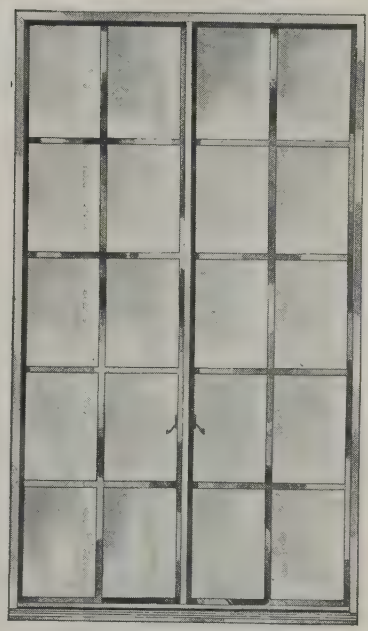
F-W-1. Large Circular Head Window



E-W-1. Large Circular Head Window



C-3. French Window



C-2. French Window

C-1. Casement Window

Newman Bronze Windows and French Doors

S. H. POMEROY CO., INC.

Manufacturers of Double Hung Metal Windows

FACTORY AND GENERAL OFFICES

282-296 East 134th Street, NEW YORK, N. Y.

LOCAL REPRESENTATIVES

BOSTON, MASS., Skillman & Sunderland Co., 1042 Little Building
BUFFALO, N, Y., E. H. Wood, 316 Jackson Building
CHARLOTTE, N. C., W. Fred Casey & Co., 340 South Church Street
CHICAGO, ILL., Kasson Steel Products Co., 180 North Michigan
CINCINNATI, OHIO, L. D. Zellner, Mercantile Library Building
CLEVELAND, OHIO, Mills Co., Wayside Road and Nickel Plate R. R.
DETROIT, MICH., J. W. Rollinson, 712 Polk Directory Building
LOS ANGELES, CAL., Calmo Engineering Co., 2302 E. 48th Street
PHILADELPHIA, PA., Thos. S. Gassner Co., 4545 Wayne Avenue
PITTSBURGH, PA., P. Larsen Co., 507 Commonwealth Building, Annex
RICHMOND, VA., James S. Archer, 202 Davis Building
ST. LOUIS, MO., H. C. Morrison Co., 1956 Railway Exchange Building
TAMPA, FLA., Stovall & Archer, 1009 Peninsular Telephone Building
WASHINGTON, D. C., A. B. Gilbert, 712 Insurance Building

A Pioneer Manufacturer of Metal Windows

The S. H. Pomeroy Co. Inc., was a pioneer manufacturer of metal windows. It has been engaged in perfecting window design and adaptability for over 30 years, during which time many prominent installations have been made. It now offers its—

"Superior Type" Heavy Metal Double Hung Window

Superior Metal—This window is made throughout of hot dipped galvanized copper-bearing steel. It is painted with a special galvanized iron primer made to our order.

Note: Committee A-5 American Society for Testing Materials:

"We have now reached a point where we may definitely conclude that copper-bearing metal shows marked superiority in rust-resisting properties as compared to non-copper-bearing metal of substantially the same general composition . . . under atmospheric exposure."

Superior Distribution of Metal—Structural and wearing portions of frame and sash of No. 14 and No. 18 gauge metal, viz.: sill, No. 14 gauge; pulley stiles, head and vertical rails of sash, No. 18 gauge; jamb boxes and cross rails of sash, No. 20 gauge.

Superior Weathering—Two-point contact inside and out entire perimeter of both sash, making double weathering.

Superior Light—Due to small sash and frame members, maximum sight glass area is obtained.

Width of standard muntin 1 in., Underwriters' muntin 1¾ in.

Superior Appearance—Compare the slender lines, the simplicity and dignity of design with other metal windows. Note the absence of rivet and screw heads, bolts, etc. All exposed screw heads on interior are countersunk.

Superior Economy—In the "Superior" window we offer to the building public, wherever located, a double hung metal window of unequaled merit and at a price so surprisingly close to wood windows that their use must now become universal.

Warwick Apartment Hotel, 54th Street and Sixth Avenue, New York, N. Y.
Geo. B. Post & Sons, Architects
1352 windows

Hotel Lincoln, 44th to 45th Street and Eighth Avenue, New York, N. Y.
Schwartz & Gross, Architects
2104 windows

No. 1 Fifth Avenue Building, New York, N. Y.
Helme, Corbett & Harrison, Architects
Sugerman & Berger, Associates
970 windows

Continued on next page

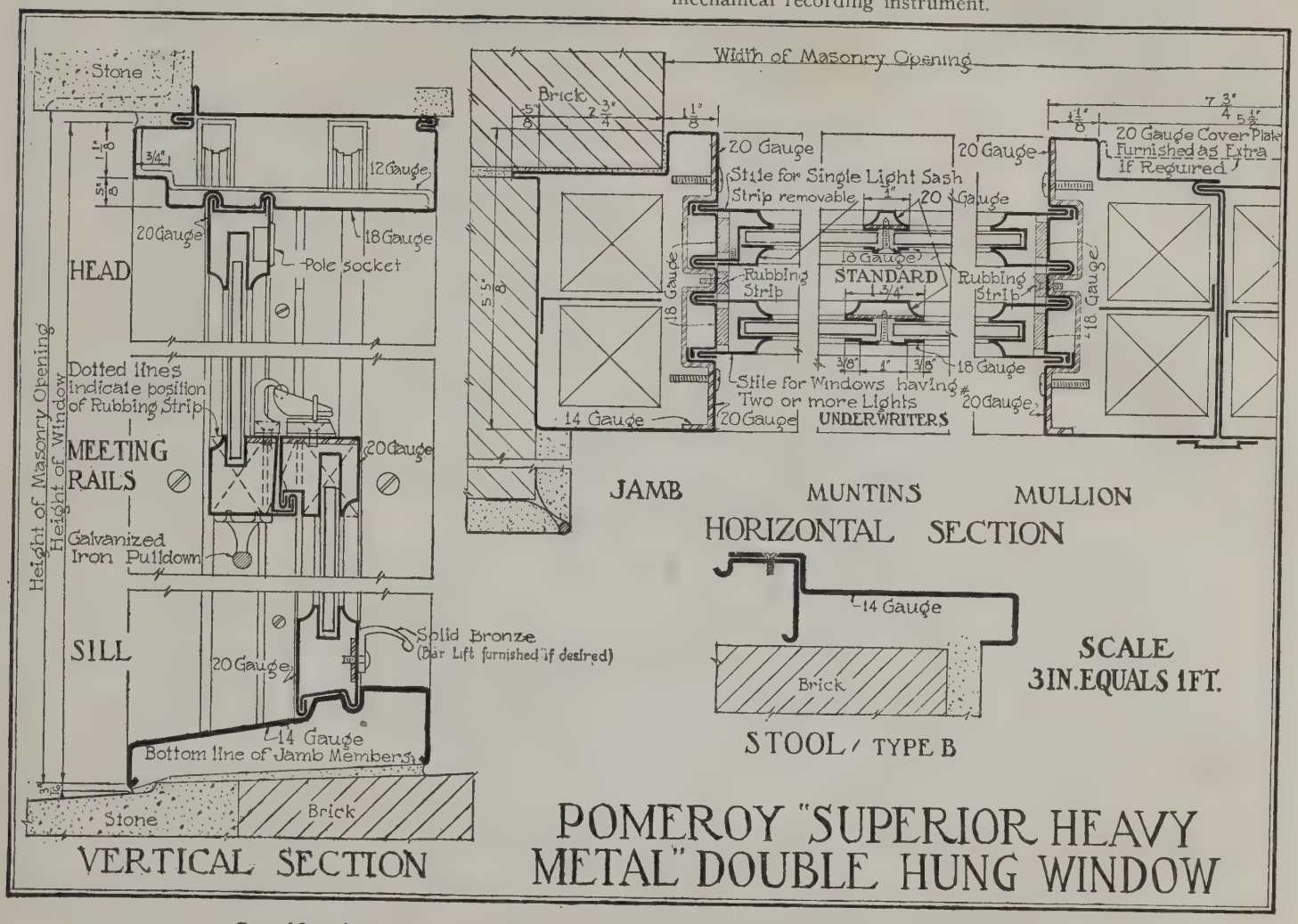
Air Infiltration

This window has been designed and constructed with the idea of insuring against excessive infiltration of air.

Subjected to test made at the University of Wisconsin by Professors Edward Anderson and G. C. Wilson, under the supervision of Professor G. L. Larson, in a manner similar to that described in the Journal of the American Society of Heating and Ventilating Engineers, June, 1924, the amount of infiltration of air through a standard double hung window proved to be less than two-thirds of a cubic foot of air per foot of sash perimeter per minute when subjected to static air pressure equivalent to air pressure exerted by a wind of twenty-five miles per hour.

This minimum amount of infiltration of air is accomplished without any added weatherstripping, device or appliance, with their additional cost.

This amount of air leakage is not discernable to a person standing on the room side of a window without the aid of a mechanical recording instrument.



Specification for "Superior" Type Heavy Metal Double Hung Window

Scope—Furnish and install, where shown on drawings, double hung windows of heavy metal "Superior" Type, as manufactured by S. H. Pomeroy Co., Inc., of New York City.

Material—All windows to be constructed throughout of copper-bearing hot dipped galvanized steel. Sills shall be of No. 14 gauge, jambs of No. 20 gauge, pulley stiles No. 18 gauge, heads No. 18 gauge, side rails of sash and inside muntin caps No. 18 gauge, cross rails of sash No. 20 gauge.

Frame Construction—Head, sill and jambs shall be constructed of one piece of metal, exclusive of pulley stiles and closure strips. All members shall be formed straight and true, neatly mitered, lapped and properly interlocked to their respective intersecting parts. Exterior hanging stile shall be flat and 1⅛ in. in width. The interior of jamb shall be flat and 3⅞ in. wide. The depth of frame from inside to outside of hanging stile shall be 6⅝ in. Pulley stiles shall be formed with deep weathering grooves and shall be removable to permit of access to weight boxes and pulleys, and held in position by flat head countersunk screws. These screws shall pass through heavy reinforcing plates spanning the inside of jamb box. With the exception of these screws no other screw heads, nuts, bolts or rivets shall appear on the inner face of the jamb or soffit of the head.

Sash Construction—Sash shall be moulded and of tubular design 1¼ in. thick. Side rails shall project not more than 1¼ in. beyond the inner face of the jamb, making the total distance from masonry jamb to sight line of glass 2½ in. Stiles and rails shall be constructed of one piece of metal moulded and neatly mitered, lapped and properly welded and interlocked. Side rails shall be of open construction with each flange being formed with a returned edge projecting into and operating in the weathering grooves of pulley stiles. Top and bottom sash rails shall be formed with flanges which shall engage in weathering grooves in the soffit of the head and those formed in the sill. Meeting rails shall not be more than 1¾ in. in depth and constructed with flanges forming interlocking contact. Glass rabbets in side and bottom rails shall be ¾ in. deep. Those occuring in top rails of upper and lower sash shall be 1⅜ in. deep. Where sash are to be glazed with one light of glass the side rails shall be constructed with removable inside glazing beads which shall be held in place with flat head countersunk machine screws.

Muntins—Exterior muntin bar shall be moulded and reinforced with No. 14 gauge steel lugs. Interior caps shall be flat and held in place by flat head countersunk machine screws passing through the reinforcing lug of the exterior member.

Hardware Equipment—Frames shall be equipped with solid steel bronze bushed pulleys, contained in Nos. 12 and 14 gauge steel housings. Sash shall be hung on substantial sherardized steel sash chain and properly counterbalanced by cast iron weights. Sash shall be equipped with one pair of solid moulded bronze lifts, one malleable iron plated sash lock and pole socket.

Painting—Frames and sash throughout shall be given one shop coat of manufacturer's special prepared metallic primer before delivery.

Note: If Underwriters' label is desired the following paragraph should be incorporated:

"Windows shall be constructed in accordance with the requirements of the National Board of Fire Underwriters and shall bear their label of approval, as well as the label of the manufacturer."

Note: If it is desired to construct this window of bronze or copper, please write for specification.

RICHEY, BROWNE & DONALD, INC.

2101 Flushing Avenue
MASPETH, CITY OF NEW YORK

AGENTS IN PRINCIPAL CITIES

Products

BROWNE FIREPROOF, WEATHERPROOF and DUSTPROOF WINDOWS.

Browne Windows

Browne windows are of solid steel, built on principles that produce positive results in operation and in overcoming air leakage. The windows may be in groups of one or more pair of sash as desired.

Also made in bronze and aluminum.

Browne Fire Windows—Same in general appearance, and bearing labels of Underwriters' Laboratories, Inc.

General Description

Frames and sash are of solid rolled steel. Sash are firmly hinged together to open (outwardly) and shut under symmetrical control of hinged arms attached to a stationary vertical bar. Arms are forged steel and afford absolutely rigid support. A simple catch lock fastens sash when window is closed.

Heavy felt weatherstripping is an integral part of the construction.

National Board of Fire Underwriters Building, New York, N. Y.
CLINTON & RUSSELL, WELLS, HOLTON & GEORGE, Architects
JAMES STEWART & Co., Builders

Every window is assembled at factory, tested for accuracy and shipped a complete unit including hardware and weatherstrips. Browne windows require no special skill for setting and are readily glazed after installation.

Glass—Should be furnished and set by glazing contractor and may be of grade or type desired.

Painting—All metal parts receive one shop coat of paint before shipment.

All finishing coats should be applied by the painting contractor.

Advantages

Maximum Light and Vision—Sash are continuous from sill to head with no obstruction from horizontal meeting rails.

Ventilation—Ideal changing of air without drafts. The sash control forms flue that draws out all impure air, which is automatically replaced with fresh air. A pleasant quality of ventilation is obtained by bowing sash open to extent of catch hook attached to center upright. This gives fresh air intake at bottom, exhaust at top, with no opening at sides.

Weather Protection—The airtight and dustproof qualities of the windows have been established under laboratory test of 140-mile wind velocity.

Noiseproof—Thick felt contact cushions practically shut out street noises when window is closed.

Safety—All parts of the sash are accessible from the inside. The expense and danger of outside window cleaning and painting are eliminated.

Simplicity—No track mechanism for the accumulation of dirt and water. No weight boxes to invite drafts and annoyance from noise; no chains, weights or pulleys to get out of order; no rattling of parts when open or closed.

Contact—No metal to metal weathering contact. The contact in all cases is metal to felt.

Service—Continuous and lasting, with no danger of sagging, warping, racking, or wearing off paint.

Operation—Smooth, easy, noiseless; without physical effort the sash may be opened to any desired angle. Releasing catch handle, pushing sash partly open and a slight pull at the edges of sash towards center opens window full extent. Pushing edges of sash away from center brings handle within easy reach for closing and locking. The handle is a most convenient latch attachment and is intended for this use only. Where windows can not be reached from the floor, our standard operator may be applied, locking the window in any position.

Strength—All parts are sturdy and substantial; the greatest care is taken in the construction and assembling to insure rigidity and permanence.

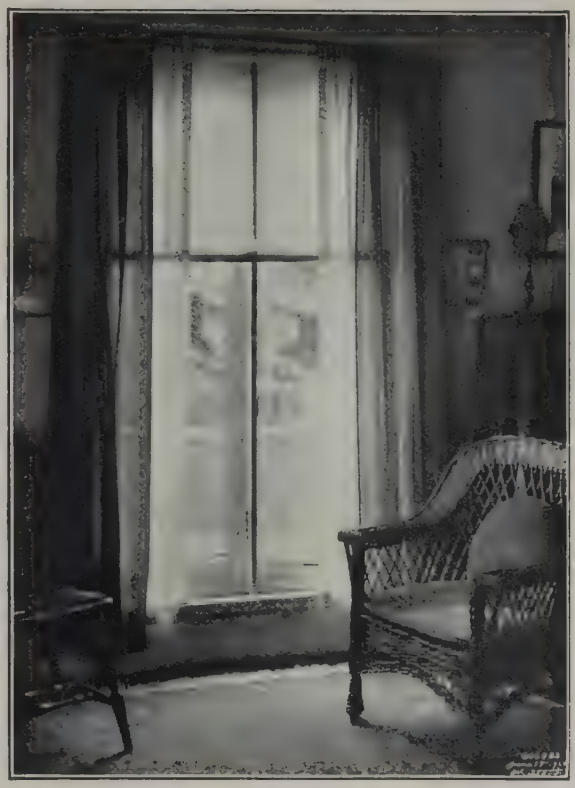
Curtains, etc.—Curtains, shades, Venetian blinds, and inside screens may be applied as for ordinary sash.

Economy—Minimum cleaning and maintenance costs; assurance of maximum results from heating arrangements; and fuel saving due to dependably tight openings are prominent features.

Hardware—Furnished by us with the window.

Information

Full size details, specifications and complete information furnished on request.



Apartment

Office Building

Meeting Room, Board of Directors, Kansas City Life Insurance Bldg., Kansas City, Mo.

Browne Windows of Various Types

Appropriate in Design for Office Buildings, Hospitals, School and University Buildings, Public Buildings, Department Stores, Industrial Buildings, Apartments, Hotels, Homes, etc.

F. W. STEVENS & SON, INC.

Manufacturers of Unit Casement Windows

70 Needham Street, NEWTON HIGHLANDS, MASS.

Products

STEVENS UNIT CASEMENT WINDOWS and SCREENS.
CASEMENT WINDOW HARDWARE.
Patented in United States of America and Canada.

Unit Casement Windows

Advantages—A completely assembled product including frames, sash, glass, screens, weatherstrips. Suitable for all kinds of construction, and architect's details. Guaranteed to be weathertight. Complete control of ventilation without direct drafts. Our ventilated transom window is especially suited for schoolhouses and hospitals. Transoms operated without disturbing screens or shades, or may be fixed.

Ease with which windows can be cleaned on the outside from within—thus eliminating danger in cleaning.

Simplicity of construction. May be installed in old frames without disturbing interior or exterior finish.

Materials—***Frames***—Either for brick or wood construction from good seasoned white pine made to our standard or architect's details.

Sash—1¾ in. thick from best white pine.

Glass—Selected quality in the varying thicknesses. Glazed with the best glazing compound.

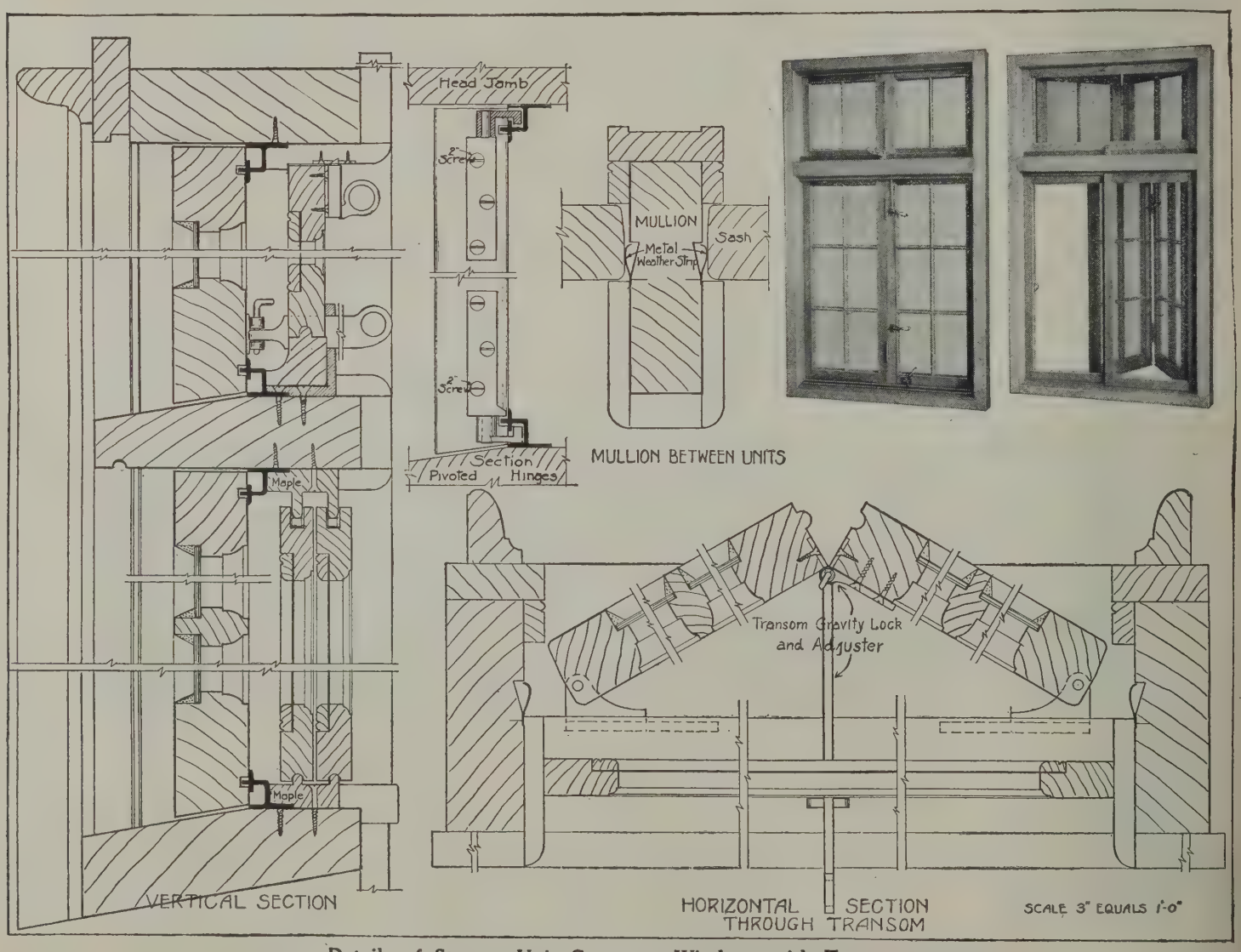
Screens—Made from best of rift sawed white pine, wired with 16-mesh dark copper screen cloth.

Hardware—All solid brass to our special detail, and completely fitted to sash. Special finishes of hardware may be furnished.

Installation—Windows are delivered at the building assembled, and carpenter has only to set units in openings designated on the plans. This completes the job in so far as the operation of sash and screens is concerned.

We do not furnish interior trim. For frame construction make rough openings 5 in. wider and higher than size of sash to be used.

Operation of Sash—A slight outward push in the center of each pair of sash will make the units fold together; they can then be slid to either side, or they may be placed in any position so as to give as little ventilation as desired. For single sash or groups of three,



Details of Stevens Unit Casement Windows with Transom

Continued on next page

the odd single sash opens similar to the units, except that one of the pivoted corner hinges is replaced by an arm, one end of which is secured to sash, other being fastened to jamb, allowing sash to remain rigid in outswung position.

Note: Sashes may be glazed with "Vitaglass," the health-giving window glass, which transmits the curative ultra-violet rays of daylight.

Further information and full sized details for either brick or wood construction furnished upon request.

Hardware for Stevens Unit Casement Windows

The extruded brass track (Fig. 1) is screwed to stool and head jamb the entire width of each opening; the horizontal projecting tongue of track acts as a weatherstrip, fitting into a groove in the sash. The pivoted hinges (Fig. 2) are of cast brass; each hinge slides in extruded track from which it is impossible to become disengaged. Commercial spring bronze weatherstrips are furnished full length for each pair of jambs. Butts are 3x2 in. and are solid wrought brass; two or more being required for each pair of sash, depending on height of sash. The polished cast brass handle and lock (Fig. 3) is used as a lock, a slight turn securely fastening the sash. Polished cast brass top lock for use on high sash (Fig. 4); one lock required for each pair of sash. Transom gravity lock and adjuster for operating transom only (Fig. 5). Loose pin butt (Fig. 6). Handle to open and close the window (Fig. 7).

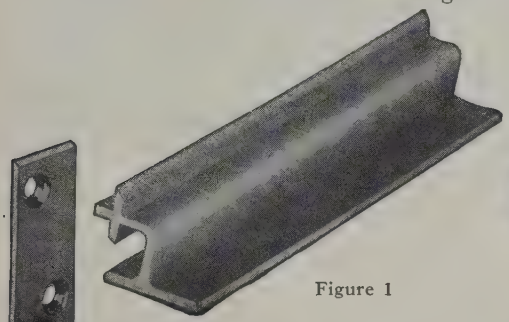


Figure 1

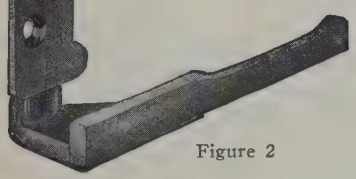


Figure 2

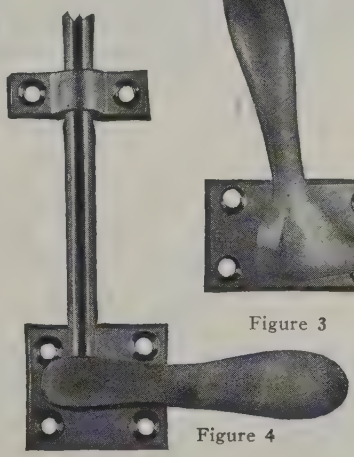


Figure 4

Figure 3

Figure 6

Figure 7

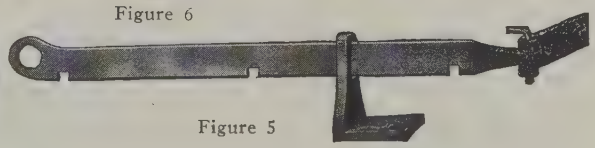


Figure 5

A Few Installations and Their Architects

Tampa Municipal Hospital, Tampa, Fla., Stevens & Lee, Boston, Mass., and M. Leo. Elliott, Tampa, Fla.
Deaconess Hospital, Boston, Mass., E. W. Dearing
Quincy City Hospital, Quincy, Mass., Stevens & Lee
Norwood Hospital, Norwood, Mass., J. Williams Beal Sons
Lawrence Memorial Hospital, Medford, Mass., Chas. B. Dunham
Heywood Memorial Hospital, Gardner, Mass., Stevens & Lee
Home for Aged, Somerville, Mass., Charles M. Baker
Children's Hospital, Washington, D. C., Stevens & Lee
Palmer Memorial Hospital, Boston, Mass., E. W. Dearing
Mary Lane Hospital, Ware, Mass., Stevens & Lee
Freeman Hospital, Joplin, Mo., E. W. Dearing
Nurses Home, Fall River Hospital, Fall River, Mass., E. M. Corbett
St. Luke's Hospital, New Bedford, Mass., Stevens & Lee
Waltham Hospital, Waltham, Mass., J. R. Worcester, Engr.
First Church of Christ, Scientist, Wellesley Hills, Mass., E. W. Dearing
Nurses' Home, Lawrence Memorial Hospital, Medford, Mass., Charles B. Dunham
Wellesley Friendly Aid Society, Wellesley Hills, Mass., Stevens & Lee

Tampa Municipal Hospital, Tampa, Fla.
Architects: Stevens & Lee, Boston, Mass. and M. Leo Elliott, Tampa, Fla.

CRITTALL CASEMENT WINDOW COMPANY

10989 Hearn Avenue
DETROIT, MICH.
EASTERN SALES OFFICE, 311 Thirteenth Street, WASHINGTON, D. C.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue
CLEVELAND, OHIO, 1526 Keith Building
LOS ANGELES, CAL., 504 Union Insurance Building
CHICAGO, ILL., 105 West Monroe Street
ATLANTA, GA., 1520 Healey Building
CINCINNATI, OHIO, 708 Gerke Building

Products

CRITTALL SOLID STEEL and BRONZE UNIVERSAL CASEMENT WINDOWS.
CRITTALL STANDARDIZED CASEMENTS.
CRITTALL REVERSIBLE WINDOWS.
STANWIN CASEMENTS.

TRADE-MARK

Catalogues

Architects are welcome to the following catalogues:

No. 1-28 Universal Casements (76 pages)
No. 2-28 Standardized Casements (8 pages)
No. 1-24 Reversible Windows (20 pages)
No. 1-29 Stanwin Casements (20 pages)

CRITTALL SOLID STEEL AND BRONZE CASEMENTS

Custom built to the architect's sizes, designs and specifications

Uses—For banks, public buildings, residences, churches, universities, office buildings, clubs, hospital operating rooms, etc.

Material—The weight of sections, heavy or medium, shall be determined by manufacturer's best standards as set forth on page 46 of Catalogue 1-28. All steel used in the manufacture of these sash shall be Crittalloy—the copper bearing steel—containing not less than 0.15% nor more than 0.30% copper in order to resist rust. All bars shall be hydraulically straightened and free from hammer marks or other imperfections.

Painting—All steel shall receive two coats of rust resisting paint, each coat baked on separately.

Weathering—The sections shall be so designed as to give double contact on all sides without the use of pressed or screwed on fillets or strips of any kind.

Welding—All corners shall be mitered and electrically welded. Plates to receive hardware must be securely welded to the casement sections.

Hardware—All hardware shall be solid bronze, government mixture, toned a dark coinage color, this color secured without the use of plating or chemicals. (Transoms in [describe location] shall be fitted with mechanical operators to operate from floor.)

Note: Specially designed hardware in bronze or hand wrought iron may be specified when desired.

Glazing—All sash shall be fitted with *solid* rolled steel glazing stops for glazing from the inside. Glazing stops shall be mitered at the corners and shall be held in place by countersunk brass screws. (Alternate: All sash shall be fitted with copper covered spring clips for putty glazing from the outside.)

Design—Sash shall be made to the design and sizes shown on the elevations and details. Ventilating units are marked on elevations with dotted diagonal lines; all other units to be fixed or stationary.

Erection—These windows shall be set by the manufacturer and all joints between the steel sash and the collateral construction are to be made tight with the use of Crittall Mastic Cement neatly pointed on the exterior.

(Describe here whether the windows set in ⅜-in. rabbeted stone, wood or cast iron frames, or are fitted with angle fin for setting directly into masonry, or are to set into rabbeted No. 12 gauge pressed metal frames to be furnished by the casement manufacturer but to be built in as the walls go up.)

ARARAT SHRINE TEMPLE, KANSAS CITY, MO.

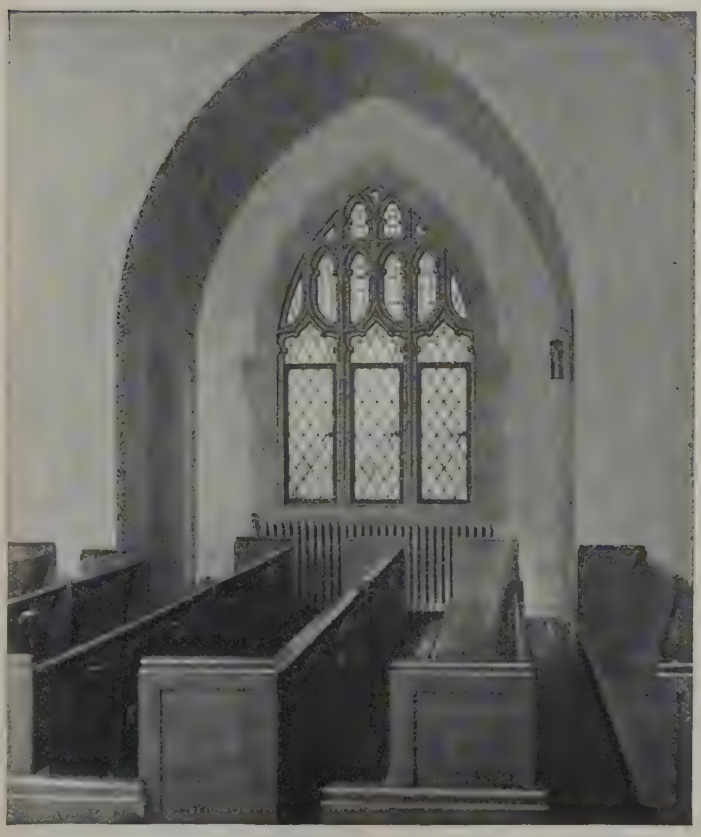
OWEN, SAYLOR and PAYSON, Architects

Continued on next page

C. K. Boettcher Residence, Denver, Colo.
Harry J. Manning, Architect

Chicago Theological Seminary, Chicago, Ill.
H. H. Riddle, Architect

A FEW TYPICAL INSTALLATIONS OF CRITTALL STEEL CASEMENTS



Highland Park Methodist Church, Highland Park, Tex.
De Witt & Lemmon, Architects

New City Hall, Los Angeles, Calif.
John C. Austin, John Parkinson and Albert C. Martin, Associated Architects

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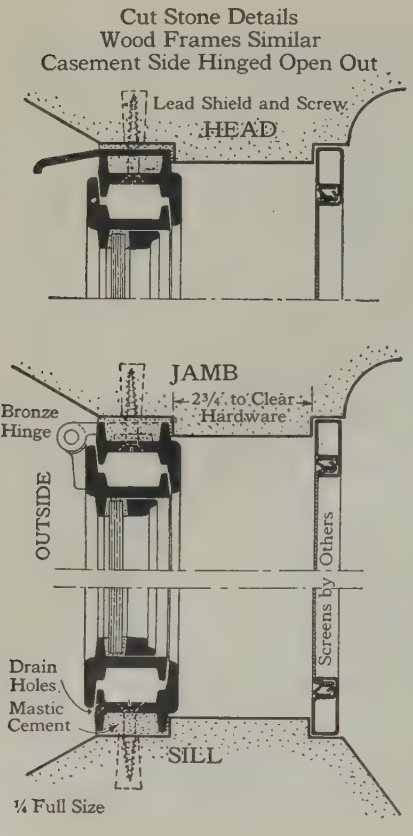
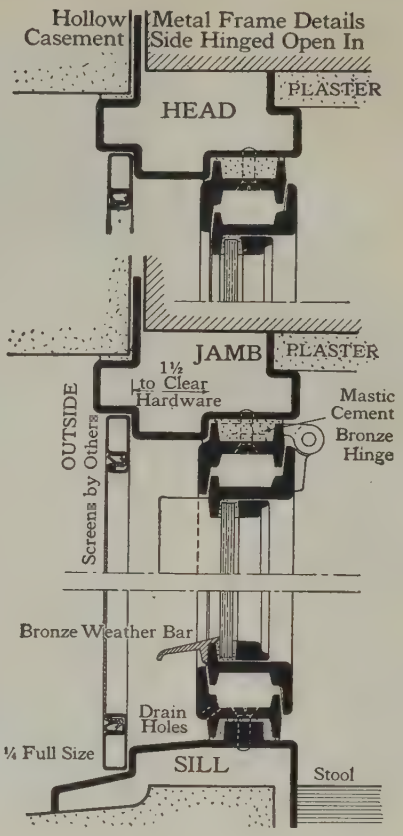
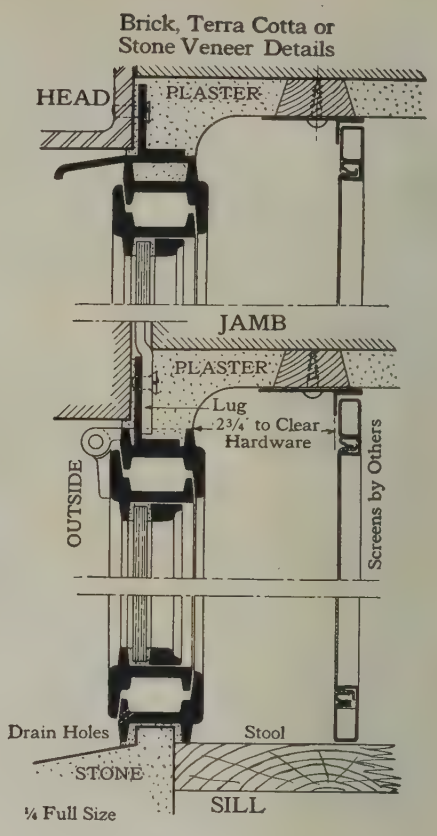






Details—The details shown above can be varied to suit any given conditions. Wood frames, mullions and transom bars may be used in a detail very similar to the cut stone shown.

In place of the No. 12 gauge hollow metal frames shown in the second detail, ornamental cast iron frames may be used where expense is not a primary consideration.

The third detail is economical and suitable wherever a narrow sight line is sought.

Special Hardware—While standard hardware is of solid bronze, of Government mixture, toned a dark statuary color, in pleasing and substantial designs, specially designed hardware may always be obtained when desired.

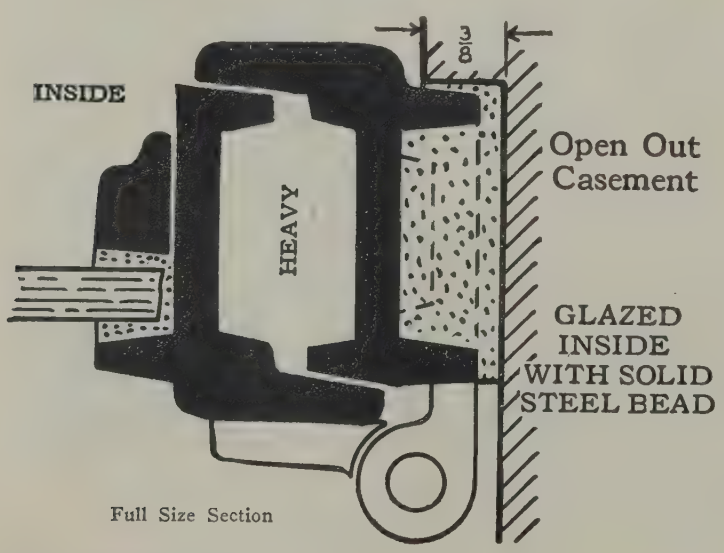
Such special hardware may be of bronze, of hand wrought iron, or of bronze nickel, silver or gold plated, to our own or to the architects' designs.

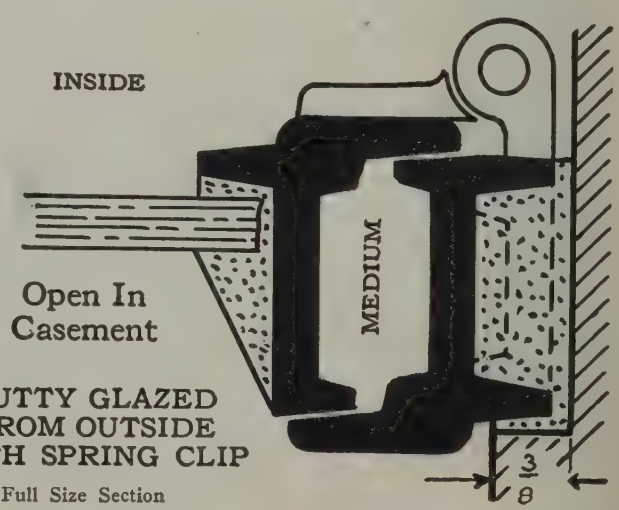
Operating Devices—Mechanical operating devices are available to meet all requirements.

These can range from a simple but effective cam stay for the pole operation of a hinged-at-top-to-open-out casement to a power driven operator for groups of sash.

Shades, Screens and Draperies—In laying out the windows it is always advisable to make provision for shades (if used), drapes and screens and it is recommended that the casement manufacturer be consulted in reference to these three items while the job is still in a preliminary stage.

Co-operative Service—The Crittall Casement Window Company has six branch offices in principal cities and has over fifty representatives. There is usually a branch office or representative near an architect, eager to be of service in the way of details, drawings and suggestions.





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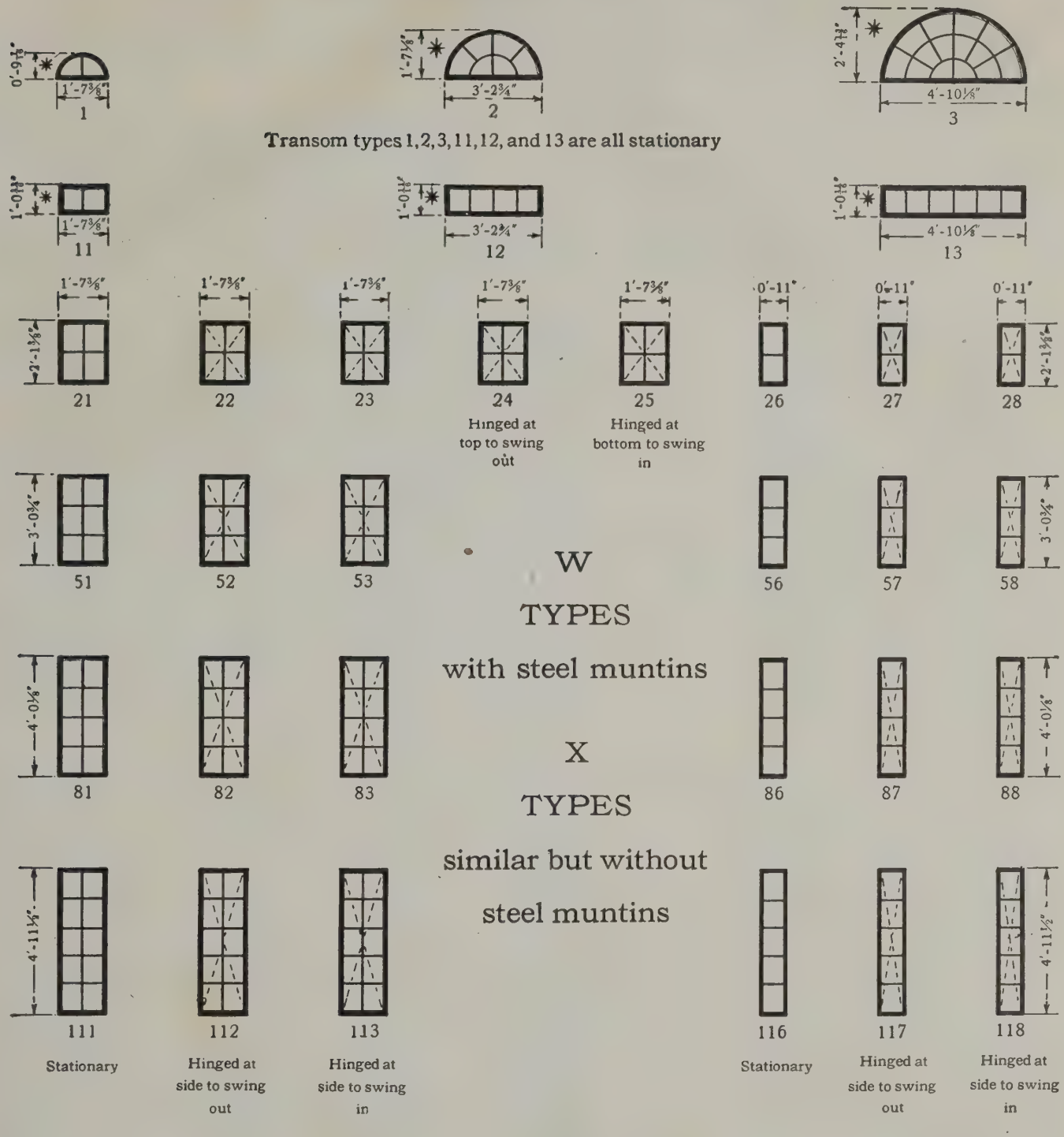
CRITTALL STANDARDIZED CASEMENTS

Standard Sizes and Types



All hinged at side sash are made in both right and left hands

Uses

These *Standardized* casements are designed for projects where the architect desires to use the best. Economy is effected by standardization but quality is maintained. Residences, churches, clubs, libraries and similar buildings may use these windows to advantage.

Hardware

All handles are of solid bronze of Government Standard. They are well designed and finished and are toned a dark statuary bronze color. Stays are bronze finished, adjustable friction type, and are fitted at the head of each casement.

Sections

Standardized casements are made of the medium section illustrated on the previous page.

This same section is also used in our custom built work for side hinged sash up to 2 ft. 3 in. wide by 6 ft. high.

Guaranty

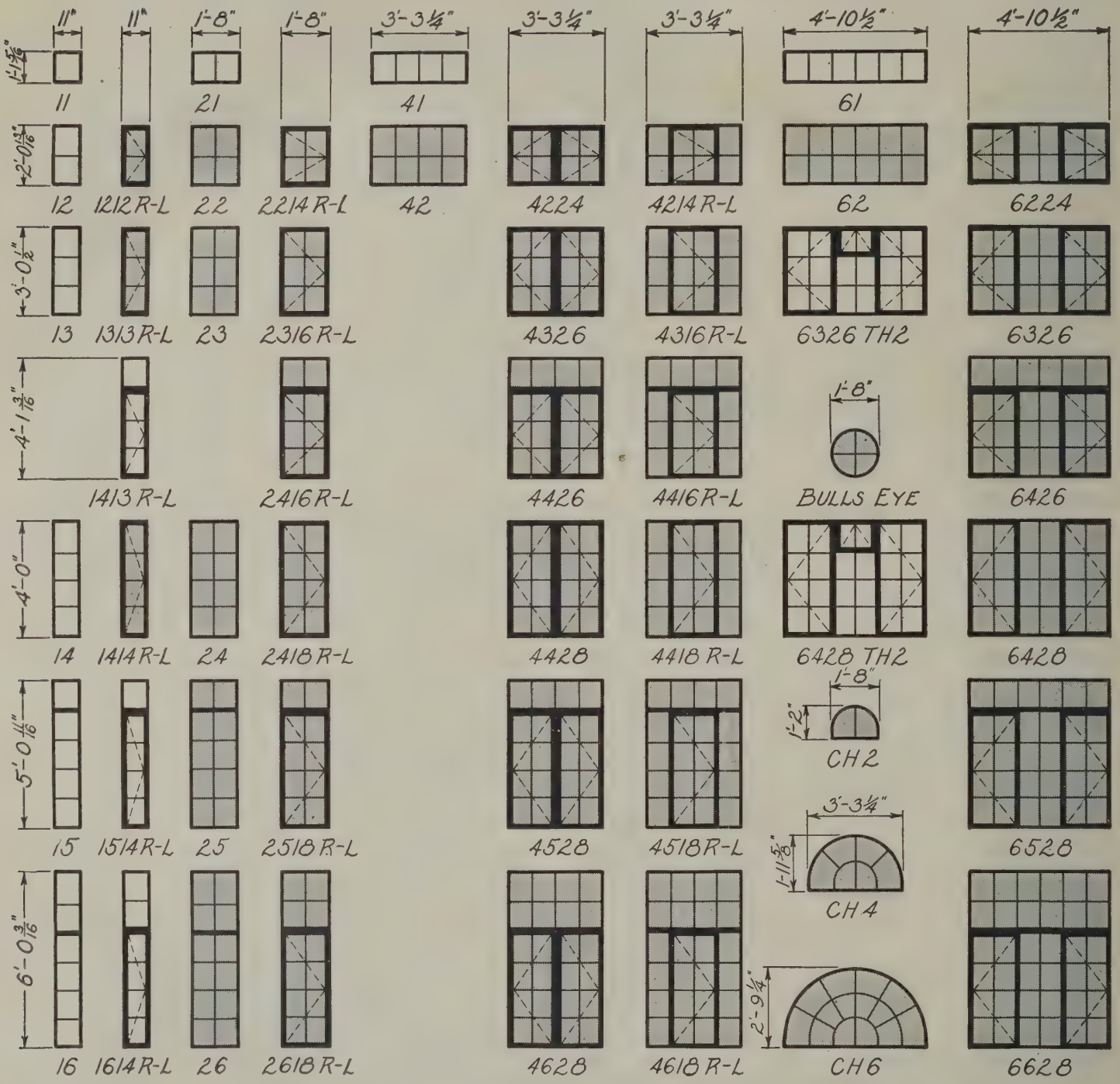
When we are permitted to erect our casements, our windows, both Custom Built and *Standardized*, both inward and outward opening, are guaranteed weathertight against wind and rain under the most severe conditions.

Continued on next page

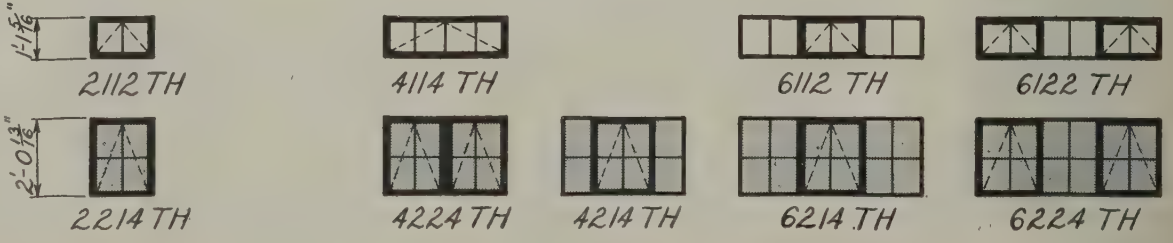
A PRODUCT STANWIN OF CRITTALL
CASEMENTS

Standard Types and Sizes with Steel Muntins

Units Carried as Warehouse Stock Shown with Shaded Background



The handing of casements is determined by the hinge location viewed from the outside. Thus a casement hinged at the right is a right-hand casement.



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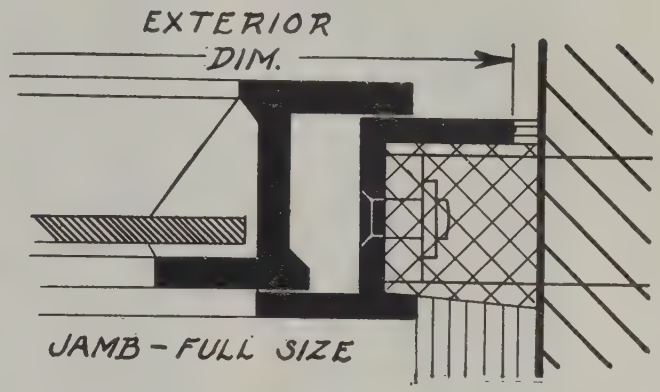
A PRODUCT STANWIN OF CRITTALL
CASEMENTS

Stanwin Casements properly set are weathertight. They are of two-point flat contact solid rolled section and are considerably heavier than the ordinary cottage casement.

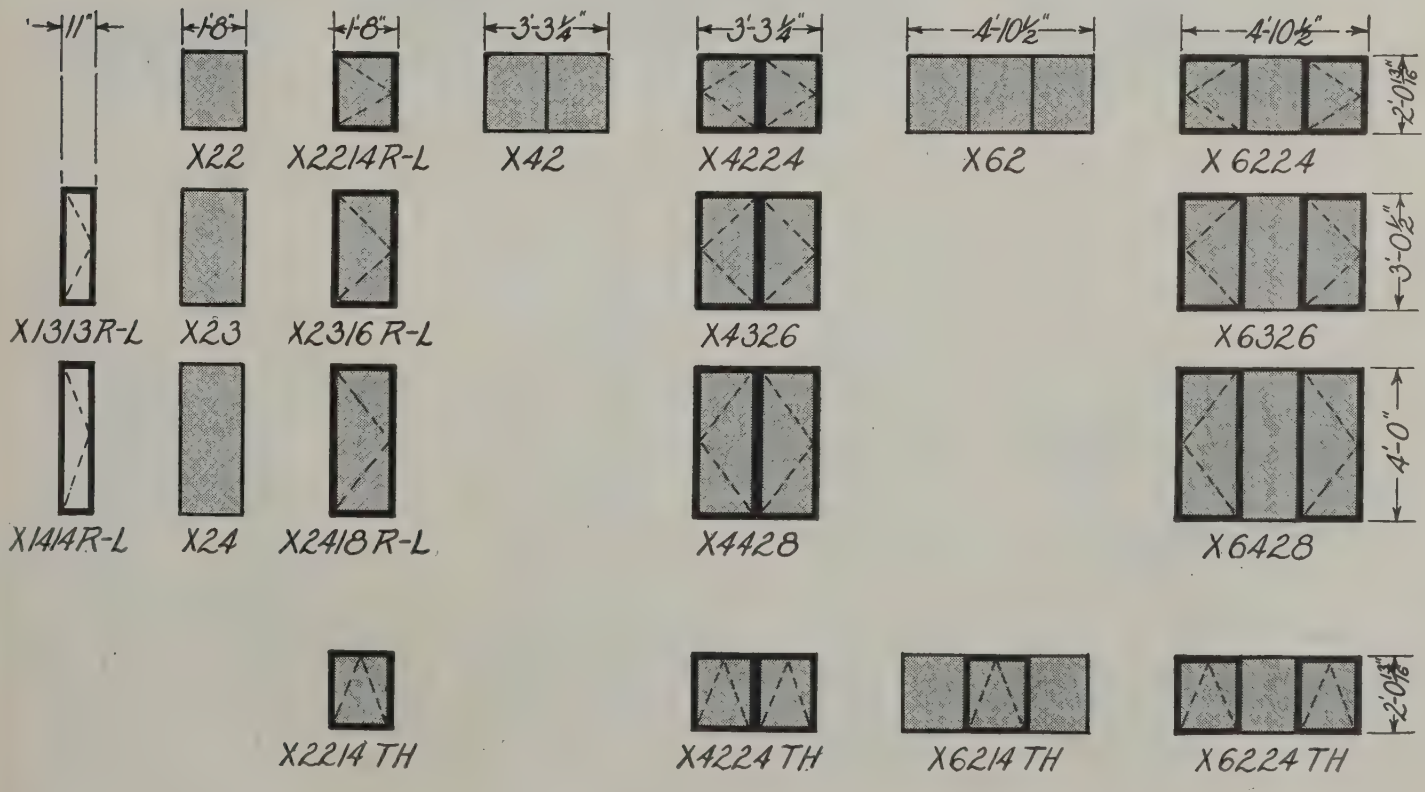
Stanwin Units can be assembled with one another into an almost limitless arrangement and thus provide windows in complete harmony with a wide variation of design, suitable in every respect to meet the most exacting requirements.

The hardware used on Stanwin Casements is of substantial design and quality with all moving parts of solid bronze. The finish of the sash is a prime coat of antirust primer and a second coat of gray zinc oxide paint, forming a complete protection and giving an excellent base for the final color coats in the field.



Standard Types and Sizes for Use with Leaded Glass

Units Carried as Warehouse Stock Shown with Shaded Background

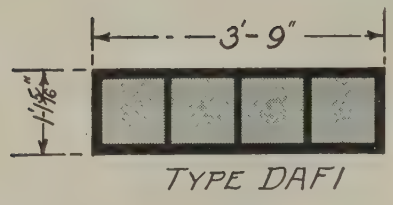


Continued on next page

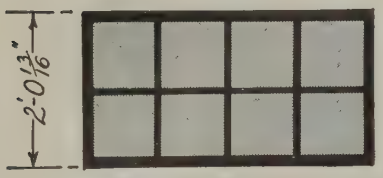
A PRODUCT STANWIN OF CRITTALL
CASEMENTS

Casement Doors in Standard Sizes and Types

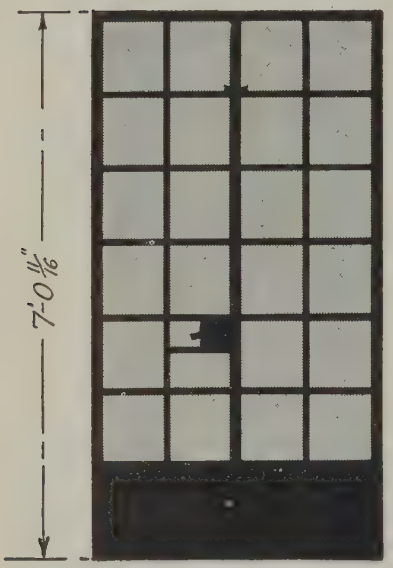
Units Carried as Warehouse Stock Shown with Shaded Background



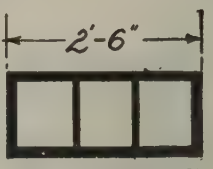
TYPE DAF1



TYPE DAF2



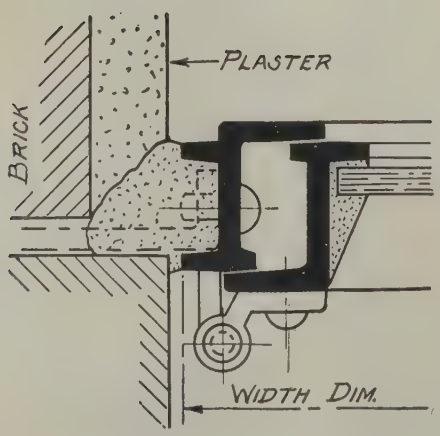
TYPE DA



TYPE DASF1

TYPE DASF2

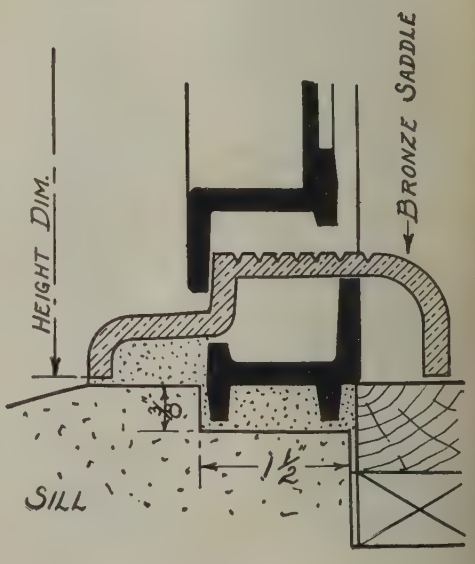
TYPE DAS



JAMB

Stanwin Casement Doors and Transoms in standard types and sizes, opening outwards harmonize with casement windows in standard sizes. Any standard casement unit may be used as a side light with these doors as the muntins line up horizontally. These doors are well adapted for terraces, entrances or balcony openings and are often used for interior openings with artistic results.

The doors are constructed of medium weight casement sections as detailed in half full size. The doors are hung on bronze hinges and are fitted with locks, bronze lever handles operating from both sides, bronze sliding top and bottom bolts to each leaf, cabin hooks, bronze threshold and steel kick plates.



W. H. TAYLOR COMPANY

Manufacturers of Copper Steel Basement Windows

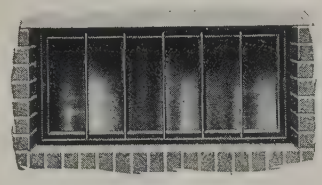
326 S. W. 11th Street
DES MOINES, IOWA

Products

TAYLOR-DES MOINES COPPER STEEL CASEMENT WINDOWS and UTILITY WINDOWS, Standard and Security Types.

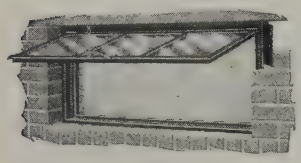
STEEL SCREENS and STORM SASH.

For Coal Chutes, Ash Pit Doors and Ash Dumps, see page A705.

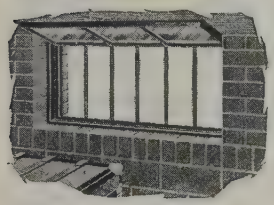


Copper Steel Basement Windows (Patented)

These windows are offered in two types, Standard and Security. Both types have all the features described and are identical throughout, except for the guard bars on the Security type. Both frame and sash are made of rust-resisting *copper steel.*



Standard Window—Inside



Security Window—Inside

Taylor-Des Moines Security Windows—Provide permanent protection against prowlers with no sacrifice in appearance. With these windows, the ventilators may be left open indefinitely without danger.

Five ½-in. solid steel bars intersect the frame and are welded to it at top and bottom. They cannot be bent because they are built solidly into the frame, which is reinforced by the groove formed for the sash top.

Bars do not interfere with either screens or storm sash which fit against the face of the frame.

Features—The *extra wide frame* provides a better bearing than is possible with a bar frame.

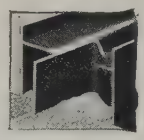
A *large mortar pocket* is formed by facing flanges and the groove of the formed stop. It holds enough mortar to seal the frame in the wall. The flanges provide a guide for the mason on both sides of the anchor plates, which extend ¾ in. beyond the flanges.

The *self-weathering hinge* utilizes the full weight of the glazed sash to press against the frame stop, insuring a tight fit at the top. The sash is easily removed from the inside only. The hinge lugs are welded to the sash. There are no rivets, cotters or other removable parts—nothing to wear out or get out of order.

Tight weathering between frame and sash is secured by the positive action of the lever latch. The bottom sash member has a slight curvature, corners make contact first, the latch draws up the center, insuring an all-around tight fit.

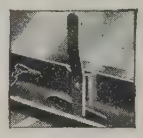
Easy to screen. All frames have slots for attaching screens or storm sash, by means of levers.

Electric arc welding—is used at every joint of frame and sash. Every window is straight and true and remains so permanently.



Frame Corner

Lift-Out, Self-weathering Hinge



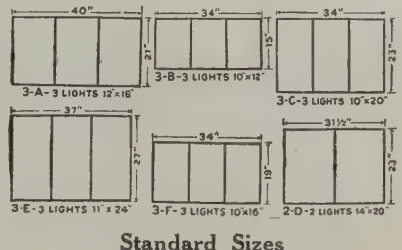
Lever Latch

Screen Slot

There are *no depressions or grooves to hold moisture.* The importance of this in resistance to corrosion is self-evident.

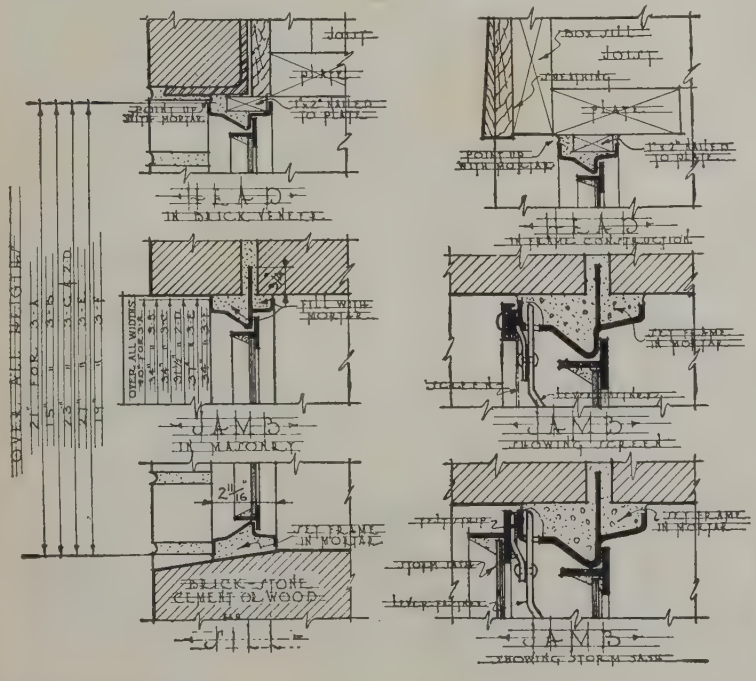
Made of copper steel. The superiority in rust-resisting properties of copper steel is universally recognized.

Construction and Sizes—The frames are of formed copper steel, about 2½ in. wide. Sash are rolled copper steel bar, 1x1x⅛ in. Anchor plates are securely welded to the jambs and extend ¾ in. into the masonry. A 12-in. chain is attached to the ventilator for support when open.



Standard Sizes

Both types are made in six standard sizes as shown. Special sizes are built to order and can be delivered in a few days.



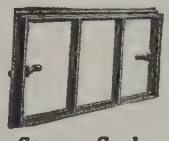
Steel Screens and Storm Sash

Steel screens and storm sash are available for Taylor-Des Moines Windows. No separate fittings are necessary, all fasteners being permanently attached to screen or storm sash. Quickly put on and removed. Also furnished with necessary fittings for attaching to other windows.

Type R Screen—Cold-rolled round steel frame, extra heavy black enameled wire cloth. Lever fasteners, welded to frame, operate in the slots of the window frame.

Type S Screen—Heavy channel steel frame (⅛ in.) welded at the corners. Best grade of bronze or galvanized cloth, 16-mesh, which can be easily replaced when necessary. Lever type fasteners.

Steel Storm Sash, Weatherstripped—A strip of wool felt is cemented to the face, which fits against the flanges of the window frame. Lever type fasteners are used. Ordered by the size of the window to be fitted. Standard sizes of glass are used.



Storm Sash

Type R Screen

Type S Screen

J. S. THORN COMPANY

Manufacturers of Steel Windows, Skylights, Sash Operating Devices, and Vertical Lift Doors

Allegheny Avenue and Twentieth Street, PHILADELPHIA, PA.

BRANCH OFFICES
NEW YORK, N. Y. CHICAGO, ILL. BOSTON, MASS.

Thorn Products

PIVOTED WINDOWS, PROJECTED WINDOWS, CONTINUOUS WINDOWS, WINDOW OPERATORS, SKYLIGHTS.

BURVETT VERTICAL LIFT DOORS.

Also Industrial Steel Doors, Counterbalanced Windows, Double Hung Windows.

For Steel Casements, see pages A1296-1298.

THORN STEEL WINDOWS

Industrial Steel Window Catalogue

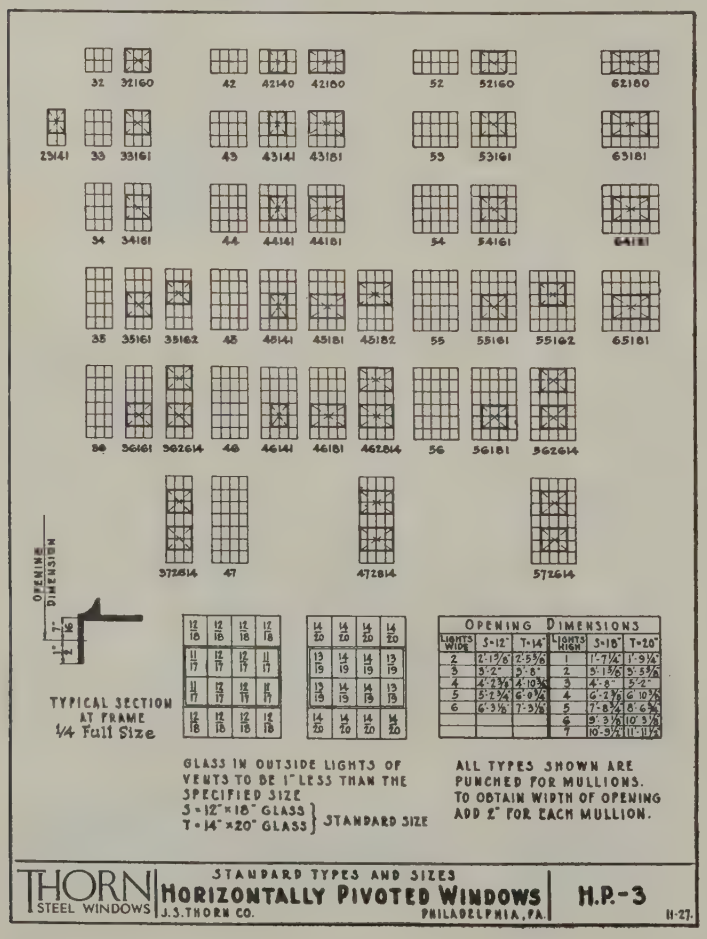
New Catalogue F-S-5 shows Thorn steel windows for industrial plants. It will be sent on request.

Thorn Pivoted Windows

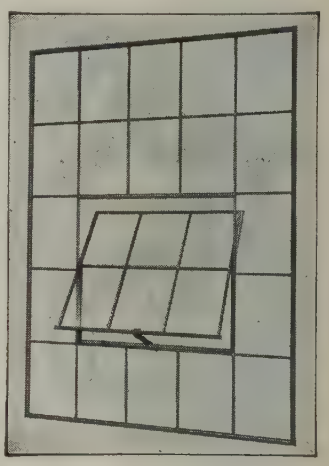
Designed for use in all types of industrial buildings and constructed of solid steel sections 1⅜ in. deep. They are of substantial construction having all muntin joints welded. Ventilators are double weathered and hung on strong steel butts. Thorn windows are given one good priming coat of gray enamel at factory but should receive two coats of paint after erection.

Standard windows are furnished only in 12x18 and 14x20-in. glass sizes, except in the lights of vents where it is 1 in. less on each outside edge.

Standard windows may be combined to form a great variety of widths and are made with uniform punching in the jamb members to match the slots in the standard mullion bars. Any combination of standard units may be obtained by joining them together with standard mullions. For heights greater than obtainable with standard units they may be joined with horizontal mullions.



Underwriters' Type — The Underwriters' label can be furnished when specified and as an extra. No unit shall exceed 7x12 ft. and ventilators shall not exceed 4x5 ft. No more than two vents shall be in a single window unit. Ventilators must be pivoted above center. Ventilator hardware must conform to rules of local board.



Thorn Pivoted Window

Thorn Projected Windows

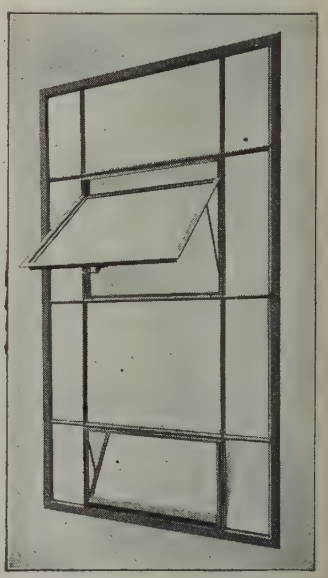
Economical office windows for industrial buildings, offices, schools, hospitals, etc., where screens and shades are necessary. Made of the same steel members and the same welded construction as Thorn pivoted windows.

They are made in commercial and architectural designs. The commercial type contains equal lights of 12x18 or 14x20-in. glass and are similar to pivoted window standards. The architectural type are made with combinations of large and small lights similar to typical window shown.

They are fitted with bronze shoes with friction adjustment which slide up and down in the stationary jamb members of the vent openings as the ventilator is closed and opened. These friction shoes together with the steel side arms attached to each ventilator hold the vent in any position.

Projected windows may be combined by the use of mullions the same as pivoted windows.

Underwriters' Type — Underwriters' label can be furnished on commercial projected windows only. Size limits are the same as for pivoted windows and vents must open out.

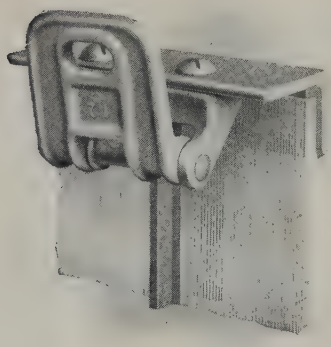


Thorn Projected Window

Thorn Continuous Windows

For use in roof construction. When properly incorporated in roof design they will perfectly daylight and ventilate buildings of great widths and lengths, increasing the efficiency of the workers and the quality of the product.

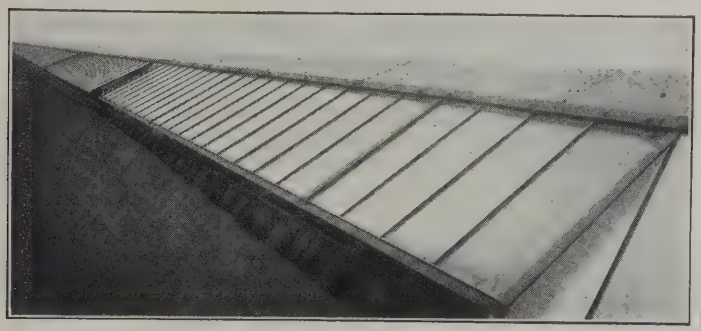
Continued on next page



Thorn Malleable Hinge

Controlled by long lines of the powerful Thorn tension operator they are particularly effective in quickly carrying off smoke, gases, etc. They form a great glass awning when open, the unbroken line of steel and glass permitting ventilation regardless of weather conditions. Stationary storm panels will be provided at the ends when ordered.

The continuous window is made of a series of window units connected together. Each unit is ruggedly built of heavy one-piece steel members. The windows are hung on heavy malleable iron, free movement hinges.



Thorn Continuous Windows

Whenever possible, continuous windows should be erected only by experienced men. We maintain a field organization to do this work and if erection is a part of the contract we assume full responsibility for a satisfactory installation.

Flashings, when necessary at head, sill and jambs of openings or gaps in the window lines, should be furnished by the contractor for the sheet metal work. They are not included with the windows.

Thorn Window Operators

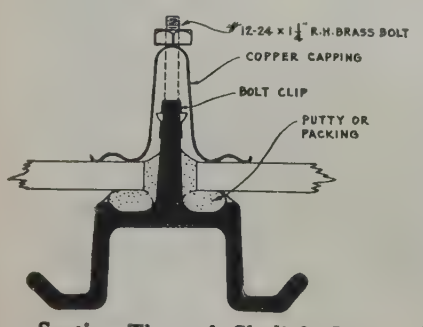
Made in two types, tension operators and torsion operators.

Tension Operator—Is designed for long and heavy lines of windows. It is a smooth working mechanism free from friction. Practically the entire load is carried by compound lever arms, eliminating strain on the tension line. Made for manual or motor operation.

Torsion Operator—Is for short runs of ventilators. Consists of a revolving shaft to which are attached pressed steel arms which have a connecting link attached to the ventilators. Made for chain or pipe operation.

Thorn Steel Skylights

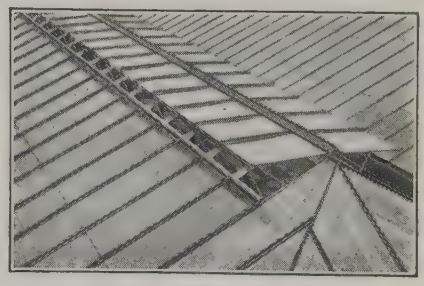
Composed of a series of heavy rolled steel bars of special design. These bars provide permanency and strength in skylight construction and have made possible glass roofs of vast areas. The bar provides wide glass rests which permit extreme expansion and contraction. It also provides wide gutters to carry off large amounts of condensation. Bars can be furnished in a single length of 30 ft. and roof purlins may be spaced as much as 8 ft. without danger of sag.



Section Through Skylight Bar No. 30

Parts of the bar subject to elements from within, such as steam, gases, etc., are accessible for painting without disturbing the skylight in any way. Portions of the bar above the glass are covered with a pressed metal cap of galvanized iron or copper and attached by brass screws.

Thorn skylights may be entirely fixed or arranged with a ventilating section operated by a Thorn torsion operator.



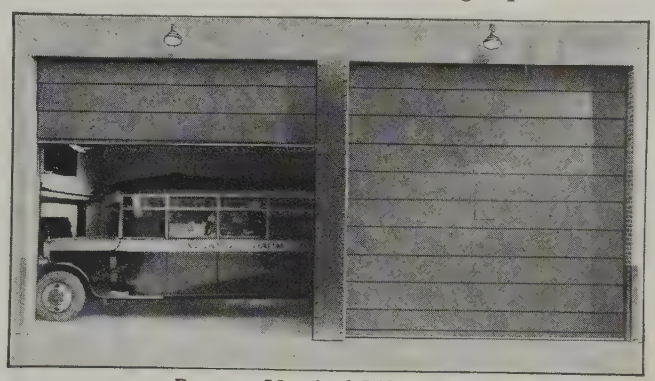
Thorn Steel Skylight

Burvett Vertical Lift Doors

The improved Burvett Vertical Lift Door, manufactured by J. S. Thorn Company, is, we claim, the most modern development in steel door construction and fills a long-felt need for a sturdy, burglar, fire and weather proof barrier that operates with the utmost simplicity, requires no wall space, and on which the cost of maintenance is extremely low.

The limitations of other types of doors used in the past have been fully overcome in this new design.

It is built of a series of 16 gauge steel plate interlocking panels, which lift vertically, telescoping into a compact group to the height of a single panel and require a head clearance of about only 22 in. when completely raised. The door is raised by means of a hand chain or motor power, turning a grooved spiral drum and winding two lines of heavy steel cable attached to the bottom plate panel.



Burvett Vertical Lift Doors

When operated by hand, or by a one-way motor, it is lowered by lightly pulling a hand chain attached to a brake lever, disengaging the clutch and permitting the door to lower by gravity and being checked by counterweights.

As each section lowers, lugs attached to the extreme ends of the panels are forced by heavy flat springs attached to the bottom panel into pockets formed in the heavy channel jamb guides, hold each panel securely and allow only a slight deflection under extreme wind pressure.

The bottom panel is equipped with two plungers, which automatically lock the door when fully closed.

The great utility of this door, and the ease with which the plates can be removed and repaired, make it particularly desirable for warehouses, piers, freight stations, loading platforms, garages, factories, aeroplane hangars, and buildings of similar character, for it is built to stand hard usage.

J. S. THORN COMPANY

Manufacturers of Solid Steel Casement Windows

Allegheny Avenue and Twentieth Street, PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y. CHICAGO, ILL. BOSTON, MASS.

Products

THORN STANDARD RESIDENCE and MANOR TYPE CASEMENTS and DOORS for residences, apartments, dormitories, etc.

THORN COTTAGE CASEMENTS.

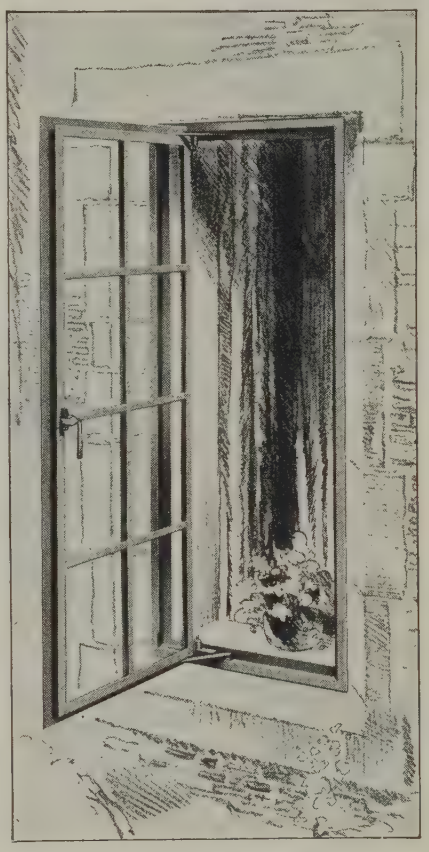
THORN MEDIUM and HEAVY TYPE CASEMENTS—Side Hung and Projected.

For other Sash Products, Sash Operators and Vertical Lift Doors, see pages A1294-1295.

Thorn Standard Residence Type Casements

Produced in standard sizes, made of specially rolled solid steel casement sections of substantial weight, and designed to produce a most rigid construction. At all corners the sections are mitered, electrically butt-welded and ground to a smooth finish. Steel muntins have a 5/8-in. face and all intersections are flush and electrically welded. All casements are accurately made, carefully fitted and when properly installed in the building are weathertight under all conditions. Casements are equipped with Thorn solid bronze straight handles and strikes, and Thorn cleaning hinges of solid bronze.

Thorn Cleaning Hinge—A new type sliding hinge of solid bronze for Thorn solid steel casements, which, when closed has the appearance of an ordinary butt hinge and, when open, permits cleaning of the glass from the inside. Not only is the unsightly extension or offset hinge eliminated, but also the sill adjusters, as the Thorn sliding hinge, with friction adjustment, holds the casement securely, top and bottom, in any position.



Thorn Residence Casement

Advantages—Thorn metal casements are of the finest quality and create an architectural appearance which can not be obtained by the use of wood windows. They have all the advantages of double hung windows and, in addition, they provide 100% ventilation. They control ventilation by conducting breezes into the building and to a certain extent will exclude rain while the windows are open. They are economical, costing no more than a good quality wood casement and are more reasonable in price than double hung windows. They need not be weatherstripped because of their watertight construction. They can not warp, shrink, or swell as do wood windows.

Thorn Cottage Casements

Thorn Cottage Casements are for use in the more modest homes where economy must be exercised, and the allowance for windows will not permit the use of the Thorn Residence and Manor types.

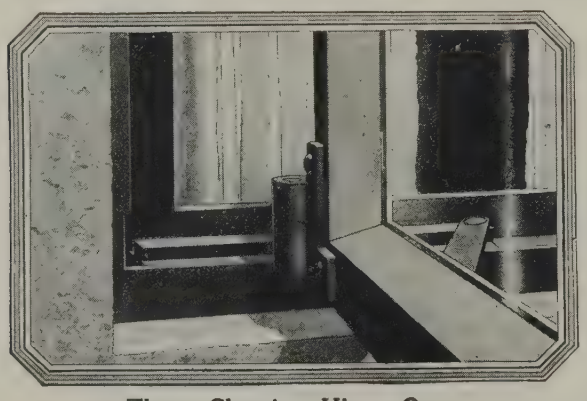
The general construction is similar to the Thorn Residence type, although steel sections of lighter weight are employed, and they are fitted with iron fasteners, sill adjusters and extension hinges to permit glass cleaning from within.

They can be furnished with bronze fittings, combination iron and bronze friction cleaning hinges or with a type of under-screen operator at an extra cost.

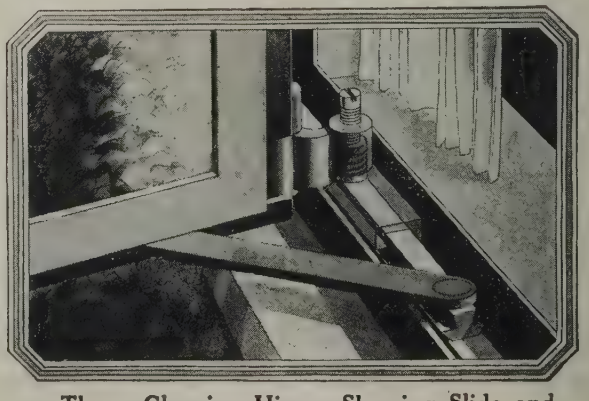
Catalogues

Thorn Casements for Residences and Apartments—R.C-4, M.C-1 and C.C-1.

Thorn Medium and Heavy Type Casements—M.H-1.

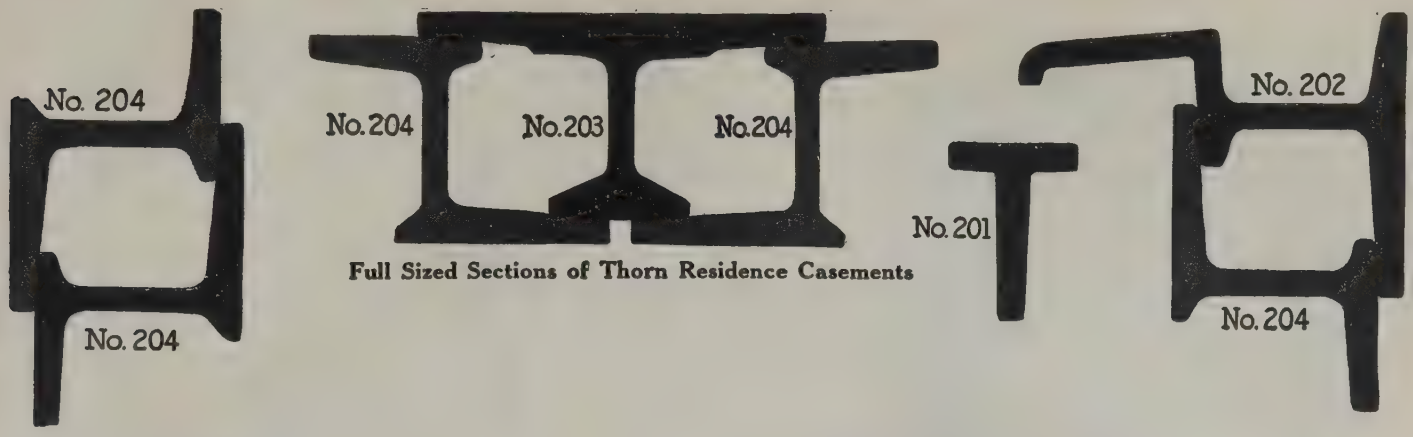


Thorn Cleaning Hinge Open



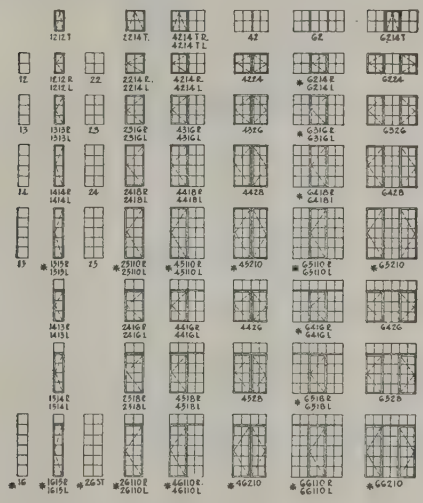
Thorn Cleaning Hinge, Showing Slide and Friction Adjusting Screw

Continued on next page



Full Sized Sections of Thorn Residence Casements

STANDARD RESIDENCE AND COTTAGE TYPES –



EXTERIOR ELEVATIONS

CH2 CH1

UNITS MARKED "T" PROJECT OUT AT BOTTOM
UNITS MARKED "R" AND "L" ARE SIDE HUNG TO OPEN OUT AS INDICATED
A TRANSOM HINGED AT TOP IS INDICATED THUS ☒
A WINDOW HINGED AT LEFT SIDE (from Inside) IS INDICATED THUS ☒ AND AT RIGHT SIDE THUS ☒
* UNITS MARKED THUS NOT FURNISHED FOR COTTAGE TYPE CASEMENTS

CASEMENT SIZES

RESIDENCE TYPE - RS			COTTAGE TYPE - CG		
No. Of Lights	Unit Width	Unit Height	No. Of Lights	Unit Width	Unit Height
1	11 3/16"	—	1	1' 1⅛"	—
2	1'-8"	2'- 1½"	2	1'- 7⅜"	2'- 3½"
3	—	3'- 0 15/16"	3	—	3'- 3½"
4	3'- 3"	4'- 0⅛"	4	3'- 1½"	4'- 3¾"
5	—	4'- 11 7/16"	5	—	5'- 4"
6	4'- 10"	5'- 10¾"	6	4'- 7½"	—
CH 1	1'- 8"	1'- 2 3/16"	CH 1	1'- 7⅜"	1'- 1 5/16"
CH 2	3'- 3"	1'- 11 3/16"	CH 2	3'- 1½"	1'- 10 5/16"

ADD ¼" TO SIZES NOTED FOR CLEAR OPENING DIMENSION

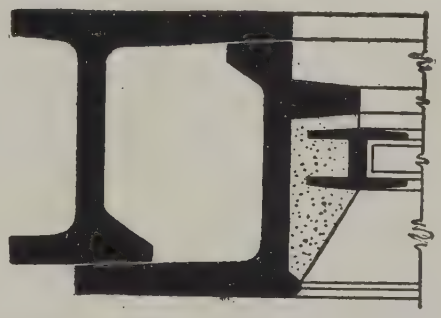
Thorn Manor Casement Windows

A standardized casement of the finest quality combining the very best of materials and workmanship.

The design of the sections incorporates refinements of the most minute nature to gratify architectural desire for a sturdy, well made casement, particularly adapted to leaded glass with neat, narrow sight lines and short putty bevels.

The famous Thorn Hinge, strong, pleasing to the eye and unequalled in performance, is standard equipment.

The "Manor" is an accomplishment in steel window craft befitting the finest architecture.



Full Size Section of Thorn Manor Casements

Thorn French Casement Doors

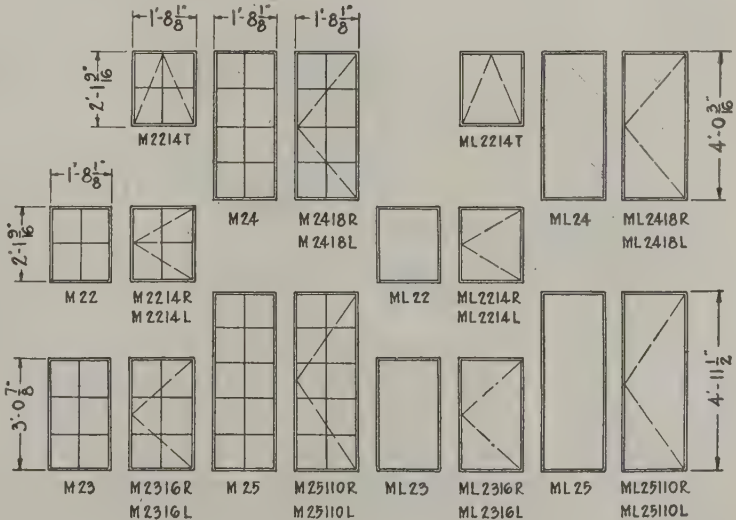
The very finest of materials and the highest quality of workmanship are incorporated in the standard Thorn French Casement Doors. They are made of heavy casement sections solidly welded at the corners, and the lower section of the door is arranged with a small kick panel of furniture steel. The sill of the frame is a heavy extruded bronze threshold riveted and brazed into the jamb members. They are fitted with beautiful bronze hardware including cremone bolts and friction adjusters at the head and receive two coats of gray enamel, oven dried, before leaving the factory.

The standard type is made to fit an opening 3 ft. 7¾ in. x 6 ft. 10 3/16 in. and can be arranged to open in or out.

Thorn Manor Casement Doors

We also manufacture a more economical door known as the *Thorn Manor Casement Door* composed of sections adapted to putty glazing. This door is made with standard steel frame section at the sill and is fitted with head and foot bolts and bronze handles.

STEEL MUNTIN TYPES LEADED GLASS TYPES



EXTERIOR ELEVATIONS

ALL UNITS ARE INDICATED AS RIGHT HAND

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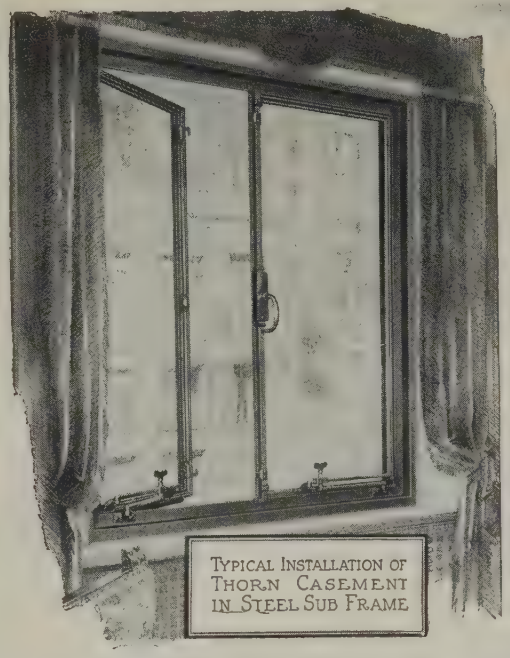


TYPICAL INSTALLATION OF THORN CASEMENT IN STEEL SUB FRAME

Thorn Medium and Heavy Type Metal Casements

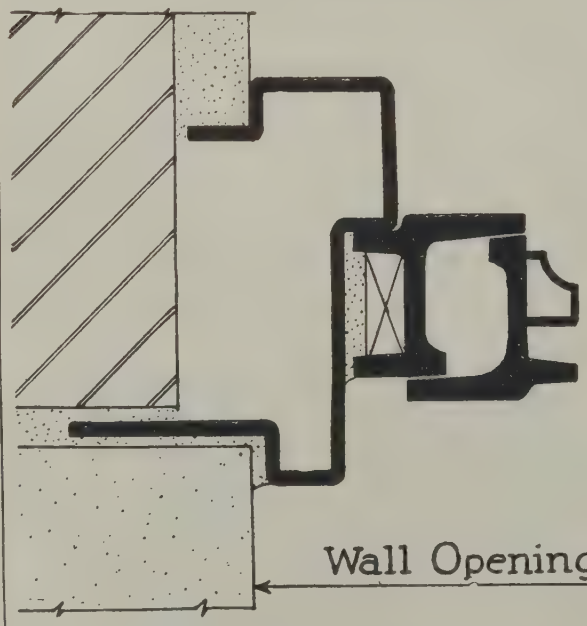
For use in more elaborate residences, churches, banks, office buildings, etc. Constructed of heavy 2-point specially rolled steel casement section. Constructed with the same care and accuracy as Thorn light casements. Glazing may be provided for by the use of putty only or glass may be held in place with drawn steel glazing beads which are accurately mitered at the corners and held in place with brass oval head screws. Solid bronze hardware is used throughout.

Where desired, Thorn medium and heavy type metal casements may be provided with a pressed metal subframe which is built in and the casements placed after openings are prepared.

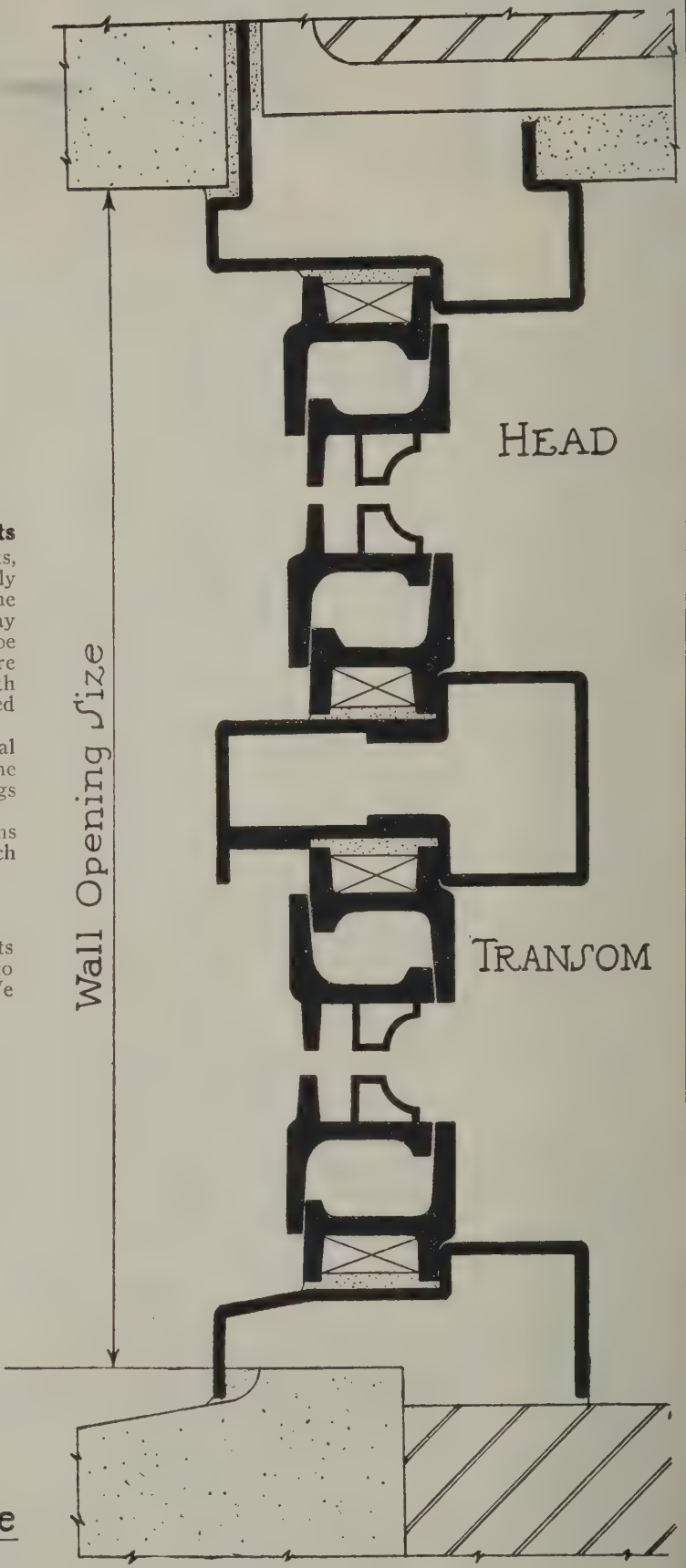
Made to open outward or inward. These larger sections lend themselves admirably to the construction of French casements.

Architectural Service

In designing buildings in which Thorn metal casements are to be installed, it is always well to detail the openings to receive the windows after masonry work is completed. We will at all times be glad to co-operate with architects, owners and builders in the proper preparation of details and will forward on request our booklet covering usual installation conditions for Thorn standard units.



JAMB



One-half Full Size

THORN CASEMENTS

DETAILS OF HEAVY TYPE CASEMENTS

THORN CASEMENTS

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Building Products Including Steel Windows and Mechanical Operators

EXECUTIVE OFFICES AND PLANT
YOUNGSTOWN, OHIO

Warehouses and Offices in All Principal Cities, see Local Telephone Directory

Products

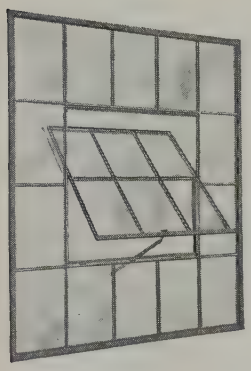
Truscon manufactures a complete line of STEEL WINDOWS for industrial, commercial, public and residential buildings. Also Manually and Electrically Controlled OPERATORS for all ventilating requirements.

TRUSCON STEEL WINDOWS

For other Truscon Products, see pages in this edition as follows:

Concrete Reinforcement, page A151; Steel Roof Decks, page A213; Steel Joists, page A674; Steel Doors, pages A986-987; Metal Lath, pages B1704-1705.

TRUSCON HORIZONTALLY PIVOTED STEEL WINDOWS



Horizontally Pivoted Window

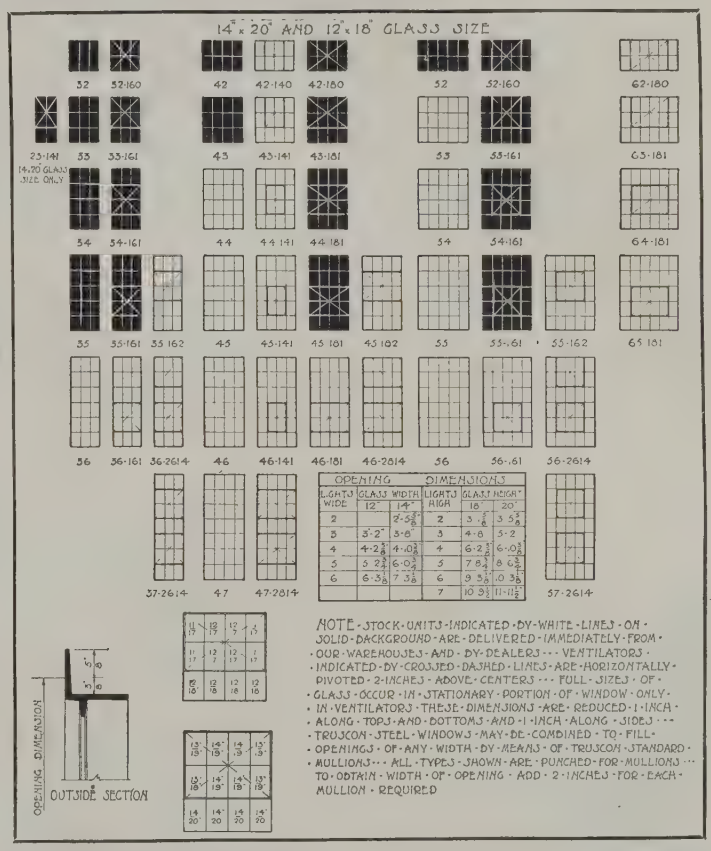
Description

Recommended for use in factory buildings, warehouses, public and private garages, store and loft buildings, inexpensive schoolhouses, gymnasiums, and other structures where economical steel windows are required.

Made of heavy hot rolled copper steel sections. The outside section is of angle shape to allow 5/8-in. anchorage at the masonry or mullion connection. The intersections of the horizontal and vertical members are dovetail mitres, rigidly interlocking the bars. Double contact weathering is provided on all four sides of the ventilators.

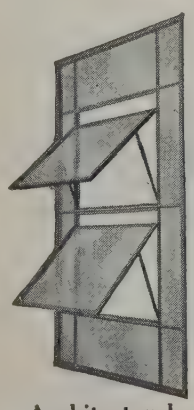
Sizes

Horizontally pivoted steel windows are furnished in various sizes to fill practically all building needs. The diagram shows the fifty standard types, available in either 14x20-in. or 12x18-in. glass size. Stock units, indicated by white lines on black background, are available for immediate delivery from any of our warehouses and from dealers' stocks. They can be combined with standard mullions to fit practically all sizes of window openings.



TRUSCON PROJECTED STEEL WINDOWS

In buildings having no provision for ventilation other than the natural clearing off of vapor, smoke and stale air through the windows, Truscon Projected Steel Windows are the most practical and efficient sidewall windows available. They can be kept open in all kinds of weather and at any desired angle. Their tilted ventilators, while acting as deflectors of the elements, effect a continuous change of air, at the same time eliminating direct drafts and protecting the interior of the building against damage from driving rains or snows. These windows are made in sizes to meet all ordinary building requirements and in two types as described below.



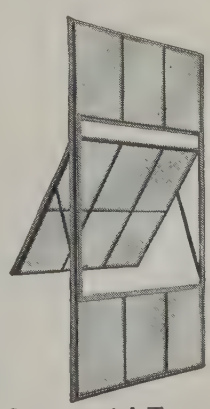
Architectural Type, Projected Steel Window

Architectural Type

The architectural type of Truscon Projected Window emphasizes proportion as well as practicability. In keeping with the greater suggestion of massiveness to be found in most monumental buildings, its outside frame is a heavy channel. All corners of the frame are welded and ground. The ventilators are formed of hot-rolled angle members. This adds greatly to their appearance and strength and results in greater resistance to corrosion through the elimination of needless joints and cracks. Glazing angles improve the general appearance as does also the practice of using large glass lights.

Commercial Type

Where plain design and economy are the keynote of the construction, Truscon Commercial Projected Windows should be specified in place of the architectural type. While the essential features of each are identical, the commercial type can be furnished at lower prices, as a result of standardization and volume production. On account of the fact that glass sizes of the commercial type are the same as those used in pivoted windows, commercial projected windows can be used in the office section of an industrial plant with complete conformity to the general external design. These windows are also very popular in buildings such as schools, garages, filling stations, printing shops, warehouses and so on.



Commercial Type, Projected Steel Window

Continued on next page

TRUSCON CONTINUOUS STEEL WINDOWS

Types

Truscon manufactures continuous steel windows, in top hung, bottom hung and center pivoted types, or combinations thereof, for use in "A" frame, monitor, sawtooth, valley roof or sidewall construction. Windows of this type, used in conjunction with mechanical operators, afford the most efficient means of daylighting and ventilating industrial buildings.

Truscon Continuous Steel Windows are manufactured entirely of copper bearing steel, making them highly resistive to the corrosive influences of gases finding their escape through the roof openings in the factories of many industries.

Exclusive Construction Features (See Plate)

Top Rail—Is an extra heavy, specially designed hot rolled channel section, one leg of which rests in the continuous hook section of the hinge member, insuring positive weathering and ease of operation.

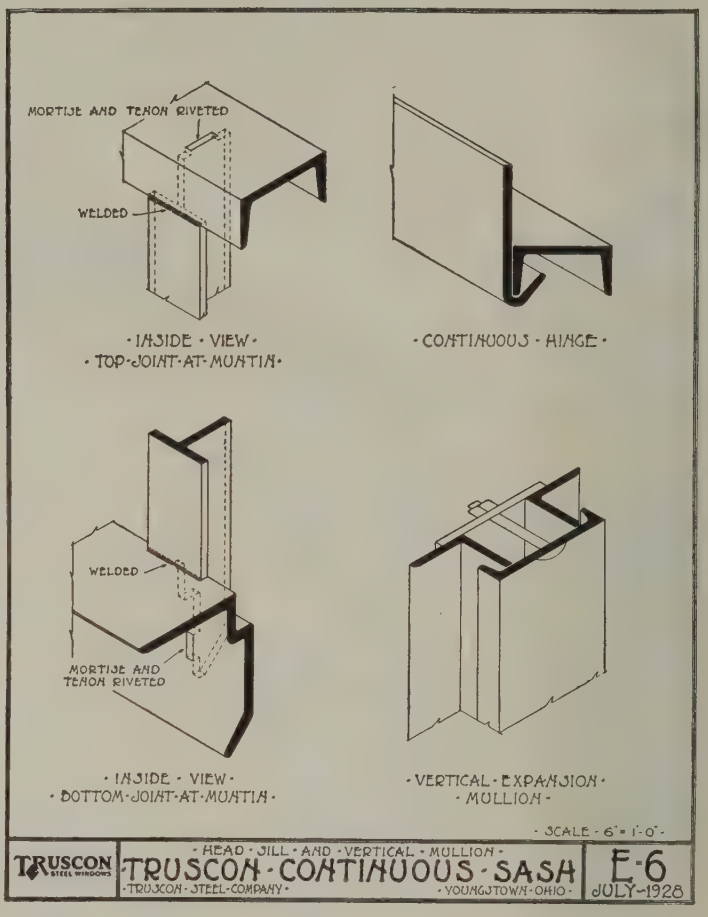
Continuous Hinge—Is a patented feature which insures straight alignment, positive weathering and complete freedom for expansion and contraction, eliminating glass breakage and preventing damaging strains on the sash.

Bottom Rail—Is a heavy hot rolled section, specially designed to give the required strength between points of support and to bring the glass flush with the outside face of the sash to insure perfect drainage whether the window is open or closed.

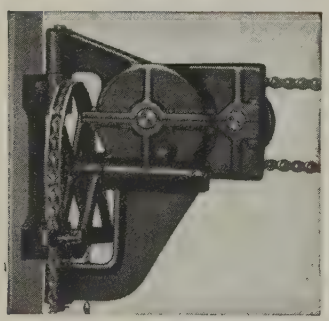
Vertical Muntins—Are heavy T-sections securely joined to the top and bottom rail by mortise and tenon joints, air hammer riveted and securely welded, making these windows the strongest and most rigid on the market.

Sizes

Truscon Continuous Steel Windows are made in standard heights of 3, 4, 5, and 6 ft., in runs of any length assembled from standard 20-ft. long panels in which muntin bars are spaced 2 ft. on centers. Our Engineering department will be glad to co-operate with you in the selection of the proper type for any project.



TRUSCON MECHANICAL OPERATORS

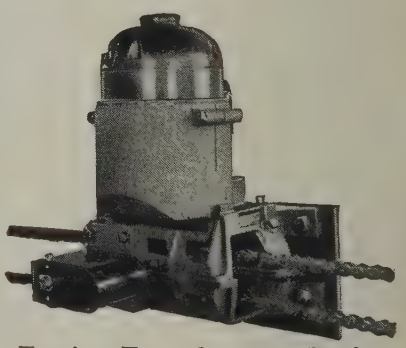


Tension Type Operator Hand Power

Truscon manufactures window operators of various types and designs for the control of either continuous or sidewall windows. They are designed for either manual or electrical control and are made in light and heavy duty types adaptable to runs of any length.

Electrically controlled types can be wired so that the opening and closing of all windows in an entire building may be directed from a central switchboard, making it possible for one man to regulate the ventilation in any part of a building by the mere pressing of a button, thus saving the time of other workmen and placing the responsibility for proper ventilation on one individual.

Truscon Mechanical Operators are simple in design, mechanically right, dependable, smooth running and permanent. The Truscon engineering department will gladly help you in the selction of operators for any project, giving a complete and thorough analysis based on your individual requirements.



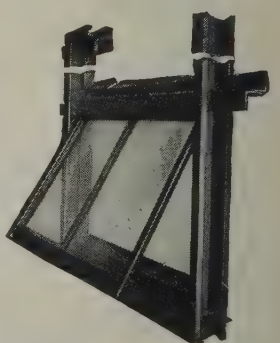
Tension Type Operator Duplex Power

TRUSCON POWERHOUSE STEEL WINDOW FRAMES

Section of Structural Steel Frame

The daylighting and ventilating of powerhouses is today effected through the medium of either continuous window panels or pivoted or projected type windows arranged vertically in multiple units. Where these panels are of great height, as is ordinarily the case, it is necessary, both from a structural and an architectural standpoint, to set these windows in heavy steel frames.

Truscon supplies two types of frames for this kind of work—an economical frame built up from structural steel sections and an ornamental pressed steel frame. The pressed steel frames are welded at all construction joints and the corners are reinforced. Both types of frames are made in any size to fit any special requirements of design.



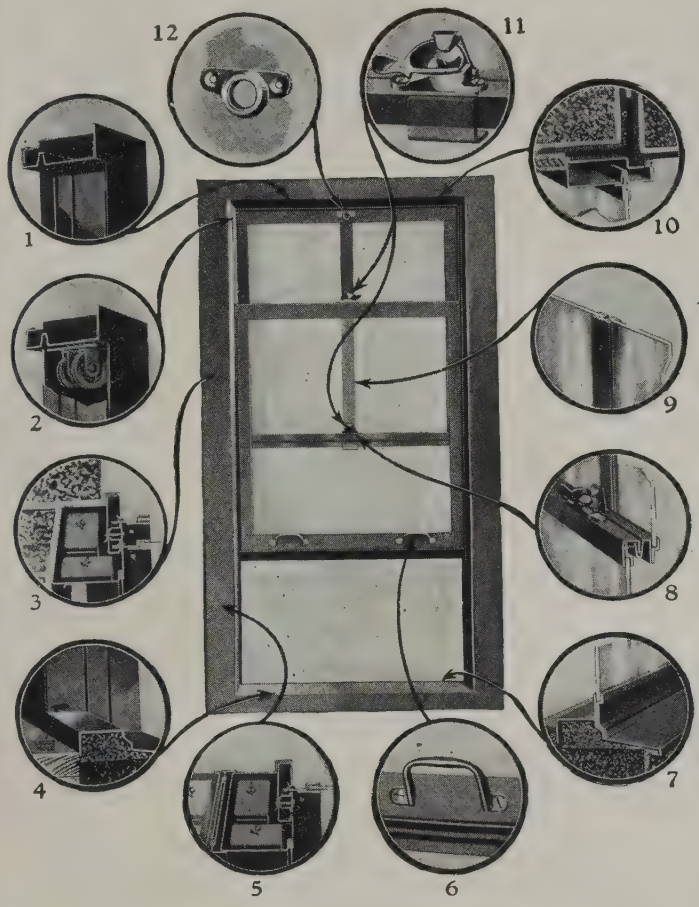
Section of Pressed Steel Frame

Continued on next page

TRUSCON DOUBLE HUNG STEEL WINDOWS

Model No. 28—Counterweighted

A moderately priced, solid steel, plate type, double hung window for use in hotels, office buildings, hospitals, schools and similar buildings. It is neat in appearance, smooth in operation, and rigid in construction. Heavy steel sections, electro-galvanized, make it a most durable window, while careful design and proper weatherstripping make it weathertight to a high degree.



Construction Details and Hardware Model No. 28

(1) *Section through head of frame* showing one-piece channel construction with recess to receive upper sash rail; staff mould formed from two thicknesses of metal and head cover welded to frame section.

(2) *Cut-away view of jamb frame* showing bronze-bushed, pressed steel chain pulleys that turn on hardened steel pins in heavy, pressed steel housings. Pulleys are deeply grooved to prevent sash chains from rolling off.

(3) *Section through jamb* illustrating the dual function of the jamb frame as weight box and sash guide. A removable weight-pocket-cover-plate extending from sill to head makes the weights easily accessible and a light metal parting strip between the weights prevents them from becoming twisted or locked together. Sash parting stop is adjustable and held in place with one line of sherardized screws. Proper weathering is secured through spring bronze weatherstripping attached to the sash stiles.

(4) *Concealed grout holes* at each end of sill, and back of the removable cover plate, make it easy to fill the opening under the sill with grout, thus assuring a firm and weathertight bed for the window.

(5) *T-shaped mullions* are used for joining two or more windows in a single opening and are held in place by means of concealed steel straps which eliminate all unsightly screws, bolts, nuts and other objectionable projections.

(6) *A pair of lifting handles* are tap-screwed through two thicknesses of metal to the bottom rail of the lower sash.

(7) *Sections through bottom of window* showing double contact weathering between sash and sill. Sill section of frame is formed from a single piece of steel with all offsets graduated to the outside to insure good drainage. Proper weathering is secured through spring bronze weatherstripping attached to sash rail.

(8) *Section through meeting rail* showing interlocking contact between upper and lower sash, and spring bronze weatherstripping on upper rail of lower sash. Brass weathering plates are attached to parting stops at meeting rail to assure additional weather protection. Bottom rail of upper sash is shaped to act as a drip.

(9) *Muntin bars* can be furnished horizontally and vertically to secure small glass-light effects. These are interlocked and welded at all intersections.

(10) *Section through head of window* showing adaptability of head section to any type of construction and positive contact between sash and frame. Proper weathering is secured by the use of spring bronze weatherstripping.

(11) *Combination sweep lock and pull down handle,* adjustable to secure proper contact and locking.

(12) *A pole socket* attached to the top rail of the upper sash facilitates opening and closing this sash.

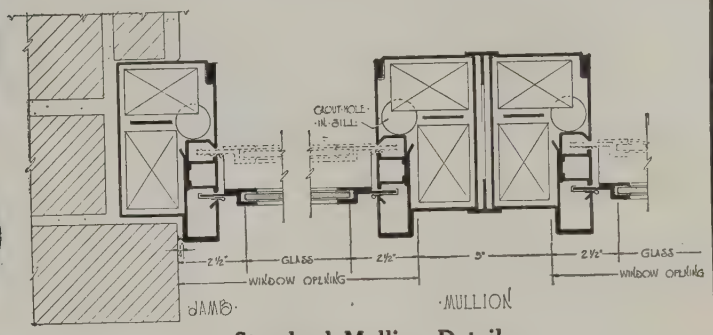
Note: Standard hardware is sherardized malleable iron. Solid bronze can be supplied when bronze hardware is specified.

Standard Sizes

Standard Sizes—Model No. 28 Double Hung Windows are furnished in widths ranging from 3 to 5 ft. and in heights from 4 to 9 ft. in increments of 6 in.

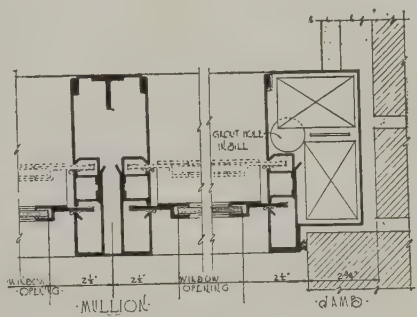
Mullions

Standard Mullions—When two or more windows are used in a single opening, they are generally connected by means of structural tees as illustrated by diagram.



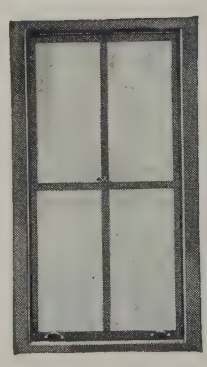
Standard Mullion Detail

Weightless Mullions—Where windows are used in pairs, in a single opening, and a narrow mullion effect is desired, weightless mullion type windows should be specified. In these, the weights and weight boxes between windows are eliminated by means of an ingenious arrangement of sash chains and pulleys which permits counterweighting of the sash from the outside jambs only. See diagram.



Weightless Mullion Detail

Underwriters' Window



Underwriters' Type

The muntins are constructed in two widths with 1¼ and 1¾-in. glazing stops; no single window can be more than 6 ft. wide or 10 ft. high and each light of glass must be limited to 720 sq. in., not less than ¼-in. wire glass. Size 1¾-in. muntins are to be used for windows with lights from 225 to 720 sq. in. of exposed glass area.

Segmental or Curved Head Units

Segmental or curved head units can be provided in almost any radii or design. The inside of this window is finished square to facilitate the use of shades and drapes, and provide for the practical approach of the sash without interfering with the exterior masonry treatment.

Continued on next page

TRUSCON DONOVAN AWNING TYPE STEEL WINDOWS

Correct Shading

Shades are attached to bottom rail of each sash and move in or out with the sash. Consequently, it is possible, by changing angle of the sash, to secure a uniform diffusion of blue skylight throughout the room and, at the same time, eliminate direct glare

Designed by John J. Donovan, a national authority on school architecture, the Truscon-built Donovan Window provides the schoolroom with properly diffused sunlight and accurate ventilation control. Its success in this field has led to the adoption of Donovan Windows for many other types of buildings, such as hospitals, offices and public structures of a similar nature.

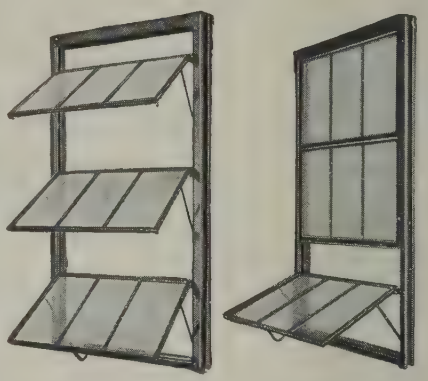
Construction and Operation

The frame opening of the Donovan Window is divided into three sash. These open outward in parallel and do not protrude into the room. Thus, in this design, the ventilating possibilities of each window are 100% of the window opening and, at the same time, can be controlled to any degree. Horizontal and downward drafts are avoided without the usual sacrifice of fresh air by deflecting all air currents upward; and the awninglike operation of the sash protects the interior against rain without necessitating the closing of the windows. Nor does shading impede ventilation, because individual shades are attached to each separate sash and the shade and sash operate as a unit.

Sizes and Types

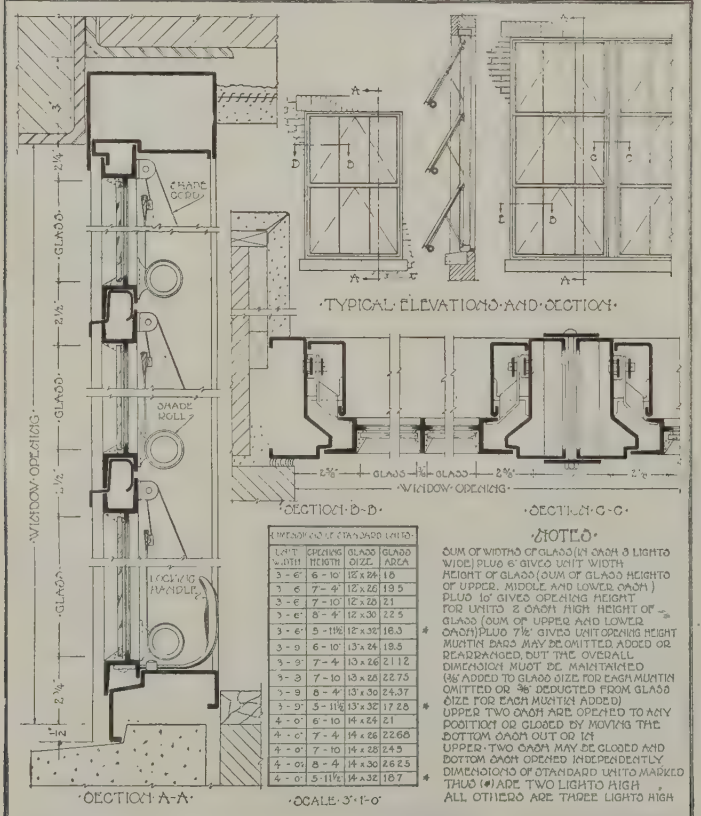
Plate P-1 below gives dimensions of all standard units including windows made with two sash instead of three. Special units, four lights high, with the top sash fixed and the three lower sash movable, as in the standard types, can be furnished when necessary.

Mechanical operators with KC movable cranks can be furnished with windows intended for use in asylums and similar institutions. (Plate P-3.)



Controlled Ventilation

One or all of the sash may be opened to any angle to deflect breezes and avoid drafts. Move the bottom sash and the upper ones open or close simultaneously; or release a catch and the bottom sash operates independently, leaving the upper sash in any desired position



WIDTH	OPENING HEIGHT	GLASS SIZE	GLASS AREA
3'-6"	6'-10"	12 x 24	16
3'-6"	7'-4"	12 x 26	19.5
3'-6"	7'-10"	12 x 26	21
3'-6"	8'-4"	12 x 30	22.5
3'-6"	5'-11½"	12 x 32	16.3
3'-9"	6'-10"	13 x 24	18.5
3'-9"	7'-4"	13 x 26	21.12
3'-9"	7'-10"	13 x 26	22.75
3'-9"	8'-4"	13 x 30	24.37
3'-9"	5'-11½"	13 x 32	17.28
4'-0"	6'-10"	14 x 24	21
4'-0"	7'-4"	14 x 26	22.66
4'-0"	7'-10"	14 x 28	24.5
4'-0"	8'-4"	14 x 30	26.25
4'-0"	5'-11½"	14 x 32	18.7

NOTES

SUM OF WIDTHS OF GLASS (IN SASH 3 LIGHTS WIDE) PLUS 6" GIVES UNIT WIDTH

HEIGHT OF GLASS (SUM OF GLASS HEIGHTS OF UPPER, MIDDLE AND LOWER SASH) PLUS 10" GIVES OPENING HEIGHT FOR UNITS 2 SASH HIGH. HEIGHT OF GLASS (SUM OF UPPER AND LOWER SASH) PLUS 7⅛" GIVES UNIT OPENING HEIGHT

MUNTIN BARS MAY BE OMITTED, ADDED OR REARRANGED, BUT THE OVERALL DIMENSION MUST BE MAINTAINED. (⅜" ADDED TO GLASS SIZE FOR EACH MUNTIN OMITTED OR ⅜" DEDUCTED FROM GLASS SIZE FOR EACH MUNTIN ADDED)

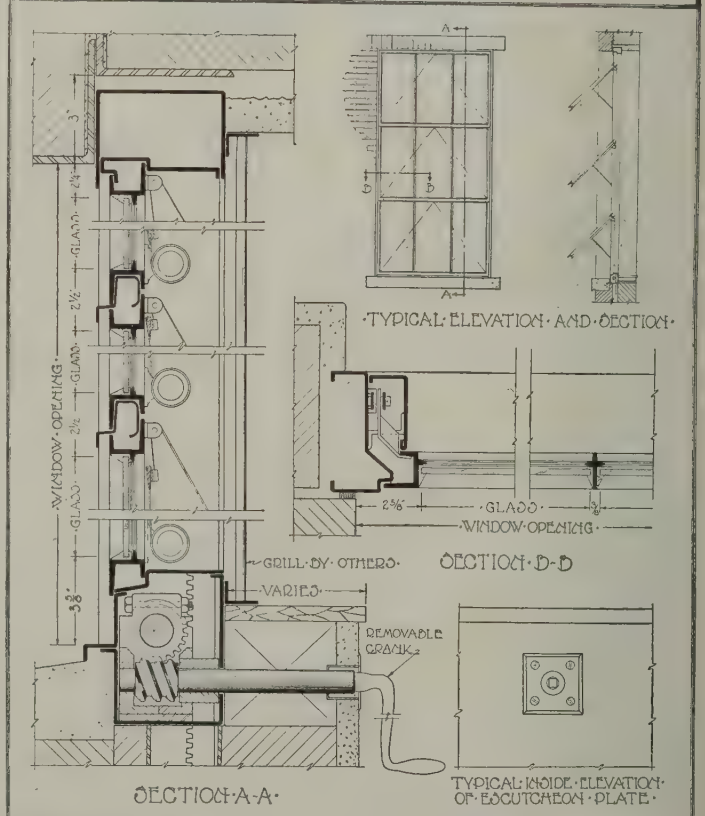
* UPPER TWO SASH ARE OPENED TO ANY POSITION OR CLOSED BY MOVING THE BOTTOM SASH OUT OR IN

UPPER TWO SASH MAY BE CLOSED AND BOTTOM SASH OPENED INDEPENDENTLY

DIMENSIONS OF STANDARD UNITS MARKED THUS (*) ARE TWO LIGHTS HIGH

ALL OTHERS ARE THREE LIGHTS HIGH

TRUSCON STEEL WINDOWS — AWNING TYPE—VENTILATORS TO OPEN OUT — DONOVAN WINDOW — TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO — P-1 JULY-1928



TRUSCON STEEL WINDOWS — MECHANICAL OPERATOR FOR INSTITUTIONS — DONOVAN WINDOW — TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO — P-3 JULY-1928

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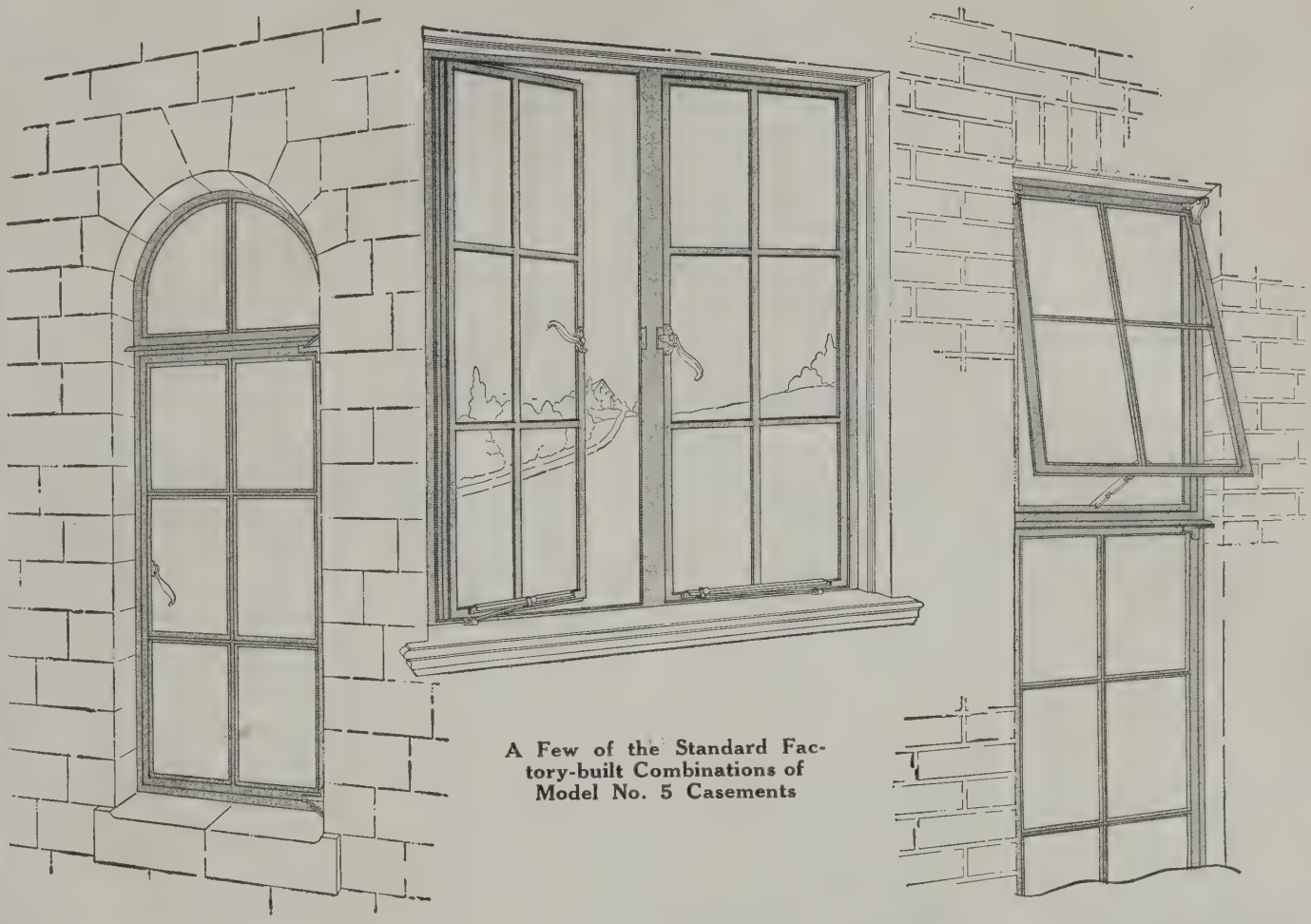
TRUSCON STEEL CASEMENTS AND BASEMENT WINDOWS



A Few of the Standard Factory-built Combinations of Model No. 5 Casements

Truscon Casement Model No. 5

The new single and one-piece combination Truscon Casements, Model No. 5, are substantial in construction, economical in application and distinctive in appearance.

Construction—Sash and frames are fabricated from specially designed hot rolled zee sections that provide a broad, double contact, positive weathering surface. All corners are mitered and electrically butt welded, making the frame members rigid and true. All surfaces of joints between muntins and sash, stiles and rails and intersections of muntins are flush both inside and out. Horizontal and vertical muntins are continuous between stiles and rails, providing further strength and rigidity.

Truscon Casements are equipped with artistically designed malleable iron hardware in a parkerized rustproofed, dead black finish. Solid bronze hardware can be furnished where desired. The use of extension hinges permits cleaning both sides of the glass from the inside.

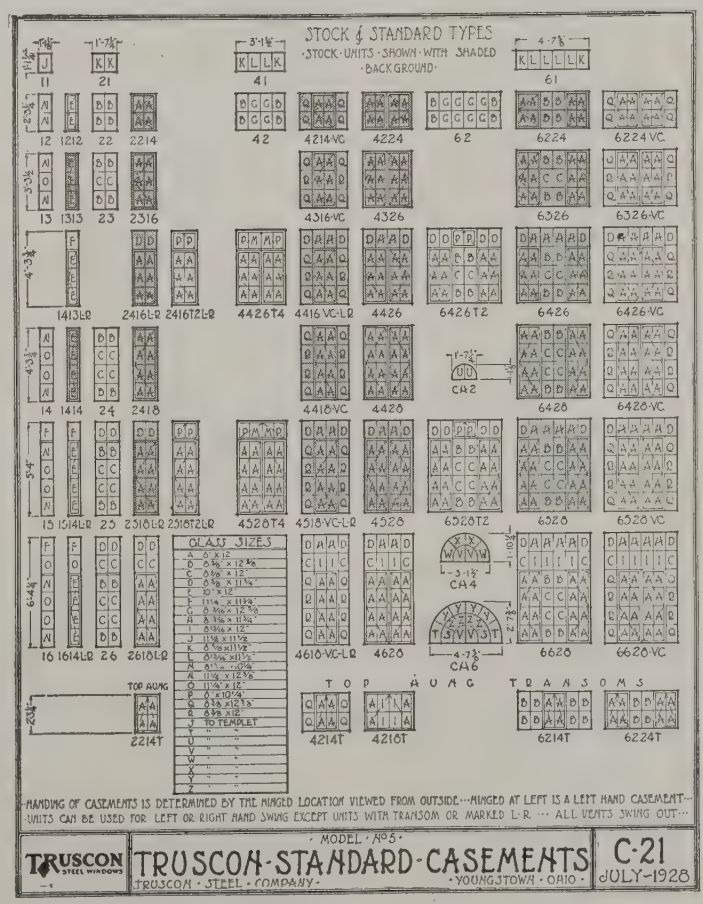
All casements are painted with a priming coat at the factory and are shipped completely assembled ready to set in the openings, eliminating a lot of costly field labor.

The accompanying plate shows the large variety of standard single, combination and transom units available for openings of any desired size or shape and for use in any type of wall construction.

Truscon Basement Windows

These steel windows for the basement, made in four standard sizes, can be installed in any type of foundation, open and close easily, are readily screened, never stick, leak or need repairs. Furnished complete ready for installation in either shop painted or hot dipped galvanized finish.

Sizes—2 ft. 9⅝ in. wide, 1 ft. 11⅛ in. high; 3 ft. 3⅝ in. wide, 1 ft. 9⅛ in. high; 2 ft. 9⅝ in. wide, 1 ft. 3⅛ in. high; 2 ft. 7⅞ in. wide, 1 ft. 11⅛ in. high.



UNITED STATES METAL PRODUCTS CO.

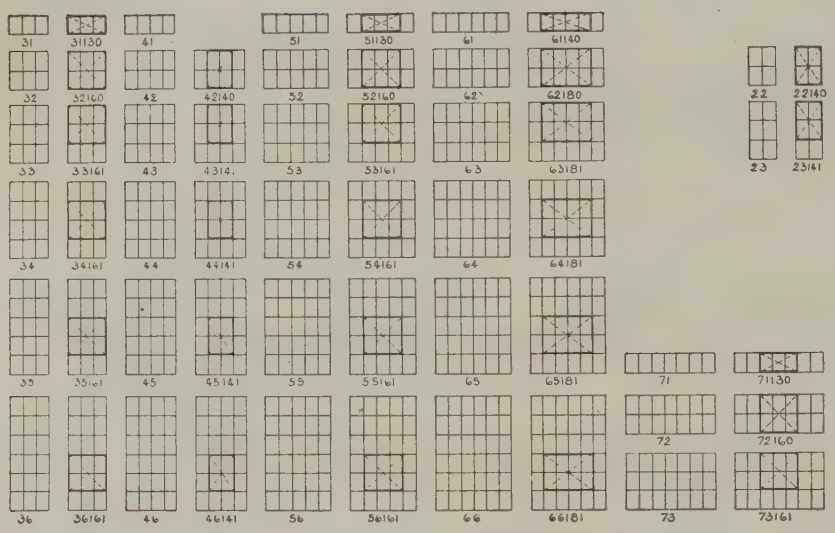
Manufacturers of Met-prod-co Steel Windows for All Purposes and for All Types of Buildings, and Saino All-metal Fire Doors

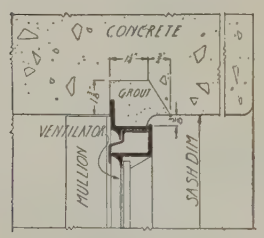
330 10th Street
SAN FRANCISCO, CALIFORNIA

AGENTS: SEE TELEPHONE DIRECTORY

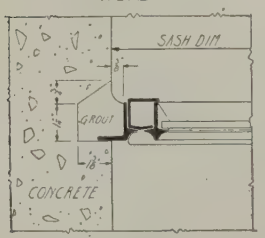
INDUSTRIAL STEEL WINDOWS

Standard Types

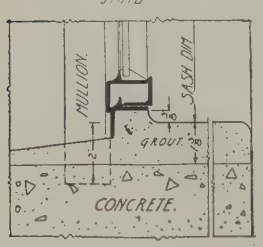




HEAD

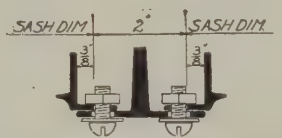


JAMB

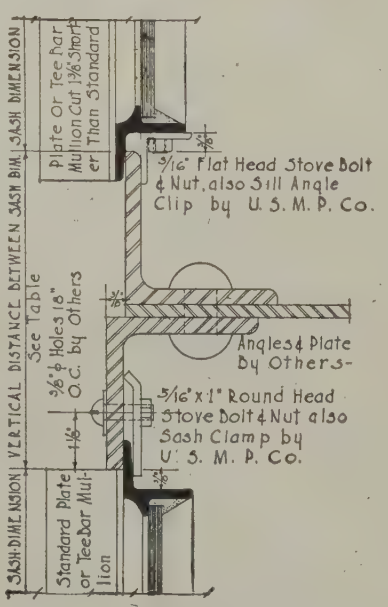


SILL

Typical Installation Details for Concrete



Vertical Mullion



Horizontal Structural Mullion

Mullions

DIMENSIONS—STANDARD UNITS

Glass Sizes		Number of Lights high
B=12″ x 18″	C=14″ x 20″	
Height	Height	
1′- 7 ¼″	1′- 9 ¼″	1
3′- 1 ⅝″	3′- 5 ⅝″	2
4′- 8″	5′- 2″	3
6′- 2 ⅜″	6′-10 ⅜″	4
7′- 8 ¾″	8′- 6 ¾″	5
9′- 3 ⅛″	10′- 3 ⅛″	6
10′- 9 ½″	11′-11 ½″	7

Any width may be had in any of above heights		Number of lights in each sash unit
Width	Width	
1′- 1 ¼″	1′- 3 ¼″	1
2′- 1 ⅝″	2′- 5 ⅝″	2
3′- 2″	3′- 8″	3
4′- 2 ⅜″	4′-10 ⅜″	4
5′- 2 ¾″	6′- 0 ¾″	5
6′- 3 ⅛″	7′- 3 ⅛″	6
6′- 6″	7′- 6″	3, 3
7′- 3 ½″	8′- 5 ½″	7
8′- 6 ¾″	9′-10 ¾″	4, 4
9′-10″	11′- 4″	3, 3, 3
10′- 7 ½″	12′- 3 ½″	5, 5
10′-10 ⅜″	12′- 6 ⅜″	3, 4, 3
11′-10 ¾″	13′- 8 ¾″	4, 3, 4
11′-10 ¾″	13′- 8 ¾″	3, 5, 3
12′- 8 ¼″	14′- 8 ¼″	6, 6
12′-11 ⅛″	14′-11 ⅛″	4, 4, 4
12′-11 ⅛″	14′-11 ⅛″	3, 6, 3
13′- 2″	15′- 2″	3, 3, 3, 3
13′-11 ½″	16′- 1 ½″	5, 3, 5
13′-11 ½″	16′- 1 ½″	4, 5, 4
14′- 9″	17′- 1″	7, 7
14′-11 ⅞″	17′- 3 ⅞″	4, 6, 4
15′- 2 ¾″	17′- 6 ¾″	3, 4, 4, 3
16′- 0 ¼″	18′- 6 ¼″	6, 3, 6
16′- 0 ¼″	18′- 6 ¼″	5, 5, 5
16′- 6″	19′- 0″	3, 3, 3, 3, 3
17′- 0 ⅝″	19′- 8 ⅝″	5, 6, 5
17′- 0 ⅝″	19′- 8 ⅝″	6, 4, 6
17′- 3 ½″	19′-11 ½″	4, 4, 4, 4
17′- 6 ⅜″	20′- 2 ⅜″	3, 3, 4, 3, 3
18′- 1″	20′-11″	6, 5, 6
18′- 6 ¾″	21′- 4 ¾″	3, 4, 3, 4, 3
19′- 1 ⅜″	22′- 1 ⅜″	6, 6, 6
19′- 4 ¼″	22′- 4 ¼″	4, 5, 5, 4

Met-prod-co Industrial Steel Windows are furnished in standard or special types and sizes, with center pivoted or projected in or out ventilators. Suitable hardware is furnished for operating the ventilators. Mullion bolts and washers are sheradized to prevent rust streaks.

Underwriter's labels can be furnished on either projected or center pivoted sidewall sash.

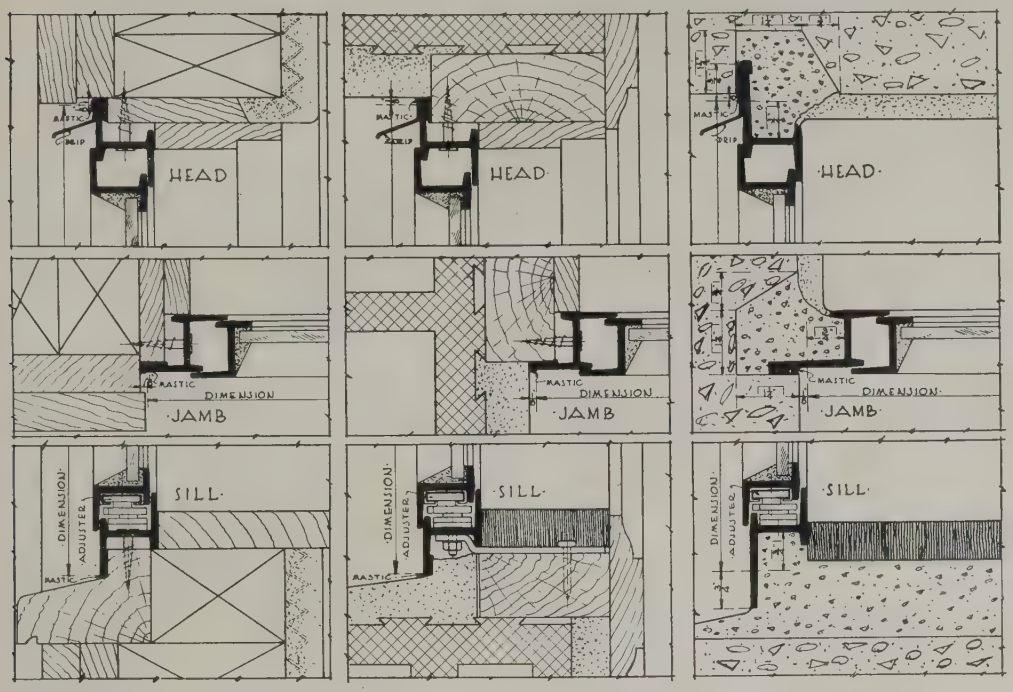
Mechanical operators can be supplied to operate groups of windows.

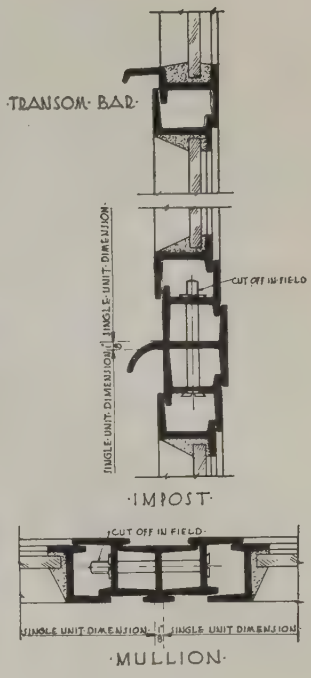
Continuous monitor sash are furnished either fixed or operated.

Continued on next page

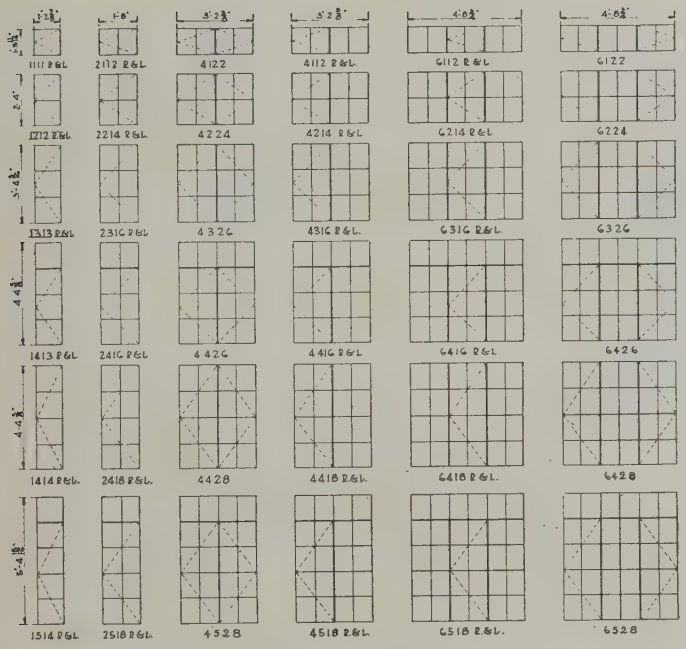
RESIDENTIAL CASEMENTS

(Note: Special Section for anchorage in masonry construction)

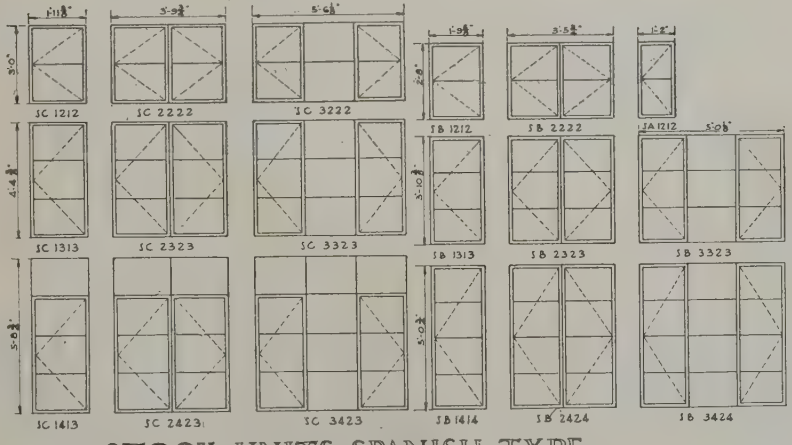




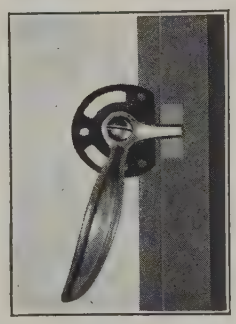
DETAILS



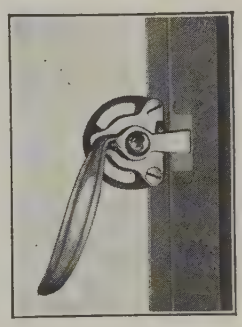
STOCK UNITS ENGLISH TYPE



STOCK UNITS SPANISH TYPE



Fastener No. 118



Fastener No. 119

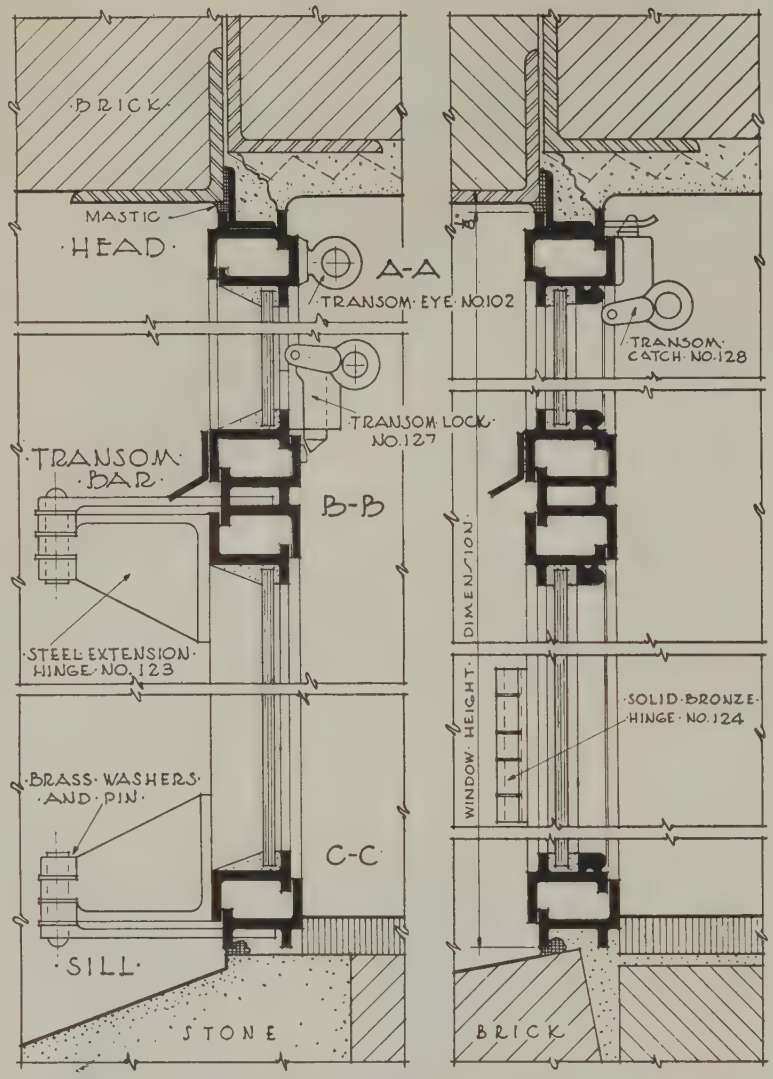
Met-prod-co Steel Casements are equipped with bronze casement fasteners as illustrated.

No. 118 furnished as standard.

No. 119 is furnished in a choice of colors and finishes at a slight additional charge.

Met-prod-co Residential Casement Windows can be furnished in standard or special sizes and designs. Hardware consists of either extension cleaning hinges or reversible fixture solid bronze casement fasteners and strike, and special rust-proof automatic adjuster built into head member so as not to project inside of window. Adjusters are furnished at both head and sill of windows over 3 ft. 6 in. in height.

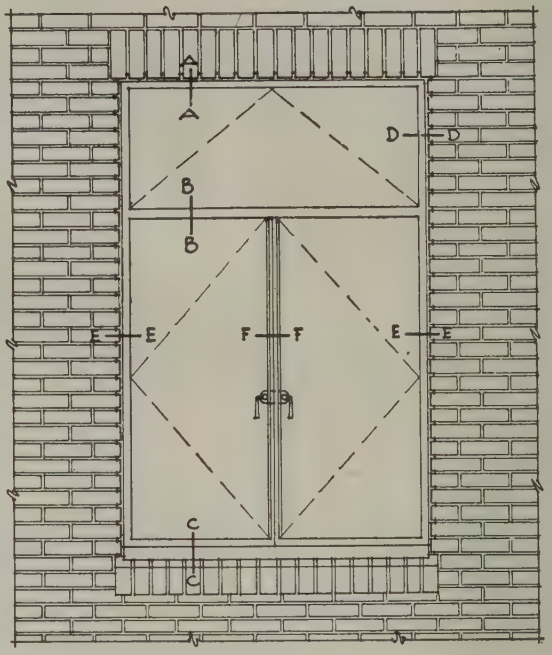
Continued on next page



·SECTION·WITH·PUTTY·OUTSIDE· ·EXTENSION·HINGE· ·AND·PROJECTED·OUT·TRANSOM·

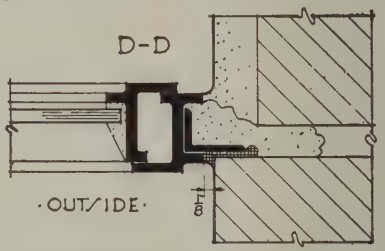
·SECTION·WITH·GLAZING·BEADS· ·BRONZE·BUTTS· ·AND·PROJECTED·IN·TRANSOM·

[GLAZING·BEADS·EXTRA]

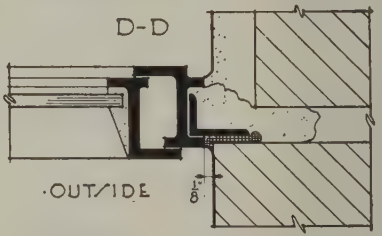


·TYPICAL·EXTERIOR·ELEVATION·

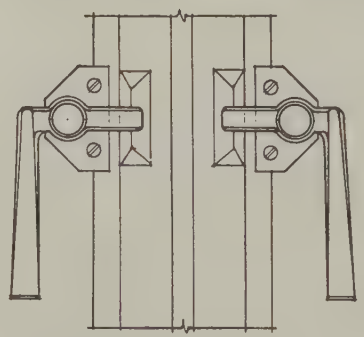
·JAMB · SECTIONS



·FOR·PROJECTED·IN·TRANSOM·



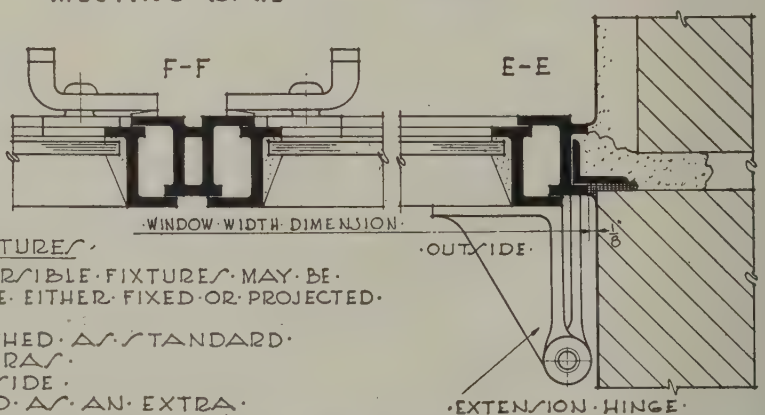
·FOR·PROJECTED·OUT·TRANSOM·



·CASEMENT·FASTENER·NO.122

·SCALE·
·ONE-FOURTH·FULL·SIZE·

·MEETING·RAIL·

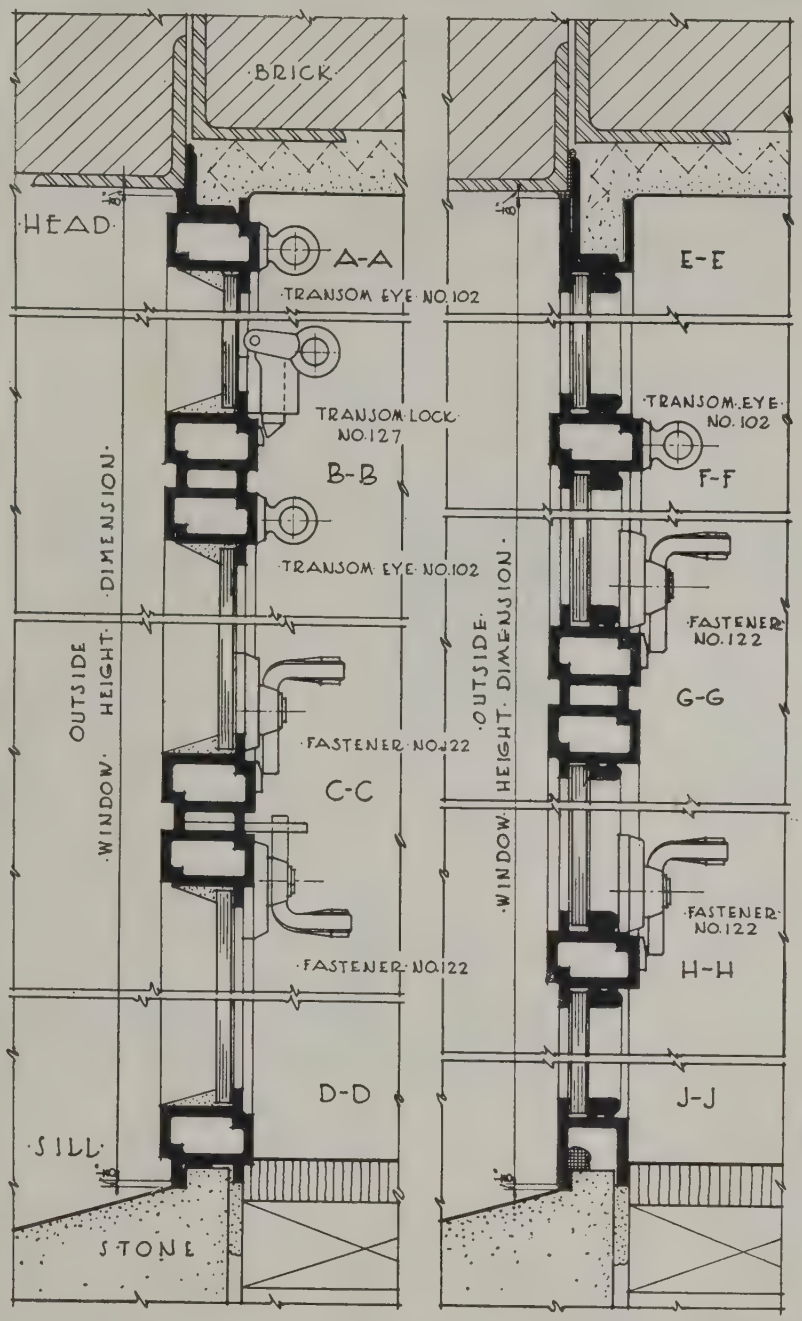


·STANDARD·FEATURES·

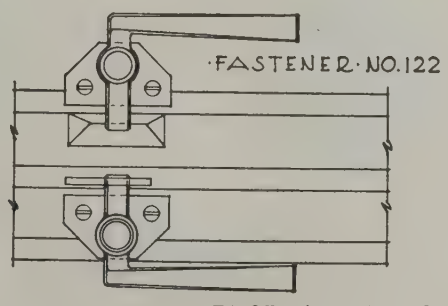
·CLEANING·HINGES·BRONZE·BUTTS·OR·REVERSIBLE·FIXTURES·MAY·BE·
·USED·WITH·CASEMENTS· TRANSOMS·ARE·EITHER·FIXED·OR·PROJECTED·
·AS·SPECIFIED·
·BRUSHED·BRONZE·HARDWARE·IS·FURNISHED·AS·STANDARD·
·OTHER·FINISHES·ARE·FURNISHED·AS·EXTRAS·
·PUTTY·GLAZING·IS·DONE·FROM·THE·OUTSIDE·
·METAL·GLAZING·BEADS·ARE·FURNISHED·AS·AN·EXTRA·

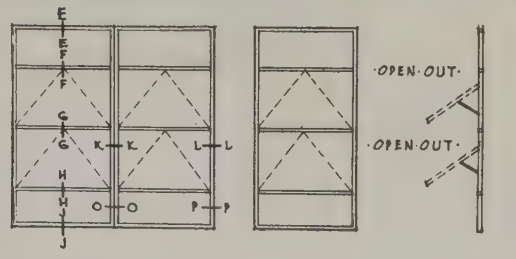
MET-PROD-CO	HEAVY·TYPE·CASEMENTS	DRAWING No. H.C.9

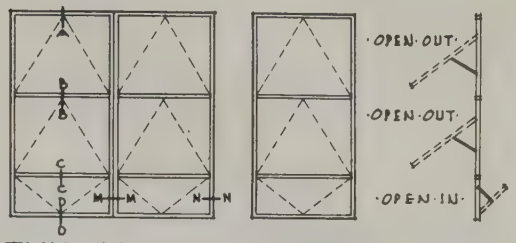
Continued on next page



·VERTICAL · SECTIONS·





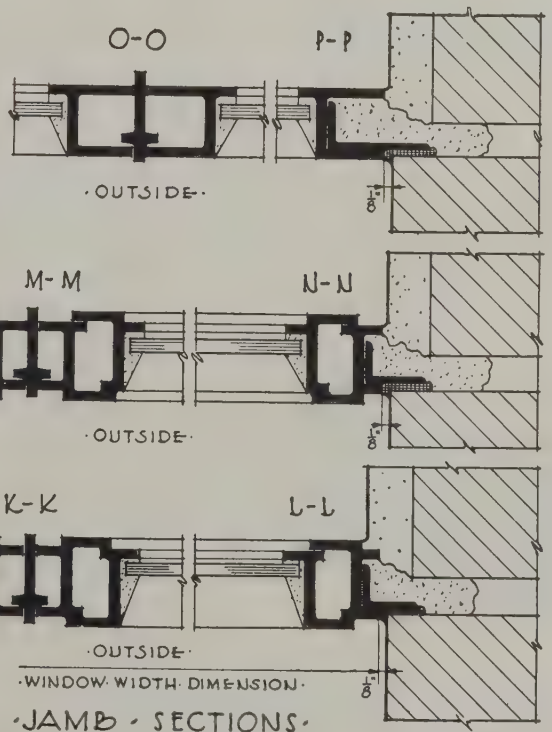


·TYPICAL·ELEVATIONS·&·SECTIONS·

·OTHER·COMBINATIONS·OF·
·VENTILATORS·MAY·BE·USED·

·STANDARD · FEATURES·

·MET-PROD-CO· HEAVY·PROJECTED·WINDOWS·
·ARE·MADE·WITH· VENTILATORS· OPENING·
·EITHER· IN· OR· OUT·
·BRUSHED· BRONZE· HARDWARE·IS·
·FURNISHED· AS· STANDARD·
·HARDWARE· OF·OTHER· DESIGNS·OR·
·FINISHES· IS· FURNISHED·AS·AN· EXTRA·
·METAL·GLAZING· BEADS·ARE·
·FURNISHED·AS· AN· EXTRA·



·JAMB · SECTIONS·

·SCALE : ONE-FOURTH· FULL·SIZE·

MET-PROD-CO	HEAVY TYPE PROJECTED WINDOWS	DRAWING No. H.C.10

VENTO STEEL SASH COMPANY

INCORPORATED

Puttyless Steel Windows and Steel Bound Screens

MUSKEGON, MICH.

Products

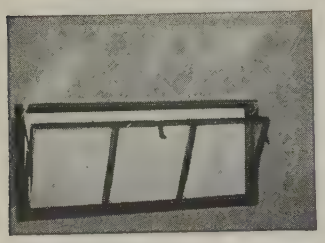
PUTTYLESS STEEL BASEMENT WINDOWS.

PUTTYLESS STEEL FACTORY WINDOWS.

STEEL BOUND BASEMENT SCREENS and FACTORY SCREENS.

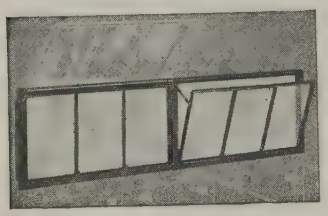
Also Steel Thresholds and Steel Puttyless Coal Chutes. Patented March 4, 1924, U. S. Patent Office. Other patents pending.

Vento Puttyless Steel Basement Windows



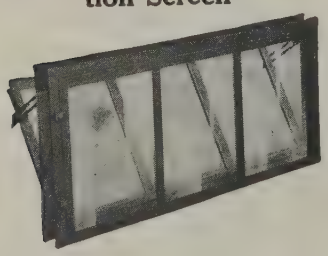
Frame of 12 gauge coppered steel bridge construction, electrically welded at all corners into solid unit 2 in. wide with anchorage fin in center. Jigged square. Sash of 1x1x⅛-in. tee bar, electrically welded at all joints of muntins and corners. Sash opens in at top for ventilation; also lifts up and opens full wide. When open, can be locked at bottom with safety lock. Makes basement secure.

Vento Puttyless Steel Mullion Basement Windows

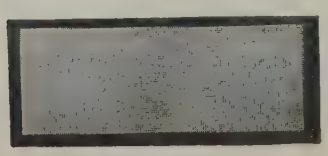


Vento basement window has a ⅝-in. outside watershed at bottom and a ⅜-in. condensation ledge at bottom of pane of glass. All water runs out keeping basement dry. This window does not stick, bind or sag and can be opened in winter, as well as in summer. Open in at top breaks away ice and snow and when open, is safe and all rain and water runs out. The glass is held against a cushion of cork (bed putty) by Vento patented glazing clips which saves contractor and owner cost of putty and glazing. Guaranteed waterproof and weatherproof. Any one can get a pane of glass or fit a screen in place of glass.

Vento Puttyless Steel Storm Window and Combination Screen



Vento steel basement window is fitted with a steel storm sash that can be made into a screen. Being puttyless, the pane of glass is held against the (bed) cord with clips during the winter and a pane-size screen replaces the glass in summer and is held by the same puttyless clips. Can be changed from the basement in a few minutes' time. A storm window is needed in cold weather. Keeps the basement warm and helps keep the house warm.

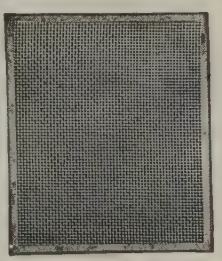


Vento Metal Bound Outside Screen

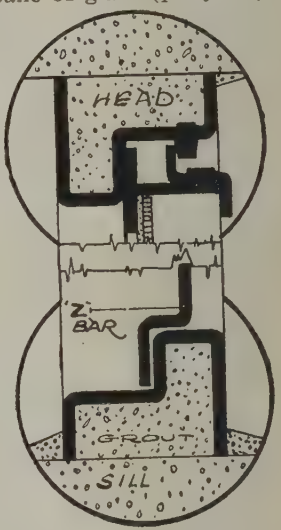
Each Vento basement window is drilled and tapped ready to be fitted with a 16-mesh galvanized or copper pane-size screen in regular basement window as well as in storm window.

Vento Metal Frame Pane-size Screens

Vento can also be fitted with a pane-size screen. Remove the pane of glass (puttyless) and replace with metal bound outside screen (16-mesh galvanized or copper wire cloth) or a combination storm and screen sash.

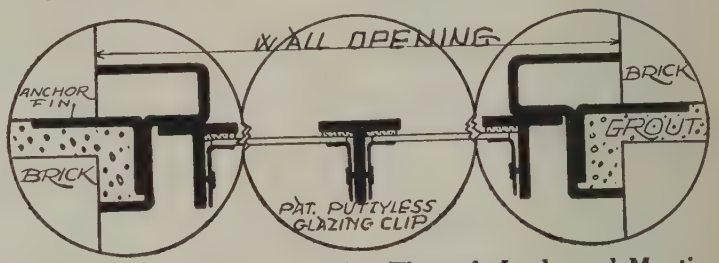


Panel-size Screen



Detail Basement Installation Through Head and Sill (At Right)

Bridge formation of frame, made of 12 gauge steel with grout, makes extra heavy and firm

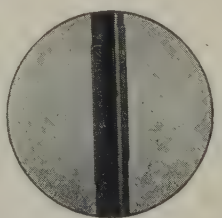


Detail Basement Window Section Through Jambs and Muntin

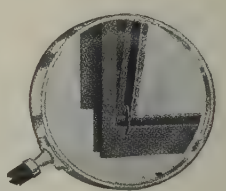
Right

Detail of Vertical Mullion Bars

Vento vertical mullion bars for basement windows are made of 12 gauge steel held secure by square carriage bolts. If the space between mullion bar and window is filled with cement it makes a solid concrete steel covered jamb. This window can be fastened in combinations of units



Vento Patented Glazing Clip



Vento Patented Safety Lock at Bottom of Sash

STANDARD SIZES OF VENTO BASEMENT SASH

Number of lights	Size of lights, in.	Wall opening required, in.	Net shipping weight, lb.
2	10 x 12	23½ x 15	17
2	14 x 20	31⅜ x 23	21
3	10 x 12	33¾ x 15	18
3	12 x 18	39¾ x 21	23
3	10 x 20	33¾ x 23	23
3	10 x 16	33¾ x 19	22
3	12 x 20	39¾ x 23	23
3	10 x 24	33¾ x 27	28
2	14 x 24	31⅜ x 27	23

Special sizes made upon order.

Continued on next page

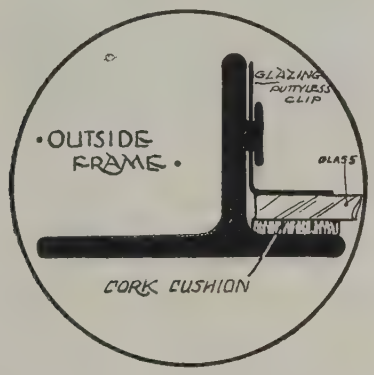
Vento Puttyless Factory Type Steel Window

Patented March 4, 1924. U. S. Patent Office.

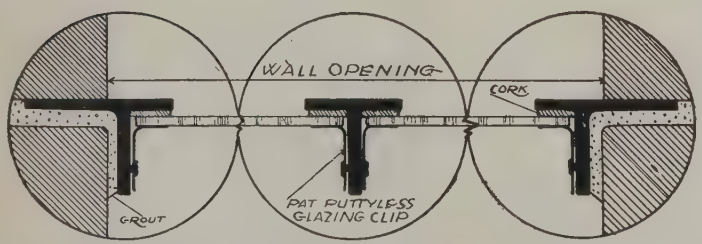
Frame constructed of 1½x1x⅛-in. coppered structural steel tee, electrically welded at each corner making a solid steel frame. Sash constructed of standard 1x1x⅛-in. tee, electrically welded at each muntin contact and at each corner, into a solid unit. Vento being puttyless, each pane of glass is held against a cushion of cork (bed putty put on at the factory) by Vento patented glazing clips, making a weatherproof and waterproof job, saving cost of putty and glazing at first installation as well as replacement.

Any section of window can be ventilated, the opening is top hinged to swing in at top, yet can be lifted open full wide. The frame is tapped and drilled to take a flat outside (16-mesh) galvanized or copper screen. Each pane of glass can be removed and replaced with a pane-sized screen.

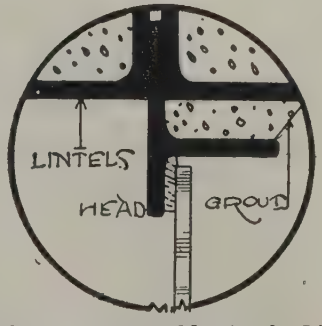
The Vento Puttyless Steel Window gives overhead ventilation, has interchangeable ventilating sections and is especially suitable for creameries, bakeries, ice cream factories, public and private garages and factories. Two or more units can be fastened together by vertical mullion bars. Easy to install and to keep glazed (no putty). Each pane can be removed, washed on both sides and replaced. Specify Vento and have a pleased client for life. There will be no complaint about putty staying soft or glass broken.



Detail of Factory Type Window Frame

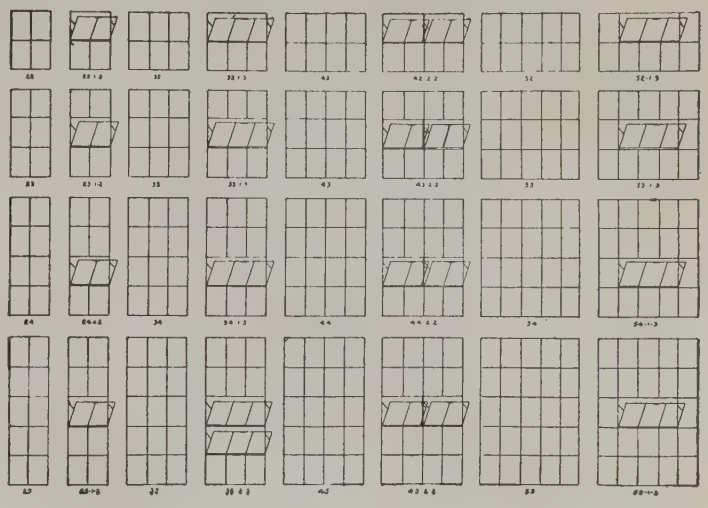


Detail Section Through Jambs and Muntin



Detail at Head Double Angle Lintels

Vento Puttyless Steel Factory-Type Windows —Fixed or with Overhead, Indirect Ventilation Sections as shown.

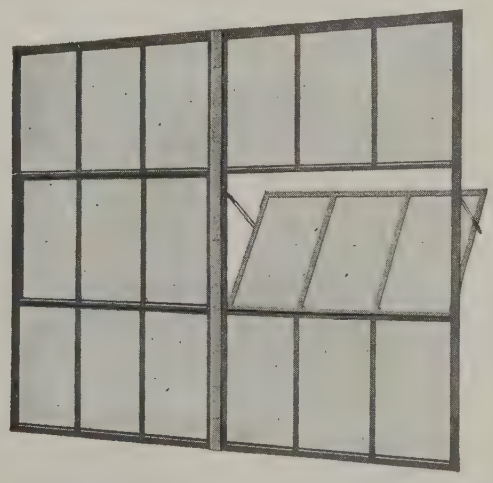


Standard Sash are designed to receive 12x18-in. and 14x20-in. glass. The wall opening dimensions for single units are as follows:

Lights wide	12 in. wide, glass		14 in. wide, glass		Lights high	18 in. high, glass		20 in. high, glass	
	ft.	in.	ft.	in.		ft.	in.	ft.	in.
2	2	7⅞	2	4⅞	2	3	5⅛	3	4⅝
3	3	1	3	7	3	4	6⅞	5	⅞
4	4	1⅜	4	9⅜	4	6	1⅜	6	9⅛
5	5	1¾	5	11¾	5	7	7⅜	8	5⅜
6	6	2⅛	7	1⅜	6	8	8⅝	10	1⅝

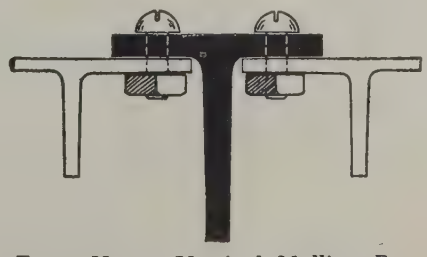
Combine any 12-in. wide glass with 18-in. high glass and any 14-in. wide glass with 20-in. glass to get wall opening.

Two or more units may be combined in an opening. The opening size would be the added width of the units plus 2¼ in. for each mullion.



Ventilating Section Opens in 11 Inches

One, two, or all sections may be ventilated



Extra Heavy Vertical Mullion Bar

VOIGTMANN METAL WINDOW CORPORATION

TELEPHONE
2—0156

Reed and Fulford Streets
KALAMAZOO, MICHIGAN

Products

VOIGTMANN HEAVY SECTION STEEL WINDOWS, Double Hung.

VOIGTMANN HOLLOW METAL WINDOWS, Double Hung.

Tested and approved as standard by the Underwriters' Laboratories, Inc.

Improved Features

Complete and scientific weatherstripping at all points. Ease of sash operation made possible by use of zinc guides in which sash operate. Cold rolled moulded art metal glazing stops, mitered and welded at the factory and attached with countersunk screws, removed from the inside face of sash, effecting a glazing stop finish in neatness and design not heretofore accomplished. These stops can be arranged for any thickness of glass. Offset plaster bond formed on inside face of jambs and head, eliminating necessity of trim or auxiliary plaster stops. Elimination of all exposed screws and simplified method of hanging weights and adjusting sash. Architecturally correct and neat design throughout combined with smooth finish and excellent workmanship.

Specifications

All material heavy gauge hot galvanized steel, or copper bearing steel or iron, primed one coat gray paint, complete with solid bronze hardware, cast iron sash weights, steel sash chains and labeled by the Underwriters where required. Spring bronze weatherstrips at sills and meeting rails and zinc weatherstrip guides at jambs. Pulleys, removable type, No. 14 gauge steel, hot galvanized; 3-in. wheels, heavily bronze bushed; axles ⅜-in. cold rolled steel. Metal stools, solid bronze window washer's safety anchors, screen guides and metal trim furnished on special order.

Voigtmann Model No. 16 Double Hung

Sash No. 14 gauge, pulley stiles, sills and heads of No. 16 gauge, weight boxes of No. 20 gauge.

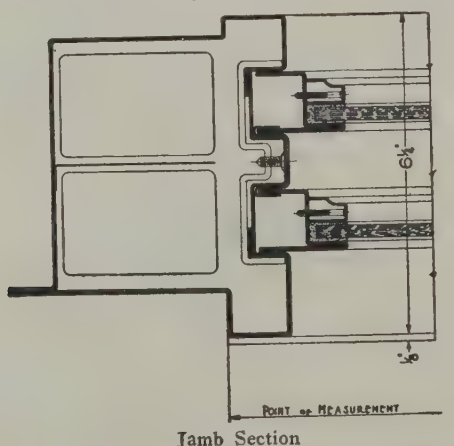
Voigtmann Model No. 14 Double Hung

Sash and staff bead No. 14 gauge, sills No. 12 gauge, pulley stiles and heads No. 16 gauge, weight boxes No. 20 gauge.

Voigtmann Model No. 12 Double Hung

Sash and staff bead No. 14 gauge, sills No. 12 gauge, pulley stiles, heads and weight boxes No. 16 gauge.

Greater Penobscot Building, Detroit, Mich.
SMITH, HINCHMANN & GRYLLS, Architects
ALBERT A. ALBRECHT CO., Builders
3026 heavy section double hung windows

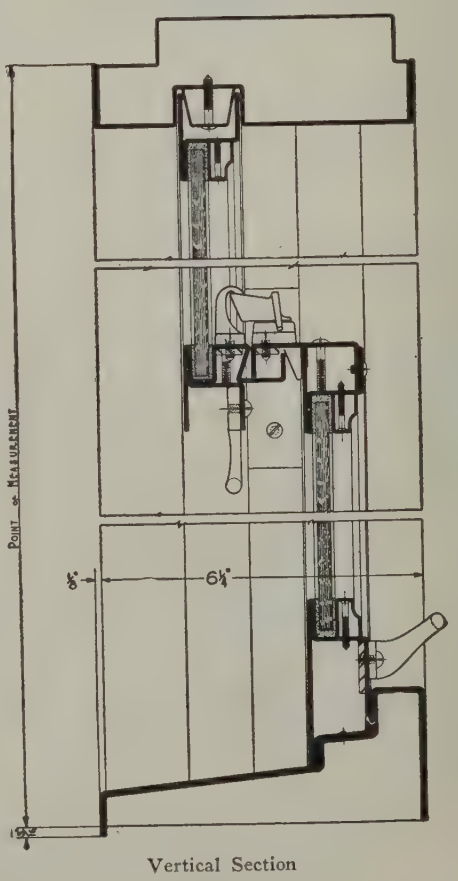


Jamb Section

Narrow Muntin Bar

Underwriters' Muntin Bar

Scale: 3 in. = 1 ft.



Vertical Section

Details of the Voigtmann Heavy Section Double Hung Window

Continued on next page

Voigtmann Model No. 24 Hollow Metal Window

This window possesses the same Voigtmann quality and the many other desirable features of the Model No. 12 window. It was developed to meet the demand for a lower cost window without a sacrifice to strength and durability. Although possessing neat members, its strength is provided for by the number of correct reinforcing bends made in the metal during the forming operations. This model is a pleasing type, architecturally correct, and permits a maximum of glass area. Sills are made of No. 14 gauge and all frame and sash members are made of No. 24 gauge, tight coated, hot galvanized steel. The sash weights are hung with extra heavy steel chain. Sash operate easily and are weathertight.

Hardware

These specifications apply to both Model Nos. 12 and 24: Voigtmann special removable pulley, sash lock, lifts and pole socket. Furnished either in solid bronze or malleable iron, plated. Special hardware furnished if desired.

Bronze and Copper Windows

All models can be furnished in cold rolled bronze or copper.

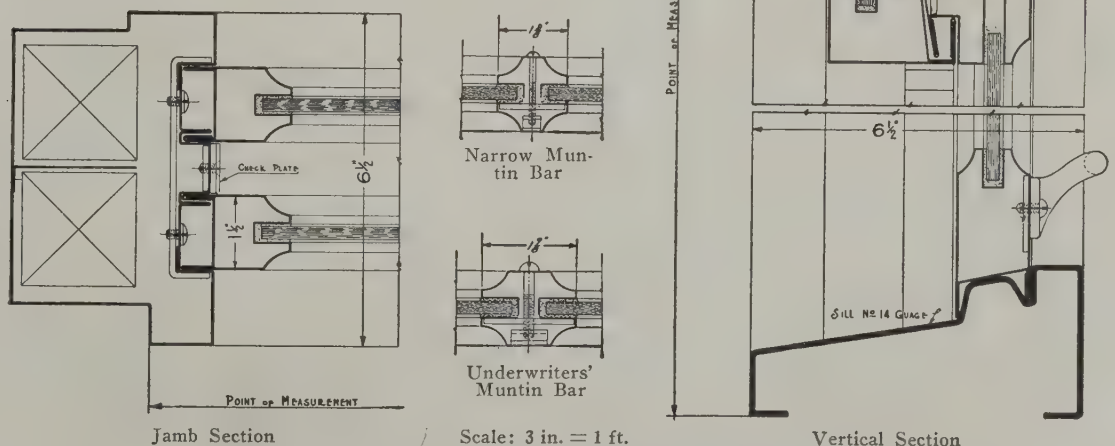
Installations

On these two pages we show illustrations of two important installations of Voigtmann windows during 1928. Many other equally important installations have been made throughout the United States and a more complete list will be sent upon application.

The Company

The Voigtman Metal Window Corporation was the first to make metal windows and now offers the experience of thirty-five years of continuous, successful manufacture. The plant facilities and grade of skilled workmen employed are such as to guarantee the highest grade of product and deliveries according to schedule. An opportunity to estimate your work will be given prompt and careful attention.

Southwestern Bell Telephone Building, Kansas City, Mo.
Hoit, Price & Barnes, Architects
Swenson Construction Co., Builders
642 Model No. 24 windows



Jamb Section Scale: 3 in. = 1 ft. Vertical Section

Details of the Voigtmann Model No. 24 Double Hung Window

THE WILLIS MANUFACTURING COMPANY

INCORPORATED 1891

Manufacturers of Hollow Metal Windows and Tin Clad Fire Doors

HOME OFFICE and FACTORY

GALESBURG, ILL.

Products

HOLLOW METAL WINDOWS, Heavy and Light Gauge; TIN CLAD FIRE DOORS and Hardware.

Approvals

All types of Willis hollow metal windows and tin clad fire doors have been tested and accepted as standard by the National Board of Fire Underwriters.

Hollow Metal Windows

The Willis hollow metal window is made in all types, including double hung, single pivoted, double pivoted, top hinged, casement and stationary. Double hung with pivoted, hinged or stationary transoms.

Our approved mullion may be employed when it is necessary to use more than one single unit in an opening.

Tin Clad Fire Doors

Two-ply and three-ply, wood core, tin clad doors of the sliding or swinging type for any kind of opening.

Specifications for Hollow Metal Windows

All hollow metal windows shall be those manufactured by THE WILLIS MANUFACTURING COMPANY of Galesburg, Ill., or such other make that will comply in every respect with their design and construction.

Metal used throughout shall be No. 24 gauge tight coated galvanized, as required by the Underwriters' Laboratories, Inc., and shall be copper bearing. Heads, jambs and all sash rails shall be constructed of one piece of metal each, excepting back covers. All covers to be carefully and securely locked to their respective members. Heads and jambs shall have a moulded brick or staff bead and shall be properly constructed for building into brick, stone or terra cotta walls. All members must be carefully formed and miters neatly cut, lapped and riveted. Where two sash members lap on an exposed surface, the under member shall be offset the thickness of the metal to permit of a smooth and even surface to insure perfect operation of sash.

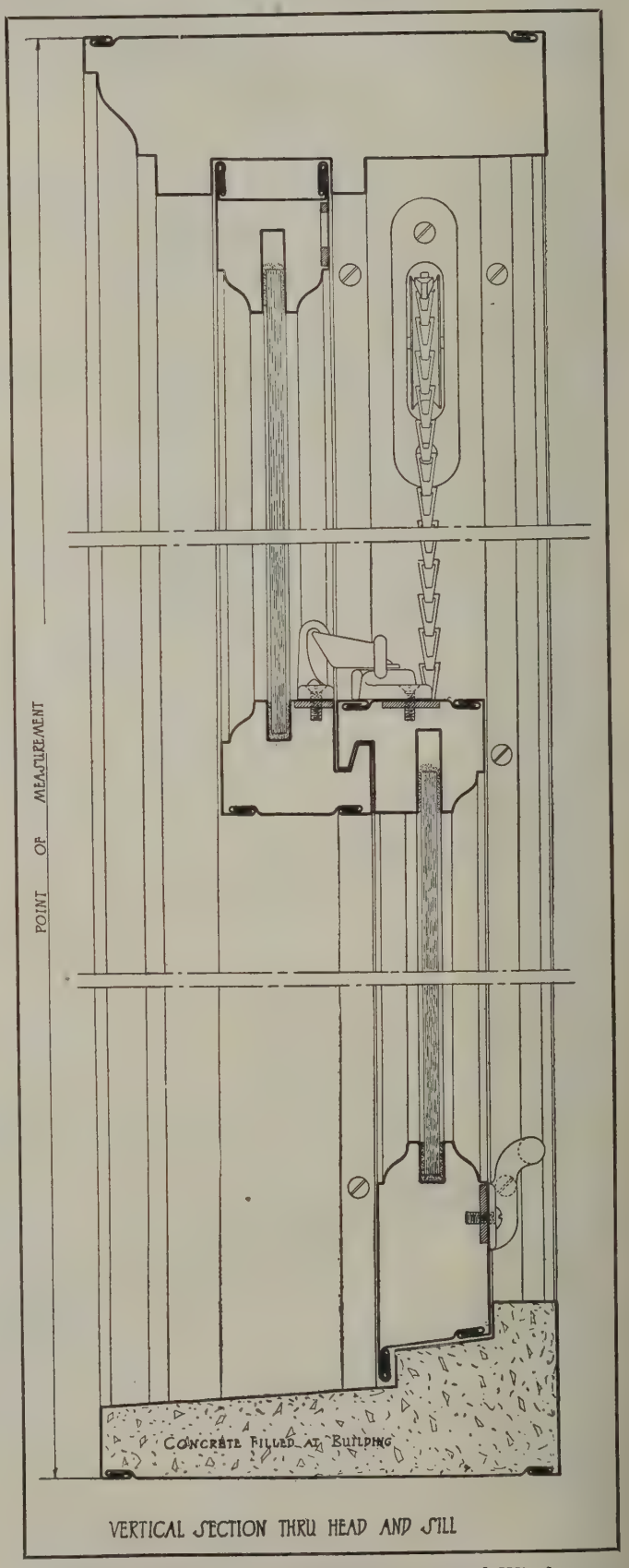
Pulley stiles shall each be formed accurately to provide for a perfect operation of the sash. Each jamb to have a weight pocket of ample size to permit of easy application of the sash weights. Weight pockets to have a removable cover which will fit tight and which will not offer obstruction to the sash in their operation.

Sash rails to be neatly mitered and riveted. All sash to be carefully fitted into the frames at the factory to insure perfect operation and a weathertight job. Meeting rails to lock tightly together when both sash are closed to insure strength and weathertightness. Glass rabbets on all side and bottom rails to be ¾ in. deep and on top rails 1½ in. deep. Sash to be divided with muntin bars into lights as required by the Underwriters' Laboratories, Inc., or as shown on the plans. Muntins to have removable caps to permit of glazing without removing sash from the frames. The outside section of the muntin to be securely fastened to the sash rails by rivets and reinforced every 12 in. with a steel, tapped plate. The inside muntin section to be secured to the outside section by means of screws passing through the reinforcing plates. Both sections of the muntin to be moulded to conform with the sash rails.

Hardware to consist of substantial ball bearing pulleys fastened in place in the jambs by means of screws passing through plates riveted on the inside of jambs. Sash shall be hung on heavy sherardized sash chain, approved by the Underwriters' Laboratories, Inc., and counterbalanced with sectional weights. All pulleys shall be placed in jambs in such a manner that they may be removed and replaced without disturbing other parts of the window. Sash shall be equipped with pole socket, bar lifts and underwriters' approved malleable iron lock, dead black, bronze or brass plated finish. Plates to be attached inside sash rails with rivets for attaching hardware. Sash shall be glazed with ¼-in. wire glass (specify kind) thoroughly embedded in putty. All metal shall have one shop coat of an approved metallic paint before leaving the factory.

All windows shall be constructed in accordance with the specifications of the National Board of Fire Underwriters and shall meet their requirements in every respect. All windows shall bear both Underwriters' and manufacturers' labels.

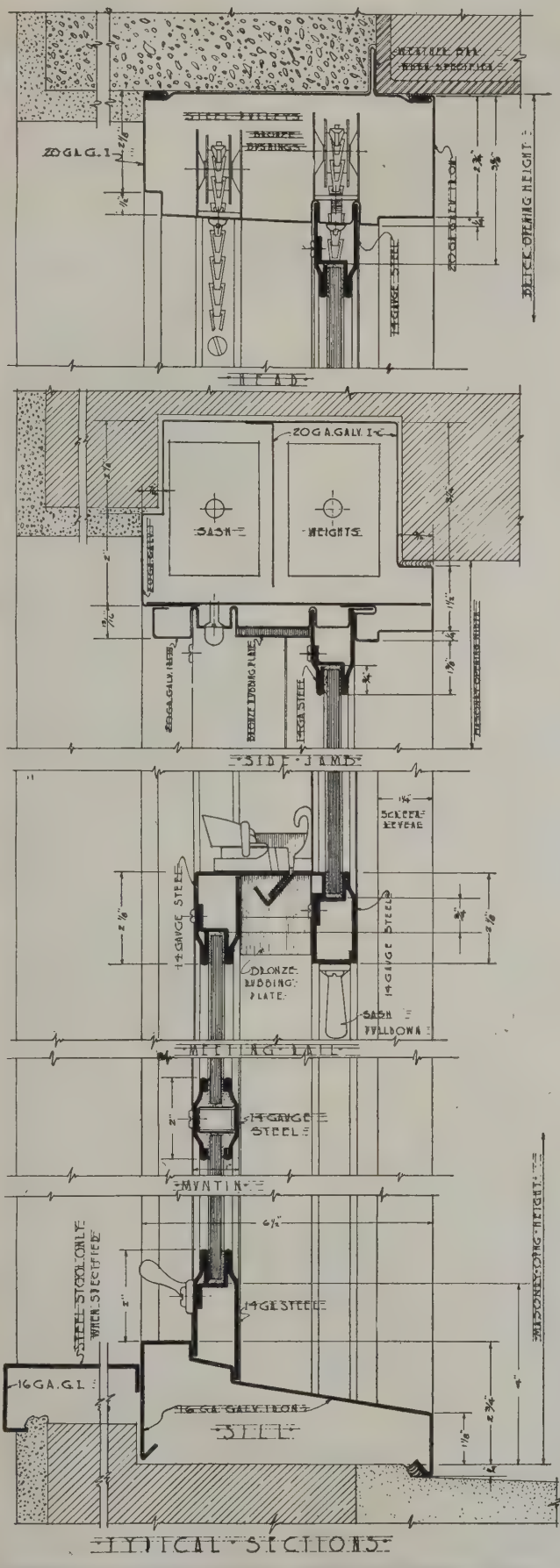
Note: In sending in specifications be sure to furnish all necessary information such as type of window wanted, brick opening size, style of head, whether square or segment, division of glass in sash and kind of glass wanted.

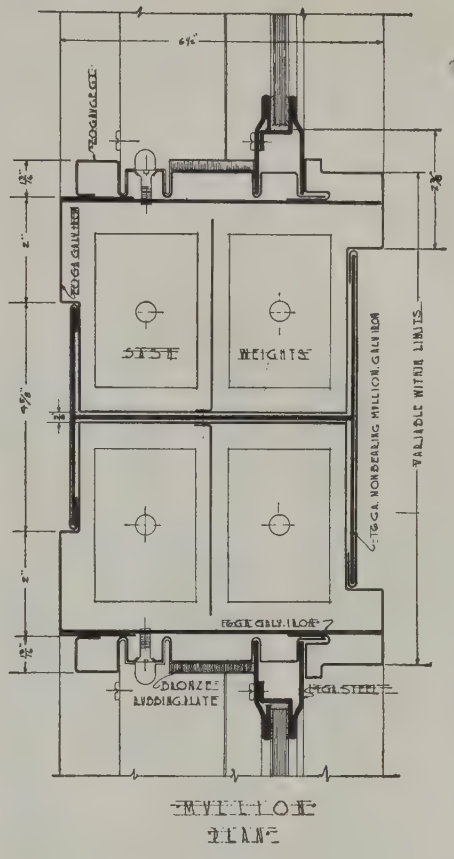


VERTICAL SECTION THRU HEAD AND SILL

Details Willis No. 24 Gauge Hollow Metal Window

Continued on next page





Willis Paramount Solid Steel Window, Double Hung Sash

Materials—All as indicated on detail drawing, sills of No. 16 gauge galvanized iron, jamb and head members of No. 20 gauge galvanized and sash of No. 14 gauge soft rolled strip steel.

Pulleys are heavy steel wheels with bronze bushings and ⅜-in. steel axles with No. 16 gauge housings.

Chain is galvanized and attached to sash and weights with galvanized fittings.

Solid bronze rubbing plate on each jamb at ends of meeting rails to insure tight fit.

Finish hardware may be solid bronze, or iron, bronze plated as desired. Each opening is equipped with one lock, two bar lifts and one pull on underside of lower rail of top sash. Weights are cast iron of size to properly counterbalance sash.

Assembly—All frame members are fastened together with butt joints reinforced with plates. All sash joints are mitered and welded. Glazing strip is fastened to sash member with screws as indicated on detail.

Finish—All parts receive a coat of the best grade priming paint on inside and outside before shipping.

Underwriters' Labels—When desired, window will be made according to the specifications of the Underwriters' Laboratories, Inc., and their labels attached.

PATENTED FEB. 9, 1926

WILLIS PARAMOUNT SOLID STEEL DOUBLE HUNG WINDOW

SCALE 3=1-0 DRAWING L-35

DAVID LEVOW

"Fitrite" Skylight Gearing and "Fitrite" Bronze Strainers

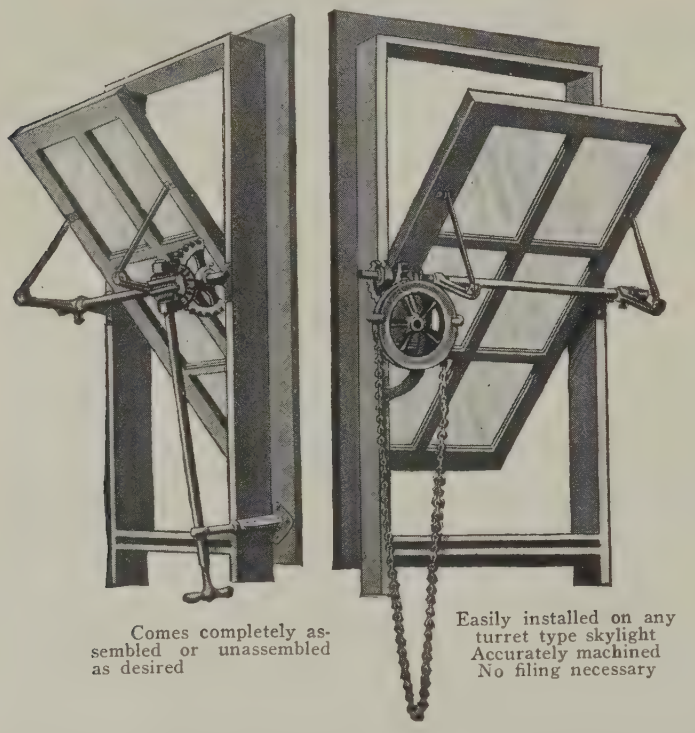
TELEPHONE
CHELSEA 2400

542 West 23rd Street
NEW YORK, N. Y.

For Adjustable Pipe Snow Guards and One-piece Ornamental Leader Straps, see page A505

"Fitrite" Skylight Gearing

Features—Instead of the usual round pipe holes (where the only point of contact is at the setscrew),



Comes completely assembled or unassembled as desired

Easily installed on any turret type skylight
Accurately machined
No filing necessary

"Fitrite" Skylight Gearing has special oval pipe holes on arms and lifting gear.

The result is a much firmer grip (contact at *three* points instead of one) and absolute freedom from rattling in any position.

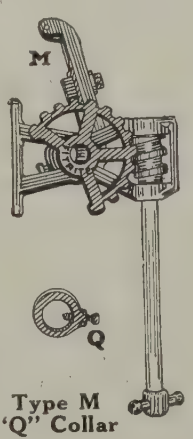
Material—Made in both best quality gray iron and in solid bronze, which is rustproof and harmonizes with copper skylights.

Sizes—Made for standard ½-in. pipe size.
Also furnished for ⅜-in. and 1-in. pipe sizes.

Type "M"—For single sashes or concrete work. Type "M" requires no horizontal piping. It is therefore suitable for small skylights with single sashes.

Type "M" requires no extensions, thus eliminating the problem of fastening extensions to concrete walls.

"Fitrite" Bronze Gearing—Is especially recommended (1) for industrial buildings as it resists corrosion due to chemical fumes, acids, etc., (2) for laundries, kitchens or wherever excessive moisture causes iron to rust away. The slight extra cost of "Fitrite" Bronze Gearing assures a permanent trouble-free job.



Type M
"Q" Collar

"Fitrite" Roof Strainers—for Flat Roofs Having Inside Cast Iron Leaders

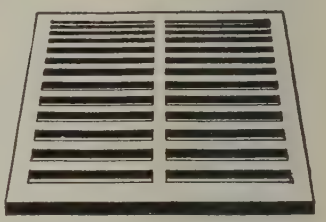
Type F—Perfectly flat. Extensively used for roofs and roof gardens requiring freedom from all obstruction; also for swimming pools.

Type R—The slight crown (1 in. high) does not seriously obstruct the roof, yet the construction is such that debris slides off easily. Especially recommended for flat tile or slag roofs having inside leaders, at center of roof.

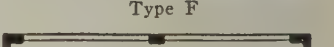
Type X—Recommended where drainage efficiency is the prime consideration. The extra high crown (3½ in.) and narrow slits effectively keep out gravel, sticks, etc. Type X is especially desirable where leaders are at edge of roof.

Materials—All types made in solid bronze.

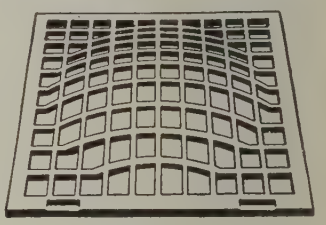
Features—"Fitrite" bronze strainers are about ¼ in. thick, will not rust, and are practically unbreakable—will easily support the weight of three husky men. Each strainer has two hinges allowing easy attachment by copper strip to leader box.



Type F



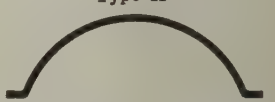
Cross-section of Type F



Type R

Cross Section of Type R
1 in. high

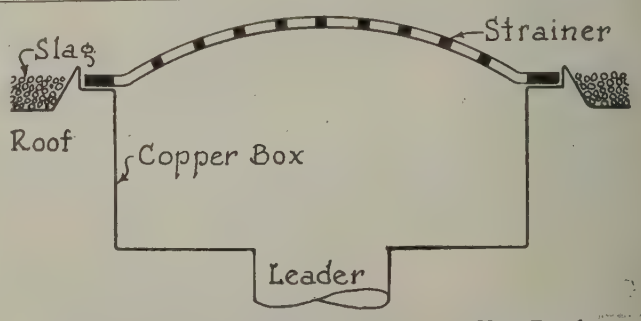
Type X



Cross-section of Type X
3½ in. high

STRAINER SIZES

No.	Exact size, in.	Types
12-in.	11¾ x 11¾	F, R and X
10-in.	9¾ x 9¾	R and X
8-in.	8 x 8	R and X
6-in.	6 x 6	F and R



Application of "Fitrite" Strainer to Slag Roofs

Information concerning installations on other types of roofs gladly supplied on request

LORD AND BURNHAM COMPANY

SASH CONTROL DIVISION

Graybar Building, NEW YORK, N. Y.

FACTORIES

IRVINGTON, N. Y. DESPLAINES, ILL. ST. CATHARINES, ONT., CANADA

BRANCH OFFICES IN PRINCIPAL CITIES

Products

SASH CONTROL MECHANISM of the highest grade, architecturally suitable for Banks and Office Buildings, Churches, Libraries, Theaters and Public Buildings.

SASH CONTROL EQUIPMENT for Factories, Power Houses and Industrial Type Buildings.

SCREW THREAD OPERATORS for Transom Sash.

For Greenhouses, see pages B2236-2241.

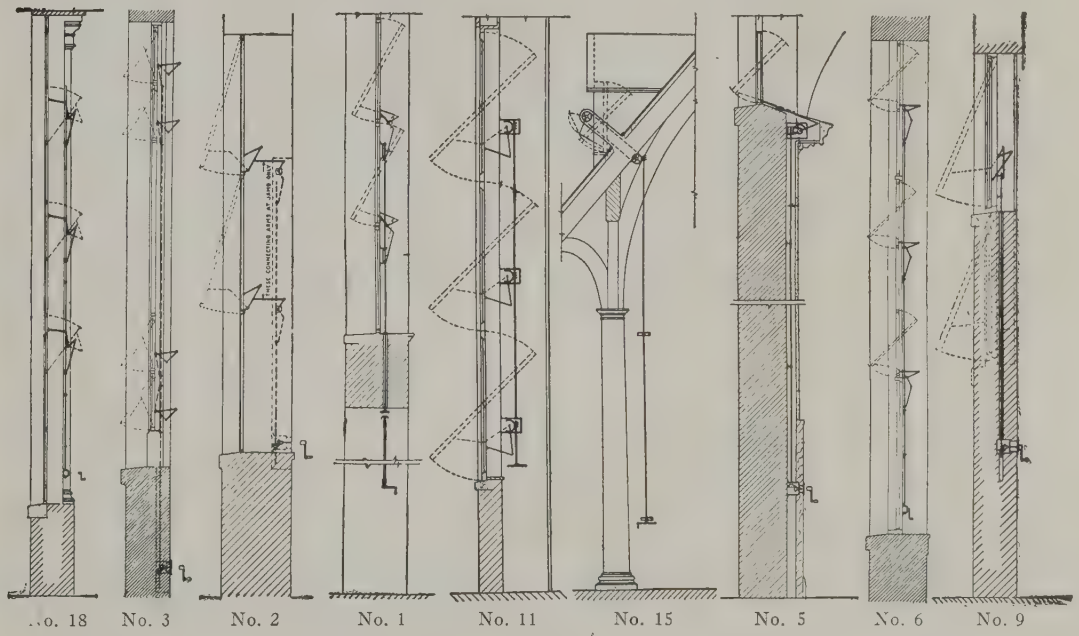
Estimating and Advisory Service

Our engineers are prepared to give full information regarding our products and their uses, to offer suggestions as to arrangements, to quote prices, etc.

These mechanisms are especially made to meet individual building conditions. Each problem is carefully studied by our engineers. Drawings showing the most practical solution are prepared for architects' approval.

Architects secure co-ordination of architectural treatment and utility, by using this service in the preliminary stages of their design.

Sash Controls in Large Bank Windows

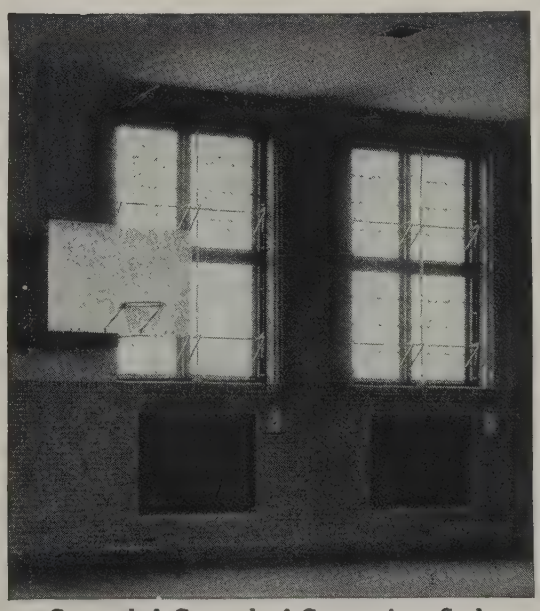


Arrangements of Mechanisms Which Solved Various Problems of Sash Control

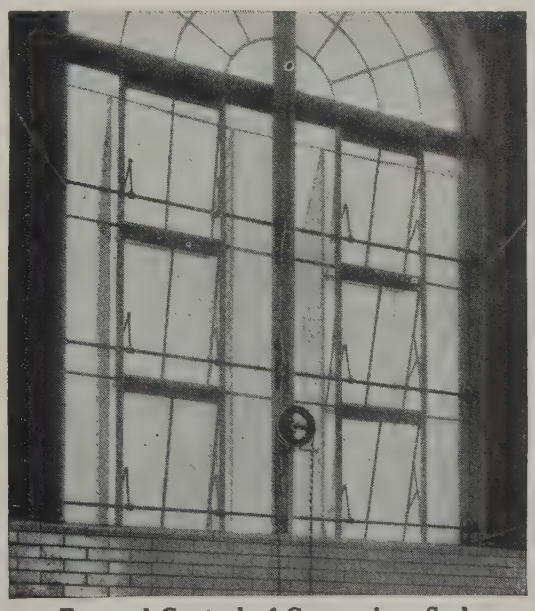
We have prepared a series of drawings and photographs showing solutions of twenty-one sash control problems.

These include schools, churches, banks and other public buildings. The ideas illustrated will be found of help to architects and designers.

This series and our catalogues in an American Institute File Folder gladly sent upon request



Concealed Control of Gymnasium Sash



Exposed Control of Gymnasium Sash

ESTABLISHED 1875

THE PAYSON MANUFACTURING COMPANY

Manufacturers of Sash Operating Devices and Builders' Hardware

2920 Jackson Boulevard

CHICAGO, ILL.

Products

Sash Operating Devices.

Also manufacturers of: Simplex Transom Lifter, for all types of transoms; Casement Adjusters, friction, geared, and thumbscrew control for all types of casement sash; Signal Sash Lock, for double hung windows; No. 49 Harris Concealed Transom Lifter, for transoms where concealed device is required.

Types of Payson Sash Operating Devices

Torsion Type Using Levers to Sash—Ideal, chain control, for pivoted sash.

Superior, hand wheel control, for pivoted sash.

Triumph, hand wheel control, for pivoted sash in monitors, also for store front transoms.

Torsion Type Using Racks and Pinions to Sash—Reliance, chain or hand wheel control, either straight or curved rack, for top hinged or heavy pivoted sash.

Gem, for single top hinged, skylight sash, chain control.

Star, for single top hinged skylight sash, pole control.

Screw Type Using Levers to Sash—Crown, for short runs of bottom hinged sash opening in.

Duplex, for heavy transoms.

Signet (new), for long runs of hinged sash opening in or out.

Tension Types—Peerless, chain control for top hinged continuous steel sash.

Victor chain wheel control for vertically pivoted sash.

Monarch, for short runs of vertically pivoted or side hinged sash.

All types furnished with electric equipment if desired.

Payson Products Give Satisfaction

This list of Payson products is selected with the hope that it may be used freely by architects in writing specifications. The list contains standard articles that are guaranteed to give perfect satisfaction.

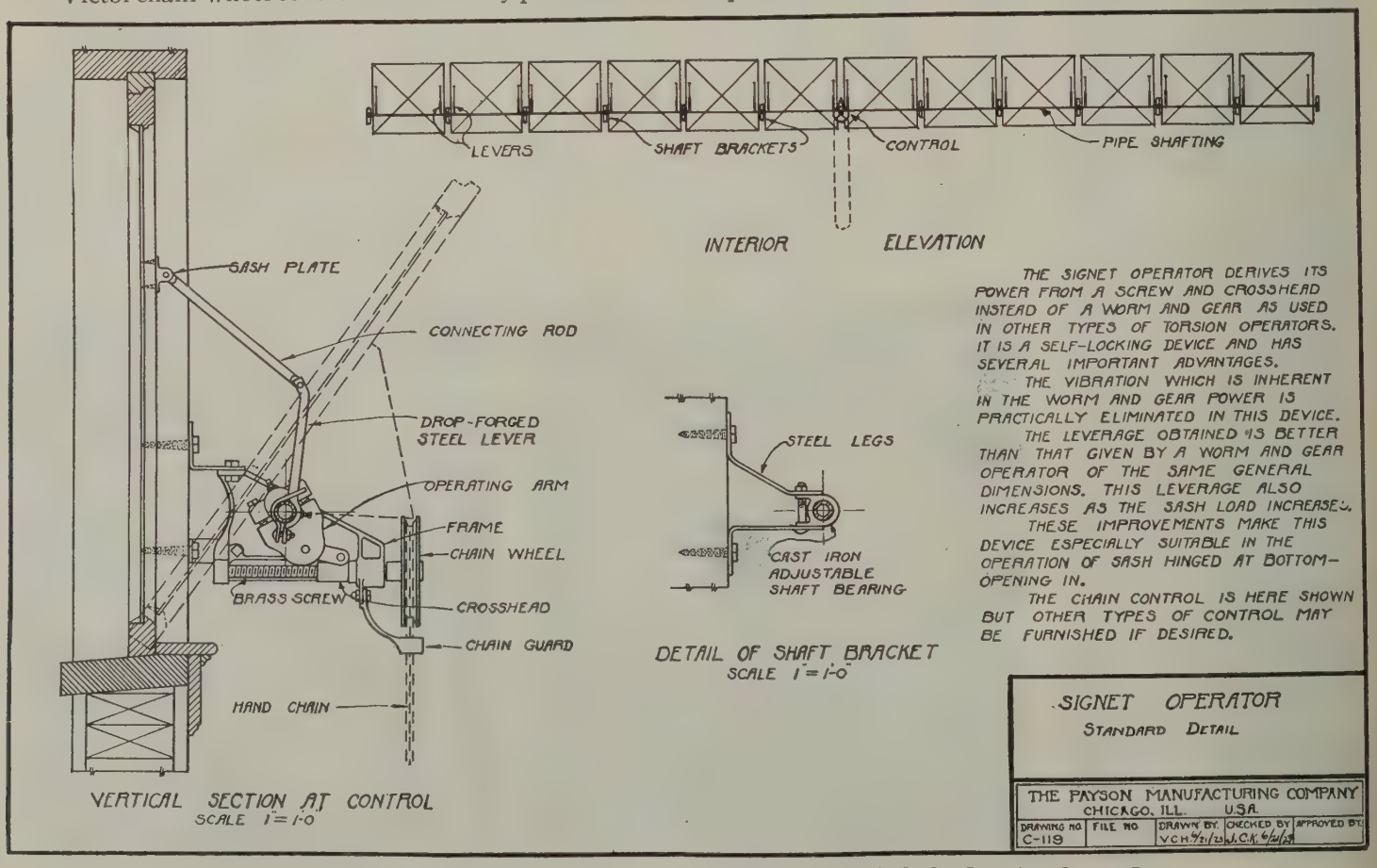
Service

Payson sash operating devices are made to order, using measurements taken from the plans and checked at the building. Every job is exhaustively studied by Payson engineers, and a drawing showing the scheme thought most satisfactory is prepared and submitted to the architect for approval as to layout and general design. After this approval is obtained, if there is any question as to measurements, drawings are forwarded to the building to be checked.

Time is really saved in this way, because the operators can then be erected from the blue print with the certainty that every part will fit the place for which it is intended.

Catalogue

We have a very complete catalogue of Payson products which we would be glad to forward on request.



Detail of Signet Operator for Use on Top or Bottom Hinged Sash, Opening In or Out

Continued on next page

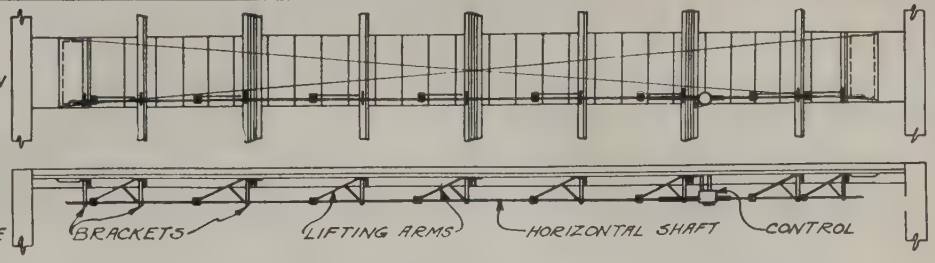
THE PEERLESS A OPERATOR IS INTENDED ESPECIALLY FOR THE OPERATION OF TOP HINGED CONTINUOUS SASH.

THE OPERATOR STATION IS AN OIL TIGHT BOX CONTAINING A HARDENED STEEL WORM AND BRONZE WORM GEAR. THE WORM SPINDLE IS EQUIPPED WITH THRUST BEARINGS. A CAST RACK AND A CUT STEEL PINION TRANSMIT THE POWER FROM THE OPERATOR BOX TO A HORIZONTAL SLIDING SHAFT.

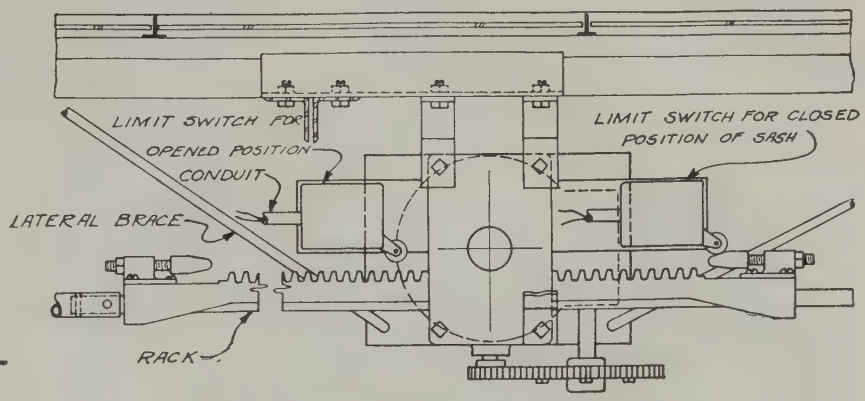
THE ELECTRIC MOTOR IS APPLIED TO THE OPERATOR BOX MAKING A COMPACT EFFICIENT UNIT. MACHINE CUT SPROCKETS AND SILENT CHAIN ARE USED FOR SPEED REDUCTION.

THE SHAFT IS SUPPORTED BY ROLLER BRACKETS ATTACHED TO THE TRUSSES AND TO INTERMEDIATE STEEL MEMBERS. THE LIFTING ARMS ARE ATTACHED TO THE BRACKETS AND ARE ARRANGED SO AS TO ELIMINATE ALL LATERAL THRUST ON THE SASH. ALL SWIVEL POINTS ON LIFTING ARMS HAVE BRASS WASHERS AND THE ROLLER BRACKETS ARE FITTED WITH BRASS SLEEVES.

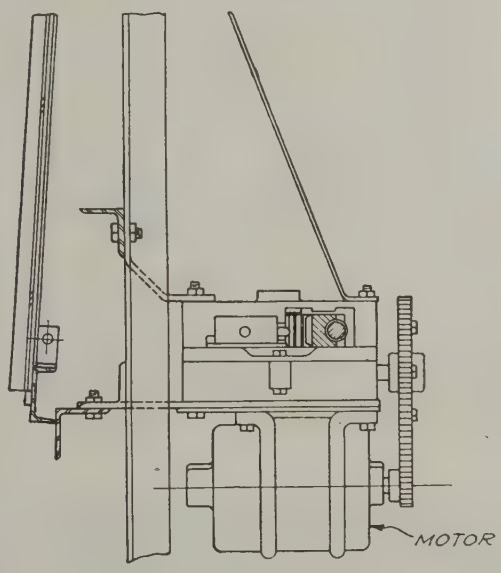
DIAGRAMS WILL BE FURNISHED WHICH WILL GIVE THE ELECTRICAL CONTRACTOR COMPLETE INFORMATION REGARDING THE NECESSARY WIRING AND CONTROL SWITCHES REQUIRED.



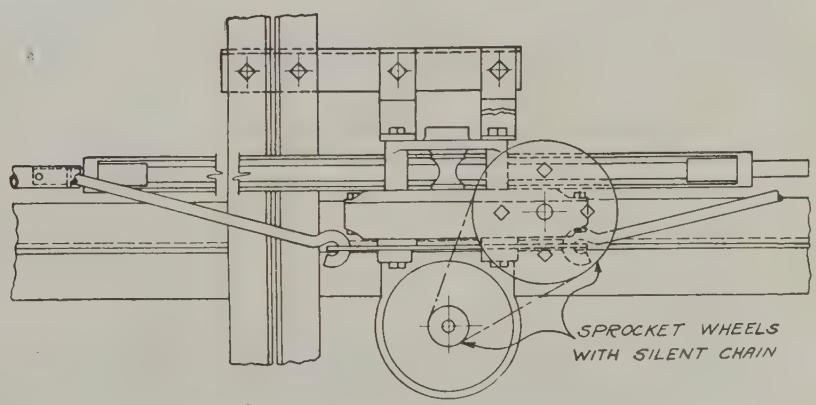
INTERIOR ELEVATION & PLAN VIEW



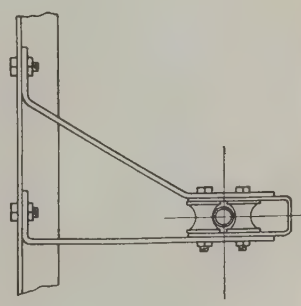
PLAN VIEW



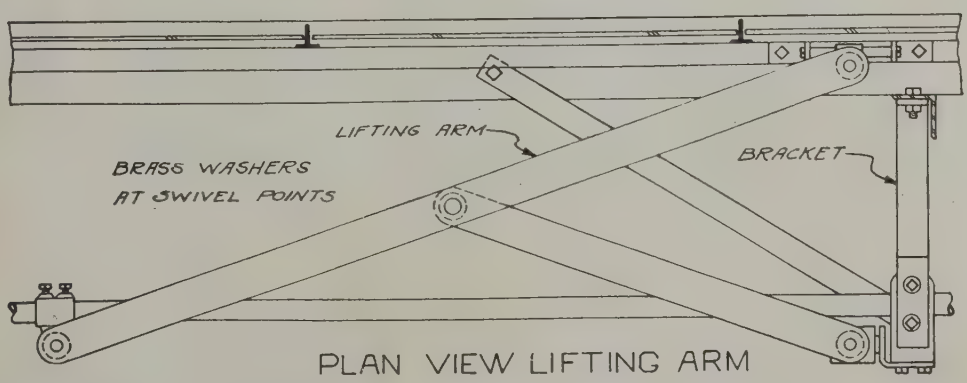
CROSS SECTION



ELEVATION



BRACKET



PLAN VIEW LIFTING ARM

PEERLESS "A" OPERATOR ELECTRICAL

THE PAYSON MANUFACTURING CO. CHICAGO, ILL. U.S.A.				
DRWNG C-129	FILE NO	DRAWN BY V.G.S.	CHECKED BY	APP. BY W.E.P.

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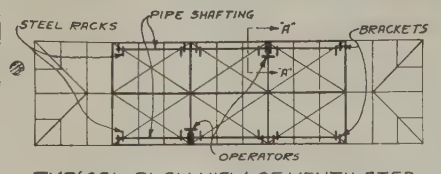
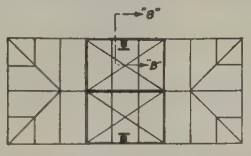
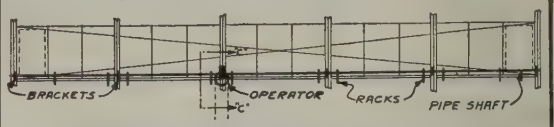


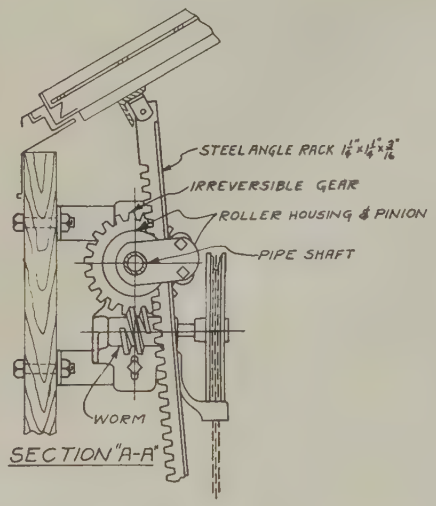
TYPICAL PLAN VIEW OF VENTILATED RIDGE TYPE SKYLIGHT.



TYPICAL PLAN VIEW OF VENTILATED RIDGE TYPE SKYLIGHT.

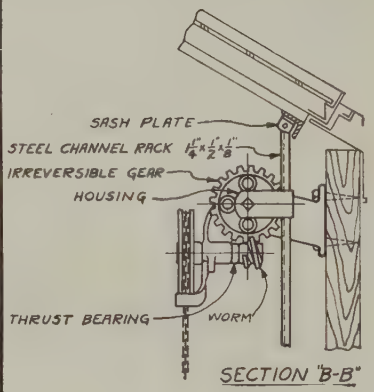


INTERIOR ELEVATION OF TOP HUNG CONTINUOUS STEEL SASH.



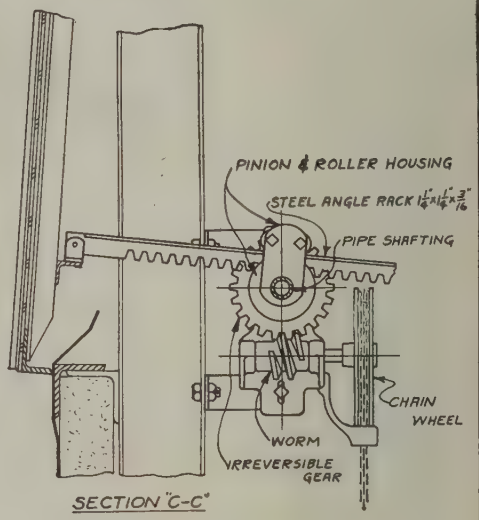
SECTION "A-A"

RELIANCE "C."



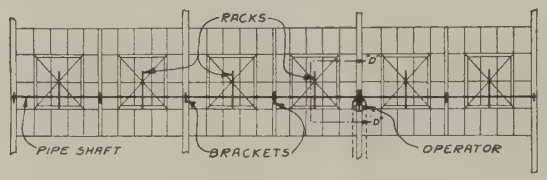
SECTION "B-B"

GEM.

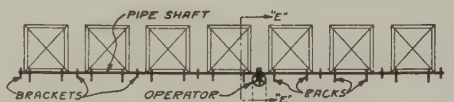


SECTION "C-C"

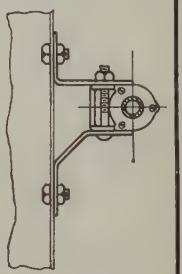
RELIANCE "C."



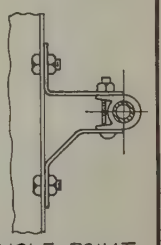
INTERIOR ELEVATION AT WALL SASH.



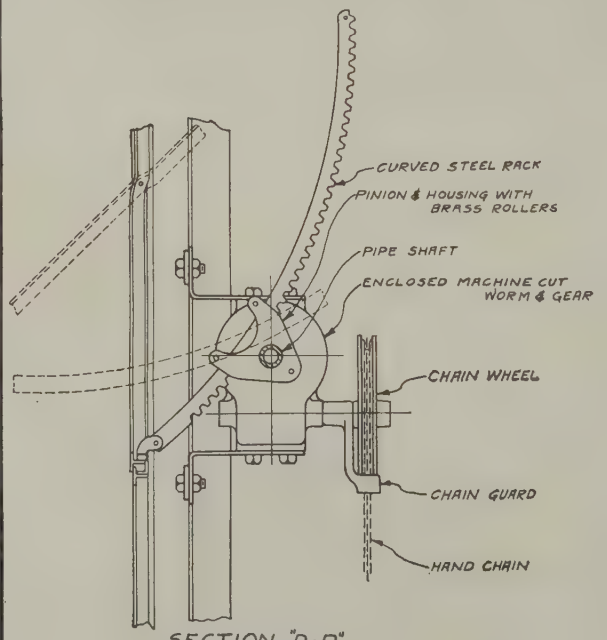
INTERIOR ELEVATION AT WALL SASH.



BALL BEARING SHAFT BRACKET.

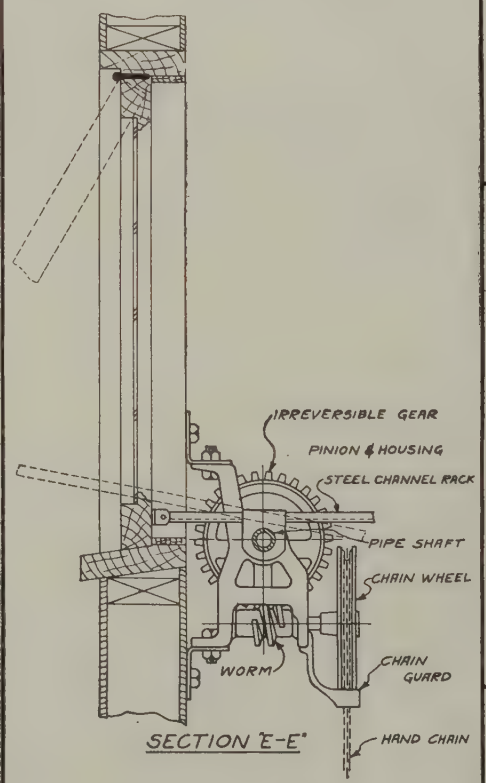


SINGLE POINT CONTACT SHAFT BRACKET.



SECTION "D-D"

RELIANCE 521.



SECTION "E-E"

RELIANCE #80.

THE RACK AND PINION OPERATOR AS SHOWN ON THIS PAGE IS THE MOST POWERFUL OF ALL DEVICES COMMONLY KNOWN AS THE TORSION TYPE. THE LEVERAGE IS SO REDUCED THAT THE TORSIONAL STRAIN ON THE OPERATING SHAFT IS VERY SLIGHT.

ITS SIMPLICITY OF ACTION MAKES ITS USE ADVISABLE WHEREVER THE WORK TO BE DONE COMES WITHIN ITS LIMITS.

THE TYPES SHOWN HERE COVER IN A GENERAL WAY PRACTICALLY ALL OF THE CONDITIONS ON WHICH THE DEVICE MAY BE USED TO ADVANTAGE. IN SELECTING THE TYPE DESIRED THE GOVERNING FACTOR IS AMOUNT OF DUTY TO BE PERFORMED. THIS IS BASED ON THE LENGTH OF RUNS, WEIGHT AND STYLE OF SASH AND LOCATION IN BUILDING.

RACK & PINION OPERATORS.

THE PAYSON MANUFACTURING COMPANY.
CHICAGO, ILL. U.S.A.

DRAWING NO.	FILE NO.	DRAWN BY	CHECKED BY	APPROVED BY
C-126		EJR 6-25-27	JCK	

ALLWEATHER VENTILATOR COMPANY, INC.

Manufacturers of "Wurldsbest" Window Ventilators

452 Lexington Avenue

NEW YORK, N. Y.

DEALERS IN ALL LARGE CITIES

The "Wurldsbest" Window Ventilators

"Wurldsbest" window ventilators are stormproof, draftproof, dustproof and insectproof. Planned by a well-known construction engineer these ventilators literally transform a room from the hour they are installed. Every trace of "stuffiness" vanishes—the atmosphere of the whole room changes and becomes as delightfully fresh, airy and invigorating as in summertime.

Special Features of "Wurldsbest" Ventilators

Hooded Opening—Admits the air yet breaks up the direct air currents and excludes all drafts, rain and snow.

Built-in Screen—Completely covers the entire opening and not only excludes insects but keeps out approximately 80% of the street dust, soot, etc.

Adjustable Ends—Which telescope into the body of the ventilator make it fit any window within the limit of the size selected.

"Wurldsbest" Ventilators Are Strongly Constructed

"Wurldsbest" ventilators are made of 20-22 gauge, terne plate sheet steel. The series of hooded openings are stamped into the steel. These not only provide for admission of the air but materially stiffen the body of the ventilator.

The entire opening in the ventilator is covered with 18-mesh copper bronze wire screen which is permanently built into the body of the ventilator.

Beautifully Finished

"Wurldsbest" ventilators are finely finished in olive green enamel baked on. This makes a beautiful and durable finish. It also thoroughly protects the metal from the action of the elements. "Wurldsbest" ventilators can be used the year round.

They can be supplied in other colors to order at slightly additional cost.

Sizes

All "Wurldsbest" ventilators are made 9½ in. in height and in 7 lengths for windows of various widths, as follows:

	Retail Price
No. 2 —to fit windows 15 to 23 in. wide	$2.50
No. 3 —to fit windows 23 to 30 in. wide	3.00
No. 4 —to fit windows 30 to 36 in. wide	3.50
No. 5A—to fit windows 36 to 46 in. wide	4.00
No. 6A—to fit windows 46 to 58 in. wide	4.75
No. 6B—to fit windows 58 to 63 in. wide	5.00
No. 6C—to fit windows 63 to 72 in. wide	5.50

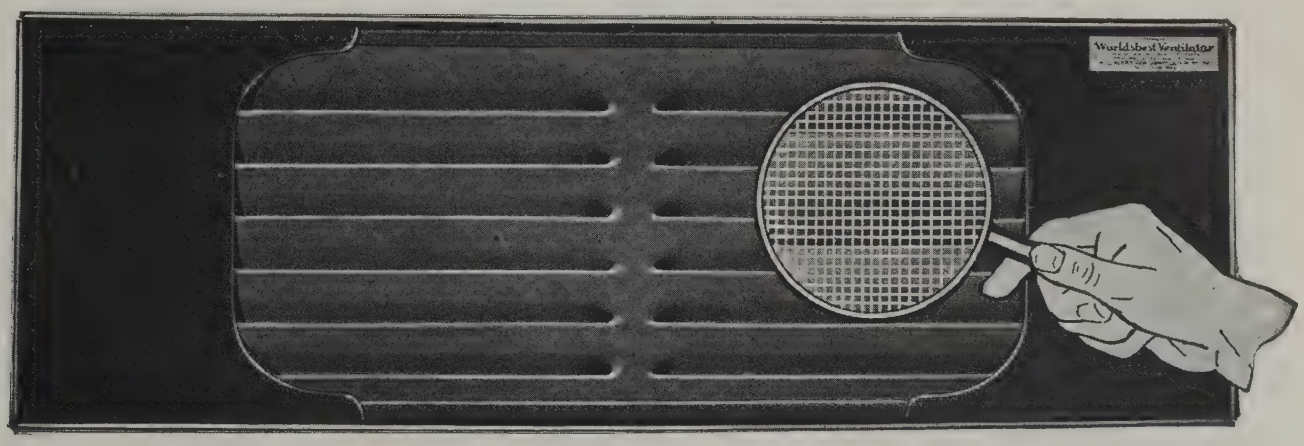
Exterior View Showing One of the Adjustable Telescopic Ends

Installation

"Wurldsbest" ventilators are installed on the parting strip either at the bottom or top of the window or both as desired. Each end piece has a cut out slot near the top which fits over a round head screw that is placed in each parting strip. This allows the ventilator to be easily attached and removed. The sliding end pieces make a snug fit.

Since the ventilator is attached outside, the lower sash of the window can be closed completely or opened wide when desired without removing the ventilators.

End View



Inside View of Wurldsbest Ventilator Showing Copper Wire Screen

A Few Representative Installations of "Wurldsbest" Ventilators

Remington Typewriter Company Offices, Chicago, Ill.
Presbyterian Hospital, Medical Center, New York, N. Y.
Lord & Taylor, New York, N. Y.
Farmers Loan & Trust Co., New York, N. Y.
Harris, Forbes & Co., New York, N. Y.
Cunard Steamship Co. Offices, New York, N. Y.
Standard Oil Co. of New Jersey Offices, New York, N. Y.
Fisk Rubber Co. Offices, New York, N. Y.
Durant Motor Co. Offices, New York, N. Y.
Racquet & Tennis Club, New York, N. Y.
Executive Mansion, Albany, N. Y.
Continental Oil Co. (Subsidiary of Standard Oil Co.), Denver, Colo.
Mountain States Telephone Co. (Bell System), Denver, Colo.
Buick Motor Car Co., Flint, Mich.
Hamilton Building, Wichita Falls, Tex.
Chase Co., Inc., Waterbury, Conn.

PRAIRIE WINDOW VENTILATOR CORP.

Manufacturers of Metal Window Ventilators

141 Georgia Avenue, PROVIDENCE, R. I.

NEW YORK, N. Y., Room 611, Graybar Building

BOSTON, MASS., Room 428, Statler Building

Prairie Sliding Sash Window Ventilator

The Prairie Window Ventilator is a simple, practical and scientifically constructed device that renders perfect ventilating service in homes, offices and public buildings. No drafts, stormproof, volume of fresh air under control—*makes the open window safe.*

It can be easily installed in any vertical sliding sash window and can be easily and quickly removed.

An adjustable slide, moving up or down, regulates the opening and closing of the pivot louvers and controls the air flow through the ventilator. It is rainproof and stormproof. A lateral adjustment of from 10 to 20 in., depending on the size, makes it possible to fit any window requirement. Made in 8, 12 and 18-in. heights and 5 adjustable widths.

Tin coated steel sheets, "Follansbee Forge," are used in construction of this type, finished in baked enamel, white, old ivory, gray, green, brown, or biege.

Industrial Steel Sash Window Ventilator

The Prairie Industrial Sash Ventilator is installed like a light of glass. It is made in standard sizes to fit the steel frames. Simply remove a light of glass and place the ventilator with the screen facing against the frame, insert wire springs or clamps as with glass, and putty same as regular glazing.

Industrial type is made of galvanized iron 28 gauge (not steel), assuring ample strength for rough abuse and is finished in brown or gray baked enamel, harmonizing with the plant appearance. Fine mesh, rustless screens, cut to exact size, are furnished with each ventilator, making it insectproof.

Made in two standard sizes, 12x18 and 14x20 in., or special sizes made to order.

This ventilator has the louver or shutter adjustment for controlling the air movement similar to the sliding sash type of ventilator.

FRANK B. PERRY, INC.
ENGINEERS AND ARCHITECTS
44 FRANKLIN ST., PROVIDENCE, R. I.

Job No. 532
Subject, Brier Mfg. Co.

April 20, 1928.

Prairie Window Ventilator Corp.,
141 Georgia Avenue,
Providence, R. I.
Attention Mr. C. I. Bigney, Pres.

Dear Sir:

In connection with the design for the three story reinforced concrete Nemo Building, to be occupied by the Brier Manufacturing Company and the Little Nemo Manufacturing Company, at the corner of Ship and Richmond Streets in this city, we made a thorough study of various window ventilators on the market.

With steel sash in cold weather the condensation of moisture on the interior surface of the glass is a source of annoyance. After some experiments, we decided that it would be advisable to install one Prairie Ventilator in place of a 14x20-in. light of glass in each sash, to not only prevent condensation but to have a source of ventilation which would be adequate and within the control of the operatives occupying the space adjacent to the windows at the work benches and elsewhere in the factory.

The experience which has been obtained on a smaller scale in another industrial building similarly equipped confirms our judgment in recommending the installation of three hundred of your Unit Sash Ventilators in the Nemo Building.

Yours truly,
FRANK B. PERRY INC.

FBP:VC

Prairie
WINDOW VENTILATOR
"Fresh Air without Drafts"

Users

International Silver Co.
Cudahy Packing Co.
American Steel & Wire Co.
Stone & Webster
N. Y., N. H. & H. R. R.
W. L. Douglas Co.
General Electric Co.
American Tel. & Tel. Co.
Yale University
Otis Elevator Co.
Electric Storage Battery Co.
American Woolen Co.
Ruberoid Co.
Bellevue Hospital
Old Colony Trust Co.
Copley Plaza Hotel
State of Pennsylvania

SWISS
CLEANSING COMPANY
CLEANSERS AND DYERS
PROVIDENCE, RHODE ISLAND

April 13, 1928.

Mr. C. I. Bigney,
Prairie Window Ventilator Corp.,
141 Georgia Ave.,
Providence, R. I.

My dear Mr. Bigney:

We would like to express our delight and pleasure over the service rendered by your Prairie Window Ventilator.

Where formerly it was almost impossible to keep men at our hot pressing machines, we have replaced them entirely with girls at an enormously increased output and superior work due to the perfect ventilation, caused by your ventilator. Ever since one of our men died with pneumonia caused by draft through an open window, although it was summer time, we had been sorely beset by our ventilating problems until you installed your ventilators.

We recommend these ventilators highly to everyone visiting our plant, and you no doubt have had orders from them from time to time.

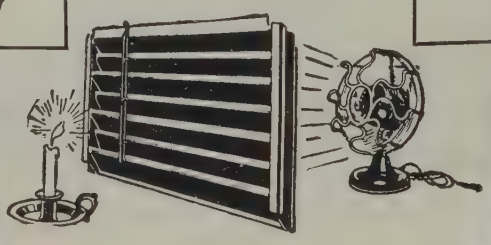
Trusting that you're meeting with the best of success in the marketing of this article, I am,

Sincerely,

JD:AO

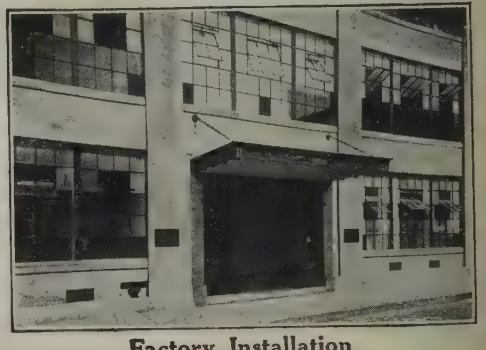
On your street TWICE every day

Residential Installation



Proof That the Prairie Prevents Drafts

The simple candle test illustrated here proves *conclusively* that there is no possibility of a draft when the *Prairie Window Ventilator* is used. When the fan is turned on directly in front of the ventilator, the flame of the candle is not blown out, but is attracted toward the ventilator by the upward deflection of the air. The air is forced through the ventilator directly up toward the ceiling



Factory Installation

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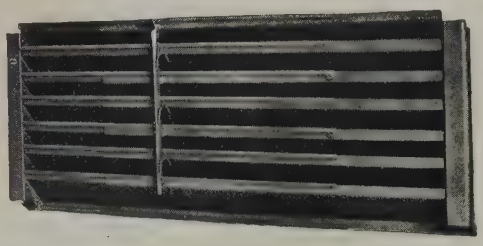
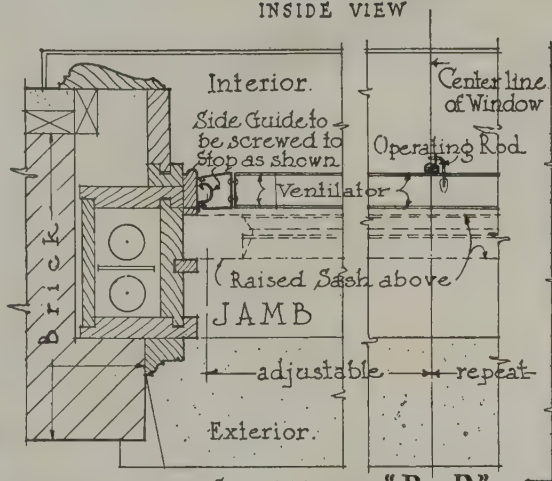
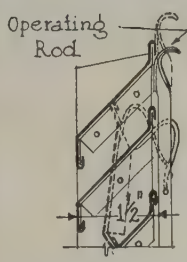


INSIDE VIEW

OUTSIDE VIEW

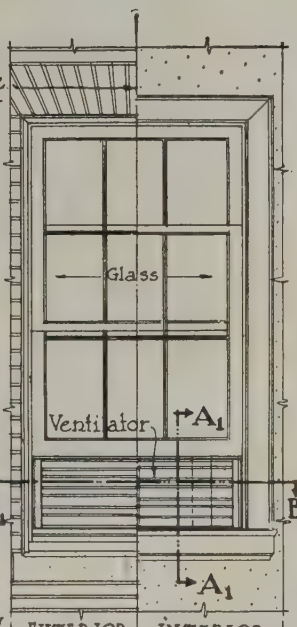


SECTION "B_1-B_1"



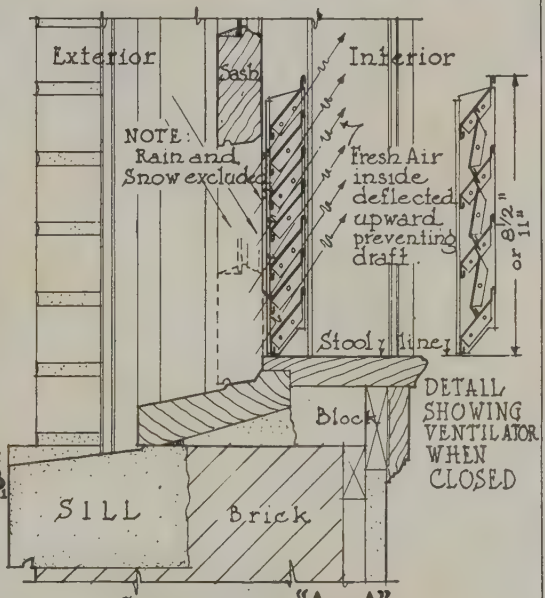
1/4 F.S. DETAIL SHOWING HOW VENTILATOR IS OPENED OR CLOSED.

NOTE: Louvres telescope making Ventilator adjustable to any Window width. Dash line shows Ventilator when closed by pushing the rod upwards - typical also for industrial steel window.



EXTERIOR — INTERIOR

HALF-ELEVATIONS



SECTION "A_1-A_1"

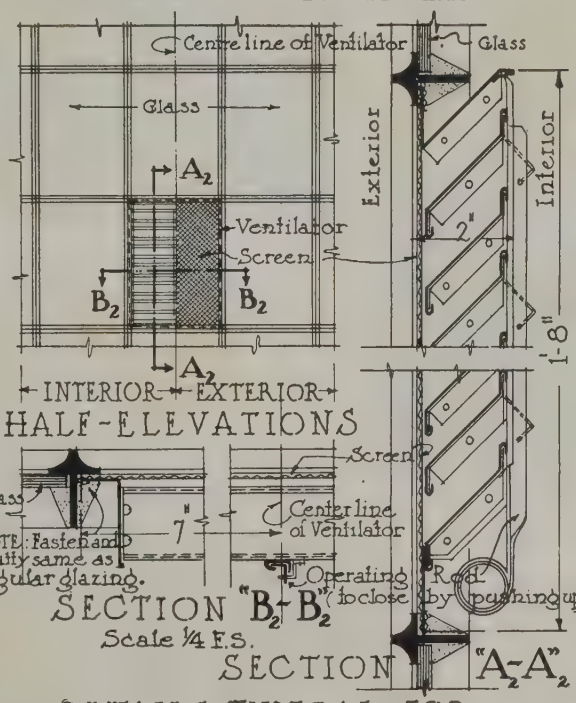
· DETAILS · TYPICAL · FOR · D.H. · WINDOWS ·

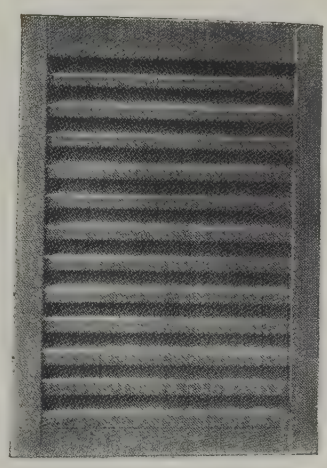
TABLE OF DIMENSIONS

HEIGHT (inches)	ADJUSTABLE WIDTH (inches)
8 to 12	12 to 22, 22 to 36, 30 to 50
	50 to 64, 60 to 76.
18	22 to 36, 30 to 50.

FINISHES: Finished in White, Old Ivory, Gray, Green, Brown and Beige Baked Enamel

INSIDE VIEW





OUTSIDE VIEW

DETAILS TYPICAL FOR INDUSTRIAL STEEL SASH WINDOWS

STANDARD SIZES 12" x 18" & 14" x 20"

PRAIRIE WINDOW VENTILATOR CORPORATION	APPLICATION OF PRAIRIE WINDOW VENTILATORS DOUBLE-HUNG AND INDUSTRIAL TYPES	DRAWING No. 1 SCALE: 3 3/8" & 1 1/2" EQUALS 1 FOOT

THE AIROLITE COMPANY

Manufacturers of Natural Air Ventilating Equipment

MARIETTA, OHIO

NEW YORK, N. Y., Room 721, Architects Building, 101 Park Avenue—Telephone, Ashland 6660

CHICAGO, ILL., 1102 Security Building, 189 W. Madison Street—Telephone, Franklin 8259

AGENCIES IN ALL PRINCIPAL CITIES

Products

THE WINDOW-WALL UNIT, a patented type of window and wall construction for bedrooms and sleeping porches built in combination with either double hung or casement windows.

"AIROLITE" ADJUSTABLE WINDOW VENTILATORS.

"AIROLITE" STEEL SASH VENTILATORS.

"AIROLITE" VENTILATING SASH.

For all kinds of Adjustable and Stationary Louvered Panels for natural air ventilation, see pages B1468-1469.

Window-Wall Sleeping Porch, in Use More Than Ten Years in Home of W. R. Metcalf, Marietta, Ohio

Mr. Metcalf Says: "I would give up the rest of the house before I would my Window-Wall Sleeping Porch. We sleep in the fresh air every night, regardless of the weather and the Window-Wall is the only thing I ever heard of that will permit of this and at the same time give you proper protection. I am strong for the Window-Wall."

Window-Wall Unit

The Window-Wall Unit is a combination of screen, glass and "Airolite" Ventilating Sash, ideal for sleeping porches, fresh air bedrooms and sun parlors, both in private homes and institutions. Affords protection, ventilation, privacy, comfort, convenience and health to the occupants of any room in which it is installed, and the original cost is only slightly more than the cost of an ordinary window. With Window-Wall, no awnings, inside window blinds or drapes are necessary. In other words, with Window-Wall you live outdoors with indoor protection. It is installed practically the same as an ordinary window.

Window-Wall Unit with Double Hung Sash as It Appears When Installed

The Window-Wall Unit consists of a wooden frame, a screen which is hung on the outside, a set of glass sash, a set of "Airolite" Adjustable Ventilating Sash and a tuck-a-way pocket with hinged sill. When the glass and "Airolite" Sash are lowered into the tuck-a-way pocket, a screened opening effect is obtained.

With the glass sash run up into place, you have a regular window or sun parlor. With the "Airolite" Sash raised and the glass sash lowered you have an all-year, open air, sleeping room. Both glass and "Airolite" Sash can be run up into place at the same time. By this arrangement the "Airolite" Sash serves as an awning or shade. The steel louvers can be tilted or adjusted to keep out excessive sunlight and at the same time retain absolute privacy.

Suggested Window-Wall Specifications for Architects' Use

(For insertion in Carpentry section.)

Specifications vary with the designs and construction desired. The following specifications cover all items, which may be segregated and used to specify construction for double hung windows:

Where indicated on the plans, the [Carpenter] [Contractor] shall furnish and install Window-Wall Units as manufactured by THE AIROLITE COMPANY, Marietta, Ohio.

Each Window-Wall Unit as shipped by the manufacturer shall consist of a substantially constructed wood framework built with window openings, each unit built up by framing pulley jambs (with pulleys, outside blind stops and parting stops), head jamb, weather pan board and copper weather pan in the proper manner. This does not include any interior or exterior trim.

The following material shall be furnished by the manufacturer and be installed by the [Carpenter] [Contractor].

One pair double hung, metal louvered "Airolite" Adjustable Ventilating Sash (louvers to be finished in standard baked enamel paint, olive green color; frames, three coats air-dried enamel paint, olive green color).

One pair double hung glazed sash, one full length copper wire screen, outside sill, hinged sill, inside sill, sash weights and weight guides.

One pair sill hinges, one pair copper drain tubes and one set full length screen hangers.

The [Carpenter] [Contractor] to leave proper openings to receive Window-Wall Units and to furnish all labor and material required to install these units in first class workmanlike manner and in line with all exterior and interior construction.

Continued on next page

Detail Drawings of Window-Wall Units

The details in the next column are for frame construction, also for stucco if 1⅛-in. casing is used. For casement windows, brick or other construction write for detail drawings.

STANDARD SIZES OF WINDOW-WALL UNITS

Widths

Glass size, in.	Over-all glass sash, in.	*Over-all clearance required between studding or structure opening, in.
20 in.—One-light wide	24	31¾
22 in.—One-light wide	26	33¾
24 in.—One-light wide	28	35¾
26 in.—One-light wide	30	37¾
28 in.—One-light wide	32	39¾
30 in.—One-light wide	34	41¾
32 in.—One-light wide	36	43¾
18 in.—Two-lights wide	41	48¾
20 in.—Two-lights wide	45	52¾
22 in.—Two-lights wide	49	56¾
24 in.—Two-lights wide	53	60¾

**Note:* For brick construction, etc., where weight boxes are required, add 1½ in. to the above dimensions on over-all width clearance required.

Mullion Casing: When the Window-Wall Units are to be installed with mullions between units, the ground casing and finished interior casing fitting between the units will each be 10¾ in. wide. This will be increased by 1½ in. when used in brick or masonry walls.

Heights

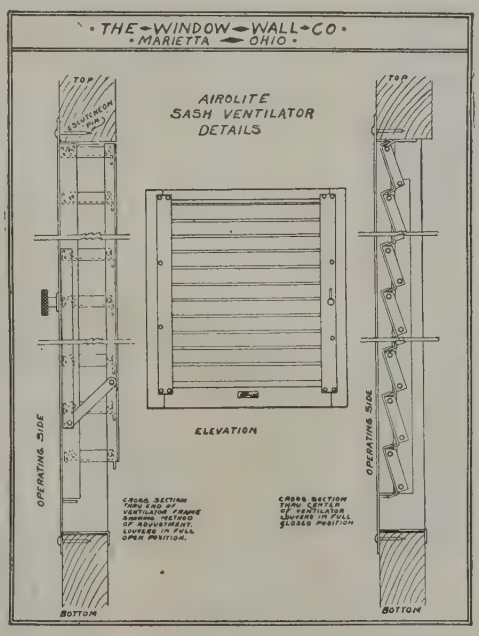
Glass size, in.	Over-all glass sash, in.	Floor line to top of inside sill, in.	Over-all clearance required between floor line and headers, in.
20	46¾	31 1/16	78 5/8
22	50¾	33 1/16	84 5/8
24	54¾	35 1/16	90 5/8
26	58¾	37 1/16	96 5/8
28	62¾	39 1/16	102 5/8
30	66¾	41 1/16	108 5/8

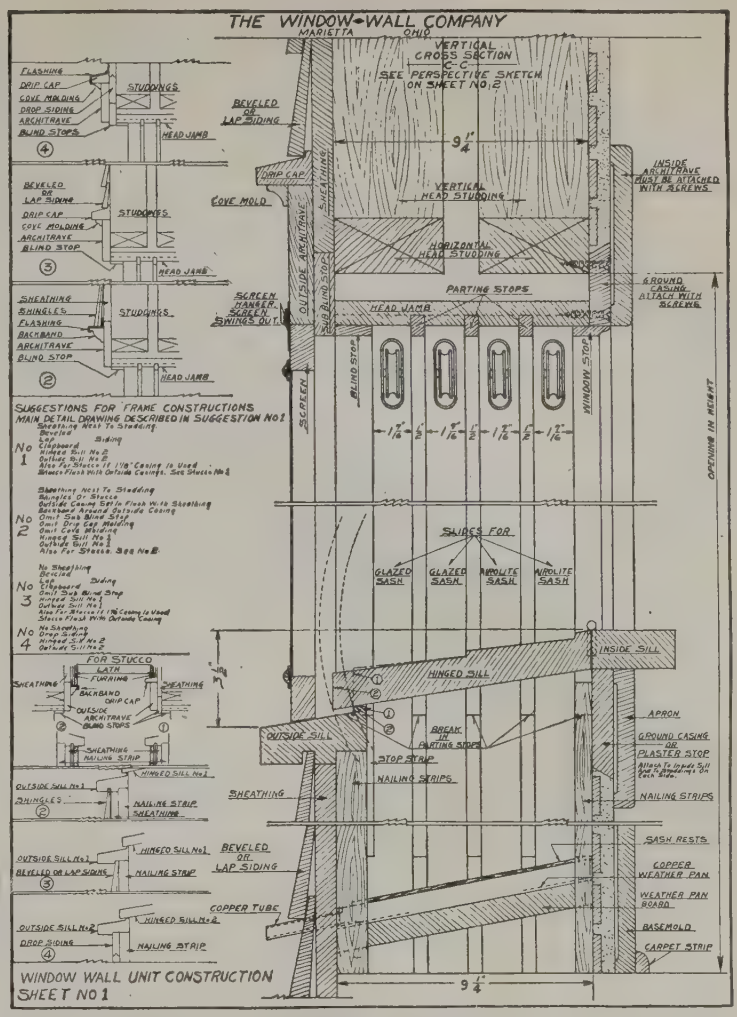
Caution: The above dimensions cover the actual openings required to receive the Window-Wall Unit. Take care of top and side trim.

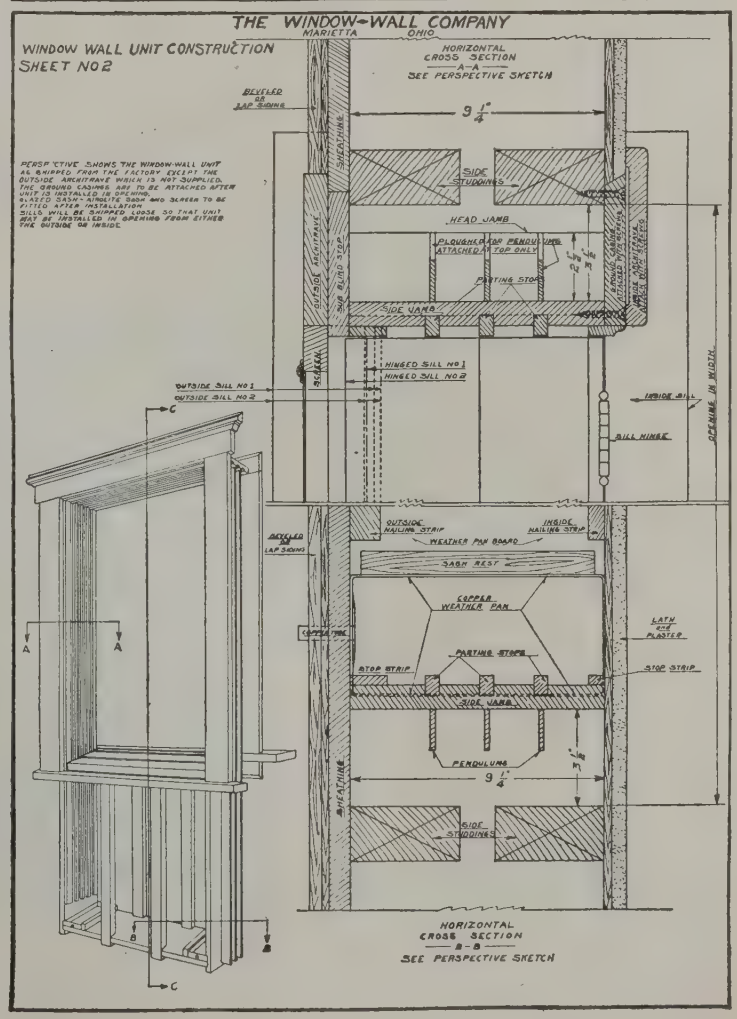
"Airolite" Ventilating Sash, Glazed Sash and Screen are the same in width.

"Airolite" Sash, an All Weather Sash

"Airolite" Sash is a patented ventilator constructed with wood frame and adjustable louvers, made of rust resisting steel, each louver having a ¼-in. flange. A slight pressure of the thumbscrew sets the louvers at any desired angle, quickly and silently, thus affording privacy, shade or light as desired, fresh air without draughts and protection against storms. While "Airolite" Sash is used as part of the Window-Wall Unit it can be installed as a separate unit in old and new construction as ordinary double hung glazed sash, as full length screen, or as half sash to fit against outside blind stops and flush against upper glass meeting rail; the bottom to rest upon the main sill. "Airolite" Sash can be supplied with or without screen. When screen is desired, we use 16-mesh copper wire cloth. On large sizes, the "Airolite" Sash is divided up into various size lights.







AMERICAN DISTRICT TELEGRAPH COMPANY

Central Station Protection Service and Electric Signaling Systems

EXECUTIVE OFFICE

183 Varick Street, NEW YORK, N. Y.

For complete list of A. D. T. Service and Central Offices, see page C3566

For A. D. T. Watchman's Compulsory Tour, Fire Alarm, Sprinkler Supervision and Proprietary Systems, see pages C3566-3567

Phonetalarm—A. D. T. Bank Vault Protection Systems (Approved Grade-A)

The Phonetalarm provides a system of bank vault protection operating on the sound detection principle. Protection is provided by means of microphones or detectors installed on the ceiling of the vault. Any attempt to force an entrance into the vault necessarily results in certain noise. This causes the diaphragms of the detectors to vibrate with a resulting effect upon certain instruments which cause the alarm to operate.

The system is effective against attack by means of hammering, drilling, burning or explosion. A sharp blow on the vault wall or any part of the vault structure will cause the alarm to sound; it will not operate from sounds originating elsewhere on the premises. Vault door and bolts are provided with protection contacts so that an alarm will be given upon any attempt to open the vault prior to the prescribed opening time.

The simplicity of Phonetalarm construction makes it possible to install a system without inconvenience in a vault already erected as well as in vaults under construction. The devices are always accessible, so that repairs and adjustments can be made at any time without difficulty. The Phonetalarm is less expensive to install than any other type of system, yet it has an unusual value from a protection standpoint.

The A. D. T. Phonetalarm is the original sound detection system, the first system having been installed by A. D. T. engineers in 1914. Since that date, scores of banks throughout the country have installed the Phonetalarm, including many Federal Reserve Banks and other large banking institutions. This system has the approval of the Underwriters Laboratories, Inc., and is listed as Grade "A," thus securing the maximum discount on burglary insurance premiums.

A. D. T. Central Station Phonetalarm

Under Central Station operation the Phonetalarm System is given continuous supervision. All alarms are responded to immediately by men especially trained for this service. A careful check is maintained on the opening and closing of the vault and it cannot be left open or be reopened after the usual closing hour without causing an investigation.

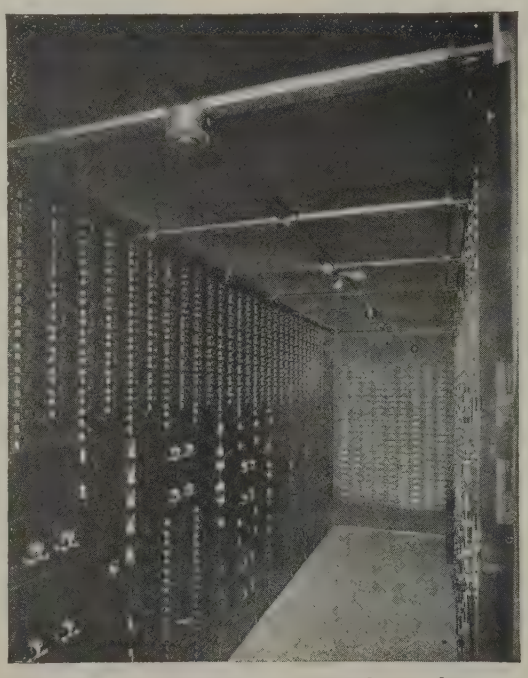
Each Phonetalarm System is connected to the Central Station by means of an individual wire. This is under constant supervision and cannot be opened, shorted or grounded without detection by Central Station operators.

The Phonetalarm detectors are tested periodically during the closed period by means of a sounding device within the vault which is operated from the Central Station. This simulates an alarm condition and the signal received in the Central Station is identical with one originating from an attack on the vault.

Service is an important item in Central Station operation and all systems are carefully inspected and tested periodically in order to assure perfect operation. Skilled repair men are constantly on duty to render service in the event repairs are necessary.

Central Station Phonetalarm may be secured in all cities where A. D. T. Central Stations are maintained.

For complete list, see page C3566.



Typical Phonetalarm Bank Vault Installation

Local Bank Vault Phonetalarm

Designed for installation anywhere without restriction as to location. Consists of Phonetalarm detectors and control equipment together with apparatus for providing an alarm locally. The alarm device is an 18-in. loud ringing bell installed in a protected steel housing. The protection is under the control of a time clock within the vault. A visual signaling device installed on the outside of the vault indicates condition of the alarm at all times. Means are provided for making sound tests after vault is closed.

Control equipment includes the A.D.T. sound accumulator adjustable as to number and intensity of shocks which eliminates unnecessary alarms due to momentary disturbances. An automatic cutout and reset silences the bell and restores system to normal after a period of ringing. Energized from dry cells or storage battery as desired.

Serviced from A. D. T. offices located at 117 points in the United States. Periodic inspections provided; prompt service may be obtained in event repairs or replacements are required.

Other Protection Systems for Banks

In addition to the Phonetalarm System described above, the American District Telegraph Company also furnishes laced systems for both Central Station and local operation. Systems are also supplied for protection against "hold-up."

DUPLEX ELECTRIC COMPANY

Bank Vault and Day-Raid Alarms, Vault Ventilators, Night Depository Protection

MAIN OFFICE AND FACTORY
71-73 Grand Street, NEW YORK, N. Y.
BRANCH OFFICES IN LEADING CITIES

Duplex Grade "A" Bank Vault Alarm Systems

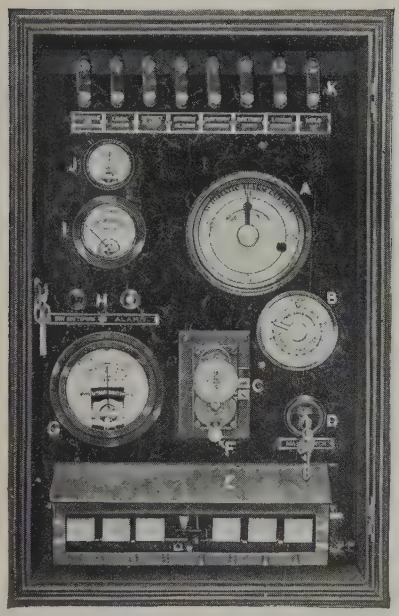
Tested and listed by the Underwriters' Laboratories, Inc., and rated Grade "A" giving 65% reduction in burglary insurance rates.

Duplex Grade "A" Microphone System—The entire vault structure and door are protected electrically by Duplex Microphone Units located on vault ceiling. Duplex Patented Sound Regulator controls the sound waves required to operate the alarm and prevents accidental alarms from extraneous sounds; alarm operates only from direct attack on vault structure or door.

The microphone element is discontinued automatically from service during daytime banking hours.

Vault Door—Is protected with bolt contacts and lined with Duplex patented thermostatic lining which operates to sound the alarm when door is attacked by torch or drill; the lining operates from mere conduction of heat through steel of door. This lining protects a greater continuous area of door than any other type of lining.

Public Alarm Station—Comprises two 18-in. diameter cast riot gongs (differently intoned to increase the violence of alarm) and mechanism. Completely enclosed in steel housing electrically protected at all points against every means of attack. No batteries located in alarm housing.



Control Panel in Vault

Control Cabinet—Installed inside the vault contains the following: 72-hour time-lock time controller, automatic cut-out, segregating circuit busbars, Yale-lock type main switch, testing ammeter, supervising milliammeter and relays, annunciator drops, constant ringing mechanism, automatic sound regulator.

Primary Batteries—Used for operating the closed circuits are located inside the vault.

Application—Installed for any type vault—whether already built or under construction.

Duplex Grade "A" Vault Cable System—Walls, ceiling and floor are electrically protected throughout by special lead covered cables laced at 3-in. centers in 18 separate circuits on the reinforcing rods before the concrete is poured. Cable System operates on a closed circuit through relay mechanism which gives the alarm the moment any circuit is severed. Vault door protection, public alarm station, control cabinet, etc., are identical to those in the Microphone System, excepting the microphone control features.

Application of Cable System—New vaults only, as cables must be installed on reinforcement during construction.

Duplex Grade "A" Night Depository Protection

Tested and listed by Underwriters' Laboratories, Inc. as Grade "A" reducing burglary rates on depository 65%.

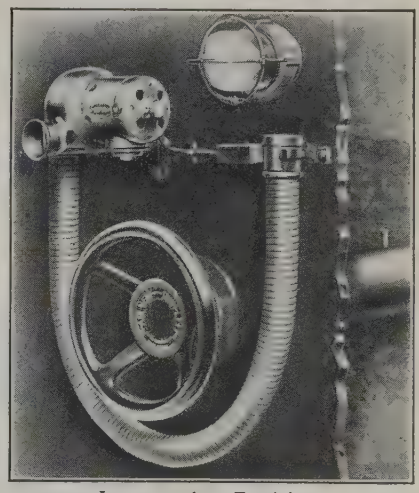
Walls and chute of Night Depository safe protected by lead covered cables at 3-in. centers installed prior to placing of concrete jacket. Safe door protected with Duplex thermostatic lining or closed circuit cables. Depository entrance completely protected. The depository protection is connected to the vault alarm system.

Application—Any Night Depository (After Hour) Safe, preferably when safe is being installed.

Duplex Vault Ventilator

Not only maintains basic insurance rates on vault, but adds to strength of wall. Provides a tested and approved means of preventing suffocation.

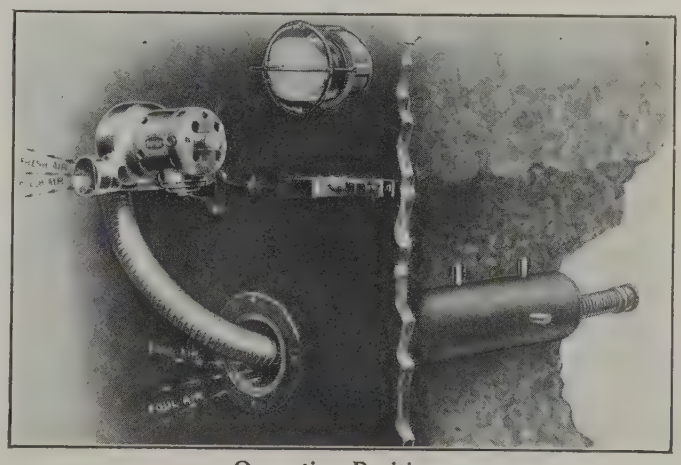
Comprises: (1) outer steel casing, (2) steel plug with pilot wheel, (3) fan motor unit with automatic control switch, (4) emergency light fixture.



Inoperative Position

Casing, which is 3¾ in. outside diameter, is embedded in concrete vault walls. Inner surface is tapered to form a liquid tight fit with the steel plug. Plug is held in locked position by heavy threads on hub of pilot wheel. Wheel is attached to plug by special joint which prevents successful outside attack or manipulation. Face of pilot wheel has radiant letters and is easily located in the dark. Flexible metallic air intake tube is permanently attached to fan. Automatic switch hook is attached to vault wall near pilot wheel and holds intake tube in inoperative position. Removal of tube starts fan and lights emergency light.

Operation—Simply remove plug by turning pilot wheel, take air intake tube from hook and thrust it through opening from which the plug has been removed.

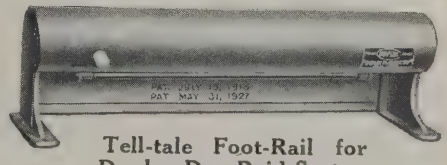


Operative Position

Duplex Day-Raid System

Reduces robbery insurance rates 10%.

Provides patented foot-rails for tellers' cages. A contactor bar on the underside of the rail operates by movement of the toe upward and towards the operator. Box type rail prevents accidental alarms by insertion of mop or broom. Tell-tale type rail has a red annunciator which registers when rail is operated, thus showing exact source of alarm. Annunciator can be reset only by key in hands of cashier, thus checking any possible mischievousness. System operates an outside gong, silent alarm, or both.



Tell-tale Foot-Rail for Duplex Day-Raid System

FEDERAL LABORATORIES, INC.

Manufacturers of Federal Gas Protective Equipment

1631 Liberty Avenue
PITTSBURGH, PA.

AGENCIES

NEW YORK, N. Y. DETROIT, MICH. ST. LOUIS, MO. BUFFALO, N. Y. CINCINNATI, OHIO PHILADELPHIA, PA.
SAN FRANCISCO, CAL. INDIANAPOLIS, IND. COLUMBUS, OHIO CHICAGO, ILL. LOUISVILLE, KY. CLEVELAND, OHIO
LAKELAND, FLA. TOLEDO, OHIO WASHINGTON, D. C. SALEM, ORE. TORONTO, CAN.

Products

FEDERAL GAS PROTECTIVE DEVICES for banks, stores, pay offices, etc.

FEDERAL GAS BURGLAR PROTECTIVE EQUIPMENT for safes and vaults.

Effective Safeguarding of Financial Institutions

Over 3500 Installations—Hundreds of banks and other financial institutions throughout the country have installed Federal Gas equipment in and about their buildings for the purpose of protecting the lives of their employees and the cash and securities entrusted to their safekeeping.

It is the newest and most modern form of protection against the hold-up man because of the fact that no physical injury to bystanders, employees or customers takes place. When an armed bandit enters the bank or store protected with Federal Gas Devices and orders the cashier or teller to put up his hands he has to approach the window of the cage or counter, as the case may be. The employee obeys orders and raises his hands, but his feet are active. One foot quietly presses a control unit for discharging the gas, filling the lobby in one-half second, and instantly the bandit is blinded and rendered helpless by the cloud of tear gas discharged in his face. This gives the employees of the bank a few moments time to act before the gas reaches them behind their cages, and the bandit will remain helpless for a considerable period of time, sufficient to summon help and disarm him.

Federal Gas in Operation in a Bank

Entire corridors of banks, fronts of cages, doorways, safes and vaults, wherever protection is necessary, Federal Gas guns can be concealed to protect the premises.

Bandits are helpless against these guns. This protection has never been beaten by the bandit. Guns are thoroughly concealed, if necessary, and are either automatically or mechanically operated from remote controls. It is the one form of protection which instantly becomes an offensive weapon, and before which a bandit or gang of bandits is rendered harmless and unable to shoot. It is a weapon which can be used without danger of injuring innocent persons; which does not depend upon the aim of the operator; and which is non-injurious, the effects lasting only about fifteen minutes. Insurance companies assume all liability without extra cost.

Federal Gas is the only protection that will break the coverage of a bandit with his gun without endangering the lives of bystanders.

For these reasons, Federal Gas stands paramount in the great business of combating crime.

Federal Gas

It is used in a solid form for stability and is instantly generated into a gaseous state which simultaneously supplies the pressure to project the gas from the guns. It is a harmless non-toxic gas, commonly known as tear gas. The guns are easily reloaded with new cartridges.

Federal Gas is approved by the Underwriters' Laboratories, Inc. and reduces holdup and burglary insurance rates where installed. Customers who have installed this protection attest to the fact they have no accidental discharges.

Installation and Equipment

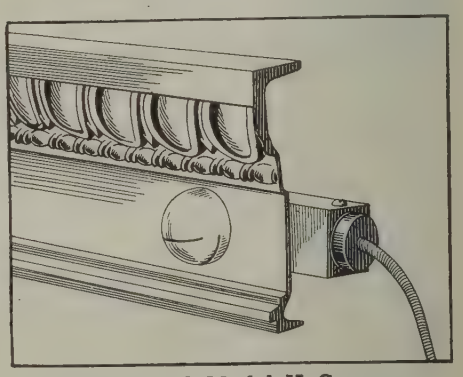
Architects and financial and business executives interested in the installation of Federal Gas Equipment for the protection of their business should communicate directly with the FEDERAL LABORATORIES, INC. or the nearest agency for complete details of installation, type of equipment and other information.

It will not obligate you in the slightest degree to have our representatives call, set up and discharge equipment suitable for your needs and furnish you with all necessary information.

This equipment can be installed by local workmen or by experienced men supplied by us.

Federal Foot Control
Cannot be accidentally operated

Federal Hand Control Push Buttons on Side Are Countersunk and Safe



Federal Model K Gun
Concealed in bank partition cornice
Electrically operated and invisible

O. B. McCLINTOCK COMPANY

Burglar Alarms, Vault Ventilators, After Hour Depositories and Electrical Chime Clock Systems

GENERAL OFFICES AND FACTORIES
MINNEAPOLIS, MINN.

SERVICE STATIONS

738 Ceres Avenue, LOS ANGELES
310 California Street, SAN FRANCISCO
604 Chamber of Commerce Building, PITTSBURGH
1511 Widener Building, PHILADELPHIA
475 Fifth Avenue, NEW YORK

Products

Complete Electrical Bank Vault Local Burglar Alarms.

After Hour Depositories.

Vault Ventilators.

Electrical Tubular Chime and Clock Systems.

Organization and Scope of Operation

Over a quarter century of successful experience in electrical vault protection.

Paid up capital over $500,000.

Highest financial rating.

Experienced engineers and electrical experts.

More than 5000 systems in operation and under service throughout the United States and Canada.

Service

A large corps of field experts maintained and so located that any portion of the United States can be reached on a few hours notice.

Approved Grade "A" Burglar Alarm Systems

Discount—65% discount from burglary insurance rates upon vaults of any classifications.

Automatic Control—Exclusive patented features of automatic operation and control with visible and audible supervision and testing absolutely guarantee that the vaults will be properly closed, locked and electrically protected every night.

Burglar Alarm Housing

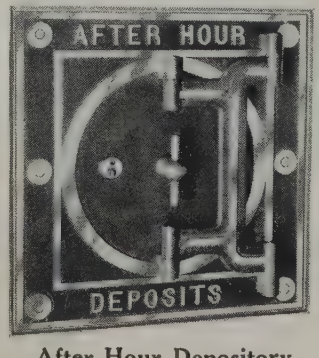
Daylight Holdup Alarm Stations—Both footrail and push button types for vaults, cages and other desired locations.

Inspection and Maintenance—Annual inspection by field experts provided for in contract.

After Hour Depositories

Enable banks to extend their deposit service to twenty-four hours every day without changing banking hours or adding to working force.

Special Features—Automatic return of deposit receiver; completes deposit automatically. Complete Grade "A" electrical protection to be connected to any make of Burglar Alarm System (optional). Electrical counting of deposits (optional). Sturdy construction. Best depository classification; lowest insurance rates; highest discounts. Name "After Hour" Registered U. S. Patent Office.



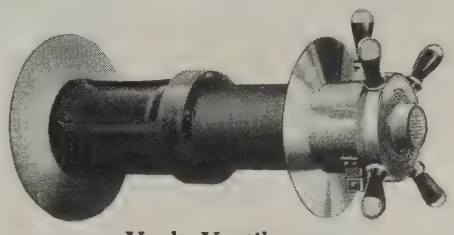
After Hour Depository

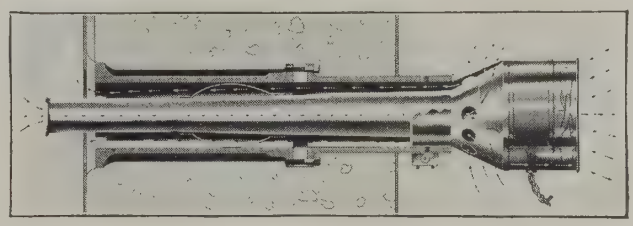
Vault Ventilator

The vault ventilator safeguards the lives of persons locked within an airtight vault. Provides scientifically correct ventilation by forced draft—affording an abundance of air for all locked within the vault.

Draws in fresh air, expels foul air.

Embedded in the vault wall, it offers as much resistance against attack as the wall itself and is fireproof and liquidproof. It does not affect insurance rates.


Vault Ventilator


Sectional View of Vault Ventilator

Clock and Chime Systems

McClintock Clock and Chime systems are specified for use where accuracy and long life are desired—particularly outside clocks.

The systems include the master clock, secondary clocks, storage battery and charger.

Tubular chimes are a special feature of our clock system if desired.

Styles of outside clocks include bracket clocks with two, three and four dials, also pedestal style. Regular construction is steel frame covered by fabricated copper plates. Cast iron, wrought iron or bronze can be furnished.

Prominent Installation of McClintock Chime Clock

Literature

Descriptive literature on McClintock products sent upon request. Standard A.I.A. folders furnished architects and vault engineers. Correspondence invited.

THE BANK VAULT INSPECTION CO.

SAMUEL P. YEO, President

Night Depositories for Banks
Bank Vault Engineers and Bank Lock Inspectors

MAIN OFFICE

5 South 18th Street, PHILADELPHIA, PA.

CHICAGO OFFICE, 6 North Michigan Avenue

Sales Engineers in All of the Principal Cities

"Yeo Rotary"—Night Depository for Banks

The "Yeo Rotary" is a burglarproof *night depository* which allows a bank to offer a complete 24 hour deposit service 365 days per year to all their depositors, especially chain stores, garages, restaurants, storekeepers, building associations and all others who accumulate large sums after regular banking hours.

The "Yeo Rotary" is similar to the modern mail chute, used in office buildings, and consists of the same three general units: a receiving chest, a drop or entrance (rotary) and a steel connecting chute.

The "Yeo Rotary" has been approved and specified by leading architects and engineers and over 600 of these night depositories are now installed in the United States.

The "Yeo Rotary" Entrance, when open, projects no further from the building than when in the normal closed position. This is an important consideration when weather resistance is an objective.

Our patent, No. 1,576,125 covers rotary entrances and we are fully protected by the American Patent Protection Co. of New York. We are specializing in this field and have originated and patented the first burglarproof night depository entrance—the "Yeo Rotary."

"Yeo Rotary" Units—

(1) Yeo Patented Rotary Entrance.

(2) The steel connecting chute.

(3) The burglarproof receiving chest with circular door.

(4) The surrounding 6 in. of reinforced concrete poured around connecting chute and receiving chest.

(5) The deposit bags to be issued to prospective users, such bags being sealed by a special fastener and a padlock.

(6) All necessary form cards for bank records of such deposits.

(7) Necessary advertising data.

Insurance—"Yeo Rotaries" and their allied equipment receive the lowest insurance rating.

Electrical Protection—They can be attached to electric alarm systems already installed in the bank.

Data and Service—Our engineering service can give you the benefit of their experience and will assist you in the design of this equipment. Write for standard A. I. A. file giving full data.

Bank Vault Engineering Service for Architects

We maintain a staff of qualified vault designers and engineers. This staff will gladly assist you in the design and preparation of specification for vaults.

Full sets of plans and specifications should be furnished to the manufacturers in order to assure fair competitive bidding on vault equipment.

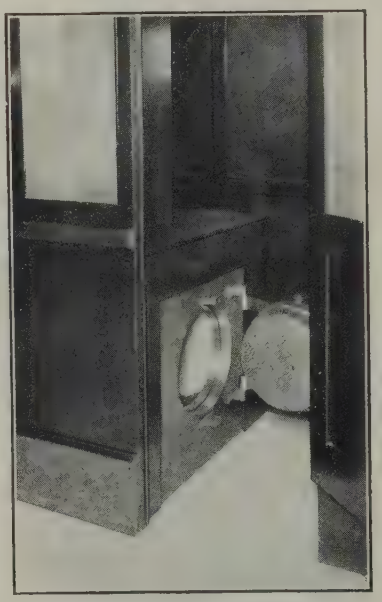
We have designed vaults from $10,000 up to $500,000 in cost. Our factory inspectors meet with all up-to-date methods of burglar-attack and we can design to resist them.

Inserting Yale Key in Control Lock of Rotary

A slight pull on cylinder will rotate it to open position

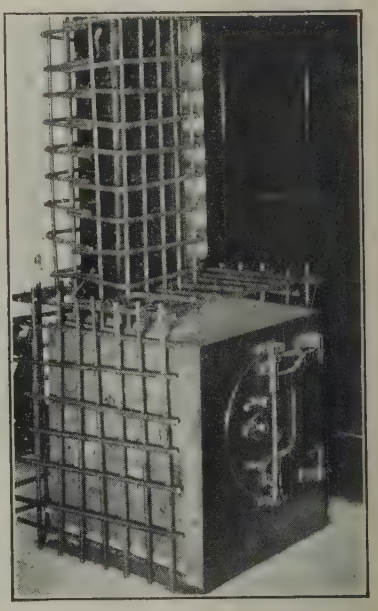
Rotary Cylinder in Open Position

Depositor placing sealed bag in cylinder



Installation Completed within a Booth in Bank Basement

Door of receiving chest shown open



Burglarproof Receiving Chest

Reinforcing rods erected ready for 6 in. of concrete around chute and chest

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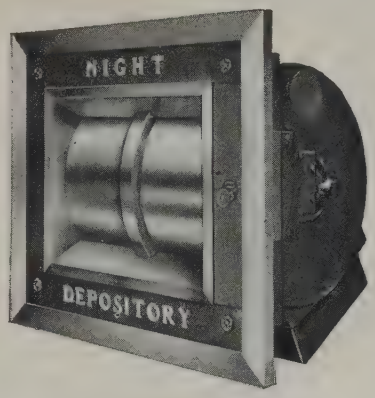
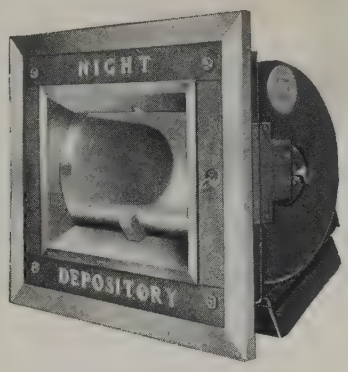
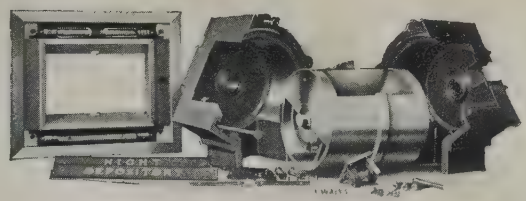


Rotary Cylinder Closed



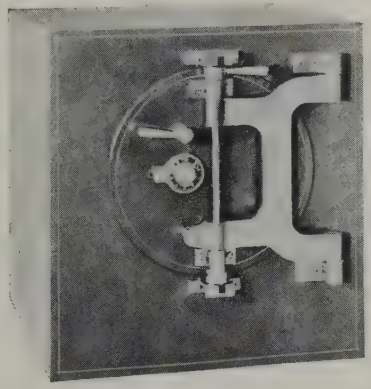
Rotary Cylinder Open

Tiffany illuminated letters, note impressive strength
Weight 600 lbs.

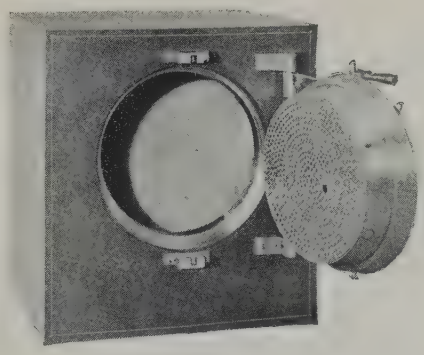


Rotary Dissembled

Note accurate machine work

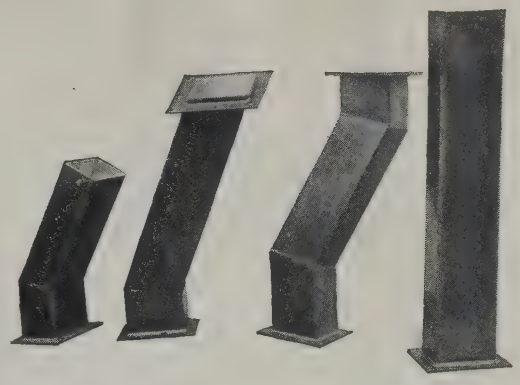


Receiving Chest
Door locked



Receiving Chest
Door open

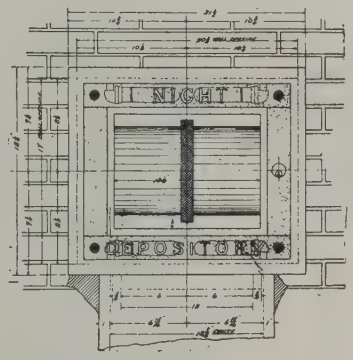
Weight 2000 lbs.



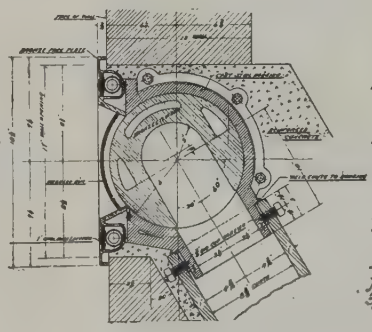
Steel Connecting Chutes

Welded construction
Interior size, 8⅜x13⅞ in.
Note various shapes to suit structural conditions

FRONT VIEW OF YEO DE LUXE ROTARY WITH TIFFANY ILLUMINATED LETTERS - "NIGHT DEPOSITORY"



NOTE - Allow opening through wall 17"x20½". Interior size of chute 8⅜" x 13⅞"

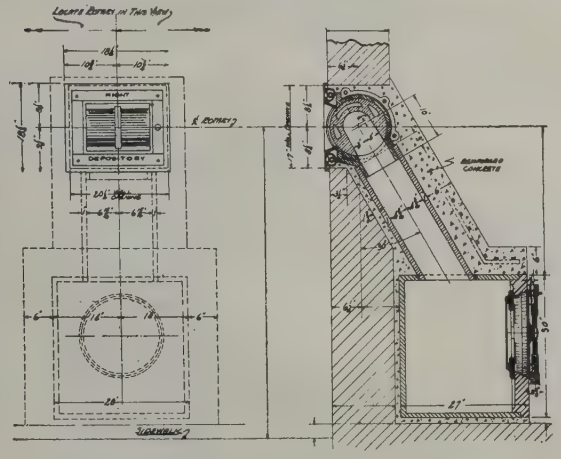


SIDE VIEW SHOWING SECTION THRU ROTARY

NOTE - Rotating cylinder seals chute opening at any point of revolution

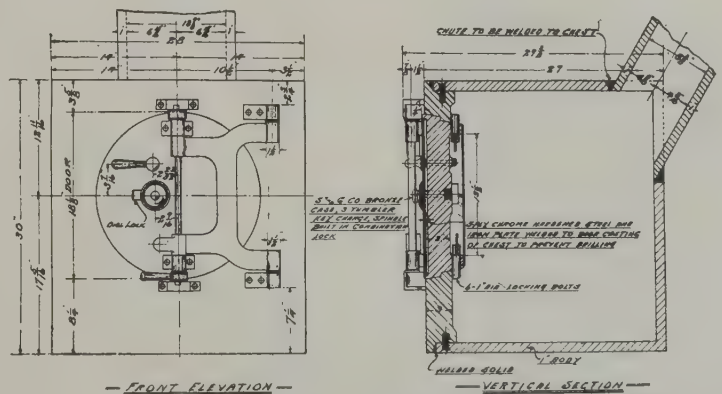
Weight of De Luxe Rotary 600 pounds.

NOTE - Rotary only projects beyond wall face ¾ inches - open or closed



FRONT ELEVATION *VERTICAL SECTION*

TYPICAL FIRST FLOOR INSTALLATION



— FRONT ELEVATION — *— VERTICAL SECTION —*

THE RECEIVING CHEST — Weight 2000 lbs.
Burglar Proof Construction - Door 3 in. Solid Thickness - Body 1 in. Solid Thickness.

YEO PATENTED NIGHT DEPOSITORY DETAILS

DIEBOLD SAFE & LOCK COMPANY

FACTORY AND GENERAL OFFICES

CANTON, OHIO

RETAIL STORES

NEW YORK, N. Y. CHICAGO, ILL. ST. PAUL, MINN. DETROIT, MICH. CLEVELAND, OHIO OMAHA, NEB. NEW ORLEANS, LA.

REPRESENTED IN LEADING CITIES IN UNITED STATES AND CANADA

Products

BANK and SAFE DEPOSIT VAULTS and VAULT FRONTS, including: Safe Deposit Boxes, Linings and Complete Equipment; FIRE-RESISTIVE VAULT DOORS, plate and filled; FIRE-RESISTIVE SAFES and FILING SAFES; STEEL MONEY CHESTS, rectangular and round doors.

Exclusive Features

Embodied in Diebold Vault Doors, Series 600 and 1000 are three exclusive Diebold features: (1) Diebold Daylight Automatic Lock, protection against daylight holdup; (2) Electric Alarm Grid *built into* the door, connects with any standard electric alarm system and is approved by manufacturers of leading electric alarms.

On all Diebold Bank Vault Doors 7 in. or greater in thickness the Diebold patented Thermatic Locking Device may be installed when requested. Approved by Underwriters' Laboratories and National Bureau of Casualty and Surety Underwriters, it entitles the bank to 10% preferential insurance discount.

65 Years of Successful Safe Building

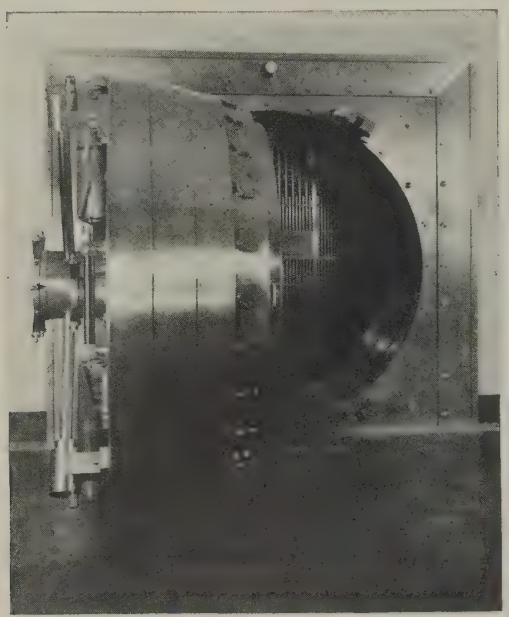
The recognized quality of the Diebold product is the result of experience as designers, engineers and manufacturers of bank vaults and safes since 1859.

During this period many Diebold safes and vaults have successfully withstood the severest tests, in actual service, as is attested by the many letters on file in this office.

Co-operative Service to Architects

Our Engineering Department, together with the entire personnel of our various branch offices is at the disposal of the architect or contractor.

Sketches and estimates on special work, as well as stock designs will be gladly furnished, without charge.



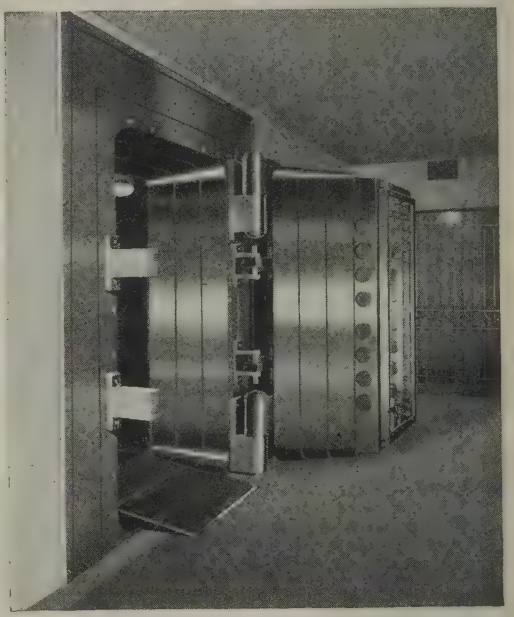
Bank and Safe Deposit Vaults and Doors

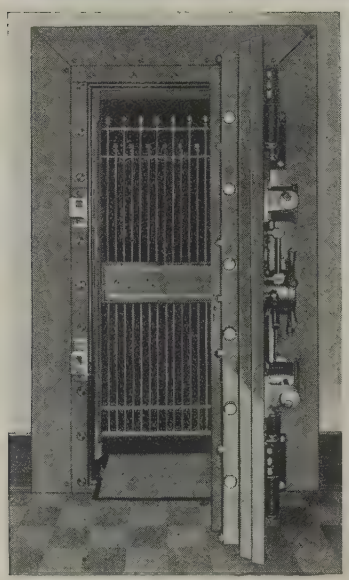
Complete Diebold bank vault outfits are in use in many of the largest banks throughout the United States.

These include all styles and sizes from the simplest to the most elaborate.

In this work all necessary equipment such as safe deposit boxes, linings, etc., can be furnished.

Catalog sent upon request.

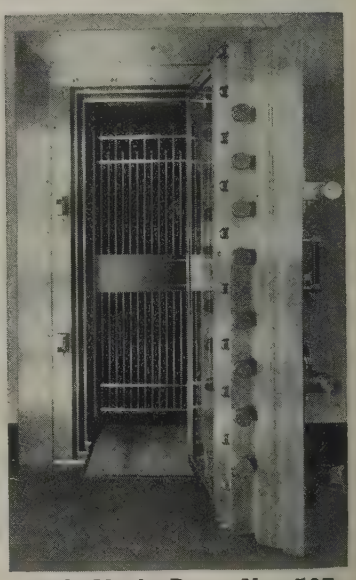




Bank Vault Door No. 235

Burglarproof Vault Fronts—In addition to our lines of standard vault doors described below, we are prepared to build any style or size to meet special or unusual conditions.

Door No.	Solid steel, thickness in.	Wall opening, in. High	Wall opening, in. Wide	Depth of vestibule (without lining), in.	Clear opening between jambs, in. High	Clear opening between jambs, in. Wide	Outside over all, in. High	Outside over all, in. Wide
Rectangular Doors								
215	1½	85⅞	44½	20	78	32	87	48½
235	3½	84⅝	40	20	78	32	91 13/16	56⅛
507	7	93	49	20	78 3/32	32 3/16	95	60
610	10	93	49	20	78 3/32	32 3/16	96 31/32	62 7/16
612	12	95½	52½	20	78	34	105¾	80
616	16	98	56	21	78	34	107⅞	82 11/16
620	20	99	60	24	80	38	109 3/16	88 25/32
625	25	111½	72¾	27½	84	40	116 21/32	97¾
Circular Doors								
1010	10	96	96½	20	80	80	102¼	119
1016	16	100	100	24	80	80	106	123¾
1020	20	106	106	27	82	82	109¼	126
1025	25	111¾	111	33	84	84	115	133



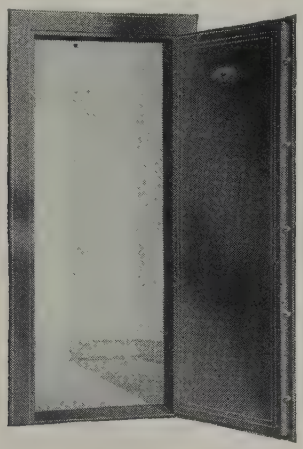
Bank Vault Door No. 507

Continued on next page

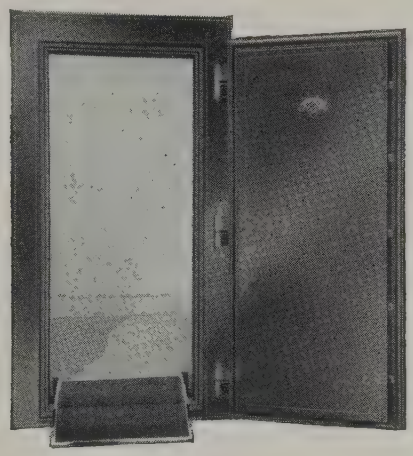
Victory Line Fire-resistive Vault Doors

The "Victory" Line includes a complete range of modern fire-resistive vault doors. Old style vault doors afforded approximately ten minutes resistance to intense heat unless thoroughly grouted and then only twenty-seven minutes, providing inside doors were closed. Grouting the old style plate door was not only impractical due to twisting it out of shape, but was seldom done because of the difficulty of installation and ease of misrepresentation. The Diebold "Victory" Line has been developed to overcome these evils and to give architects a line of Underwriters' labeled vault doors that need no grouting and that are so easy to install that there can be no object in slighting the installation.

During a severe fire, heat and flame are most likely to pass into the vault between the vestibule and the vault wall and between the door and jamb. The new Diebold "Victory" doors are designed to prevent this happening. Patented reinforced antiwarping channels are used so that buckling under the influence of heat cannot force an opening between the face of the wall and frame. An extra deep construction tongue on both sides and top jambs reinforced by the antiwarp channel and by "Z" bars that form the frame of the door, prevent warping between door and jamb. The lightest Diebold vault doors are fire-resistive for twenty-nine minutes with inside door open and from forty to forty-five minutes with inside door closed. The line ranges from these doors up to four-hour fire-resistive doors including Underwriters' labeled one-half hour and two-hour doors. In appearance they are handsome with their olive green finish, brush bronze trimming and black bakelite handles.



Vault Door Style "L," Underwriters' Label ½ Hour



Insulated 6-in. Filled Door No. 154

Insulated Door No. 152, Underwriters' Label 2 Hours

SPECIFICATIONS FOR THE VICTORY LINE OF VAULT DOORS

Style	Masonry opening, in.			Clear entrance, in.		Over-all door thickness, in.	Weight, lb.	Style	Masonry opening, in.			Clear entrance, in.		Over-all door thickness, in.	Weight, lb.
	Height	Width	Depth	Height	Width				Height	Width	Depth	Height	Width		
"R"	79	33	18	75⅜	27	2¼	525	"L"	79	33	9	75¾	28½	2¼	400
"S"	79	40	20	75⅜	34	2¼	650	152	79½	32	20	77²³⁄₃₂	29⁷⁄₁₆	3³⁄₁₆	1000
"Tile"	79	33	9	75¾	28½	2¼	400	154	88½	45	20	78	32	6	1650

Standard Fire-resistive Safes

Diebold fire-resistive safes embody several unusual structural features. The heat-resisting filler, besides furnishing perfect resistance to heat, possesses a high degree of inherent structural strength and thus provides a continuous, solid insulation between the walls of the safe.

It retains its fire-resisting qualities regardless of age.

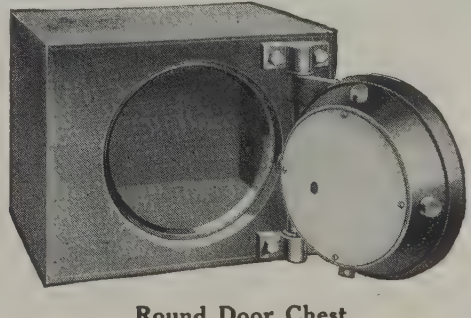
Heavy hinges provide easy operation of door and prevent sagging. Outside finish is olive green satin enamel, gold striped. Hinge tips, handle knobs and combination dial are buffed bronze with black bakelite handle grips.

Steel Money Chests

For bank use and for placing in standard fire-resistive safes and filing safes for protection of money, bonds, jewelry, etc., wherever burglary protection is required. Regularly made with rectangular and round doors in 5 sizes from 14x17⅞x15 in. to 24x24x24 in.

Constructed of alternate layers of open hearth steel plates, torch resisting plates and drillproof chrome steel plates. Ball bearing hinges and high grade bank combination locks. Finished in green enamel, striped in gold; combination dial black with white numbers; hinges and bolt work heavily nickeled.

Rectangular Door Chest



Round Door Chest

HERRING-HALL-MARVIN SAFE CO.

GENERAL SALES OFFICE AND FACTORIES

HAMILTON, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 400 Broadway
CHICAGO, ILL., 223-225 West Lake Street
BIRMINGHAM, ALA., 1807 First Avenue North
SAN FRANCISCO, CAL., 214 California Street

Products

FIREPROOF SAFES, Underwriters' Laboratories, Inc., Class "A" and Class "B" Label; BURGLARPROOF BANK and SAFE DEPOSIT VAULTS; FIREPROOF VAULT DOORS; VAULT EQUIPMENTS.

Also manufacturers of Filing Devices; Safe Deposit Boxes; Steel Lined Safe Deposit Safes for hotels and clubs; Silver Safes and Special Safes and Vaults for residences; Burglarproof Chests, Messenger Boxes, etc.

Fireproof Safes

The greatest possible structural strength is built into these safes. Angles and panel bars are of heavy steel and are fully welded together.

The insulation is of monolithic type and its engagement with the outer and inner walls of the safes is such as to consolidate strength and maximum heat resistivity. Perfect engagement of the doors with the safe structure is assured through pressed steel jambs with interlocking tongues and grooves supplemented with interlocking rear flanges. A patent strip seals the entire joint between the jamb and the rear flange of the doors. The doors are hung on ball bearing hinges. Heavy round steel locking bolts and their related connections are fully insulated from the face of the door. The combination lock is protected with a chrome steel drillproof plate. All safes are equipped with adjustable filing devices installed in accordance with specific requirements.

A selection of fifteen sizes is provided in the Class "A" safes and twelve sizes in the Class "B" safes, ranging from 38⅓ cu. ft. to 1¼ cu. ft. in capacity.

Standard finish is olive green.

Class A Fireproof Safe No. 4030

Outside, 58 in. high, 40½ in. wide, 30 in. deep. Inside, 40 in. high, 30½ in. wide, 19¼ in. deep

Fireproof Vault Fronts

Specifications—Sides and top No. 16, bottom ⅛-in. sheet steel. Front frame formed of 3⅞x$\frac{3}{16}$-in. open hearth steel bars, riveted at the bottom into 2½x¼-in. sill bars, fastened at the top by bar clips.

The rear frame is formed of 1¼x1¼x$\frac{3}{16}$-in. open hearth angles, securely fastened to the vestibule. Removable bars 4x$\frac{3}{16}$ in. are fastened on the back of the rear angles. These bars may be removed until the vestibule is set into the wall, after which they are to be replaced, thus holding the vestibule securely in position.

Outer door plate formed of $\frac{3}{16}$-in. open hearth steel, reinforced on sides, top and bottom by 2x¼-in. bars, making doors $\frac{7}{16}$ in. thick on edge.

No. 7830 Certified Fireproof Vault Door Bearing the Six-hour Label of the Underwriters' Laboratories, Inc.

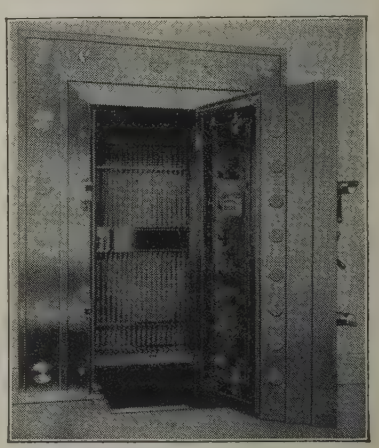
Door is 5$\frac{1}{16}$ in. thick with pressed steel jambs, containing the fireproof insulation. Jambs are built with two flanges and one tenon and groove at top, front and bottom and have an interlocking flange with patented spring seal at rear. Clear opening through vestibule is 77 in. high by 30 in. wide. Shipping weight approximately 1650 lb.

FIREPROOF VAULT FRONTS

No.	Wall opening		Clear opening		Weight lbs.
	Height, in.	Width, in.	Height, in.	Width, in.	
22	81½	34½	77¾	29	920
21	81½	34½	77¾	29	890
20	81½	34½	77¾	29	835
19	79	32	75½	26½	740
17	79	32	75½	26½	740
14	81⅜	44	76¾	36½	1180

Burglarproof Vault Equipments

Factories are fully equipped to manufacture both the simplest and cheapest, and the heaviest and most elaborate vault equipments of every description. The record and reputation established through a period of continuous service, covering over eighty years, are so well known as to require no comment.



Burglarproof Vault Door

Co-operative Service

The Engineering Department is at the disposal of architects and customers, and will gladly submit designs, specifications and estimates promptly. All inquiries will receive immediate attention.

THE MOSLER SAFE CO.

GENERAL SALES OFFICE AND FACTORIES

HAMILTON, OHIO

BRANCH OFFICES

ATLANTA, GA., 38 Arcade Building
BOSTON, MASS., 84-90 Sudbury Street
CHICAGO, ILL., 58-60 West Lake Street
CINCINNATI, OHIO, 615-16 Dixie Terminal Building
DALLAS, TEX., 427 Santa Fe Building
KANSAS CITY, MO., 714 Delaware Street
LOS ANGELES, CAL., 453 South Spring Street
NEW ORLEANS, LA., 1026 Hibernia Bank Building
NEW YORK, N. Y., 373 Broadway
PITTSBURGH, PA., 20 Wood Street
PORTLAND, ORE., 205 Railway Exchange Building
SEATTLE, WASH., 1217 Alaska Building

Products

MOSLER (PATENTED) INSULATED STEEL VAULT DOOR No. 3278—Underwriters' Labeled.

MOSLER (PATENTED) VAULT FRONT No. 51—Standard Fireproof Construction.

Also Fireproof and Burglarproof Safes, Chests, Bank Vaults, Safe Deposit Boxes, Book Vaults, Record Vaults, Silver and Fur Storage Vaults, Night Safes, Wall Safes; Safes and Vaults for hotels, clubs, jewelers, residence, oil and service stations, etc.

Mosler (Patented) Insulated Steel Vault Door No. 3278

Awarded Underwriters' Laboratories Six-hour Label for Fire Resistance.

This insulated vault door is constructed entirely of steel. Equipped with a thermostatically controlled insulated valve door which automatically seals the interior of vault against heat penetration. Maintaining a lower temperature inside the vault than the maximum allowed by the Underwriters' Laboratories, Inc. Also practically eliminates water from fire hose reaching the vault interior.

The monolithic fire-resisting insulation is of great structural strength. It will not produce gases under fire exposure that might result in explosion.

The hinges, boltwork and similar parts are of unusually rugged construction. The door swings back full 180° against vault wall. Made to swing right unless otherwise ordered.

Designed to fit masonry walls of any thickness exceeding 9 in., but, to afford protection equal to the door, the masonry should be 12 in. thick.

Specifications—The Contractor shall furnish and install a Mosler Insulated Steel Vault Door No. 3278 (Patented) for a .... in. .... wall. Masonry opening, 95¼ in. high by 45 in. wide (outside) and 79⅝ in. high by 35 in. wide (inside). Clear door opening 78 in. high by 32 in. wide, the over all of front including architrave 91¾ in. high by 50 in. wide.

Frame—Consisting of jambs, head and sill, shall be entirely of steel with interlocking tongue and grooves.

Door—Shall be 6¾ in. thick, entirely of steel with interlocking tongue and groove edges containing fire-resisting insulation. Main door shall be equipped with a supplementary insulated valve door, thermostatically controlled.

Underwriters' Label—The door and frame shall be complete in all respects and bear the Underwriters' Laboratories, Inc. label for six-hour fire resistance at high temperature.

Bolts—Door shall be equipped with seven 1-in. diam. locking bolts, three to the lock jamb, one each to head and sill, with interlocking tongue and groove and two bolts to the hinge jamb. Operated by lever handle covered with octagonal hard rubber grip.

Lock—Shall be a Mosler four-tumbler combination lock capable of 100,000,000 changes. Equipped with shouldered spindle, and protected by a hardened 5-ply steel plate and hardened steel guard plate.

Pressure Bar—Door shall be seated to surrounding frame by pressure bar device at front edge of door, operated by lever handle covered with octagonal hard rubber grip.

Foot Bridge—Provide a folding inclined non-slip steel foot bridge, to protect sill.

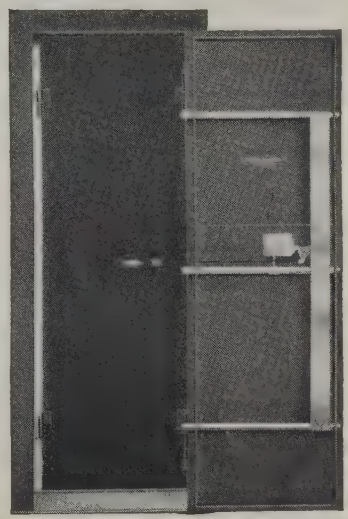
Finish—All exposed surfaces of door and frame shall be finished in Mosler standard olive green, ornamented with gold striping. Pressure bar device, metal surface of handles, lock and hinge tips shall be heavily nickelplated and rubbed to a satin finish.

Swing of Door—Door shall swing to the right [left].

Drawings and Instructions—Contractor shall obtain from the manufacturer necessary drawings and instructions for the proper installation of the vault door, and shall install the door and surrounding walls in strict accordance therewith.

Mosler (Patented) Vault Front No. 51

The type shown as No. 51 is made in various sizes and thicknesses. Especially constructed for book vaults, record vaults, storage and office buildings. Right or left swing.



Mosler No. 51 Vault Front

To fit finished masonry opening 77 in. high, 27½ in. wide, 13½ in. deep. Wall thicknesses can be increased or reduced, if desired

Specifications—The contractor shall furnish and install a Mosler No. 51 Vault Front for a wall opening, 77 in. high, 27½ in. wide and 13½ in. deep. Clear opening of this door, 74 in. high by 23½ in. wide. The outer door plate to be $\frac{3}{16}$ in. thick of open hearth steel, reinforced with $\frac{3}{16}$-in. angle bolt frames, making the door ⅜ in. thick on all edges and across center for lock protection. This door to have three single acting locking bolts 1 in. in diameter, operating across the door through the angle bolt frames mentioned above and controlled by a Mosler Combination Lock and Lever handle. The door to be equipped with an anti-dynamite device to protect the combination lock and bolts against explosives or external violence. The door swings to the right on pintle hinges.

The inner doors to be $\frac{1}{8}$ in. thick, of open hearth steel. The right-hand door to overlap the left-hand door and have flat bolt work at top and bottom and interlocking at the center, controlled by a patent key lock. Vestibule to have removable flange bars secured to the rear frame, so that this vault front can be placed in position after the walls are built and plastered. Outer door and inner doors to be finished in black and varnished—outer doors striped; inner vestibule finished in gray. Bolt work hinge tips, handles, trimmings, heavily nickelplated, rubbed to satin finish.

Engineering Service

Our branches will cheerfully furnish competent engineering service to aid you in preparing plans and specifications for burglarproof bank or safe deposit vaults. Write, or wire our factory collect, and our nearest representative will call on you.

Vaults are built in various sizes and thicknesses; to meet the particular requirements.

ESTABLISHED 1872

THE SCHWAB SAFE COMPANY

Manufacturers of Vault Doors, Safes and Burglarproof Chests

LAFAYETTE, IND.

Products

VAULT DOORS, SAFES, FILING SAFES, FUR SAFES, WALL SAFES and BURGLARPROOF CHESTS.

SCHWAB

TRADE-MARK

Service

We maintain at all times a carefully selected group of experts in our line, and will be glad to receive correspondence covering any special requirements, as well as our standard products.

Catalogue will be sent on request, without obligation.

Schwab Insulated Vault Doors (Underwriters' 2-Hour Label)

Specified where *maximum fire protection is required.*

Schwab's 2-hour Vault Doors have a wide extra margin of safety—the equivalent to approximately a 3½-hour door. No greater protection will *ever* be needed. The strain on a vault door, where only one side is exposed to the fire and heat, is not nearly so great as on a safe where all four sides are exposed. And on an insulated safe, a 4-hour label is maximum.

Both the No. 2674B (single door) and the No. 3674B (double door) are of new type, with interlocking tongue and groove, insulated doors and joint.

It has been tested at the Underwriters' Laboratories, Inc., for:

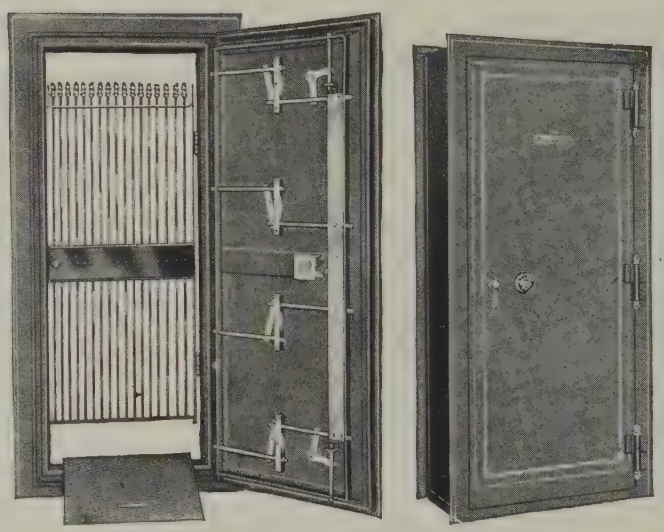
(1) Ease and practicability of installation.
(2) Fire endurance test.
(3) Fire and hose stream test.

The official Underwriters' report says:

"At the close of the test the papers were found to be in good condition with no traces of heat and no discoloration from smoke."

In every Schwab insulated vault door or safe, there is a substantial extra margin of safety.

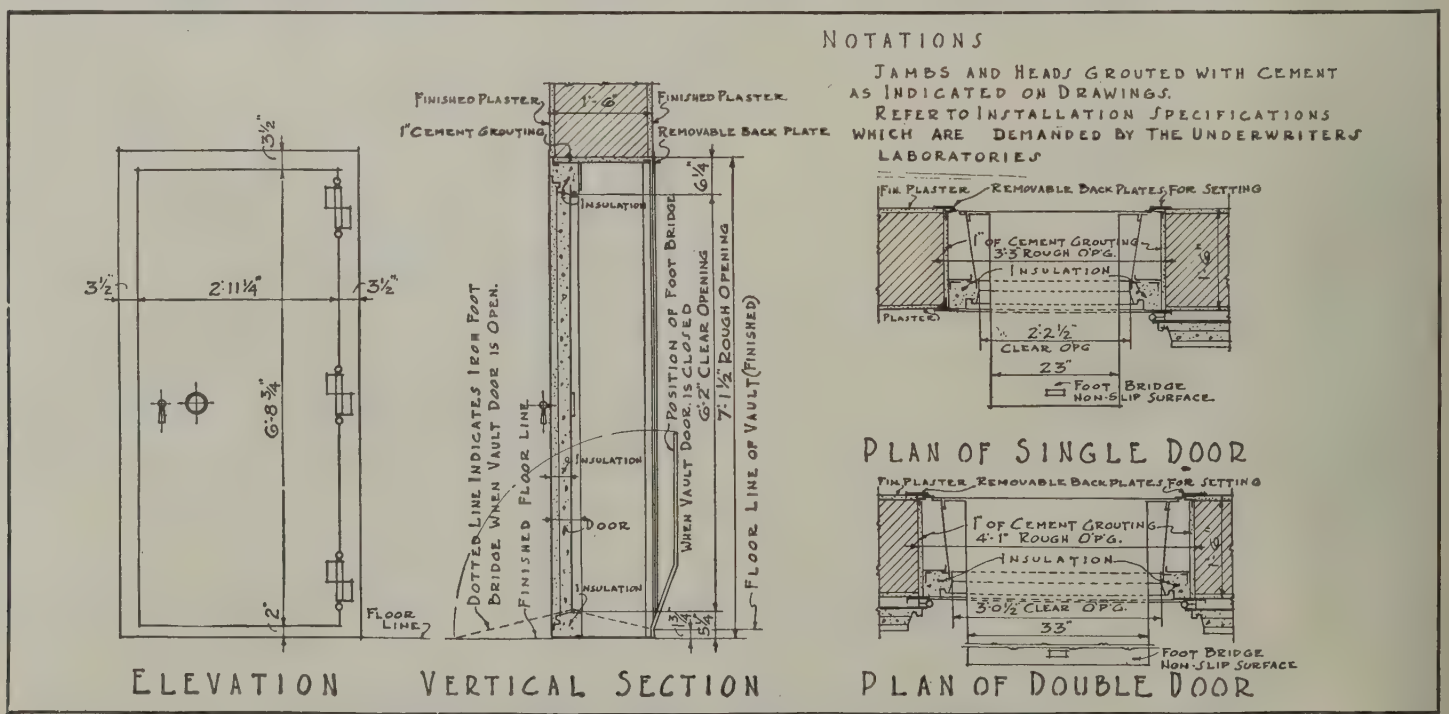
Send for our complete Architect's Portfolio, containing architects' specifications and details of vault doors, vault construction, underwriters' requirements, and contractors' and engineers' specifications.



No. 2674B, Schwab 2-Hour Vault Door

No. 3674B is the same with double door

Locking Mechanism—On inside of door are four double acting horizontal bolt bars ⅞-in. diameter cold rolled steel, operated by a cam working forward and backward and two ⅞-in. diameter bolt bars, one up and one down, all extending ¾ in. into jamb, checked by a 4-tumbler combination lock. Lock fastened to reinforcing strip on inside of door, engaging cam operated by handle on outside face of door.



Elevation, Section and Plan of Schwab Insulated Vault Door

Continued on next page

Foot Bridge—A ¼-in. thick safety tread steel plate foot bridge, hinged to turn inside when vault door is closed.

Day Gate—The day gate, complete with lock and alarm bell, as illustrated in the open view on this page, can be furnished at additional cost.

Hardware and Finish—Dark olive green lacquer, gold striped. All trimmings and bolt work heavily nickelplated.

Size—Vault doors bearing Underwriters' label can not exceed clear door opening size 38 in. in width, 78 in. in height, nor less than 10 in. in depth. The same fireproof construction can be furnished in larger size doors or in doors with narrower vestibule, but without Underwriters' label attached.

STOCK SIZES SCHWAB 2-HOUR VAULT DOORS

Door No.	Clear opening, in.	Wall opening, in.	App. shipping weight, lb.
Single door No. 2674-B....	26½x74x18	39x85½	1500
Double door No. 3674-B...	36½x74x18	49x85½	1800

Architect's Specification—No. 2674-B, or No. 3674-B—For the convenience of the architect the following specification to cover the New Type Insulated Door Vault is furnished:

The contractor shall furnish and install a No. 2674-B (or 3674-B) Schwab Insulated Fireproof [Single] [Double] Vault Door with interlocking tongue and groove, drawn steel frame and door flanges and jambs, as manufactured by The Schwab Safe Company, Lafayette, Ind. Outside door shall have four double acting horizontal bolt bars operating on a cam working forward and back and two vertical bolt bars, one operating up and one down, ⅞-in. in diameter, cold rolled steel, checked by 4-tumbler combination lock. The outer door shall be insulated with 3½ in. of insulating material tested by the Underwriters' Laboratories, Inc., and bearing the Underwriters' Laboratories 2-hour heat label. The frame and door jambs with interlocking tongue and groove shall be No. 16 U. S. gauge cold drawn steel and interlocked perfectly, one within the other. Vault shall be finished in dark olive green lacquer finish and striped. All trimming and bolt work shall be heavily nickelplated.

The masonry wall shall be * in. thick with opening for vault door [39] [49] in. wide and 85½ in. high.

Rear flange of vault frame shall be removable so that door can be installed after the building is completed.

Inside clearance of door shall be [26½] [36½] in. wide, 74 in. high.

Note: Masonry wall must not be less than 10 in. thick in order to obtain Underwriters' approval.

Note: Our complete Architect's Portfolio, containing specifications and details on vault doors, vault construction, Underwriters' requirements, contractors' and engineers' specifications, will be sent you on request.

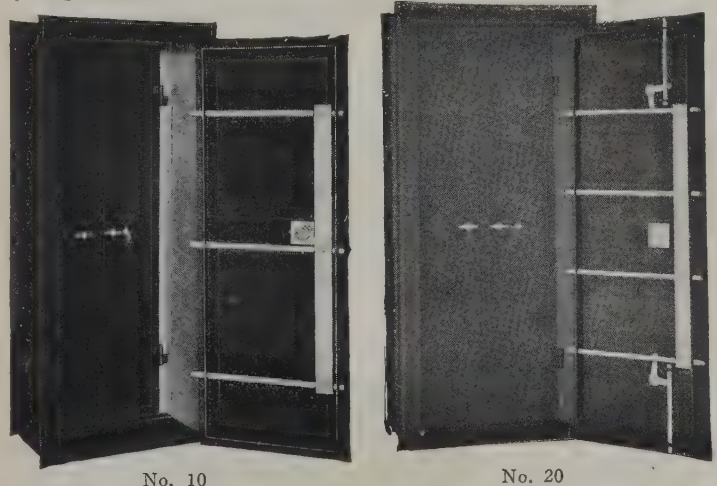
Schwab Standard Fireproof Vault Doors

These vault doors do not bear the Underwriters' Label, but will meet the requirements of the majority of installations.

SPECIFICATION OF SCHWAB STANDARD FIREPROOF VAULT DOORS

Style	Clear opening through vestibule, in.		Rough wall opening, in.			Weight lbs.	Bolt work on outside door	Bolt frame, in.
	Wide	High	Wide	High	Deep			
No. 10 with I.D.	25	74	32	77	18	580	3 horizontal Single acting	2x2x¼ angle
No. 20 with I.D.	25	74	32	77	13	620	4 horizontal 2 vertical Single acting	2x2x¼ angle
No. 19 with I.D.	25	74	32	77	13	700	4 horizontal 2 vertical Single acting	1¾x¾ bar
No. 21 with I.D.	25	74	32	77	13	750	4 horizontal 4 vertical Double acting	1¾x¾ bar
No. 12 with I.D.	27	74	32	77	?	575	3 horizontal 2 vertical Single acting	2x2x¼ angle
No. 25 with I.D.	35	74	42	77	21	800	3 horizontal 2 vertical Single acting on each of two folding doors.	2x2x¼ angle

Carried in stock sizes, but can be made proper size to fit any wall opening.



No. 10 No. 20

Schwab Standard Fireproof Vault Doors

Installation Requirements, No. 10—For installation, the clear opening in the vault wall should be 77 in. high, 32 in. wide, and 18 in. deep. The vestibule can not be made less than 16 in. for our standard width vault for the inside doors to pocket in the vestibule.

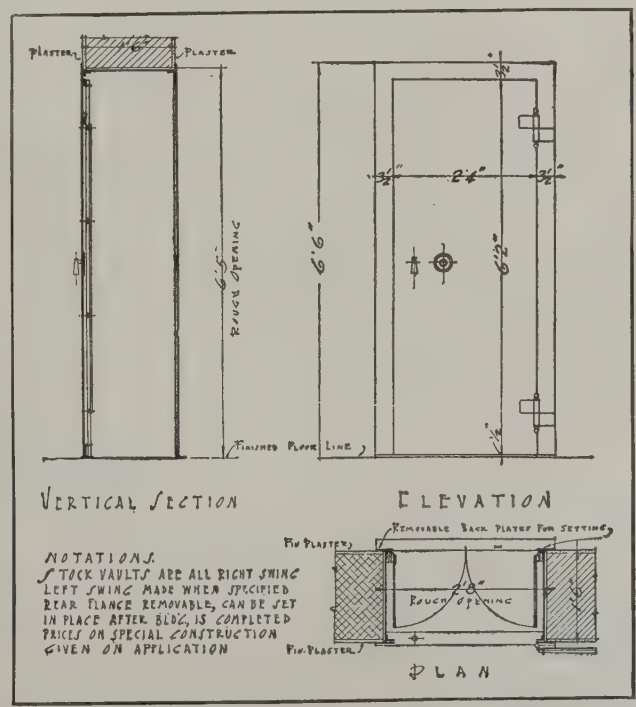
A vault 2 in. less in width will allow the inside doors to pocket in a 15-in. vestibule; 4 in. less in width will allow inside doors to pocket in a 14-in. vestibule, and so on.

Locking Mechanism—Outside door has three cross bolts 1-in. diameter cold rolled steel and checked by a 4-tumbler lock. Inside doors have one up and one down bolt checked by a heavy key lock.

Hardware and Finish—The handles, hinge tips, lock dials, cross bolt and carrying bars are polished and heavily nickelplated. Door handsomely finished in dark olive green with gold striping.

Installation Requirement No. 20—This style is similar in construction to the No. 10 vault door. Bolt work on this door, however, consists of four horizontal bolts, and one up and one down bolt 1-in. diameter of cold drawn steel.

Estimates—We can build any vault door to specification or duplicate any vault door specified in your plans, regardless of construction. Allow us to figure with you. It will be a pleasure.



Dimension Diagram, Schwab Vault Doors Nos. 10, 19, 20 and 21

No. 12—same except ordinarily used in narrow wall
No. 25—same except 42 in. wide and 21 in. thick

Continued on next page

Architects' Specifications, No. 10—The contractor shall furnish and install Schwab's No. 10 Fireproof Vault Door manufactured by The Schwab Safe Company, Lafayette, Ind. Outside door to have three cross bolts, 1-in. diameter cold rolled steel, checked by a 4-tumbler combination lock. Inside doors to have heavy flat bolts and key locks. Vault to be finished in dark olive green with gold striping. All trimmings and bolt work heavily nickelplated. The vault wall opening to be 77 in. high, 32 in. wide, 18 in. deep and must be built square, plumb and level; rear flange of vault frame to be removable so contractor can install vault door after building is completed and not mar the finish. Inside clearance of vault door, 74 in. high and 28 in. wide. Approximate weight, 580 lb.

Architects' Specifications, No. 20—The same as No. 10, with this change in bolt work: "Outside door to have four cross bolts, one up and one down bolt, 1-in. diameter cold rolled steel, checked by a 4-tumbler combination lock."

We can furnish special vault doors in either double or single door, with any desired number of bolts and any thickness of door plate up to ½ in. thick.

Can be made with either right or left-hand swing doors and proper size to fit any vault wall opening.

Schwab Safes and Burglarproof Chests

We will gladly furnish specifications or measurements upon request and assist beforehand on any built-in features contemplated in any of your plans.

Safes—Schwab builds perhaps the most complete line of safes of any manufacturer in this field. For maximum protection against fire Schwab builds the "A Label Safe" (4-hour Underwriters' Label); for a slightly lesser degree of protection, the "B Label Safe" (2-hour Underwriters' Label); and for ordinary protection the standard line of medium walled and heavy walled safes.

Insulated Filing Safes—For the protection of valuable records Schwab's Insulated Filing Safes give complete protection; complies with the Underwriters' requirements and carry their label for insulated cabinets. These safes can be equipped with any filing arrangement to fit the requirements of the purchaser.

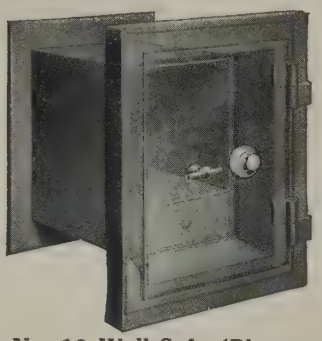
Fur Safes—In addition to building a very comprehensive line of standard single type and multiple type fur safes, we build fur safes to any specification.

Besides the added protection, fur safes beautify the modern display room, create an impressive atmosphere and effect a considerable saving in burglary insurance rates. We would be pleased to have you refer to any number of notable installations we have made. Confer with our engineering and designing staff.

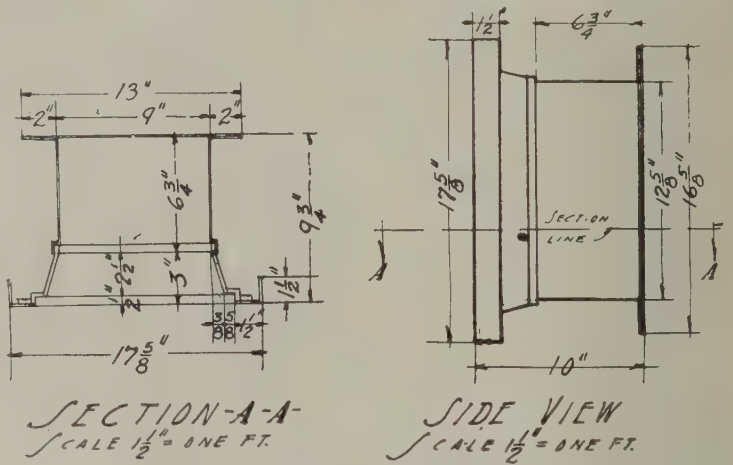
Jeweler's Safes—These safes afford maximum burglary protection combined with an attractiveness that will add beauty to any jewelry establishment. The inside may be arranged in any manner to suit the requirements of the jeweler. The standard safe, however, is ready equipped with cabinets, drawers, etc. We will be pleased to submit suggestions for the interior arrangements of these safes.

Burglarproof Chests—Filling stations, chain stores, theaters, etc., where considerable moneys or valuables are carried at all times, need, or rather are practically forced, to provide the protection of a burglarproof chest.

Schwab's Burglarproof Chests are built to install in the wall, anchor in a cement block or to place inside a regular safe. The line includes a circular door chest, a heavy steel chest and a lighter semisteel chest. Send for details.



Schwab No. 10 Wall Safe (Phantom View)



Detail of No. 10 Wall Safe

Wall Safes—This fireproof wall safe No. 10 is especially adapted for installation in homes, apartment houses, offices and hotels. Placed in the wall, it releases for other uses floor space otherwise occupied by a floor safe and, at the same time, affords greater secrecy together with protection and safety.

The interior of this wall safe is most conveniently arranged for utmost service and facility of use.

This safe is sturdily constructed throughout. The door is insulated 2½ in. thick. It has regular T-handle and combination lock, and tongue and grooved door and frame. There is a $\frac{3}{16}$-in. back plate to anchor in the wall and to prevent tampering from the back. The approximate weight of the safe is 75 lb.

Schwab's Architectural Service

Engineering Staff

We maintain a most competent staff of engineers to assist you with any problems within our scope.

Literature

Upon request we will gladly send you a copy of a recent set of specifications and details on vault doors and vault construction. This is prepared in letter file size and the entire series sent enclosed in a jute file folder with cross filing cards —A.I.A. 18 G. This series has been heartily endorsed by hundreds of architects.

We also would be pleased to send you data on fur safes, filing safes, wall safes, or our general catalogue.

The Company

The Schwab Safe Company has been building quality safes for more than 55 years. We have a very modern up-to-date plant with all modern manufacturing facilities.

Shipments

Shipments are made promptly, due to the large capacity of our plant and the excellent railroad connections.

YORK SAFE AND LOCK COMPANY

FACTORY AND HOME OFFICE

YORK, PA.

BRANCH OFFICES AND SALESROOMS IN PRINCIPAL CITIES

Products

BANK VAULT EQUIPMENT: Safe Deposit Boxes, Book and Storage Vault Doors, Burglary Chests and Safes.

York Insulated Vault Doors (Underwriters 4 hr. Label)

York Insulated Vault Doors are constructed with pressed steel jambs, forming a perfect tongue and groove around the door, and insulated in the same manner that has made the York safe noted for its fire resistance.

Mason's opening 91⅝ in. high and 46⅛ in. wide.
Clear inside opening 78 in. high and 32 in. wide.
Send for complete description.

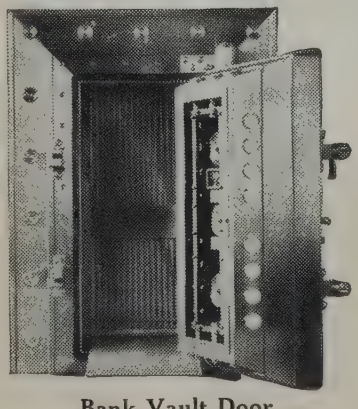
Safes

York manufactures a complete line of safes including Underwriters "A" label, standard fireproof safes, fur safes, etc.

Bank and Safe Deposit Vaults

We are designers and builders of bank and safe deposit vaults, large and small; safes, safe deposit boxes and other vault equipment. Established standard sizes and styles usually in stock for quick shipment. Especially constructed vaults in minimum time.

York bank vaults have been installed in many of the largest banks and financial institutions including the principal Federal Reserve Banks. Plans and specifications for any requirement will be submitted on request without charge or other obligation.



Bank Vault Door
15 in. thick

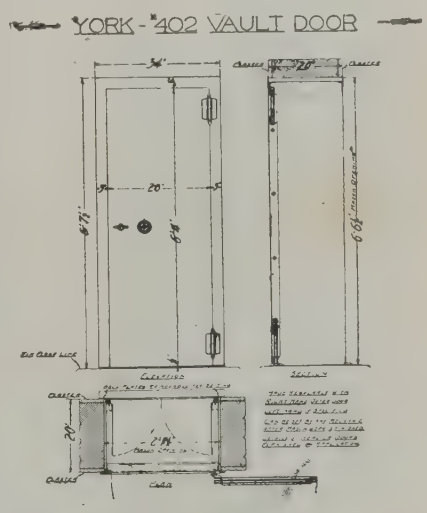
York No. 402 Vault Entrance

Standardized to fit opening 78½ in. high and 31½ in. wide for wall 20 in. thick. Can be furnished for walls of greater or lesser thickness when required.

No. 402 Vault Entrance

The illustration shows one of a type of York vault entrances which can be furnished in a variety of sizes and designs. The No. 402 has outer door $\frac{3}{16}$ in. thick equipped with four horizontal and two vertical locking bolts, checked by a high grade combination lock. The inside doors are $\frac{3}{16}$ in. thick and locked by a flat key lock. The back frame of the entrance is detachable, permitting the entrance to be set after the walls are finished. The entrance is handsomely finished in black with gold striping. Boltwork, handle and hinge tips are heavily nickelplated.

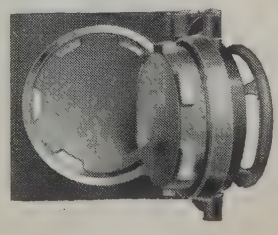
Illustrations and complete specifications of other sizes of entrances will be sent on request.



Round Door Burglary Chests

The York round door chest is built of an integral steel casting, case hardened by our special process. The door is a solid casting of the same material, treated in the same manner. This chest not only secures the lowest basic rate of burglary insurance, but the York Type "S" relocking device will entitle you to an additional 10% reduction.

Made in five sizes from 14 to 30 in. high; 14½ to 24 in. wide; 14¾ to 24 in. deep.



THE CONSOLIDATED EXPANDED METAL COMPANIES

Steelcrete Armored Bank Vaults
Steelcrete Building
WHEELING, W. VA.

SALES OFFICES AND WAREHOUSES

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BUFFALO, N. Y., 50 Wecker Avenue
CHICAGO, ILL., 2531 Arthington Street
CLEVELAND, OHIO, 10706 Quebec Avenue
DETROIT, MICH., Dime Bank Building
NEW YORK, N. Y., 103 Park Avenue
PHILADELPHIA, PA., 1075 Germantown Avenue
PITTSBURGH, PA., Oliver Building
ST. PAUL, MINN., 1429 Marshall Avenue
ST. LOUIS, MO., St. Louis Bank Building & Equipment Co., Ninth and Sidney Streets
FOREIGN SALES OFFICE, 152 West 42nd Street, NEW YORK, N. Y.

Product

"Steelcrete" System of burglar-proof and mob-resisting Bank Vault Construction.

For "Steelcrete" Expanded Metal Concrete Reinforcement, see page A147; for "Steelcrete" Metal Lath, see page B1693.

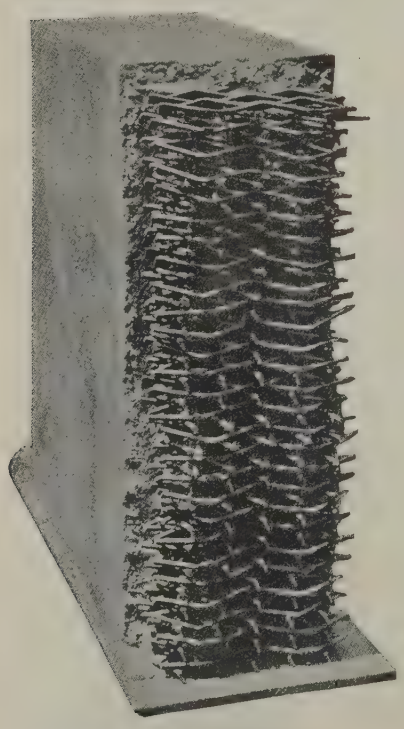
TRADE-MARK

Considerations in Planning for Adequate Bank Vault Protection

The fundamental considerations in designing or planning a vault, which will assure maximum protection under all conditions, are resistance to the burglarious and mob attacks and structural strength.

Sound judgment demands that these features be incorporated in the vault construction in a manner to produce a completely protected self-contained unit of safety.

Obviously, it is not enough that doors and locks alone be of superior quality. Wall, roof and floor structures must have equal strength and resistance.



Section of a "Steelcrete" Armor Mat

Placed either horizontally or vertically, Steelcrete forms a thick entanglement of steel. Concrete is poured through and around the steel mesh to form a wall that resists attack by drill, cutting flame and explosive

The best modern vault design will therefore comprehend using a form of construction which the most rigorous tests have shown to assure a degree of protection in wall, roof and floor equal to that afforded by the modern vault door—a continuous maze of steel locked in concrete.

Resistance to Attack

Since the purpose of any vault is to provide adequate protection by resisting the modern tools employed by cracksmen, every surface of the vault, whether exposed or not, should be constructed according to the highest standards to withstand and foil such attacks.

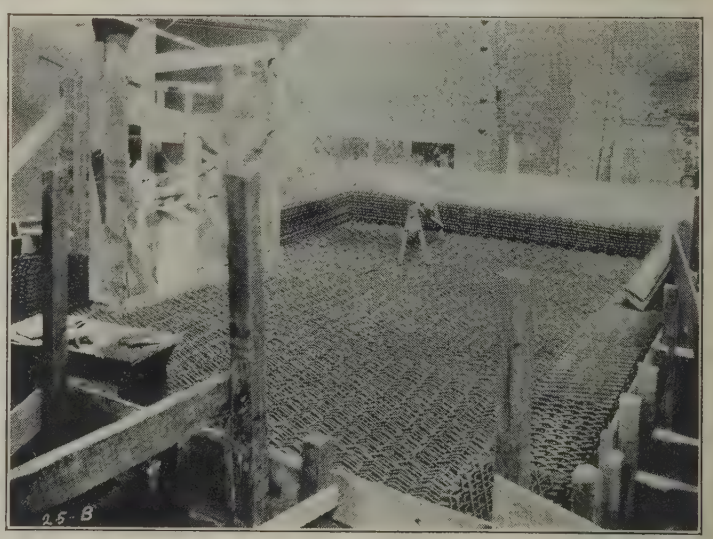
In the Steelcrete entanglement of steel and concrete, drills fail to secure a bearing, cutting torches are helpless against concrete, and high explosives lose their force in absorption by the thousands of steel members composing the mat embedded in concrete.

Extensive experiments under the authoritative supervision of engineers employed by the Federal Reserve Board have shown decisively that steel forming a matrix entanglement, combined correctly with concrete, constitutes the strongest and most economical bar to burglarious entrance.

Structural and Economic Advantages

Built up of steel units, extending layer after layer through the entire thickness of the concrete in the walls, floor or roof, Steelcrete Vaults are solid, self-contained units, constructed to stand secure against the terrific impact of falling girders, heavy office safes or such destructive forces as are caused by fire.

The costly addition of extra structural members is eliminated by the Steelcrete System, as a vault can be designed with ample load carrying capacity to support any load to which it may be subjected.



Horizontal System

Photograph taken when walls were just getting under way

Steelcrete Easily Erected by Any Skilled Contractor

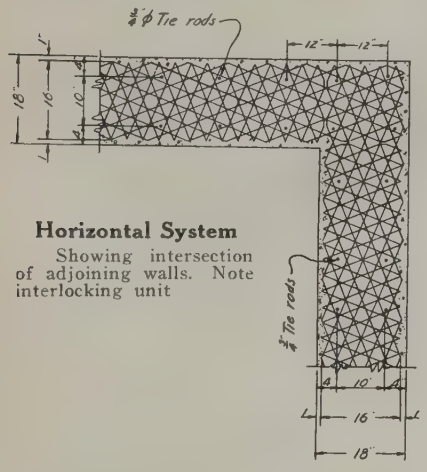
While the resistance, strength and economy of Steelcrete is unique in bank vault construction, installation is so easy and simple that it need be a matter of no concern whatever. The supervision of the architect to assure following of the specifications is all that is required, although the field engineers of the manufacturer keep in touch with the work and are held responsible by the manufacturer to guarantee the workmanship, if required.

Continued on next page

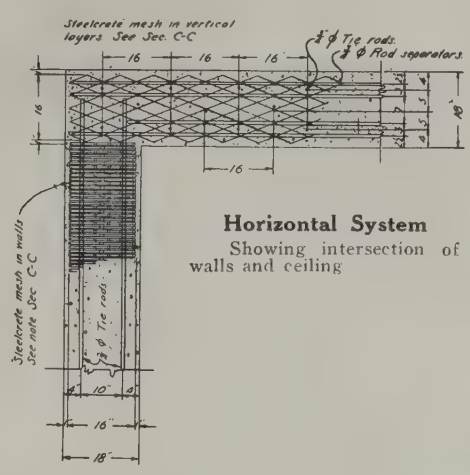
Horizontal System of Installation

The Horizontal system was developed for Federal Reserve Bank Vaults. The protection afforded per dollar invested was found to exceed that of any other horizontal design.

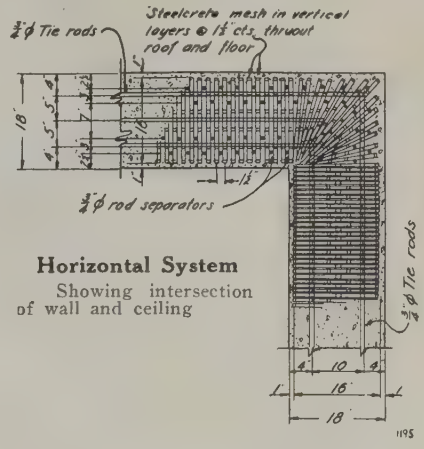
The Steelcrete units in the walls extend over to the outside surface of the adjoining walls and superimpose similar units. The corners are thus made rigid and firm.



Horizontal System
Showing intersection of adjoining walls. Note interlocking unit



Horizontal System
Showing intersection of walls and ceiling

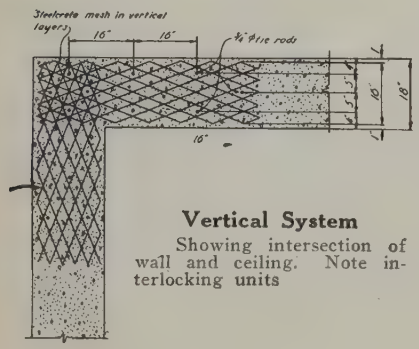


Horizontal System
Showing intersection of wall and ceiling

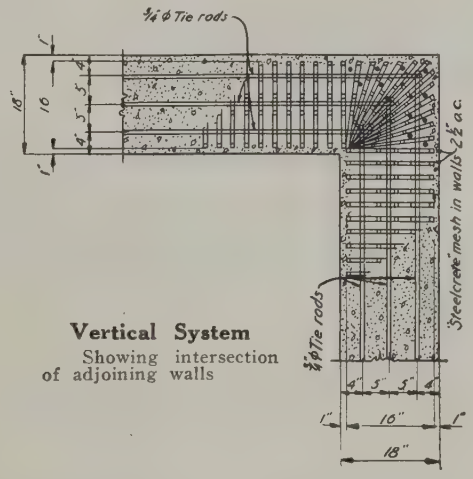
1195

Vertical System of Installation

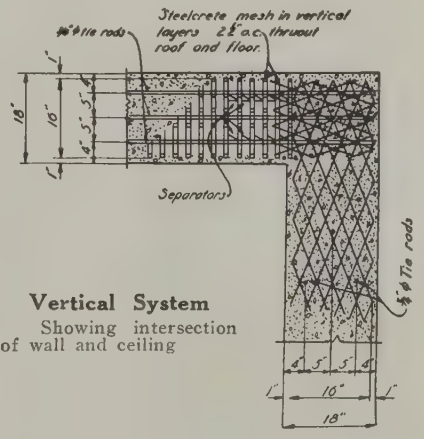
In order to suit all conditions of vault construction, the Vertical design is given. The same underlying principles of protection used in the Horizontal system have been applied here. The Steelcrete units in the walls interlock those in the roof and floor, creating a tie between the sections hardly to be exceeded.



Vertical System
Showing intersection of wall and ceiling. Note interlocking units



Vertical System
Showing intersection of adjoining walls



Vertical System
Showing intersection of wall and ceiling

Door Openings

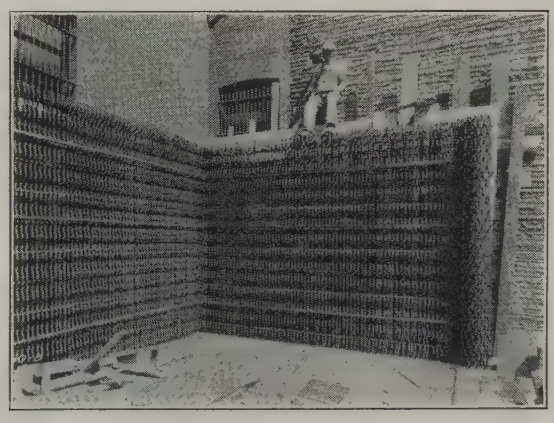
The door openings for both the horizontal and vertical systems are governed by the requirements of the manufacturer of the vault door.

Adaptable to Any Size Bank

The process materials, steel and concrete, which comprise the Steelcrete System are so flexible in themselves that there is practically no limitation to the adaptability of Steelcrete to satisfy any banking requirement or condition. Steelcrete vaults are to be found in twenty-three states and in many foreign countries. This acceptance is a tribute to the economy of the Steelcrete System as well as to its efficiency. Per dollar invested, you get more protection.

Steelcrete Service

We furnish field drawings, lump sum estimates and by arrangement will supervise the installation of the Steelcrete units. Blue print drawings showing typical details for all listed drawings in both horizontal or vertical mat construction will be furnished on request. Book mailed on request.



Wall Showing the Vertical System
In this method of construction the wall, floor and roof have the same arrangement of Steelcrete

THE RIVET-GRIP STEEL CO.

Rivet-Grip System of Bank Vault Reinforcement

MAIN OFFICE

2404 Prospect Avenue, CLEVELAND, OHIO

WAREHOUSES AND FABRICATING PLANTS AT CLEVELAND, OHIO and CANONSBURG, PA.

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CHARLESTON, W. VA., Concrete Engineering Products Co., 215 Hale St.
CINCINNATI, OHIO, Hugh J. Baker & Co., 421 Union Trust Bldg.
DETROIT, MICH., Capitol Steel Corp., 622 Polk Directory Bldg.
INDIANAPOLIS, IND., Hugh J. Baker & Co., 602 W. McCarty St.
LANSING, MICH., Capitol Steel Corp., 236 Tussing Bldg.
MINNEAPOLIS, MINN., The Hustad Co., 529 So. 7th St.
OMAHA, NEB., Gate City Iron Works, 11th and Seward Sts.
PITTSBURGH, PA., J. Willis Dalzell Co., 1401 Commonwealth Bldg.
ST. LOUIS, MO., Harry C. Uhlenhaut, 2144 Railway Exchange Bldg.
SALT LAKE CITY, UTAH, Chas. F. Porter, Kearns Bldg.
SAN FRANCISCO, CAL., J. A. Kinkead, Call Bldg.

Products

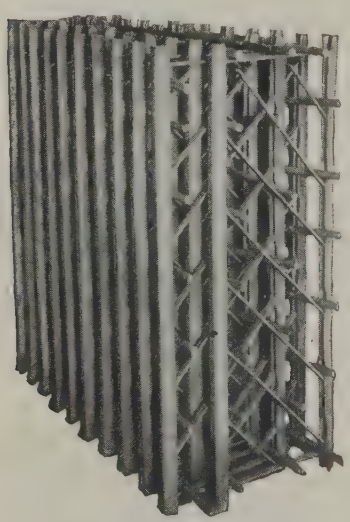
Rivet-Grip Bank Vault Reinforcement.

For Rivet-Grip Steel Joists, see page A671.

Also manufacturers of Rivet-Grip Rigid, Shop-fabricated Truss Bridge Roadway Reinforcement (description on request).

Rivet-Grip Vaults

The high regard which bank architects and engineers have for Rivet-Grip vaults and the prestige which the system has attained are evidenced by the fact that the Rivet-Grip System has been installed in nearly twice as many Federal Reserve vaults as any other type of vault reinforcement offered on the market since the Federal Reserve vault tests. It is significant, that in every instance where Rivet-Grip was purchased by a Federal Reserve Bank, either an official of the bank, its architect, or vault engineer represented the bank at the Federal Reserve tests, and the sale of Rivet-Grip was due to recommendations carried back by eye witnesses, after seeing the efficient performance of Rivet-Grip in these severe tests.



Rivet-Grip Reinforcement—Vertical Type

As a result of the Sandy Hook tests, Rivet-Grip System was adopted for nine Federal Reserve bank buildings, including the banks of Cleveland, St. Louis, Minneapolis and San Francisco, and the Federal Reserve branches at Cincinnati, Louisville, Pittsburgh, Little Rock and Salt Lake City. The Rivet-Grip System has also been used in several hundred National and State banks. (See brief list on following page.)

Balanced Protection for Bank Vaults

The first requisite for security in a bank vault is *balanced protection*—equal protective strength throughout. In other words, the walls, floor and roof should be no less secure than the vault door. In the Rivet-Grip System, this balanced protection is obtained through a new system of steel reinforcement, which is fabricated in various sizes to give the walls and slabs a protective value equivalent to that of any particular door from 4 to 48 in. in thickness.

Why Rivet-Grip Insures Balanced Protection

To penetrate a vault wall reinforced with Rivet-Grip steel frames requires a long period of time, a great variety of equipment and frequent changes in the attacking operations.

Drills must be used to penetrate the concrete, explosives are required to break up the concrete, chipping tools are necessary to separate the concrete from the steel, and torches must be used to cut the heavy Rivet-Grip sections. Moreover, the disposition of steel in a Rivet-Grip wall is such that all these operations must be repeated many times through the thickness of the wall.

There are no weak points in a Rivet-Grip protected vault. The frames interlock at all corners. The door connections are as strong as the vault door itself. The scientific design of Rivet-Grip reinforcement insures balanced protection throughout.

Design

The Rivet-Grip System consists of an interlocking network of heavy shop-fabricated frames and plain round bars, embedded and interlocked through practically the full thickness of the concrete work.

The Rivet-Grip frames are composed of two parallel, heavy Rivet-Grip main sections, joined at close intervals by lighter diagonals, which form the web of the frames. The joint, or Rivet-Grip, is formed under a 30-ton pressure which forces the metal in the main sections around the knobs on the diagonals, joining these members so securely that the diagonals will break in tension before loosening at the Rivet-Grip.

The loose bars are laced through the frames perpendicular to the plane of the web members. They are held in position automatically and need not be wired.

All Rivet-Grip reinforcement is accurately fabricated and comes to the job true to detail. There are two types of installations: *vertical,* for use in walls from 12 to 30 in. thick, and *horizontal type,* for use in walls from 27 to 60 in. in thickness.

Structural and Economic Advantages

In addition to its protective value, many structural and economic advantages help to explain the wide choice of Rivet-Grip System.

Lowest Insurance Ratings—Rivet-Grip walls and slabs receive the lowest insurance ratings.

Flexibility of Arrangement—The spacing and general arrangement of the frames may be varied to give the exact degree of protection desired.

Structural Strength—Rivet-Grip frames form an efficient structural reinforcing, and allow vault walls and slabs to be designed for carrying heavy building columns, or with clear spans up to 40 ft.

Ease of Installation—All material is completely shop-fabricated and ready to place before shipment. To unload the reinforcement from trucks and place it in its proper position in the vault requires only five to eight man-hours per ton.

Lower Cost—The Rivet-Grip System of vault reinforcement costs less than any other adequate and effective system and the ease with which it is installed materially lowers construction cost.

Designing and Estimating Service

The drawings on the following page will prove useful as a guide for selecting the proper type of Rivet-Grip reinforcement to use with any particular vault door. However, if the types shown do not fit your problem, our Engineering Department will gladly make a study and submit a layout and we will recommend the most economical solution of your problem without incurring any obligation on your part, if plans or dimension sketches of the vault are submitted to us. Whenever available, thickness of doors and linings should also be given.

Lump sum estimates, either for material only or including erection for any vault, gladly furnished to architects upon request.

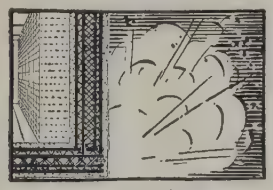
Continued on next page

Torch Resisting

The special Rivet-Grip channel sections are hard to burn as concrete adheres firmly to the steel within the channel

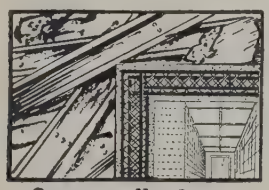
Tool Resisting

Rivet-Grip Reinforcement is not only torch resisting but tool resisting. Its multiplicity of heavy members cannot be pierced with cold cutting tools and drills as is possible with lighter members and fabrics



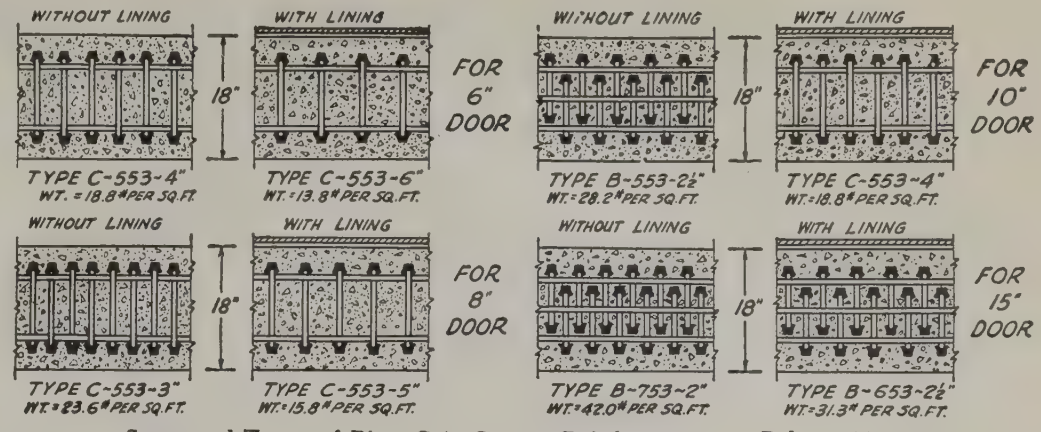
Resists Explosives

The large proportion of heavy steel members and the rigid attachment of ties or stirrups to main bars at close intervals, keeps Rivet-Grip units intact even after severe detonations

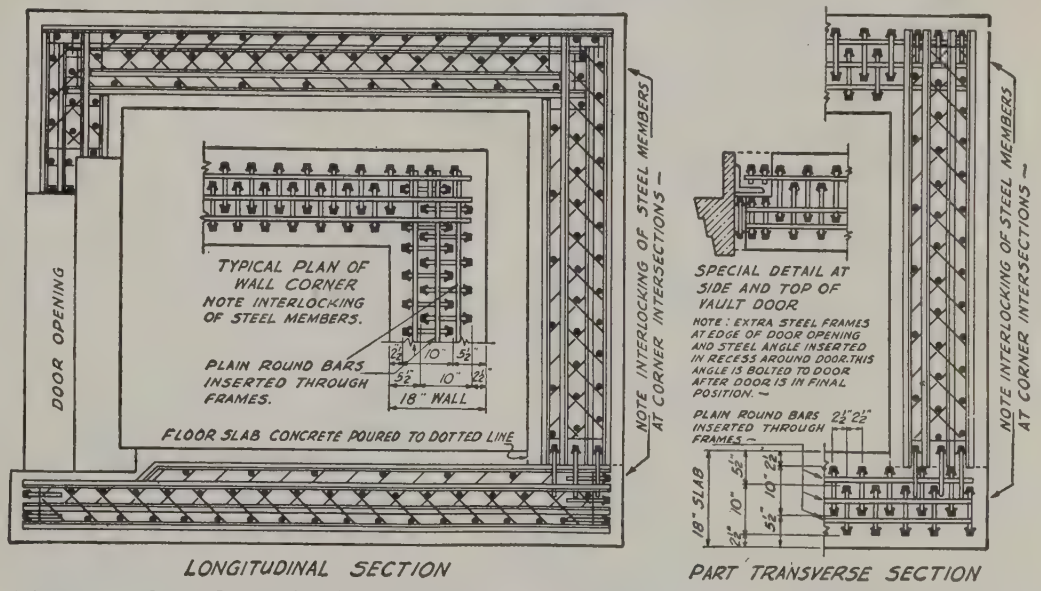


Structurally Strong

Rivet-Grip Bank Vault Reinforcement is not only impregnable to burglarious or riotous attack, but is strong enough structurally to resist breaking or crushing due to a collapse of the building from fire or other causes



Suggested Types of Rivet-Grip System Reinforcement to Balance Various Thicknesses of Vault Doors



Diagrams Above Show the General Method of Detailing Rivet-Grip Reinforcement When the Most Popular Type, Namely Type B-553—2½-in. Spacing of Units—Is Used

Vaults with 18-in. concrete walls and slabs with this type of reinforcement get the best, or No. 10 insurance rating without the use of steel lining in the vaults. Complete typical details and specifications for types of Rivet-Grip other than those illustrated will be furnished upon request

Specifications

Reinforcement—The reinforcement shall be the "Rivet-Grip System bank vault reinforcement" as produced by THE RIVET-GRIP STEEL CO., Cleveland, Ohio.

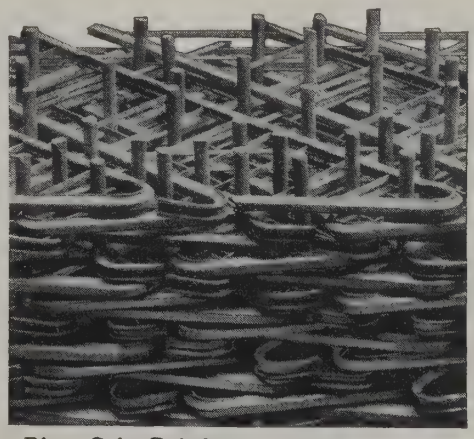
The arrangement of Rivet-Grip frames and plain round bars shall conform to that shown on page A1341 of SWEET'S ARCHITECTURAL CATALOGUE, Twenty-third Edition, for Type ..... spacing of frames. The reinforcement shall be detailed for walls ..... in., floor slab ..... in., and roof slab ..... in. thick.

All units shall interlock at all intersections of walls, and of walls and slabs, and special provision shall be made for door openings to strengthen connections between door frames and vestibules and reinforced concrete walls.

All units shall be completely shop-fabricated and shipped ready to place. They shall be tagged with an erection mark corresponding to the marks on the drawings furnished by the manufacturer.

Note: This specification applies only to the vertical type. Specifications covering our horizontal type are especially written for each individual vault.

Drawings—THE RIVET-GRIP STEEL CO. shall furnish complete placing drawings showing the exact location of each frame and spacer bar. Two sets of prints of approved placing plans and details shall be furnished for use in placing steel.



Rivet-Grip Reinforcement—Horizontal Type

Concrete—Shall be proportioned of 1 part portland cement, 2 parts clean, silaceous sand, and 3½ parts ¾-in. gravel or ¾-in. crushed stone.

A Few Recent Prominent Rivet-Grip Installations

9 Federal Reserve Vaults (see reference on opposite page)
Chemical National Bank, New York, N. Y.
Guaranty Trust Co. (2 offices), New York, N. Y.
Bank of Manhattan Co. (13 offices), New York, N. Y.
Corn Exchange Bank (13 offices), New York, N. Y.
Chase National Bank (2 offices), New York, N. Y.
Bank of America, New York, N. Y.
Equitable Trust Co. (also 4 branch offices), New York, N. Y.
Bank of New York and Trust Co., New York, N. Y.
Title Guaranty & Trust Co., New York, N. Y.
Schenectady Savings Bank, Schenectady, N. Y.
Mechanics and Metals National Bank (also 1 branch), New York, N. Y.
Union and New Haven Trust Co., New Haven, Conn.
Travelers Insurance Co., Hartford, Conn.
Barnett National Bank, Jacksonville, Fla.
Security Trust Co., Detroit, Mich.
Fidelity Union Trust Co., Newark, N. J.
Union Trust Bank, Cincinnati, Ohio
Cleveland Trust Co. (3 offices), Cleveland, Ohio
Guardian Trust Co. (5 offices), Cleveland, Ohio
Union Trust Co. (2 offices) Cleveland, Ohio
Third National Bank, Dayton, Ohio
First National Bank, Youngstown, Ohio
Erie Trust Co., Erie, Pa.
Provident Trust Co., Philadelphia, Pa.
Mellon National Bank, Pittsburgh, Pa.
National Exchange Bank, Milwaukee, Wis.

THE MACOMBER STEEL COMPANY

Massillon Vault Reinforcing

901 Belden Avenue, CANTON, OHIO

For Massillon Steel Building Products, see pages A658-659; for Massillon Joists, see pages A672-673

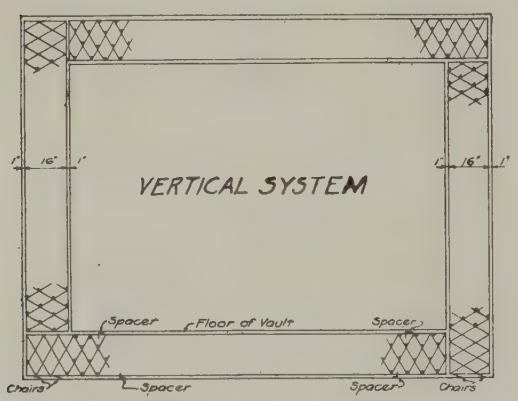
Product

Standard and special systems of vault reinforcing for banks, jewelry stores, isolated plants, financial institutions, etc. The systems are based on the use of standardized reinforcing frames, spacers, chairs and tie bars. The frames are built in standard widths from round steel bars with electric arc welding. The use of round bars results in a maximum of reinforcing with a free flow of concrete to properly encase all members. The frames and spacers insure every ounce of steel being placed exactly as intended.

The National Bureau of Surety and Casualty Underwriters grants Massillon Systems the preferential ratings indicated below. Massillon Vault Reinforcing Systems are fully protected by U. S. Patent No. 1669988.

Standard Systems

Vertical Systems—Six common types of Massillon Vertical Systems are illustrated below. The first figure indicates the wall thickness, "V" indicates vertical type, the last figure indicates spacing of frames. The plane of the frames is at right angles to the wall surface in both systems. In the vertical systems the wall frames stand on their ends on chairs. Spacing bars on the inside and outside of the walls space and maintain the frames in their proper position. Tie bars thread horizontally through the frames.



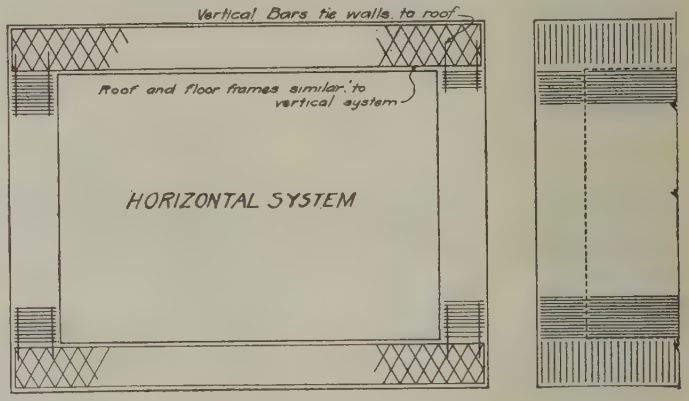
VERTICAL CROSS SECTION

ELEVATION

The placing of floor and ceiling frames is identical for both the horizontal and vertical systems. Chairs and spacers hold the frames in place. Tie bars thread horizontally through the frames and special tie bars thoroughly reinforce all corners.

Horizontal Systems—Four common types of horizontal systems are shown below. The wall frames are stacked one upon the other and separated with spacers on 2-in. centers. The tie bars are threaded vertically through the frames. The horizontal systems permit the effective placing of the maximum amount of reinforcing for any given wall thickness.

Special Systems—Smaller vaults of the type used in chain stores and filling stations and the largest vaults of the Federal Reserve Bank Type call for special treatment. Massillon engineering service is available to architects and vault engineers in drafting up recommendations for special types of vaults.

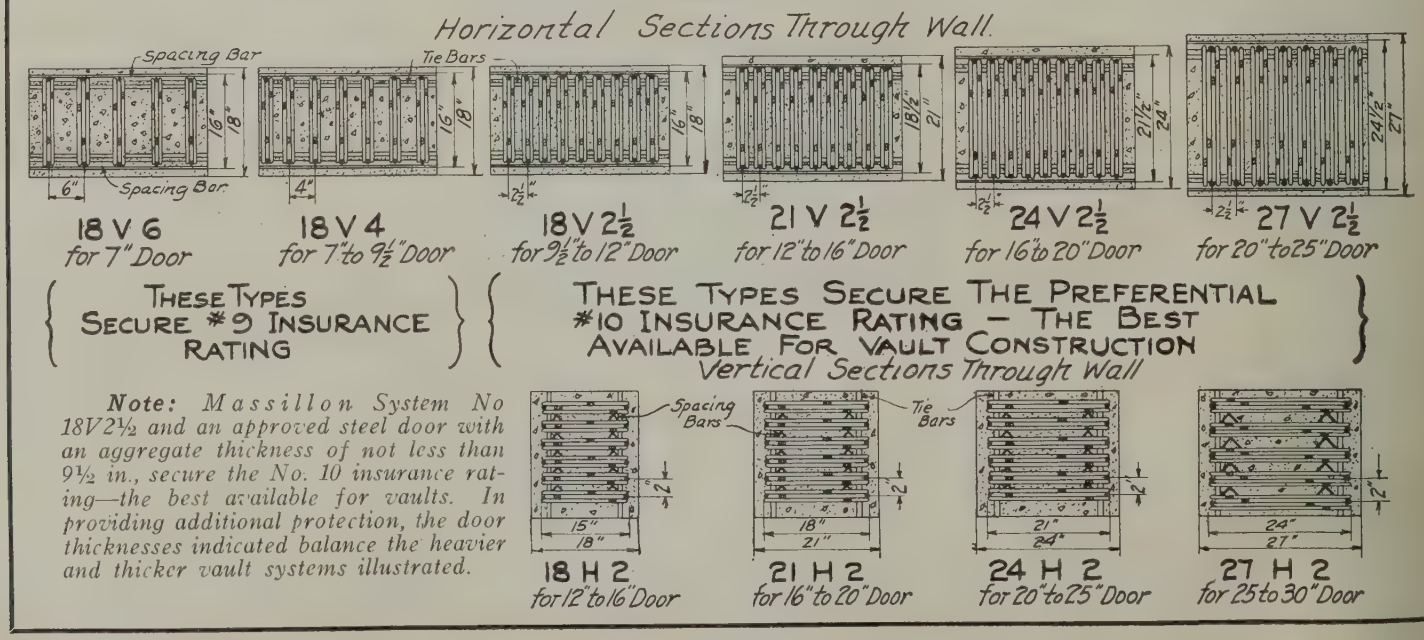


Scope of Service

Realizing the tax on an architect's time, no general sales calls are made except on request. A.I.A. catalogue containing detailed designing data and complete specifications will be mailed on request. Massillon Engineering Representatives are available in practically all building centers to co-operate with architects in preparing definite recommendations and estimates to meet their requirements.

Specifications

The vault construction shall consist of Massillon type number, ..., Vault Reinforcing manufactured by the MACOMBER STEEL COMPANY, Canton, Ohio, completely encased in concrete mixed in the proportion of one part Portland Cement to one and one-half parts sand to three parts clean washed broken stone or gravel not over ¾ in. in size. The reinforcing shall include all necessary frames, chairs, spacing bars and tie bars properly identified with symbol numbers and placed in accordance with erection plans to be furnished by the manufacturer. The arrangement and details shall conform to the requirements of the National Bureau of Casualty and Surety Underwriters to secure their No. ..... insurance rating.



Note: *Massillon System No 18V2½ and an approved steel door with an aggregate thickness of not less than 9½ in., secure the No. 10 insurance rating—the best available for vaults. In providing additional protection, the door thicknesses indicated balance the heavier and thicker vault systems illustrated.*

WESTERN WIRE & IRON WORKS, INC.

Manufacturers of Bankers Approved Locks and Wire Mesh Bank Cages

TELEPHONE
CANAL 6442, 6443

1820-1830 South Sangamon Street
CHICAGO, ILL.

Products

SLIDING DOOR LOCKS and HANGERS for Bank Cages.

WIRE MESH BANK CAGES.

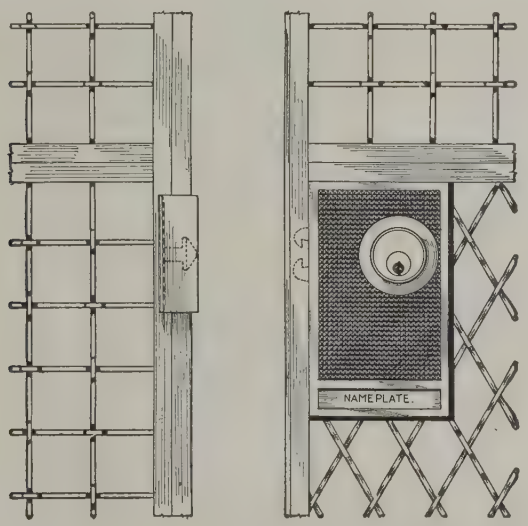
GRILLES and WICKETS for Bank Cage Fronts.

For Steel and Bronze Folding Gates and Wire Mesh Products, see page A819.

Bankers Approved Lock

The Bankers Approved Lock has been developed to provide a sliding door lock for bank cages that is *positive locking*. By referring to Fig. 1 you will notice that double jaws eliminate all possibility of lifting or working the door loose from the engaging tongue in the keeper without first disengaging the jaws with key or knob.

The jaws recessed in door frame, and the channel construction of the keeper make it impossible to open the door by picking the lock with any thin instrument.



Patented Apr. 24, 1928

Fig. 1

Another feature that overcomes a serious objection to the projecting latch type of lock is that there are *no projections* in the door opening when door is open. This helps to prevent torn clothing.

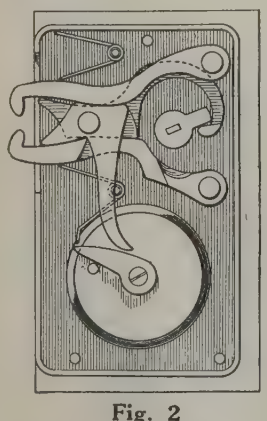


Fig. 2

Knob in rear of lock is recessed flush with back plate.

Fig. 2 shows lock with face plate and cylinder removed. Lock is made of *bronze throughout* insuring long life of parts and faithful performance. Exterior of lock is finished natural bronze.

Note: Brass springs hold jaws in closed position at all times when door is closed.

Figs. 1 and 2 both show right-hand lock. Specify Lock 106B right or left hand.

Spee-d Ball Bearing Hangers

The Spee-d Ball Bearing Hangers, while designed primarily to be used with the Bankers Approved Lock on sliding doors for bank cages, can also be used on any 1-in. wood or steel door using a 2x¼-in. flat track.

Fig. 3 shows front elevation and cross section.

Face plates have pyramidal hatched surface to match locks and are made in malleable iron or bronze. Malleable plates are painted prime coat flat black. Bronze plates are finished in natural bronze. Made in short size Nos. 110M and 110B, and in long size Nos. 111M and 111B. Gravity sliding doors require one of each size; manual sliding doors two No. 110.

Ball bearing sheave is made entirely of case hardened steel, with extra deep groove to hold the track, and contains 14 ¼-in. ground balls. All sheaves are machined and tested for alignment. Hub of sheave bolts tight against case by means of ⅜-in. machine bolt tapped through case.

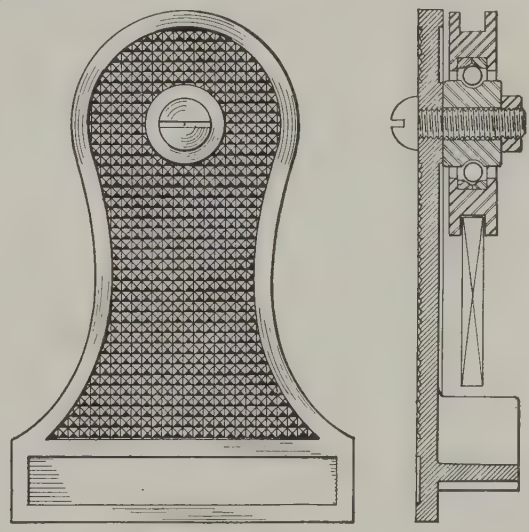


Fig. 3

Hangers are made to fit a 24-in. standard width door. If doors are wider than 24 in. or thicker than 1 in. state the width and thickness when ordering.

This is, as far as we know, the only hanger on the market made to harmonize with the lock.

Specifications for Locks and Hangers

Provide all sliding doors with Bankers Approved Lock No. 106B as manufactured by the WESTERN WIRE & IRON WORKS, INC., Chicago, Ill. Lock to be natural bronze finish and to be equipped with (name make of cylinder). Hinged door locks to match sliding door locks.

Provide Spee-d Ball Bearing Hangers Nos. 110B and 111B as manufactured by the WESTERN WIRE & IRON WORKS, INC., Chicago, Ill., with face plates to match locks. All doors to be gravity (or manual) sliding. Finish natural bronze. (For malleable iron specify Nos. 110M and 111M.)

Wire Mesh Bank Cages and Grilles and Wickets for Bank Cage Fronts

We are equipped to manufacture all types of bank cages in round, flat or square wire, and upon request will furnish new and up-to-date designs for wire mesh bank screens and dividing partitions for bank cages, either in double crimp or press crimp.

JOHN H. BUEKERS, JR.

Manufacturer and Contractor of Bulletproof Equipment

2117-21 Elmwood Avenue, DETROIT, MICH.

Products

"Platt" Bulletproof Equipment for banks, stores, offices.

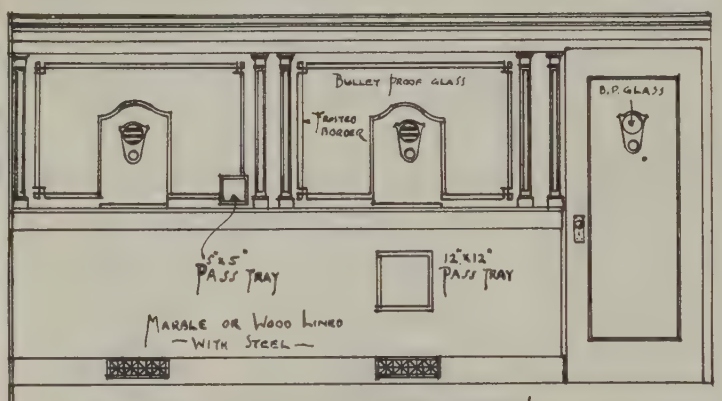
Also manufacturer of and contractor for Special Woodwork and Fine Cabinet Work, Bank Fixtures and Partitions, Ornamental and Hand Wrought Iron Work.

Bulletproof Equipment

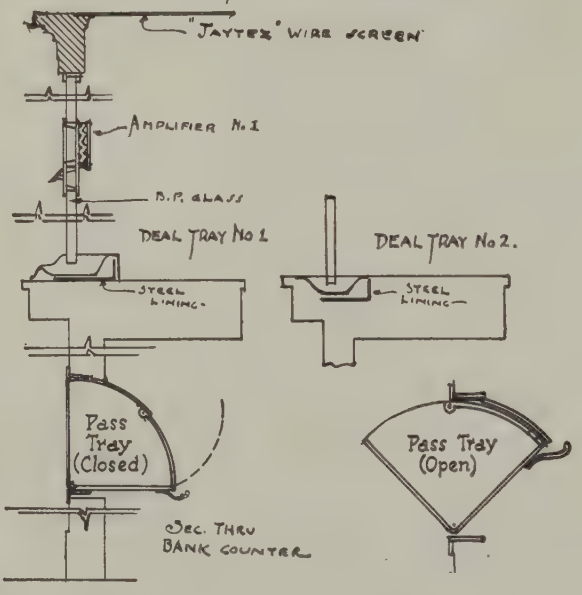
Consists of deal trays, pass trays, glass, speaking apertures, gun ports, steel wire screen. This equipment may be combined with any style of fixture, wood, marble or metal. Can be installed as individual units or we will contract for both the bulletproof equipment and the fixtures.

We will also estimate on remodeling fixtures now in use, making them bulletproof.

Note: Set of full size blue prints of our Bullet Proof Equipment sent to architects on request.



BULLET AND BANDIT PROOF BANK SCREEN



Section of Typical Installation

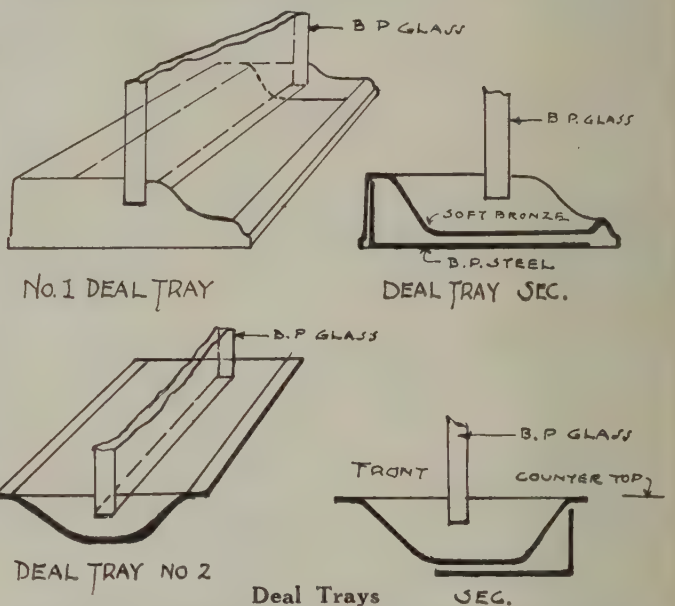
The above cross-section of a typical bulletproof installation shows how Bulletproof equipment provides the maximum protection against bandits. Neither by shooting through the woodwork, the glass, the grilles or by clambering up to shoot down through the roof of the cage can a bullet reach the occupant.

Roof of enclosure is covered with "Jay-tex" Wire Screen. Upper part of enclosure may also be partly of "Jay-Tex" screen and bulletproof glass, or all bulletproof glass (as illustrated). Bulletprooof glass can be furnished in any size required, in thicknesses of ⅞, 1⅛ and 1⅜ in.

Amplifier No. 1 (with gun port feature combined) or No. 2 (amplifier only) may be supplied. Also deal tray No. 1 or No. 2 (see description above at right).

Bottom front of enclosure can be faced with any material, marble, wood, etc., but wood enclosure is always lined with bulletproof steel.

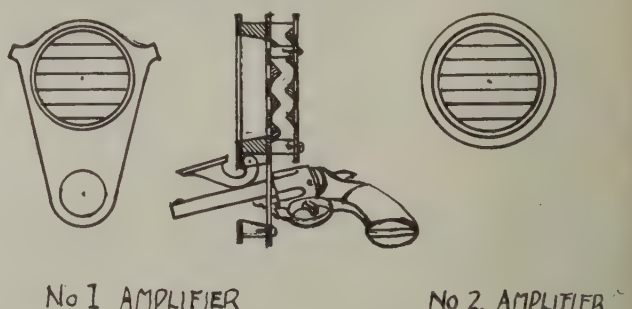
It is always desirable to specify bulletproof pass tray for receiving and disbursing bags of coin and small packages for every bank fixture fronting on the banking room.



Deal Trays

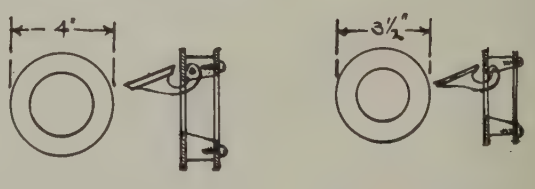
The deal trays shown above are practically the same construction but different design and it is only personal preference which dictates the selection. Trays are designed to permit interchange of funds between patron and bank employee with convenience. At the same time positive protection against hold-up is afforded the employees.

Trays are made of soft bronze and lined with bulletproof steel. Bullets fired into the tray cannot ricochet—they simply pierce the bronze and flatten against the steel lining.



No 1 AMPLIFIER

No 2 AMPLIFIER



No. 1 GUN PORT

No. 2 GUN PORT

Amplifiers and Gun Ports

Amplifiers—Made of bullet resisting Metal and arranged with louvres staggered to deflect a bullet so that it will drop harmless on the outside. Perfect audition is a feature of this amplifier.

Type No. 1 combines the features of amplifier and gun port. Type No. 2 is amplifier only.

Gun Ports—Can be opened only from inside. Permit occupant of cage to fire in all directions without risk to himself. Can be installed in the glass, in the wire or in the steel enclosure of the cage.

INDESTRUCTO GLASS CORPORATION

Manufacturers of Bulletproof and Scatterproof Glass

421 Seventh Avenue, NEW YORK, N. Y.

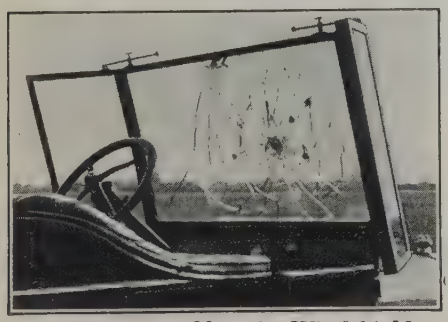
FACTORY: FARMINGDALE, LONG ISLAND, N. Y.

Indestructo Bullet Resistant Glass

Designed to provide great strength and resistance to penetration, especially of bullets from firearms. It is a clear vision, laminated product, made of alternate layers of plate glass and a flexible, transparent binding material, firmly united in one solid sheet under a patented process, which not only provides bullet resistance *but also insures against separation, discoloration or reduced transparency.*

The degree of resistance of laminated glass is in direct ratio to the strength of the bond uniting the glass with the transparent, flexible material. The Indestructo bond is accomplished without gelatins or other adhesives which frequently dry out or suffer natural chemical reaction causing loosening of the bond, total separation or objectionable yellow discoloration rendering the glass unfit for the uses primarily intended.

Revolver Resistant Glass—This standard material can not be penetrated by any revolver, regardless of caliber or ammunition. The windshield in the accompanying photograph withstood 11 shots from a .38 caliber long barrel police special revolver in a small area and a final shot from a .45 automatic in the center of the already weakened area. There was no penetration, no displacement of glass from the back and no dangerous mass action.



Indestructo Glass in Windshield
Twelve shots without penetration

Special Bulletproof Glass—Which will resist penetration from any weapon, may be produced by varying the combination of thicknesses and number of layers. Data on heavy side arm and shot gun resistant glass is given in table below. In most cases the standard revolver resistant material provides adequate protection at minimum cost.

Indestructo Scatterproof Glass

Developed primarily for protection against injury from flying glass in windows of buildings or vehicles. It is made in two grades.

Sizes

The binding material used is procurable in sheets 21x50 in. only so that this size should be considered in laying out a bank counter or other structure to be made banditproof. Larger lights can be procured by splicing the binding material which, however, results in a fine hair line being visible in the finished light at the point of splice. Splicing can be in one direction only for a given piece. Due to other conditions the maximum sizes obtainable by splicing are 34x50 in. or 21x56 in.

THICKNESS AND WEIGHTS OF INDESTRUCTO GLASS

Description	Thickness, in.	Tolerance, in.	Wt., lb. per sq. ft.		Number glass layers
			Net	Crated	
Bullet Resistant:					
Revolver	1	1/16	11	15 to 16	3
Heavy side arms	1 1/16 to 1 1/4	1/16	13	18	3
Shot gun	1 1/8 to 1 3/8	3/32	14 to 16	17 to 20	4
Scatterproof:					
Grade A	3/16 to 5/8	.....	3 to 6	4 to 8	2
Grade B	1/8 to 1/4	.....	2 to 4	3 to 6	2

Public National Bank, New York, N. Y.
Eugene Schoen, Architect
Bronze speak fixtures and sunken deal trays

Installation and Fixtures

Indestructo bullet resistant glass requires no special methods of setting or framework, other than that the frame should be large and strong enough to receive and carry the heavier and thicker glass. Aside from this, standard practices in setting glass apply.

There are various types of fixtures for passing of money and for communication between teller and customer, any of which are well adapted for use with this glass. One type has bronze speak fixtures and sunken deal trays while another has sunken deal tray with an offset wicket giving a space of 1 in. around the glass for passage of the voice thus eliminating the use of speak fixtures.

Indestructo glass can not be cut to size after manufacture, so it is necessary that exact sizes be furnished with orders if shapes are rectangular or circular. If irregular shapes are required templates or patterns should be furnished. This glass can be drilled, ground, polished and otherwise worked the same as ordinary glass, but this work must be done by the manufacturer. It also can be etched, chipped or sandblasted to produce ornamental surface patterns.

Peninsular State Bank, Detroit, Mich.
V. Pottle, Architect
Offset wicket with 1-in. space on sides for voice passage and sunken deal trays

Guarantee

Indestructo glass is furnished under a guarantee against deterioration unfitting it for use due to faulty manufacture.

Partial List of Users

Banks

American State Bank, Detroit, Mich.
Bank of Commerce, Fordson, Mich.
Commonwealth Federal Savings Bank, Detroit, Mich.
Commercial State Savings Bank, Detroit, Mich.
Hancock Bank, Hancock, Md.
Lincoln Park State Bank, Lincoln Park, Mich.
National Building & Loan Association, Detroit, Mich.
Northport Trust Co., Northport, N. Y.
Northwestern State Bank, Detroit, Mich.
Public National Bank of New York, New York, N. Y.
Wayne County & Home Savings Bank, Detroit, Mich.
Yonkers Savings Bank, Yonkers, N. Y.

Commercial Users

Brooklyn Edison Co., Brooklyn, N. Y.
Connecticut General Life Insurance Co., Hartford, Conn.
Equitable Life Assurance Society of United States, New York, N. Y.
Earl Carroll Theater, New York, N. Y.
Ford Motor Co., Detroit, Mich.
J. M. Horton Ice Cream Co., New York, N. Y.
Hornblower & Weeks, New York, N. Y.
Hudson Department Store, Detroit, Mich.
New York Times, New York, N. Y.
Standard Oil Co. of New Jersey, Tampico, Mexico
Sun Life Assurance Co., Ltd., Montreal, Can.
Wayne County Treasurer's Office, Detroit, Mich.

BULLET-PROOF GLASS

MANUFACTURED BY
SAFETEE GLASS COMPANY
Broad Street and Poplar
PHILADELPHIA, PA.

Product

SAFETEE BULLET-PROOF GLASS for Bank Enclosures and other places subject to the sudden attacks of robbers.

Safetee Glass
WON'T SHATTER OR FLY
TRADE-MARK

Holdup Men Get $28,000

A familiar enough headline and one that statistics show will be repeated with variations, within the next and succeeding hours.

To prevent this enormous loss of property, new and more efficient methods of protection are necessary—methods that will eliminate the factor chiefly responsible for the success of most holdups—intimidation.

This requires that the employee be placed beyond reach of the bandit's bullet. Safetee Bullet-proof Glass does just this, while at the same time it interferes in no way with the employee's ordinary duties.

Four Shots Shown on Glass
Test Pistols of the Highest Calibre Have Proved Ineffective in Penetrating Safetee Glass

Illustration is from a photograph, unretouched, showing the effect of test guns with high calibre bullets fired at close range. None of them went through the glass

Advantages of Safetee Bullet-proof Glass

When used in bank partitions, tellers' windows, etc., separating the public space from the working space, Safetee Bullet-proof Glass provides absolute protection to moneys, securities, etc., and to personnel, in the event of an attempted holdup.

Safetee Bullet-proof Glass will stop a .45 calibre metal jacketed pistol bullet fired at close range from an automatic pistol. This has been well proven in numerous tests.

A sample of this glass, size 12x20 in. stopped three of these bullets at 3 ft. distance. This sample is still intact notwithstanding the fact that test was made five years ago. The integrity of Safetee Glass is not impaired when cracked.

Bandits depend largely upon intimidation to help them in making a "haul." When an employee stands behind Safetee Bullet-proof Glass he is out of harm's way and therefore can not be intimidated. If he can not be intimidated, the holdup can not be successful.

Banks and cars protected by Safetee Bullet-proof Glass are left alone by bandits—they pick easier prey.

For all practical purposes Safetee Glass is as fully transparent as the best quality polished plate glass. It is not wire inserted.

And no less important than the practical advantages above listed is the fact that Safetee Glass does not detract in the slightest from the artistic effect demanded in bank fixtures.

Construction Features

Safetee Bullet-proof Glass is made up of 5 layers of material, consisting of 3 pieces of polished plate glass and 2 binding layers, the whole welded together under high temperature and tremendous pressure.

The resulting product is a perfectly solid sheet of glass possessing great strength and resiliency.

When struck a sharp, heavy blow the cushioning effect, resulting from the laminated construction, prevents the glass from shattering and the missile from penetrating.

As shown in tests and in actual use strong impacts cause a multiple of hairlike cracks, but no breaks or splinters.

Sizes

Safetee Bullet-proof Glass can be furnished in sizes up to 34x58 in. The thickness is 1 in. Allowance should be made for a variation of $\frac{1}{16}$ in. plus or minus in thickness.

Service

We will be glad to co-operate with the architect in furnishing suggestive designs for any desired installation, together with detailed drawings and estimates.

Partial List of Users of Safetee Bullet-proof Glass

Detroit Savings Bank, Detroit, Mich., (27 Branches)
Windsor Savings Bank, Windsor, Vt.
Franklin Trust Co., Philadelphia, Pa.
Farmers National Bank of Freeport, Freeport, Pa.
State Bank of Salem, Salem, Ind.
New York Life Insurance & Trust Co., New York, N. Y.
Federal Reserve Bank, New York, N. Y.
Peoples National Bank, Adena, Ohio
East Cambridge Trust Co., East Cambridge, Mass.
Bushwick Savings Bank, Brooklyn, N. Y.
First National Bank, Bakertown, Pa.
Haddon Heights National Bank, Haddon Heights, N. J.
Standard Oil Co. of New York, New York, N. Y.
State Bank of Flat Rock, Flat Rock, Mich.
First National Bank, Lockport, Ill.
Farmers & Merchants Bank, Fenton, Mo.
Hanna City State Bank, Hanna City, Ill.
State Bank of Niantic, Niantic, Ill.
State Bank of New Athens, New Athens, Ill.
Cazenovia National Bank, Cazenovia, N. Y.
Cassandra Deposit Bank, Cassandra, Pa.
Farmers State Bank, Darien, Wis.
Swift & Co., Chicago, Ill.
Lincoln National Bank, Hamlin, W. Va.
State Bank of Rockwood, Rockwood, Mich.
First National Bank, West Allis, Wis.
Florida National Bank, Florida, N. Y.
Caldwell State Bank, Cathan, Ill.
Bank of Detroit, Detroit, Mich.
John Hancock Life Insurance Co., Boston, Mass.
National Shawmut Bank of Boston, Boston, Mass. (3 Branches)
Peninsular State Bank, Detroit, Mich.
American State Bank, Detroit, Mich.
Fletcher Savings and Trust Co., Indianapolis, Ind. (8 Branches)
Murphy-Wall State Bank & Trust Co., Pinckneyville, Ill.
Norristown-Penn Trust Co., Norristown, Pa.
Trenton State Bank, Trenton, Mich.
Lyons State Bank, Lyons, Ill.

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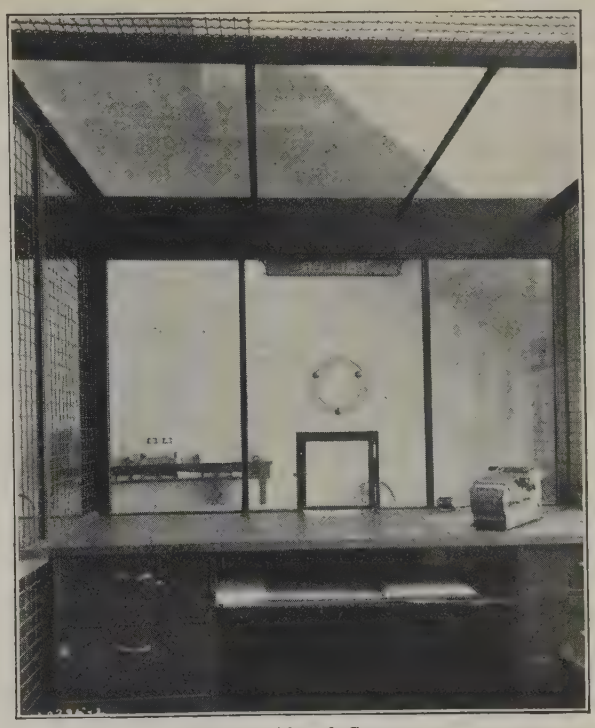
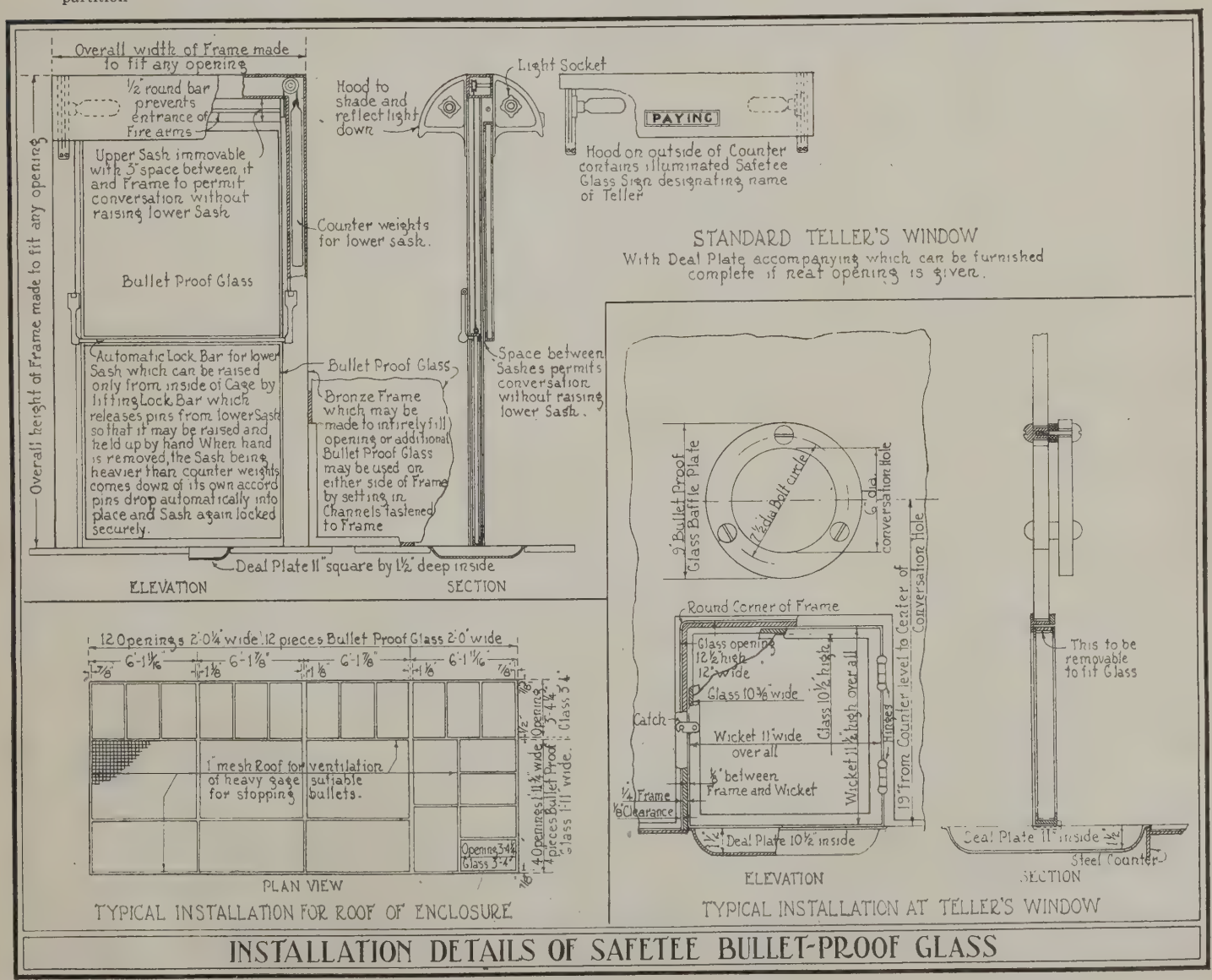
Outside of Cage



Inside of Cage

Safetee Bullet-proof Glass Installation in the Kenmore-Governor Square Branch, National Shawmut Bank, Boston, Mass.

The views above show Safetee Bullet-proof Glass installed in the front and roof of the teller's cage, including conversation hole with baffle plate attached, hinged door for passing large packages, sunken deal plate and roof protection extending 40 in. back from line of partition



INSTALLATION DETAILS OF SAFETEE BULLET-PROOF GLASS